

ARMED SERVICES BOARD OF CONTRACT APPEALS

Appeals of --)
)
Grumman Aerospace Corporation) ASBCA Nos. 46834, 48006,
) 51526
Under Contract No. F04606-86-C-0122)

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OPINION BY ADMINISTRATIVE JUDGE DELMAN

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OPINION BY ADMINISTRATIVE JUDGE DELMAN

Under ASBCA Nos. 48006 and 51526, Grumman Aerospace Corporation (GAC or appellant) seeks roughly \$65 million for additional costs allegedly incurred to modernize the avionics of the F-111A/E and EF-111A aircraft under a contract with the Department of Air Force, Sacramento Air Logistics Center (AF, SM-ALC or Government). Under ASBCA No. 46834 the AF seeks roughly \$6 million for appellant's alleged failure to comply with the terms of the contract. We have jurisdiction under the Contract Disputes Act, 41 U.S.C. §§ 601 *et seq.*

A hearing was held covering 77 trial days over a one year period. The documentary record is unusually large, with thousands of Rule 4 documents and many trial exhibits.¹ Pursuant to Board order, this opinion shall only decide entitlement on appellant's claims under ASBCA Nos. 48006 and 51526.

FINDINGS OF FACT²

(1) FINDINGS OF FACT – FB-111A Operational Flight Program (OFP) Data

Introduction

1. In the early 1980s, the AF sought to modernize the avionics for the F-111 fleet (avionics modernization program or AMP). Included in this effort was the modernization of the FB-111A, the F-111A, the F-111E and the EF-111A aircraft. General Dynamics Corporation (GDC) was the original manufacturer of the F-111. In 1983, the AF decided to award a contract to GDC on a sole source basis to modernize the FB-111A, known as the “FB-111A AMP” and to compete the AMP for the F-111A/E and EF-111A models (GAC R4, tab 2910). The AF determined that “[t]he competition will be conducted concurrent with the ongoing integration effort for the FB-111 aircraft rather than in tandem . . .” (GAC R4, tab 2909). An internal AF strategy briefing in early 1984 contemplated use of FB-111A AMP data from that contract for the concurrent F-111A/E and EF-111A program “to the maximum extent possible” but also indicated that “[s]ince the [FB] data would not be available at contract award, the contractor will not be contractually obligated for its incorporation” (GAC R4, tab 2916 at 36402).

2. The FB-111A AMP (“FB”) contract was awarded to GDC on a sole source basis in early 1984. On 1 June 1984 the AF announced the F-111A/E and EF-111A procurement in the COMMERCE BUSINESS DAILY (CBD). Insofar as pertinent, the CBD notice advised prospective offerors as follows (GAC R4, tab 3176):

Government will provide a library of available data. Additionally, required data for interface shall be the responsibility of the contractor via associate and subcontractor agreements. Previous performance of this task was by General Dynamics Fort Worth Division for the FB-111A aircraft. Data from that acquisition will not be available at time of proposal preparation or award. [Emphasis added]

3. GAC manifested an interest in the program. By letter to GAC dated 20 July 1984, the contracting officer provided GAC with, *inter alia*, a draft Statement of Work (SOW) and a list of deliverables for review and comment. Insofar as pertinent, the preliminary SOW provided as follows (GAC R4, tab 3487 at 38196):

1.6.1 MISSION COMPUTER SOFTWARE

1.6.1.1 Develop the MC [Mission Computer] OFP [Operation Flight Program]. This OFP shall be adapted from the existing FB-111A MC software with an emphasis on maintaining

commonality of function, design, code and operation where feasible. (WBS 1610)

4. The AF conducted an orientation briefing on 2 August 1984. Mr. Herman Schenck, GAC's engineering manager, attended. There was a general discussion of the relationship between the ongoing FB-111A contract and this procurement and the commonality of some of their systems. The participants were briefed that the meeting was an introduction and an overview of the procurement, and not technical in nature. The AF contracting officer, Ms. Janet Buwalda, advised: "We are in the early stages of the A/E and EF integration and many things are subject to change. Therefore, the information provided to you today is applicable today and may not be correct tomorrow. You utilize any information provided today at your own risk." (GAC R4, tab 3183 at 1925)

5. Mr. Schenck came away from the briefing with an awareness that the subject procurement was to be concurrent with the performance of the FB contract, that it was to be a stand-alone development program, and that the AF would not make available to the offerors any FB data beyond what was contained in the AMP data library (tr. 25/130-31).

6. Before the RFP was issued, appellant sought to familiarize itself with the AF avionics modernization program and the concurrent FB contract being performed by GDC. By memorandum dated 22 August 1984, appellant's engineering manager advised GAC project engineers and project leaders of the creation of GAC's own library for use on the AMP. This memorandum acknowledged the constraints imposed by the AF on the availability of certain documentation, but stated that each GAC engineer "was encouraged to attempt to obtain these items through their personal/professional contacts as best they could" (AF R4 supp., tab 2701 at Matthews ex. 3). As a result of such efforts, GAC obtained a considerable amount of GDC program documentation prior to issuance of the RFP.

7. Mr. Ralph Siegel, appellant's proposal manager, was tasked by his superiors to attend dinner meetings to meet Mr. Vic Feast, a senior AF AMP official, who was later hired by appellant. These meetings took place at the home of Mr. Dick Vatalaro, who was also subsequently hired by GAC. At the first dinner meeting, Mr. Siegel sought assurance from Mr. Feast that GAC would be treated fairly in the upcoming competition. Mr. Feast so advised. At a second dinner meeting, Mr. Siegel was tasked to discover the status of the FB contract and whether it was on schedule. He was advised generally that the FB contract was having problems and that the AF was seeking to rectify them. (Tr. 45/145-83)

8. There arose some ambiguity on the record as to when these dinner meetings occurred. At first, it appeared as if Mr. Siegel was of the mind that the second dinner meeting was held after the issuance of the RFP and the AF kickoff meeting (*id.*). After a break in the trial proceedings he stated that both dinner meetings took place prior to this

time because it would have been illegal to discuss such matters after RFP issuance (tr. 45/167-70).

9. The RFP was issued on 31 January 1985. A kickoff meeting was held at that time, attended by Mr. Siegel. According to Mr. Siegel's testimony, the AF made a number of representations regarding the nature and scope of the software development effort at this meeting. Mr. Siegel relied in large measure upon his internal trip report of the meeting for purposes of this testimony. However, this trip report did not record any specific representations made by any authorized AF representatives (tr. 45/146). At the hearing it also became evident that Mr. Siegel did not have a good recollection of AMP program events and the contract terms (tr. 46/5-6). We give Mr. Siegel's testimony little weight with respect to his interpretation of the RFP and the resulting contract.

10. Under the RFP, the Government identified the data to be provided for the preparation of proposals. In pertinent part, Clause L-637 stated as follows (GAC R4, tab 2926):³

L-637 COMPETITION DATA LIBRARY

a. Data – An Avionics Modernization Program Competition Data Library has been established [sic] and is being maintained at SM-ALC. This library contains limited F1-111 [sic] engineering and technical data, and will be maintained from RFP Release until contract award. The Competition Data Library (also referred to as "Data Library") will be provided to the successful offeror at contract award

b. This library contains the following categories of data:

- (1) ***FB-111A AMP data*** [emphasis added]
- (2) F-111A/E and EF-111A engineering drawing
- (3) F-111A/E and EF-111A Aircraft Technical Orders
- (4) F-111A/E and EF-111A System (Commodity) Technical Orders
- (5) F-111A/E and EF-111A TCTOS
- (6) AMP Group B drawings and specifications
- (7) Computer program (software) specifications
- (8) Aircraft configuration status records
- (9) Other engineering/technical data required to define the aircraft or its system.

c. This library will be complete, to the best of the Air Force's ability, at RFP Release. All data that is in the library will be

available to all competing Contractors on an equal time, reservation basis. *Data which is not available through the Data Library will not be provided by the Government to any Contractor.* Any data added to the library after RFP release will be entered into a log including a description of the data, identification number and the date received. Every two weeks a copy of the log describing the new data will be provided to each of the bidders. New data will be considered additive; older revisions will be maintained throughout the period of operation of the library. [Emphasis added]

The data library was established to provide any and all information that might be useful to the offerors, including information related to the pending FB contract. The FB data made available included the product specifications for the MC OFP, the system segment specifications for the FB contract, GDC program performance schedules as well as the various specifications for the system function processor OFP and software test stations (tr. 6/106-28).

11. The RFP advised that the data in the library were not warranted. Clause H-1051 provided in pertinent part as follows (GAC R4, tab 2926):

H-1051 GOVERNMENT PROVIDED DATA – WARRANTY

a. The Government in no way warrants the data contained in the AMP Data Library. The Government will not reimburse the Contractor for any cost incurred as a result of using data provided in the data library or allow a schedule slippage due to defects in the data provided.

12. Appellant was fully aware of the import of this clause prior to the preparation of its proposal. By internal GAC memorandum dated 6 February 1985, Mr. Ray Tiedemann, appellant's pricing specialist for the proposal, advised members of the proposal team as follows (AF R4 supp., tab 2635):

Section H-1051 – The information obtained from the Data Library is not warranted due to the fact that the FB-111A design is not frozen. *This data is to be used at the bidders own risk.* [Emphasis added]

13. GAC's proposal was dated 31 May 1985 and was received by the AF on or about 4 June 1985. The only other offeror was GDC. On 4 June, Mr. Schenck made an oral presentation of the GAC software proposal to the Government. We find pertinent the following excerpt of his presentation (GAC R4, tab 3210 at 36306):

We have analyzed the FB-111A software – both the B-5 spec that you provided to us, [as] well as the C-5. So we had the set of the requirements from the FB[-111A] and we had the detailed design. We then extracted from your Statement of Work and your System Segment Spec those things that you mandated that we should do for the F-111A/E and the EF. And, in doing that, it was a matter of then determining how much of that software is reusable, how much is modifiable, and what is unique. [Emphasis added]

We find that appellant’s reference to the data “you provided to us” includes the FB data from the AMP data library.

14. Notwithstanding that the RFP limited the availability of data to that contained in the AMP data library, appellant’s technical proposal generally indicated a planned approach which relied heavily upon the reusability of FB OFP code and data (GAC R4, tab 3348 at GAC 24330-34, 24340-45, 24359-60). Appellant’s technical proposal was not made part of the contract.

15. Under RFP Clause L-641, each offeror was directed to provide as part of its offer “a list of required Government Furnished Property (GFP) and related Need Dates applicable to their offer.” (GAC R4, tab 2926) Appellant provided such a list as part of its proposal but did not include any MC OFP software from the FB-111A. (R4, tab 35, Vol. 23 at i-2 to i-26, j-5)

16. After receipt of appellant’s proposal, the AF issued Contractor Inquiry No. 7-10-10, which provided as follows (R4, tab 39 at 1):

Para 5230.2 of the SOW refers to data for GFP to be used during development. Any such data required by the offeror must be identified as part of their proposal. Request you provide a list of any data to be provided by the Government which is in addition to that contained in the AMP Competition Data Library and the dates the data is required by.

Appellant replied by seeking, *inter alia*, paper copies of FB-111A source code within 90 days of award. The AF replied as follows (R4, tab 39 at 4):

The Government is reviewing that list. If the data is available, it will be provided.

NOTE: Regardless of the availability of the data, the requirement of the RFP, SOW and SSS will not be affected.

By this reply we find the AF made clear the following, insofar as pertinent here: (1) that the AF had no contract obligation to provide the FB source code to appellant, and (2) that appellant was contractually obligated to timely perform under the contract if the AF was unable to provide the FB source code. It does not appear that appellant questioned or took issue with this reply. Appellant submitted its best and final offer on or about 18 October 1985.

17. At an internal GAC program meeting on 9 December 1985, appellant's personnel discussed the prospect of a delayed contract award, questioning whether "G.D. [General Dynamic Corp.] problems" was affecting the award (ex. G-3 at 32). In fact, GDC's preliminary qualification testing under its FB-111A contract was postponed at or around this time, and the AF issued GDC a cure notice in December 1985. The AF did not inform appellant of these contract events.

18. The AF awarded the subject contract to appellant effective 21 January 1986. The contract included a SOW for the F-111A/E aircraft and the EF-111A aircraft, as modified by a SOW which added a Global Positioning System (GPS) in each model aircraft, and also included a System Segment Specification (SSS) for the aircraft, as modified by a GPS SSS.⁴ Briefly stated, appellant was to, *inter alia*, design, manufacture and furnish kits that would contain all the equipment, wiring and documentation necessary to install the updated avionics in accordance with contract requirements. A number of standard FAR clauses were also a part of the contract, including FAR 52.243-1 CHANGES-FIXED PRICE (APR 1984) and FAR 52.243-7 NOTIFICATION OF CHANGES (APR 1984). Insofar as pertinent, this latter clause generally required that a contractor notify the contracting officer in writing within 45 calendar days from the date of any Government conduct deemed to constitute a change to the contract, and provided that an equitable adjustment shall not include costs or time extensions resulting from the contractor's failure to provide timely notice (R4, tab 1 at 70).

The Grumman – TRW Relationship

19. In 1986 GAC and TRW reached an understanding as to TRW's performance of certain tasks under this contract. Insofar as pertinent, TRW agreed to design and test software modifications for the software test stations (STS). The STS were Government-furnished equipment and were to be provided by the AF from the FB-111A contract. The purpose of the software modification of the STS was to enable the test stations to test software under this contract as well as under the FB-111A contract. TRW also agreed to design and test the operational flight program for the system function processor (SFP OFP) for the programmable display generator for the multifunction display

set (MFDS) of the aircraft. It also agreed to make presentations to the AF at regularly scheduled design reviews with respect to its scope of work.

20. The specific terms and conditions of the GAC – TRW agreement are not of record. Appellant did not provide any signed agreement or subcontract at the hearing.

The Development of the Operational Flight Programs

21. As part of the contract work, appellant was tasked to develop and test the operational flight program for the mission computer (MC OFP) for the F-111A/E in accordance with the SOW and the SSS. SOW § 1610.1 stated in pertinent part as follows (R4, tab 1 at 462):

. . . The OFP shall be adapted from the existing FB-111A MC software with an emphasis on maintaining commonality of function, design, code and operation where feasible.

Similar contract language was used at SOW § 1620.1 to describe appellant’s contract obligation to develop the MFDS SFP OFP to be adapted from the existing FB-111A MFDS software “with emphasis on maintaining commonality of function, design, code and operation where feasible.” (*Id.*) Similar language was also used at SOW § 1630.1 regarding appellant’s development of the OFPs for the integrated communications – navigation – identification set (ICNIS) software (*Id.*)

22. With respect to the EF-111A aircraft, appellant was also to develop MC software, MFDS software and ICNIS software, and was to adapt them from the new F-111A/E software “with an emphasis on maintaining commonality of function, design, code and operation where feasible.” SOW §§ 1610.1, 1620.1, 1630.1 (R4, tab 1 at 350-51)

23. Commonality – where feasible – was sought in order to provide benefits to the overall management and operation of the fleet. OFP commonality was a source selection assessment criterion for evaluating proposals for award, and appellant’s winning proposal reflected its understanding of commonality issues. (Tr. 2/26-27)

24. The AF conducted a post-award conference in early February 1986. The AF distributed an agenda. We find pertinent an AF handout entitled “Government Points of Emphasis and Questions,” which states in pertinent part as follows (GAC R4, tab 120):

1. Data. The Government intends to be as helpful as possible in ensuring that adequate data is available. However, the RFP clearly stated that the data to be provided by the Government was limited to the contents of the Competition Library.

Additional data must be obtained via the appropriate sub or associate contractor. . . .

The AF also prepared minutes of this post-award conference. The minutes of the technical meeting state, *inter alia*, that the AF would endeavor to provide appellant with FB OFP software. We find this statement to be consistent with the AF's stated intention above to be "as helpful as possible" in providing available information, and was not a statement of contract obligation or warranty.

25. Mr. Robert Tuttle was the AF lead project engineer who worked for the AF and also later for Grumman during this contract. With respect to the availability of FB data, he testified as follows (tr. 6/133):

. . . We [the AF] knew that the FB program and the A&E program had some overlap, and we did not want the A&E program to be dependent on the FB data anywhere that it was possibly avoidable, and one of those areas had to do with – particularly with the OFPs.

So that I operated my entire time working with the Government under the impression, under the understanding that Grumman would have to conduct the A&E program with whatever FB data that they could be provided, but that the Government was not obligated to provide that.

26. At the system design review (SDR) of 3-7 March 1986, appellant presented a briefing to the AF on its progress. Appellant indicated that OFP risks to the contract schedule included on-time delivery of baseline OFPs and the usability of FB common software from the GDC contract. Appellant requested AF assistance to obtain the latest versions of FB-111A AMP software documentation from GDC.

27. By letter to appellant dated 19 March 1986 the AF provided, *inter alia*, recent magnetic tape copies of MC OFP source code and a B-5 specification in response to appellant's requests. The contracting officer cautioned appellant that the AF did not warrant this data (R4, tab 59):

The above data is being provided to Grumman as a supplement to the information required to accomplish contract tasks. It is Grumman's responsibility to evaluate this data and determine its applicability. The Government is not responsible for the accuracy of this data and under no circumstances should the data be interpreted as direction for the technical design. In particular, the software being provided is suitable for

familiarization purposes only; it contains numerous known errors. As soon as updated versions are available, they will be provided. It should be remembered that the source code baseline for the F-111A/E AMP consists of those OFPs that are in effect at the conclusion of FB-111A flight testing[.]

28. Appellant understood the last sentence of this letter as requiring appellant to use the later-developed FB software to code the F-111A/E MC OFP and that the AF was contractually obligated to provide the data. GAC's computer program development plan (CPDP), dated 24 April 1986, which was submitted to the AF for approval, suggested that the AF was contractually obligated to provide FB data and was required to so by a date certain (GAC R4, tab 3371 at 34822):

3.2 Baseline FB-111 AMP Documentation

....

... Grumman is depending on the Air Force's continued efforts to provide the latest available documentation to minimize the impact of the potentially changing baselines until scheduled completion of the FB-111 AMP development program. This baseline data, final B-5s, C-5s and program listings is required no later than June 1986.

29. By letter to appellant dated 9 June 1986, the AF contracting officer disapproved appellant's CPDP, and specifically took exception to appellant's expectations regarding the OFP data from the ongoing FB contract. Insofar as pertinent, the contracting officer stated as follows (R4, tab 74):

3. On pages 13 (paragraph 3.1) and 16 (paragraph 3.2) of the CPDP, you raised some issues that we are especially concerned about. You imply that your ability to meet the F-11A/E [sic] Avionics Modernization Program (AMP) schedule is dependent on certain FB-111A AMP data. With respect to the Software Test Station (STS), this is true. . . .

4. The Operational Flight Program documentation is a different case. We have stated, consistently, that we will provide this documentation promptly and we have done so to date. *However, there is no contractual obligation on our part to provide this data by certain dates, nor can we give you any assurances as to the accuracy of the data. Our inability to provide these documents may reduce your ability*

to maximize commonality with FB-111A software, but it is not justification for failure to meet the F-111A/E schedule.
[Emphasis added]

30. The AF continued to provide FB OFP data to appellant from the ongoing GDC contract. The record also shows other areas where the AF assisted appellant over and above contract requirements, including furnishing appellant a Harris computer for TRW's use in 1986 without charge (R4, tab 67).

31. Appellant contends that the AF was contractually obligated to provide FB OFP data as Government furnished property, that the data were not provided in a timely manner, and were incomplete and of limited usefulness which caused unanticipated cost and program delay. On 10 June 1991 appellant submitted a request for equitable adjustment (REA), updated on 7 May 1993 (R4, tabs 936, 979), seeking recovery of these costs. The contracting officer denied the REA by letter dated 26 August 1993, stating, among other things, that the AF had no contract obligation to provide appellant with FB OFP data beyond that contained in the AMP data library (R4, tab 985). Appellant reasserted its contentions by certified claim dated 30 March 1994, received by the contracting officer on that date (R4, tab 991). The contracting officer denied the claim by decision dated 30 September 1994, for essentially the same reasons set forth in his 26 August 1993 letter (R4, tab 999).

32. The MC OFPs of the FB-111A and F-111A/E aircraft were not identical. For example, the A/E models contained certain weapon delivery modes, such as low toss and dive bomb, that were not contained on the FB aircraft. The A/E contained a GPS navigational mode that was not contained on the FB aircraft (tr. 56/77-78). The FB also contained a mission data loader for the mission computer; the A/E models did not. Appellant could not rely on FB OFP data to successfully and fully perform this contract.

33. It was not necessary for GAC to have FB data or code to do its OFPs under this contract. Mr. Tuttle testified, and we find as follows (tr. 8/51):

Q Now, could Grumman, in fact, write code for the F-111A/E prior to receiving any FB-111A source code?

A Yes, it certainly would be entirely possible to take the system spec. [sic] and the contract, go through the normal sequence of the development process, and generate an A&E OFP that's fully compliant with the system spec. [sic] without having any FB data or FB code.

DECISION

I. The AF Defense of Lack of Timely Notice of Claim

The contract incorporated FAR 52.243-1 CHANGES-FIXED PRICE (APR 1984) and FAR 52.243-7 NOTIFICATION OF CHANGES (APR 1984). This latter clause makes express the implied obligation of a contractor under the Changes clause to timely notify the contracting officer of any Government conduct which has the effect of changing the contract's terms, which is commonly known as a "constructive" change. Throughout these proceedings, the AF has contended that appellant's failure to provide the contracting officer with timely written notice of its claims under this clause is sufficient reason to deny these claims.⁵ Because this issue cuts across many of appellant's claims, we deem it appropriate to review the law on this matter at this time.

We believe it legally sound to treat the Notification of Changes written notice requirement no differently than other written notice requirements under similar equitable adjustment-type clauses in Government contracts, such as the Changes clause, Differing Site Conditions clause, and Suspension of Work clauses. Under these clauses, we have held, following *Hoel-Steffen Construction Company v. United States*, 456 F.2d 760 (Ct. Cl. 1972), that written notice requirements should not be construed hypertechnically to deny legitimate contractor claims when the Government was otherwise aware of the operative facts. See *Central Mechanical Construction*, ASBCA Nos. 29431, *et al.*, 85-2 BCA ¶ 18,061 and cases cited.

In *A.R. Mack Construction Co., Inc.*, ASBCA No. 50035, 01-2 BCA ¶ 31,593 at 156,139-40 we recently summarized the state of the law on written notice requirements as follows:

The Government can be placed upon notice of a claim by being made "aware of the operative facts" thereof. *E.g.*, *Hoel-Steffen Constr. Co. v. United States* [17 CCF ¶ 81,203], 456 F.2d 760, 768 (Ct. Cl. 1972); *C.M. Lowther, Jr.*, ASBCA No. 38407, 91-3 BCA ¶ 24,296 at 121,405. Where responsible Government officials are aware or should be aware of the facts giving rise to a claim, strict compliance with a contract's written notice requirements is not required. *E.g.*, *Central Mechanical Constr.*, ASBCA Nos. 29431, *et al.*, 85-2 BCA ¶ 18,061 at 90,657; *Davis Decorating Service*, ASBCA No. 17342, 73-2 BCA ¶ 10,107 at 47,475. Oral notice, as given by Mack here, may be furnished to responsible Government representatives. See *Central Mechanical Constr.*, ASBCA Nos. 29431, *et al.*, 85-2 BCA ¶ 18,061 at 90,659;

M.M. Sundt Constr. Co., ASBCA No. 17475, 74-1 BCA ¶ 10,627.

The burden is on the Government to establish that it was prejudiced by the absence of the required notice. This burden cannot be satisfied simply by allegation, but must be supported by evidence in the record. *M.M. Sundt Constr. Co.*, ASBCA No. 17475, 74-1 BCA ¶ 10,627 at 50,425. When the Government has knowledge of the underlying facts giving rise to a claim, it is unlikely it will be prejudiced in its investigation and defense thereof. *Id.*

In *Kumin Associates, Inc.*, LBCA No. 94-BCA-3, 98-2 BCA ¶ 30,007, the Government argued that the contractor was not entitled to an equitable adjustment for a constructive change because it did not provide written notice of the constructive change to the contracting officer in accordance with the Notification of Changes clause. The Board rejected this argument, stating that contractor personnel orally notified the Government's project manager, an authorized consultant of the contracting officer, of the out-of-scope work which was sufficient under the circumstances. The Board reaffirmed that written notice requirements are construed liberally where the contracting officer has actual or imputed knowledge of the pertinent facts, or where the lack of notice was not prejudicial. The Board also noted that the contracting officer decided the constructive change claim on the merits, and therefore waived the written notice requirement (page 148,437 at n. 7). *Accord, Dittmore-Freimuth Corp. v. United States*, 390 F.2d 664 (Ct. Cl. 1968); *Selma Apparel Corporation*, ASBCA No. 30011, 88-3 BCA ¶ 20,928 at 105,771; *Central Mechanical Construction*, *supra*.

We believe the *Kumin* rationale as it applies to the Notification of Changes clause is consistent with our cases and is persuasive. We shall be guided by the aforementioned legal principles in reviewing appellant's constructive change claims.⁶

II. The AF Had No Contract Duty to Provide Appellant With FB OFP Data Beyond That Contained in the AMP Data Library

Appellant contends that SOW § 1610.1 supports its interpretation that the Government was obligated to provide FB MC OFP data from the GDC contract over and beyond the data provided in the AMP data library. For reasons stated below, we believe that appellant's interpretation is unreasonable.

Insofar as pertinent to this claim, the RFP required appellant to develop, integrate and test the OFPs for the MC and system function processor in the F-111A/E and EF-111A aircraft. According to the SOW, this work was to be adapted from FB-111A software. However, appellant was aware pre-award that this FB software was being developed

concurrently by GDC. Appellant also was aware, or should have been aware from its review of the FB-111A program schedule in the data library and from its own experience that such newly developed software had to undergo extensive laboratory and flight testing to detect and correct errors.

The SOW did not require adaptation from “flight-tested” FB software or from FB software that had been approved or accepted by the AF, nor did the contract require adaptation from software to be developed in the future. Rather, it required that appellant perform its adaptation from **existing** software. Under the contract the AF provided appellant with existing FB software and data. Appellant relied upon this information to prepare its technical software proposal. This information was located in the AMP data library, which was made available to all offerors prior to award and to the successful contractor after award. RFP Clause L-637(c), incorporated in the contract, clearly stated that the AF would not provide any data not available through the data library (finding 10).

The weight of the evidence strongly suggests that appellant was fully aware, pre-bid and pre-award, that the existing software referenced in the SOW related to the software existing in the AMP data library. The best evidence of this is appellant’s oral presentation of its proposal to the AF, wherein it makes pointed reference to its reliance on the FB-111A software and specifications which had been provided by the AF (finding 13).

Appellant has not persuaded us that under SOW § 1610.1, the “existing software” from which it was to adapt its MC OFP went beyond the existing data in the AMP data library. Nor has appellant persuaded us that the parties had any pre-award understanding which was somehow at variance with the terms of the SOW. Indeed, as part of its proposal, appellant appended a list of what it expected to receive as GFP. FB MC OFP software was not listed. In response to a Government query pre-award, appellant did ask the AF to provide FB OFP source code within 90 days of award, and the AF responded that it would be provided from the ongoing contract “if available” but in any event appellant was required to perform (finding 16).

In support of its position, appellant offers a number of instances in which the contracting officer acted upon appellant’s requests for FB OFP software as proof that the AF had a contract obligation to provide this information. We are not persuaded. The weight of the evidence shows that the AF endeavored to provide OFP documentation from the ongoing FB contract to appellant for assistance if and when available, but did so without warranting the information or recognizing any contract obligation to do so. We believe that the contract terms confirm this view.

We also hear appellant to argue that it should prevail on this claim because appellant’s technical proposal advised the AF of its bid assumptions and strategy for performing the work — insofar as its reliance upon the reusability of FB OFP data was concerned — and that the AF awarded the contract to appellant with knowledge of those

assumptions. We reject this argument. Appellant's technical proposal was not made part of the contract. By awarding the contract to appellant, the AF did not necessarily agree with appellant's bidding assumptions and strategy or make them terms and conditions of the contract.

Appellant also points to a number of pre-bid AF briefings to the prospective offerors wherein, among other matters, similarities between the FB program and this procurement were discussed. However, appellant has not shown that any AF statements made at these meetings served to modify the terms and conditions of the RFP or the contract. Indeed, at the 1984 orientation briefing the contracting officer expressly stated that the offerors utilized the information provided at their own risk.

As the claimant here, appellant has the burden to show that the contract affirmatively placed upon the AF the duty to provide and to warrant all relevant FB OFP data from the ongoing GDC contract as GFP. For reasons stated above, we believe it has not met this burden. To the extent that the AF letter of 19 March 1986 may arguably suggest otherwise, the record shows that the AF letter to appellant dated 9 June 1986 made the AF's position quite clear – the AF gave appellant no assurances of the accuracy of the data it might be able to provide under the ongoing FB program, and if this made commonality less feasible, then appellant was still obligated to perform. As discussed below, commonality was not an absolute contract requirement, but was to be pursued only “where feasible.” This was consistent with the Government's position as communicated to appellant as far back as the pre-award period, and was also consistent with the contract's terms.

III. There Were No Enforceable Contract Commonality Requirements

There is no question that the contract reflected the AF's desire to encourage commonality between the OFPs of the FB-111A, F-111A/E and EF-111A aircraft where feasible. Having said this, we must turn to the contract terms to determine whether the contract imposed any specific, enforceable obligation with respect to commonality.

Under SOW § 1601.1, the F-111A/E MC OFPs were to be adapted from the existing FB-111A MC software “with an emphasis on maintaining commonality of function, design, code and operation where feasible.” (Emphasis added) The terms “emphasis” and “where feasible” are fraught with subjective meaning and interpretation. The use of this broad language in the contract suggests to us that the contractor, as designer of the system modifications, had considerable discretion and latitude to determine the extent of the commonality in the design, consistent with the data made available under the contract. It follows that the AF was not generally free to reject appellant's work for too few – or for too many – common design features. (Regarding the latter, *see* Claim (26), “Crew Station Review Team Meetings,” *infra*).

We conclude that the contract imposed no specific, enforceable level of commonality upon appellant. As such, there was no identifiable commonality “contract requirement” which either party could accuse the other of breaching during contract performance. To the extent that the parties assert such claims, they are without merit.

IV. The AF Did Not Withhold Superior Knowledge from Appellant⁷

Appellant contends that the AF improperly withheld information pre-award regarding GDC performance problems on the FB contract to appellant’s detriment. It is well-settled that the Government has an implied contract duty not to withhold superior knowledge from a contractor that is necessary for performance. As stated in *Geisler v. United States*, 232 F.3d 864, 876 (Fed. Cir. 2000), in order for a contractor to establish a breach of that duty, it must show the following:

(1) a contractor undertook to perform without vital knowledge of a fact that affects performance costs or duration; (2) the government was aware the contractor had no knowledge of and had no reason to obtain such information; (3) any contract specification supplied misled the contractor or did not put it on notice to inquire; and (4) the government failed to provide the relevant information. [Citation omitted]

Appellant has not met its burden under this test for a number of reasons. The Government is only liable for a failure to disclose “superior” knowledge, that is, knowledge known to the Government that was unknown to appellant or not reasonably available to it. *Giesler, supra* at 877. The weight of the credible evidence shows that appellant was generally aware of GDC’s overall performance – or lack thereof – during the pre-award period. The record shows that appellant expended considerable effort to learn that status, including obtaining information from a senior AF AMP official at dinner meetings of questionable propriety. (Findings 7, 8)

Moreover, appellant had a reasonable opportunity to obtain updates on GDC’s performance from official channels. The AF, pre-award, asked appellant if it needed any additional information beyond that contained in the 1984 AMP data library. Appellant requested certain data, but FB contract status was not requested. The AMP data library also contained an early FB program schedule, and appellant could have asked the contracting officer for an updated schedule. It did not do so. This suggests that either this information was not necessary for appellant’s performance, or that appellant was aware of the status of the FB contract and had no need to make these inquiries. In either case, appellant has failed to make out its *prima facie* case under the superior knowledge doctrine. We believe that information about GDC performance problems in the pre-award period was reasonably available to appellant, if not actually known by appellant at the time.

Appellant also has not shown that the contract specifications were misleading regarding the timeliness of GDC's performance in general, or its design and testing of FB-111A MC OFP data in particular. Appellant's contract did not represent nor misrepresent GDC's performance in any respect. The AMP data library contained an early FB-111A performance schedule, but appellant was on notice under the contract that this schedule was not warranted. We conclude that appellant has failed to establish AF liability for failure to disclose superior knowledge.

For reasons stated, we deny entitlement on appellant's claim regarding FB-111A OFP data.

(2) FINDINGS OF FACT – Software Test Stations

34. As part of the contract work, GAC was to design, fabricate, test and deliver modifications to a set of FB-111A STSs from the GDC contract. The STSs were to test MC OFP software (the MC STS), as well as the SFP OFP software for the programmable display generator for the MFDS (the PDG STS). Appellant was to make such hardware and software modifications to the test stations to enable them to test the MC and SFP OFPs for the aircraft under this contract without degrading their capability to test the OFP software under the FB contract. SOW § 4410.1.1. (R4, tab 1 at 479)

35. Under Clause F-623, the Government was to make available at appellant's facility one STS on 1 January 1987 (R4, tab 1 at 38). This set was identified as STS #1. Under SOW § 4410.1.17 appellant was also to provide a kit to modify a STS that was to be housed at Government facilities in Sacramento, known as STS #2. (R4, tab 1 at 481) The STSs were GFP under this contract.

(2)(a) – STS Software Data

36. The software used to run the test stations was to be modified by appellant based upon specifications to be developed by appellant, *i.e.*, a computer program development specification, known as a "B-5," which identified the requirements of the software, and a computer program product specification, known as a "C-5," which provided for the design of the software consistent with the B-5 requirements. Under the contract at SOW §§ 6130.6.1, 6130.6.2, GAC was to deliver these specifications to the Government for approval. (R4, tab 1 at 510-11) Under SOW § 6130.6.5, GAC was to deliver to the AF the modified test station software that was designed based upon these specifications. (*Id.* at 511)

37. Under the contract as awarded, appellant's initial submittal of its B-5 to the AF was due 60 days prior to the preliminary design review (PDR) No. 1 scheduled for 16 July 1986, that is, by 15 May 1986. *See* Contract Data Requirements List (CDRL) A00E, DI-E-3119B/T (R4, tab 1, Vol. 2 at 53). As this B-5 effort had to insure that testing of the

FB-111A software would not be impaired, it was essential for appellant to review and analyze a reasonably accurate and complete version of the B-5 from the FB-111A software test station (FB STS). In order to meet the contract schedule as set out above, this B-5 was needed by appellant by mid-March 1986. (Tr. 14/219-26)

38. The AF did not provide appellant with a reasonably complete and accurate B-5 from the FB STS, although an older version was located in the AMP data library. At the SDR during the first week of March 1986, appellant sought AF assistance to obtain the latest version of software documentation, including the B-5 for the MC STS and PDG STS that were “critically needed to continue F-111A/E AMP SW [software] development” (GAC R4, tab 3367). This software development was being performed by TRW on behalf of GAC.

39. TRW received a number of B-5 versions between March and October 1986. However, none of these versions was accurate and complete. (Tr. 17/239-40) We find that the Government failed to timely provide appellant with a reasonably accurate and complete STS B-5 specification from the FB contract. We find that this failure impacted appellant’s ability to timely provide a complete and accurate B-5 specification to the AF as required by the contract (GAC R4, tab 948). It also impacted appellant’s ability to present a thorough preliminary design review at PDR No. 1 (tr. 15/43-44).

40. Under the contract as awarded, appellant was also to make initial submittals of the STS C-5 specification to the Government in late 1986 prior to the critical design review (CDR) scheduled for 1 January 1987. *See* CDRL A00F, DI-E-3120B/T (R4, tab 1, Vol. 2 at 55). In order to make this submittal it was essential for TRW to review and analyze a reasonably accurate and complete C-5 from the FB STS to insure that the FB test station capabilities would not be degraded. The contract did not contain a reasonably accurate and complete C-5, although an older version was located in the AMP data library.

41. Appellant and TRW needed the updated information by June-July 1986 (tr. 14/226-28), which it made known to the Government. The contracting officer, by letter dated 9 June 1986, stated that the AF would deliver the data to appellant by the end of June 1986 (GAC R4, tab 213).

42. By letter to appellant dated 16 June 1986, the contracting officer forwarded what it considered an interim C-5 to appellant (R4, tab 80). This C-5 was neither technically accurate nor complete (tr. 17/282-86).

43. As of the program management review (PMR) No. 2 in August 1986, appellant and TRW still had only the interim C-5. The documentation and the code listings were incomplete. At this PMR, Grumman and TRW recommended that PDR No. 2 and the CDR be delayed because of the lack of this required data. (Tr. 15/6-7, 11-13) It appears that this request was granted by the AF.

44. By letter to the contracting officer dated 15 October 1986, appellant addressed the late receipt of FB-111A STS documentation. GAC advised that the work was proceeding with the preliminary information provided, but this was causing “work arounds” and cost and potential schedule impact, the extent of which could not be presently determined. (GAC R4, tab 969)

45. By letter to GAC dated 17 October 1986, the contracting officer provided appellant with C-5 Specification ZE 32013 which had recently been received from GDC but had not yet been approved by the AF. The contracting officer stated in pertinent part as follows (GAC, R4, tab 970):

[The Government] has determined that preliminary documents must be used to establish a base line.

. . . The Government directs the use of C-5 Specification ZE 32013 for the STS as a baseline for the F-111A/E STS design work.

[I]t is our position that delivery of the C-5 Specification completes the Governments obligation to supply STS documentation to Grumman Aerospace Corporation.

This preliminary C-5 was slightly better than prior versions but still did not provide what was needed to perform STS software modification activities (tr. 18/27).

46. We find that the Government did not timely provide a reasonably accurate and complete C-5 from the FB STS. We find that this caused appellant and TRW unanticipated cost, disruption and delay. (Findings 41, 44)

47. Insofar as pertinent to this claim, the contract contained the standard FAR clause entitled GOVERNMENT PROPERTY (FIXED-PRICE CONTRACTS) (APR 1984) which states in pertinent part as follows (R4, tab 1 at 70):

GOVERNMENT PROPERTY (FIXED-PRICE CONTRACTS
(APR 1984)

(a) *Government-furnished property.* (1) The Government shall deliver to the Contractor, for use in connection with and under the terms of this contract, the Government-furnished property described in the Schedule or specifications together with any related data and information that the Contractor may request

and is reasonably required for the intended use of the property (hereinafter referred to as “Government-furnished property”).

(2) The delivery or performance dates for this contract are based upon the expectation that Government-furnished property suitable for use (except for property furnished “as-is”) will be delivered to the Contractor at the times stated in the Schedule or, if not so stated, in sufficient time to enable the Contractor to meet the contract’s delivery or performance dates.

(3) If Government-furnished property is received by the Contractor in a condition not suitable for the intended use, the Contractor shall, upon receipt of it, notify the Contracting Officer, detailing the facts, and, as directed by the Contracting Officer and at Government expense, either repair, modify, return, or otherwise dispose of the property. After completing the directed action and upon written request of the Contractor, the Contracting Officer shall make an equitable adjustment as provided in paragraph (b) of this clause.

(4) If Government-furnished property is not delivered to the Contractor by the required time, the Contracting Officer shall, upon the Contractor’s timely written request, make a determination of the delay, if any, caused the Contractor and shall make an equitable adjustment in accordance with paragraph (h) of this clause.

We find that the FB STS and its related data, including the B-5 and C-5 specifications, were GFP in accordance with this contract clause.

(2)(b) – STS Hardware Data

48. As part of the contract work appellant was also to make necessary hardware modifications to the FB software test stations to enable them to test the MC and SFP OFPs for the FB-111A as well as the aircraft under this contract.

49. The contract provided that the AF was to make STS #1 available to appellant for modification on 1 January 1987, and STS #1 was to be at full capability for integrated testing on 1 August 1987 (R4, tab 1 at 38).

50. At the hearing, appellant offered testimony from its engineering manager in the Department of Integrated Logistics Support (ILS), which department was responsible for hardware modifications to the STS. This person had never worked on an STS prior to this contract (tr. 38/274).

51. The engineering manager testified that he expected the flow of FB STS drawings necessary for hardware modifications to begin immediately after award, and he expected to have a complete set of drawings by March-April 1986 (ex. A-29). However he did not offer any contract support for these dates, and we have found none. SOW § 4410.1.12 provided that appellant was to deliver hardware drawings 30 days prior to STS CDR. Under the contract as awarded, CDR was scheduled for January 1987, but actually was not held until April 1987.

52. By letter to the contracting officer dated 8 May 1986, GAC sought certain updated and missing drawings by 31 May 1986 (GAC R4, tab 855). The record does not provide a contract schedule date supporting the need for these documents by this particular date.

53. The record reflects that the AF made drawing submissions to GAC throughout 1986. The engineer manager testified that had drawings been delivered sooner, appellant's hardware efforts would have been expedited (tr. 38/278).

54. Appellant's engineering manager also testified that the AF failed to provide certain "system-level drawings," which required appellant to reverse-engineer the lower level drawings it did receive (ex. A-29). However the record does not disclose that the contract required the AF to provide this type of drawing, or that such drawings are typically provided with software test stations. This witness was not shown to be an expert or experienced with software test stations in general, or with these software test stations in particular.

55. By letter to appellant dated 28 October 1986, the contracting officer reviewed appellant's claimed list of missing STS drawings, stating that the remaining drawings had been provided to GAC in October 1986, and that "[t]he Government believes that GAC now has a complete set of STS drawings" (GAC R4, tab 971). At the PMR dated 17 November 1986, GAC advised the AF that it had "sufficient drawings to proceed with STS Mod" (GAC R4, tab 3388 at 7705).

56. It is not disputed and we find that STS #1 was delivered to GAC for modification in February 1987.

The AF Defense of Accord and Satisfaction

57. In reply to appellant's request that it receive Government-furnished STS data by June-July 1986, the AF wrote to appellant on 11 August 1986, stating that it was the Government's opinion that the contract required the data for the STS to be delivered with the test stations in January 1987 (R4, tab 91).

58. Appellant responded by letter dated 15 October 1986, stating that it needed the STS data prior to delivery of the STS in January 1987, and that "FAR 52.245-2 [the Government Property clause] recognizes that the availability of data must precede [sic] the delivery of the item." (GAC R4, tab 969)

59. By letter dated 20 October 1986, the Government forwarded an Advance Change/Study Notice (ACSN) to appellant. In the ACSN the Government acknowledged that the contract required the AF to deliver STS #1 to appellant by 1 January 1987. It proposed, *inter alia*, changing the STS #1 delivery date to 1 February 1987, and asked appellant to submit a proposal for the recommended change. (R4, tab 105)

60. In response to the ACSN appellant prepared a contract change proposal entitled "CCP-AMP-016" (the CCP) dated 10 February 1987. The CCP indicated that it was being submitted as a result of the change in the delivery date for STS #1 from 1 January 1987 to 1 February 1987. Appellant submitted the CCP to the AF by cover letter dated 20 March 1987, which stated, in pertinent part as follows (GAC R4, tabs 1020, 1039):

3. The prices shown herein are the costs associated with the late availability and delivery of the STS *Hardware*. As set forth in Reference (c), any costs incurred as a result of the preliminary or missing STS *data* will be proposed under separate cover at a later date. [Emphasis added]

The "Reference (c)" mentioned in this letter referred to appellant's 15 October 1986 letter. The CCP's proposed target cost was \$1,522,740 and the target price was \$1,705,468.

61. At the hearing the contracting officer, Mr. Charles D. Taylor, testified that appellant's CCP also included costs for STS data and was about \$500,000 more than the modification that was ultimately negotiated. According to Mr. Taylor, after the Government told appellant that these data costs were in-scope, the costs were removed from the proposal. (Tr. 14/ 89-90, 100) Mr. Taylor testified that "just a few days before negotiations, face-to-face negotiations, started, Grumman submitted a new TRW proposal without the costs for late and deficient [STS data]. This was as – after Air Force stating on several occasions that late/deficient data was in scope" (tr. 14/90).

62. In GAC's F-111A/E cost performance report (CPR) for March 1987 under the heading, "ADDITIONAL IMPACTS TO BE PRICED (ROM ESTIMATES)," appellant listed "STS Late Data" with a ROM (rough order of magnitude) estimate of \$500,000 (AF R4, supp. tab 1013 at 2). By the June 1987 CPR, the STS Late Data ROM had increased to \$1,250,000. The ROM periodically increased thereafter, and in the February 1989 CPR stood at \$5,700,000 (AF R4 supp., tab 1036 at 2).

63. The parties signed bilateral Modification No. P00046 on 30 September 1988. Mr. Taylor signed on behalf of the AF. P00046 indicated that its purpose was to incorporate "CONTRACT CHANGE PROPOSAL CCP-AMP-016-GOVERNMENT LATE DELIVERY OF THE SOFTWARE TEST STATION (STS)." The modification increased the contract price by \$816,200 and changed the delivery date of the F-111A/E STS #1 from 1 January 1987 to 1 February 1987. At paragraph E, the modification stated as follows (R4 Vol. 78, tab 1BT):

IN CONSIDERATION OF THE ABOVE CHANGE IN THE
CONTRACT PRICE, THE CONTRACTOR HEREBY
RELEASES THE GOVERNMENT FROM ANY CLAIMS FOR
AN EQUITABLE ADJUSTMENT BASED UPON THE
GOVERNMENT'S LATE DELIVERY OF THE STS, WHICH
CAUSED DELAY IN THE CONTRACTOR'S
PERFORMANCE OF THIS CONTRACT.

64. Mr. Taylor testified that P00046's "disclaimer statement did not spell out the STS data was exempt." Mr. Taylor testified that at the time he signed P00046 there were no requests for equitable adjustments or claims involving late or immature data before him. (Tr. 14/90, 101)

65. In January 1989, the parties executed bilateral Modification No. P00062. The modification stated, in pertinent part as follows (R4, tab 1CJ):

A. The purpose of this modification . . . is to incorporate a revised EF-111A Major Engineering Milestone Schedule, revise delivery dates for CLIN 2055 and 2056, to change in part the date to exercise the FY 89 option, and provide support for STS #1 in accordance with SM/ALC letter PMWFD/MWM-1025.

The modification also listed revised delivery dates for items including "STS #1 UPDATE BEGINS" and "STS #1 FULL CAPABILITY TEST." The SM/ALC letter referenced in P00062 is a 3 January 1989 AF letter to appellant in which the Government stated that it anticipated sending two Government employees to appellant's facility in response to a request by appellant for STS support, and set forth the conditions for doing so (GAC R4, tab

460). We find that P00062 did not address the Government's delivery of STS data to appellant.

66. In its REA dated 10 June 1991, appellant alleged that the Government had provided late and defective STS data which adversely affected appellant's ability to comply with contract requirements (R4, tab 936 at 48-60, 162-85). Appellant's allegations were restated in its updated REA dated 7 May 1993 (R4, tab 979 at 24-47). The contracting officer found that appellant's contentions were without merit by letter dated 26 August 1993 (R4, tab 985).

67. In its 30 March 1994 claim, appellant reasserted that the Government had provided appellant with late and defective STS data (R4, tab 991 at 38-44). The contracting officer's decision dated 30 September 1994 denied, *inter alia*, the STS portion of appellant's claim. Insofar as pertinent, the contracting officer found that the contract required the STS to be delivered in January 1987 and that there was no separate delivery date for STS data. The contracting officer stated that P00046 increased the contract price and gave a schedule extension for the late delivery of the STS and also contained a release statement for other claims. (R4, tab 999)

DECISION

The STS Data Claims Were Not Released

As a threshold matter, the AF contends that appellant has waived and/or released its STS software and hardware data claims pursuant to the execution of P00046. The AF argues that P00046 was an accord and satisfaction of all STS issues, including late and defective STS data. Appellant argues that P00046 only related to the delivery of the STS hardware, not the STS data. Although the Government identifies its defense as one of "accord and satisfaction," its arguments focus on whether appellant has released its claim to costs arising from alleged late and defective STS data by executing P00046. Accordingly, the issue before us is the proper interpretation of the release language agreed to by the parties.

The Government bears the burden of proof on the affirmative defense of release. *American Construction & Energy, Inc.*, ASBCA Nos. 52031, 52032, 01-1 BCA ¶ 31,202 at 154,048. "Release or waiver of claims is basically a matter of intention." *Maintenance Engineers*, ASBCA No. 23131, 81-2 BCA ¶ 15,168 at 75,073. We construe a release "by reference to the surrounding circumstances to give effect to the parties' intentions." *Coastal Government Services, Inc.*, ASBCA No. 50283, 01-1 BCA ¶ 31,353 at 154,832.

The AF has not carried its burden of proving that the release paragraph in P00046 encompassed the late and defective STS data issue. Although the modification's release language did not state that STS data was exempt, neither did it state that it was included. We

do not believe that appellant's failure to seek to have the language explicitly state this exemption is indicative of appellant's agreement that the modification included STS data.

The modification also specified that it incorporated appellant's CCP. The CCP's cover letter stated that the prices and costs in the CCP were for the late availability and delivery of the STS *hardware* and that any costs connected with preliminary or missing STS *data* would be proposed separately. This indicates to us that appellant did not intend the release in P00046 to include STS data.

We are also not persuaded that the parties had agreed that appellant's claimed STS data costs were in-scope and were no longer at issue. Rather, we are persuaded that appellant's continuing inclusion of "STS Late Data" estimates in its CPRs, both before and after the execution of P00046, and the inclusion of allegations of late and defective STS data in its REAs indicate that appellant did not understand the release to encompass STS data. The Government has not shown that P00046 served to release any STS data claim.

The Government also argues that Modification No. P00062 was an accord and satisfaction of the late and defective STS data issue, without explaining the relevance of the modification. The Government bears the burden of proof on its affirmative defense of accord and satisfaction. *Jimenez, Inc.*, ASBCA No. 52825, 01-1 BCA ¶ 31,294 at 154,502. We have found that the Government's delivery of the STS data to appellant was not included in P00062. Since there is nothing on the face of the modification to suggest that its execution barred appellant's claim and the Government has presented no evidence to show that there is a connection, we conclude that P00062 was not an accord and satisfaction on the late and defective STS data issue.

STS Software Data Claim

There is no dispute that the AF was obligated to furnish appellant with reasonably accurate and complete B-5 and C-5 specifications from the FB-111A STS from which appellant could design a modified set of specifications to accommodate the testing of the FB-111A, the F-111A/E and EF-111A aircraft. The thrust of the parties' dispute is *when* the Government was obligated to provide the data. The contract does not expressly provide a delivery date for these specifications. Appellant argues that the contract, reasonably construed, required the AF to deliver the specifications in sufficient time to allow for their use in accordance with contract requirements. The Government argues that the contract, reasonably construed, required the AF to deliver the specifications on the same date the test station was to be delivered, on 1 January 1987.

We believe that appellant's interpretation is more reasonable. Appellant was required to provide the AF with a modified test station and software to accommodate the testing of the aircraft. The contract set out specific dates for the Government to review appellant's design efforts – at preliminary design reviews and critical design reviews – and

specifically required appellant to submit its B-5 and C-5 specifications to the Government substantially prior to these design reviews. In order to make these contractually-required deliveries and presentations, which were to take place throughout 1986, it was essential for GAC to have reasonably accurate and complete B-5 and C-5 specifications from the FB-111A STS.

GAC did not receive from the AF reasonably accurate and complete B-5 and C-5 specifications from the FB-111A STS in sufficient time to make reasonably accurate and complete B-5 and C-5 specifications in accordance with this contract. We believe appellant's work was impacted by this lack of timely and complete data.

The AF's interpretation – that it was obligated by contract to provide the data and specifications on the same date it delivered the STS hardware – fails to account for the contractually-imposed restraints imposed upon appellant in the design and delivery of the B-5 and C-5 specifications, specifically the CDRL submissions to the AF, which required appellant to have this FB STS data much earlier.

On balance, appellant's interpretation serves to accommodate and harmonize all contract requirements and the purpose to be served by the Government's contractually specified design reviews. The Government's interpretation does not. For reasons stated, we find entitlement for appellant based upon the Government's untimely and inaccurate submission of the B-5 and C-5 software specifications for the FB-111A STS.

STS Hardware Data Claim

We believe appellant has failed to make a *prima facie* case of entitlement for missing and late STS hardware data for a number of reasons. Appellant's singular witness on the subject – its ILS engineering manager – who testified as to appellant's expectations regarding test station hardware data, was generally not persuasive. The ILS manager's experience was limited; this was his first STS job. Appellant also failed to show by a preponderance of credible evidence a reasonable expectation – supported by the contract terms or by industry practice – that it was entitled to receive certain system-level drawings from the AF. The record shows that appellant received the drawings it needed by October-November 1986, which was within sufficient time to meet contract delivery dates.

For reasons stated, appellant's claim for defective and untimely STS hardware data and drawings is denied.

(3) FINDINGS OF FACT - Normal Accelerometer

68. The Normal Accelerometer was a sensor that was part of the FB-111A aircraft and the F-111A/E aircraft. As part of the contract work, GAC was to design the F-111A/E MC OFP to use data generated by the Normal Accelerometer to calculate "G" forces in

certain non-inertial navigation modes and to drive certain cockpit steering cues. Since the FB aircraft did not have a “dive and toss” weapon delivery capability, the FB-111A MC OFP had no need to consider these Normal Accelerometer inputs. (Tr. 21/198-200)

69. After the F-111A/E MC OFP was satisfactorily tested by GAC on the MC STS, it was tested on the aircraft during flight test in 1988. In or around October 1988 it was discovered that the steering cue did not work correctly. Appellant investigated the problem. It first tested the aircraft hardware related to the pitch steering bars but found nothing wrong. It then analyzed and tested the Normal Accelerometer. Appellant determined that the Normal Accelerometer inputs to the MC OFP software were off by 180 degrees. (Ex. A-5 at 3-4)

70. Appellant made changes to the MC OFP software, and the system worked satisfactorily on the aircraft. However, when the revised software was returned to the MC STS for validation testing, it did not test properly. After further investigation GAC determined that the problem was within STS #1 that was delivered as GFP in February 1987. The Signal Interface Unit (SIU), the device on the STS that simulated Normal Accelerometer output, was wired incorrectly and did not accurately reflect aircraft conditions. (Tr. 21/205; ex. A-5 at 4)

71. GAC made the AF aware of this problem. A software trouble report was issued by appellant to document the matter. GAC kept the contracting officer advised of the investigation. (Tr. 21/250-51)

72. By letter to the contracting officer dated 23 January 1989, appellant provided written confirmation of the foregoing and sought direction with respect to the need to correct the STS common hardware circuitry to make it functionally equivalent to the aircraft. Appellant also gave notice that it would submit a proposal for equitable adjustment under separate cover for additional, out-of-scope efforts undertaken to investigate and to resolve this problem. In this letter Mr. Ziegler, GAC project systems engineer, was identified as appellant’s technical contact. (GAC R4, tab 1138)

73. Mr. Ziegler offered testimony at the hearing regarding the Normal Accelerometer. Although Mr. Ziegler did not perform any of the investigation work himself, it was performed by employees under his supervision (tr. 21/193-94). We find that he was technically familiar with the facts and provided persuasive testimony on this subject.

74. By letter to appellant dated 14 April 1989, the AF provided the requested direction, advising appellant not to make any corrective hardware changes to the STS (R4, tab 554). As a result, appellant had to patch its software when it was tested in order to account for the defects of the SIU in the STS. Appellant incurred additional cost relating to

the investigation and identification of the problem and working around it thereafter (ex. A-5 at 5).

75. By letter to the contracting officer dated 6 July 1989, GAC submitted its REA seeking \$139,361 for the out-of-scope effort to investigate and address the Normal Accelerometer problem (GAC R4, tab 1166).

76. The contracting officer sought technical advice to assist in the analysis of the REA. By memorandum dated 24 July 1989, the contracting officer sought guidance from the AF project manager and stated as follows (GAC R4, tab 1172):

GAC is requesting additional funds for research into STS-Accelerometer problem. Do you concur this is an out-of-scope effort?

The AF project manager replied as follows (*id.*):

MMKAE (Vu) and MMKAM concur that *this is an out-of-scope effort*. Dao [Mr. Dao Vu, an AF electrical engineer] stated that dollars included are high. [Emphasis added]

77. The AF contract review board disagreed with the AF technical staff, however, contending that this matter involved in-scope work. By letter to appellant dated 6 October 1989 the contracting officer stated that appellant was “responsible for developing a complete AE/EF STS” and that the Government was not liable “if the STS that you developed” resulted in extra effort (GAC R4, tab 1181).

78. Appellant reasserted the Normal Accelerometer claim as part of its REA in June 1991, updated in May 1993 (R4, tabs 936, 979). The contracting officer conducted fact-finding on the REA. By letter to appellant dated 26 August 1993 the contracting officer reversed his position. He held that appellant was entitled to recover on this claim, and granted appellant \$24,960 for its additional effort to correct the Normal Accelerometer problem, on the grounds that the “STS was not functionally the same as the aircraft in this area” (R4, tab 985). The parties were unable to settle this claim.

79. Appellant reasserted the Normal Accelerometer claim as part of its overall claim dated 30 March 1994, which was asserted on a modified total cost basis. The contracting officer again found entitlement for appellant. However he denied any quantum recovery at this time because he questioned the validity of appellant’s quantum methodology (R4, tab 999; ex. G-141 at 67-68).

DECISION

The FB-111A STS from the FB-111A contract was Government-furnished property under this contract. We believe that appellant's expectation that the Government-furnished FB-111A STS would model the FB-111A aircraft in all material respects was a reasonable expectation. The record shows that the STS SIU, which simulated the Normal Accelerometer that was on the aircraft, was wired incorrectly, and hence the FB STS did not model the FB aircraft in this respect. The record also shows that appellant incurred costs to investigate, identify and to address this problem. We believe that appellant has established entitlement arising out of this defective GFP.

The AF argues that under the contract appellant was generally responsible to define and develop avionics system interfaces and to modify the STS, suggesting that GAC had the responsibility to correct the STS wiring. We do not believe this argument is persuasive where Government-furnished wiring in GFP is at issue. Nor did this argument appear to persuade the AF technical staff in 1989, the contracting officer in 1993 and the contracting officer in 1994, all of whom found entitlement for appellant on this claim.

For reasons stated, we find entitlement on appellant's Normal Accelerometer claim.

(4) FINDINGS OF FACT - Jovial Tool Set (ASBCA No. 51526)

80. As part of the contract, GAC was to design and test the SPF OFP for the programmable display generator (PDG) computer for the MFDS on the aircraft. TRW performed this work on GAC's behalf. In order to perform this work properly, it was necessary for TRW to unit test the SFP OFP. TRW's plan was to perform this work by using an IBM mainframe computer located at GAC's New York facility to which TRW's facility in Dayton, Ohio, would tie in through a telecommunications link. (AF R4 supp., tab 2697, ex. 4 at 82556; also R4, tab 35 at 1-8)

81. In order for the IBM mainframe to be useful in unit level testing, it needed a program called a "simulator" that would read the PDG target computer's program and generate the same results as the target computer (tr. 35/139-41). It was TRW's expectation under its agreement with GAC that GAC would provide the IBM mainframe, the simulator and certain support software, known as a Jovial tool set, so that TRW could perform this work. TRW needed access to this setup no later than five months after receipt of appellant's order, that is by July 1986. (Ex. G-12 at 57, see Figure 5.8 Grumman Furnished Equipment and Data)

82. Under the AF-GAC contract there was no provision for the AF to provide the IBM mainframe or the simulator to appellant; the AF, however, was to provide the Jovial support software above. It appears that this was provided to appellant. For purposes of this

claim, GAC does not assert that the Government-furnished support software was delivered in an untimely or an incomplete fashion.

83. According to GAC, it planned pre-award to obtain a compatible simulator for TRW's use, free of charge, through a Government office known as the "Embedded Computer System Program Office" (ECSPPO) (tr. 35/153, 172-73). The record, however, does not reflect any pre-award agreement between GAC and ECSPPO with respect to the delivery of a simulator. Appellant's software project engineer, Mr. Herbert Warner, had reviewed a list of products available at ECSPPO at the time of proposal preparation, which included a simulator debugger that appeared to be compatible with the Government-furnished jovial tool set. He did not, however, contact ECSPPO to verify this information. (Tr. 35/173) Nor did appellant identify a simulator on the GFP list in its proposal.

84. After award, appellant learned that ECSPPO did not have a simulator available for TRW's use. As a result, TRW presented GAC with two alternatives: (1) purchase a Jovial tool set for TRW containing a simulator to run on TRW's VAX computer; or (2) allow TRW to perform SFP OFP unit testing on PDG STS #2, which apparently had already been delivered by GDC to the AF. (Tr. 35/154)

85. It does not appear that GAC presented TRW's options to the AF for any Government input. After assessing the relevant risks, GAC in late 1986 authorized TRW to purchase a Jovial set and simulator to be hosted on TRW's VAX computer in Dayton, Ohio for unit testing of the SFP OFP (ex. G-60). TRW acquired and installed the equipment sometime in January 1987. GAC did not notify the contracting officer at or around this time that it viewed the purchase of this equipment as an additional cost for which the AF was responsible (ex. G-141 at 80).

86. By letter to the AF dated 16 May 1988, appellant sought reimbursement from the AF for the above equipment, contending *inter alia*, that it reasonably assumed that a simulator/debugger was part of the Jovial tool software support package that was furnished by the Government (AF R4 supp., tab 1462). By letter to appellant dated 21 February 1989, the contracting officer denied reimbursement, contending that appellant's assumption was not reasonable and that the contract did not state that the AF was to provide this simulator (GAC R4, tab 2048).

87. Appellant's 10 June 1991 REA sought reimbursement for these costs based upon a totally different set of facts and legal rationale, stating as follows (R4, tab 936 at 4-26):

[D]ue to the immaturity of the FB-111 software, Grumman was required to develop the F-111A/E AMP software as a new development job, and not as a modification. Under these

conditions, the STS alone could only provide the means for integration and testing of the software; it could not effectively support the early phases of a full development that required heavy access to a low level debugger; additionally, it could not serve as a development facility for both Grumman and TRW. Grumman was required to procure a simulator/debugger package from ACT for itself and TRW in order to protect the software development schedule for the mission computer OFP and SFP OFPs.

The contracting officer denied the REA by letter dated 26 August 1993 (R4, tab 985).

88. Appellant reasserted its Jovial tool/simulator claim in its 30 March 1994 claim, contending that since the AF failed to furnish debugged FB-111A AMP OFP software, GAC was “required to make substantially greater use of the Jovial support software than was anticipated by Grumman or required by the A/E/EF Contract” and “was forced to procure an additional Jovial tool set, at its own expense, for TRW’s use in TRW’s SFP OFP software development.” (R4, tab 991 at 59) The contracting officer denied this claim in his decision dated 30 September 1994 (R4, tab 999), which decision was appealed to this Board.

89. During the appeal proceedings and in reply to a Government motion for partial summary judgment, appellant sought to amend its complaint, over AF objection, to add a materially different set of facts to support its Jovial tool claim. Appellant stated to the Board in writing on 7 July 1997 that appellant was abandoning and withdrawing the facts asserted in its claim and complaint, and was seeking to replace them with other factual allegations in support of its claim. These new allegations had not been submitted in appellant’s claim to the contracting officer for a decision under the Disputes clause.

90. By decision dated 7 August 1997, the Board denied the Government’s summary judgment motion as moot and also denied appellant’s request to amend its complaint, stating as follows:

[Appellant] has totally abandoned the factual predicate of its jovial tool set claim, and seeks to replace the same with a whole new set of facts in support of recovery. Clearly, appellant’s proposed amendment to the complaint raises operative facts different from those it has abandoned, and the contracting officer should be given the opportunity, guaranteed by statute, to review these facts on the merits with the hope that the matter may be resolved short of litigation, *Trepte Construction Company, Inc., supra*. In essence, this is a new

claim which must first be submitted to the contracting officer for decision under the CDA.

Grumman Aerospace Corporation, ASBCA Nos. 46834, 48006, 97-2 BCA ¶¶ 29,180 at 145,115.

91. Appellant filed a new claim on 17 February 1998, contending that it was entitled to reimbursement for the items purchased for TRW based on GAC's inability to realize either of two unit testing options: (1) ECSPO's failure to provide a simulator for TRW's use, and (2) the AF's unjustified refusal to separate or split the STS into MC and PDG sections so that the latter section could be used for testing by TRW. The contracting officer denied the claim, contending, among other things, that appellant's purported options and expectations were not supported by the contract and were unreasonable. The contracting officer also was of the view that contract Modification No. P00046 barred any further claims for STS delivery (ex. G-144).

92. GAC timely appealed the contracting officer's decision, and the appeal was docketed as ASBCA No. 51526.

93. The contract provided for the Government's delivery to appellant of the STS as GFP, but it did not state or otherwise imply that the AF was to separate or split the STS into MC and PDG sections for appellant's use or convenience. Appellant proposed such a split pre-award – it requested that in order to facilitate the contract work, AF should deliver the PDG section to TRW in Sacramento, California, and the MC section to GAC on Long Island, New York (tr. 35/145). According to Mr. Warner, the AF did not take exception to appellant's proposal, which he understood to be a tacit agreement with appellant's approach (tr. 35/175-76).

94. After award, appellant once again raised the issue of the separation of the STS. AF technical personnel were of the view that it was technically feasible to separate the test stations but that some minor changes in software and hardware were required (R4, tab 1390). By letter to GDC dated 9 July 1986, the AF directed GDC to divide the STS into MC and PDG sections for shipment (GAC R4, tab 896), but a few weeks later the AF rescinded this direction. It is unclear whether the AF decision was based on technical, monetary or other considerations. The AF advised appellant that the STS would not be divided.

95. In October 1986 the AF issued an Advance Change/Study Notice (ACSN) to appellant. The ACSN advised that an undivided STS would be delivered to appellant's facility later than provided for by the contract, and it sought a proposal from appellant related to any impact. (R4, tab 105)

96. By cover letter dated 20 March 1987, appellant submitted a proposal – a CCP – to the AF. The CCP was dated 10 February 1987. The “DESCRIPTION OF PROPOSED CHANGE” section of appellant’s CCP provided, in pertinent part as follows (GAC R4, tabs 1020, 1039):

The government will deliver the [sic] GFE the Mission Computer (MC)/Programmable Display Generator (PDG) STS No. 1 to GASD on 1 February 1987 and have General Dynamics set up and test the MC/PDG, STS No. 1 by 1 April 1987.

....

1.1 Effort Associated with STS Slippage

The major effort associated with the STS slippage is as follows:

- (a) A two site checkout (at TRW & GAC) was originally cost estimated by GAC to occur upon STS delivery. This would have allowed the Programmable Display Generator (PDG) STS to be sent directly [sic] to TRW for development of PDG software and testing, while the Mission Computer (MC) would be sent to GAC for acceptance and testing. This method of testing the STS was chosen to reduce cost. But now, due to GD’s late delivery of the STS and the amended contractual requirements to assemble and test the STS to the FB configuration at GAC Plant 106, it will not be feasible to accomplish the two site checkout without incurring further schedule slippage. GAC to preclude this additional schedule slippage intends to accept the PDG and MC simultaneously at the GAC Plant 106 facility. . . .

Based upon the language above, we find that appellant was aware of, and sought to account for the late delivery of the undivided STS in its monetary change proposal.

97. The parties executed Modification No. P00046 on 30 September 1988. The contracting officer signed on behalf of the AF. P00046 indicated that its purpose was to incorporate appellant’s CCP. The modification increased the contract price by \$816,200 and changed the delivery date of the undivided STS #1 from 1 January 1987 to 1 February 1987. At paragraph E, the bilateral contract modification provided as follows (AF R4 supp., tab 1BT):

IN CONSIDERATION OF THE ABOVE CHANGE IN THE CONTRACT PRICE, THE CONTRACTOR HEREBY RELEASES THE GOVERNMENT FROM ANY CLAIMS FOR AN EQUITABLE ADJUSTMENT BASED UPON THE GOVERNMENT' S LATE DELIVERY OF THE STS, WHICH CAUSED DELAY IN THE CONTRACTOR' S PERFORMANCE OF THIS CONTRACT.

98. At the hearing the contracting officer testified, and we find that as part of P00046 the AF agreed to pay appellant for, among other things, the impact of not separating the STS into two separate sections (tr. 60/153-55).

DECISION

We believe appellant's jovial tool claim is without merit for a number of reasons. We must note that appellant's claim has undergone a number of factual iterations over many years, the latest while appellant's claim was pending before the Board. It took appellant roughly 10 years (1988-1998) to present its current factual position from the date it first requested reimbursement from the contracting officer. If the facts are as suggested by appellant now, we fail to see why they were not presented to the contracting officer in 1988 when appellant first sought reimbursement. This passage of time – and appellant's changing factual positions – cause us to generally question the credibility of this claim.

With respect to appellant's purported plan for unit testing of the SFP OFP, which it contends was frustrated by the AF, appellant has failed to show that the AF made any contract commitment to furnish a simulator free of charge from ECSP0 or to separate the STS. The record also shows that the AF solicited a change proposal from appellant related to the impact of delivering the STS in its undivided state to GAC in February 1987, and that appellant submitted a contract change proposal reflecting that impact. This impact was addressed under bilateral contract Modification No. P00046. Hence, the parties' agreement serves as an accord and satisfaction and bars appellant's efforts to reopen the agreement. Appellant is also barred by the unconditional release language in the bilateral contract modification.

For reasons stated, we deny entitlement on appellant's Jovial tool set claim. ASBCA No. 51526 is denied.

(5) FINDINGS OF FACT – Backup Functions and Memory Reserve

99. As part of the contract appellant was to design and test OFP software for the general navigational computer (GNC) and the weapons delivery computer (WDC) of the F-111A/E, both of which were known collectively as the MC. In general, the software for each computer was to be designed to provide its own primary functions, navigational or

weapons delivery as appropriate pursuant to the SSS, as well as the functions of the other computer (known as “backup” or “redundant” functions) where feasible, commensurate with providing a minimum amount of unused memory in the computers (“memory reserve”) for future use.⁸ Insofar as pertinent, we find the following SSS provisions relevant (R4, tab 1 at 240):

3.0 REQUIREMENTS

....

3.1.1 General Description. ..The system shall be controlled by two WNC Mission Computers. One MC shall provide primary navigation functions (General Navigation Computer (GNC)) and backup weapon delivery functions. The second MC shall provide primary weapon delivery functions (Weapon Delivery Computer (WDC)), and backup navigation functions. *Maximum redundancy of these OFPs is a design goal, commensurate with memory reserve requirements. . . .* [Emphasis added]

The GPS SSS provided as follows (R4, tab 1 at 113, 121, 127):

3.2.1 Performance Characteristics. . . . Functional operation of the avionics system *shall be identical in primary (two computer) and backup (one computer) operation wherever feasible.* When in backup operation, MFD/CDU displays and pushbutton selections that are not backed up shall not be displayed to prevent operator confusion. Provision shall be made for smooth transition of MIL-STD-1553B mux bus control and system functions in the event of failure of the primary bus controller or either MC. If only the bus controller hardware fails and the associated MC is still capable of performing its primary functions, it shall continue to do so, acting as a remote terminal. The alternate MC shall assume control of bus transmissions. Provisions shall also be made for direct computer-to-computer communication to allow the other MC to assume the backup functions in the event of primary computer failure[. Emphasis added]

....

3.2.1.1 Navigation . . . Primary navigation functions shall be accomplished in the GNC. *In the event of GNC failure, the*

WDC shall assume these functions, although the processing may be simplified (e.g. the WDC may not provide a Kalman Filter). [Emphasis added]

....

3.2.1.2 Weapon Delivery . . . Primary weapon delivery functions shall be accomplished in the WDC. *In the event of WDC failure, the GNC shall assume these functions, although the processing may be simplified.* [Emphasis added]

3.3.1 Computer Programming.

....

The MC OFP shall be designed such that the memory reserve is a minimum of 35 percent and that the useful throughput reserve is a minimum of 50 percent. In addition, the memory reserve for each computer (GNC and WDC) shall be a minimum of 20 percent.

100. In its technical proposal, GAC proposed a backup functionality for each computer that was less than the primary functions assigned to the other computer (ex. A-6 at 5-7). Appellant's technical proposal, however, was not part of the contract.

101. At the SDR on 4 March 1986, appellant made a slide presentation which addressed its planned approach to functional redundancy and memory reserve in the F-111A/E (ex. A-6 at 12). The AF technical team at the SDR was concerned with the limited backup proposed by GAC, and documented this concern to GAC in a "Review Item Disposition" (RID) Form, AESDR-08. This RID stated in pertinent part as follows (GAC R4, tab 3367 at 14755):

Proposed full-up implementation of only Level Radar and Level Visual weapon delivery in the GNC is not acceptable. The TAC [Tactical Air Command] users feel the need for more modes (particularly toss and/or diving modes). TAC will provide prioritization of requirements for backup, and Grumman must provide trade-offs (cost of implementation and memory reserves). (Gov' t will provide prioritization prior to end of SDR).

Appellant checked the "Category II" box on the RID Form indicating that the subject of the RID was "within-scope." GAC completed its portion of the RID Form as follows (*id.*):

Grumman will provide response to TAC inputs by April 30, 1986, providing [sic] TAC inputs are received by us by the end of SDR.

The TAC inputs were timely provided as requested by appellant. The input took the form of a prioritized list of eight weapon delivery modes for the GNC, the first three of which were deemed essential by the AF technical personnel. (*Id.*)

102. Appellant's written reply to this list stated as follows (GAC R4, tab 2120):

At the Air Force's request, Grumman has looked into the possibility of providing an alternate set of backup weapon delivery modes from those identified in Grumman's proposal. The three highest priority modes in the alternate set, specified by the Air Force as a minimum backup weapon delivery implementation requirement, are not any of the modes implemented by the FB-111A AMP baseline. Without such a means of comparison, Grumman is unable to submit any reasonable estimate of memory reserve and cost impact at this time. As a minimum, we will use the Air Force provided modes (page 2 of SDR RID #08) as a design goal in our backup weapon delivery modes in the GNC OFP. However, we feel confident that in the time frame of the final PDR, we will be able to provide a realistic assessment of impact.

103. At the SDR, the AF technical team also wrote up a separate RID Form, AESDR-44, relating to navigational backup in the WDC, which appellant had also proposed with limited backup functionality. The AESDR-44 stated in pertinent part as follows (GAC R4, tab 3367 at 14791):

As briefed, Grumman proposed only the GPS, I and TAS navigation modes, without any Kalman or conventional Filtering. The specification requires that all NAV modes operate in backup (WDC operation) as similar to the primary (GNC operation) as feasible. This means that the dual sensor modes GPS-I, I-TAS, and GPS-TAS are also required in backup operation. Note that GPS-I-GND NAV is *not* required. An additional requirement is to provide in-flight alignment of the SINU in backup. Grumman should re-evaluate their proposed design and provide these required modes or rationale supporting a position otherwise. [Emphasis in original]

104. Appellant replied to this RID in writing as follows (AF R4 supp., tab 1207 at 80):

Grumman will provide backup NAV (in the WDC) that incorporates as much of the GNC navigation software that is feasible and within the memory reserves and throughput limitations of the WDC. We will provide our recommendations to the AF by PDR 1.

Grumman will provide and [sic] in-flight of SINU using TAS and ARS fix taking modes (i.e. Wind Update, Heading Update, Position Fix) as stated in the SSS.

105. Insofar as pertinent, Grumman's CPDP, transmitted to the AF in April 1986, stated there were potential uncertainties in meeting reserve requirements due to the level of backup capability in each MC. Grumman's preliminary approach was stated, in part, as follows (GAC R4, tab 3371 at 34820):

Impact of back-up capability on OFP reserves will be addressed by estimating the resource utilization for each candidate, functional element. Based on user requirements, these elements would be prioritized. The planned incorporation of back-up capabilities would then be based on priority, resource utilization, and the reserve requirements. As the OFP development nears maturity and actual resource utilization levels evolve, opportunities to trade back-up elements with reserve requirements and with levels of effort to implement changes could be exercised.

106. A technical meeting was held on 14 May 1986. Mr. Tuttle, the AF lead engineer, attended on behalf of the AF. Insofar as pertinent, Mr. Tuttle's internal record of the meeting stated as follows (GAC R4, tab 3547 at 16957):

b. . . . Memory reserve will eventually become a significant technical issue because the Government has elevated its desire for functional redundancy since the SSS was finalized prior to A/E AMP contract award. Increased functional redundancy is in scope contractually but may require relaxation of the memory reserve requirement.

107. Appellant's initial submittal of its B-5 for the GNC and WDC reflected increased backup functionality in both computers as compared to its pre-award technical

proposal. Backup functionality and memory reserve were briefed to the AF at PDR #1 in July 1986. The minutes of the meeting reflect the following (AF R4 supp., tab 1214 at 7):

. . . B. Tuttle [Air Force] noted that there was almost complete redundancy between the OFPs. H. Ziegler [Grumman] stated that this was our design goal.

. . . Art Rindell [Air Force] expressed concern about memory reserve vs. redundancy. H. Ziegler [Grumman] stated that these are Grumman's estimates at this time.

108. At PDR #1, appellant briefed the AF that its estimated combined memory reserve for the MC OFP was 27.5%, which was below the 35% required by the contract. Appellant advised that it intended to improve its memory reserve by looking at ways to eliminate the backup or redundancy that it was designing into the software, and would thereafter look at ways to optimize and to write more efficient code. (GAC R4, tab 3374 at 35174)

109. The AF technical team did not agree with appellant's priorities, stating in RID MC 1-005 that the AF desired appellant to maintain functional redundancy and simplify processing and use other optimizing and coding techniques to save memory. GAC replied on the RID form as follows (GAC R4, tab 2124):

Grumman's priority of options, as stated above, to meet the memory reserve requirements will not jeopardize our ability to meet the requirements of the F-111A/E SSS Our priority of options is consistent with the overall F-111A/E AMP goals delineated in our proposal for this effort.

The Government's priority of options may require additional effort on Grumman's part which may result in additional costs.

In evaluating the alternatives in reducing the program size, Grumman will maintain the order of priorities as stated by Grumman above. However, where feasible, Grumman will evaluate the impact of reducing the program in the order of priorities that the Government desires and determine whether it is a significant effort or not.

110. It also appears that at PDR #1 the AF technical team had concerns that appellant's proposed design of navigational backup in the WDC did not provide for a simple backup conventional filter to provide for mixing of inputs and data for inflight

alignment. RID 42 was issued to this effect. Appellant replied as follows (GAC R4, tab 3374 at 35550):

Grumman has considered various alternatives in the WDC NAV function. However, the current adverse memory reserve requirements preclude considering them in the WDC NAV function. We will provide you an estimate of the additional memory reserve impact of adding a filter to the WDC NAV function.

111. At PDR #2 in September 1986, appellant briefed the AF that, with minor exceptions, all GNC and WDC functions would be identical in primary and backup modes. Memory reserve estimates were unchanged from PDR #1, and remained below the levels required by contract. (GAC R4, tab 3383 at 12201)

112. By letter to GAC dated 17 October 1986, the contracting officer addressed the issue of OFP backup functions and memory reserve, as well as a dispute over how memory reserve should be calculated. The contracting officer wrote as follows (R4, tab 104):

. . . Meeting the memory reserve requirements requires a tradeoff between maximizing functional redundancy (for the GNC/WDC OFPs), higher order language (HOL) optimization and the mix of assembly language and HOL. Reference (d) [RID MC1-005] addressed this tradeoff question. To date, the Government is satisfied with the level of functional redundancy [sic] in Grumman's design; however, your reply to reference (d) indicated that redundancy is the *first* area you will look to change in any effort to achieve memory reserve requirements. As we have stated throughout the preliminary design phase, we want this to be the *last* resort taken. [Emphasis in original]

. . . Both of these issues, memory reserve definition and approaches to achieving memory reserve, are difficult to resolve. We have decided that a reasonable resolution for us would be to accept your memory reserve definition, provided that you adjust your response to reference (d) and assure us that your approach to meeting memory reserve requirements will not entail deletion of functional redundancy that exists at this time.

113. GAC replied by letter dated 21 November 1986, stating that it could not accept the contracting officer's proposal (R4, tab 110). The contracting officer then replied by letter dated 5 January 1987, stating in pertinent part as follows (R4, tab 114):

The Government is willing to accept your memory reserve definition as clarified [sic] in reference (a) [MWM-191], provided that you adjust your response to reference (c) [RID MC1-005] and assure us that your approach to meeting memory reserve requirements will entail deletion of functional redundancy that exists at this time only as a last resort.

The record does not reflect that appellant replied to this letter.

114. At the CDR of 20-23 January 1987, Grumman briefed the detailed design of each software module in the GNC and WDC OFPs. With minor exception, each module was briefed as being identical in the two mission computers. The estimated memory reserve was briefed as 21.7% in the GNC and 36% in the WDC, providing a GNC/WDC combined total of 29%. The Government inquired of GAC's progress towards the 35% memory reserve contract requirement. Appellant advised that it would provide updates of OFP memory reserve (GAC R4., tab 3393).

115. In 1987, appellant proceeded to code the MC OFP that it had designed for the F-111A/E. At PMR #7 in December 1987, appellant briefed the memory reserve status. The minutes reflected the following (AF R4 supp., tab 1125 at 9, 82):

The Air Force pointed out that the data showed Grumman was not meeting the combined GNC/WDC reserve requirement and asked how Grumman planned to correct it. Grumman said that emphasis was being placed on establishing OFP functionality and performance, first, to be followed with attention to reserve optimization, later.

116. At PMR #9 in July 1988, during flight test, appellant briefed the memory reserve as GNC 8%, WDC 14%, with combined GNC/WDC as 11%. Appellant's presentation indicated that "attainment of reserves [is] 2nd priority to flight test support and functionality completion." (AF R4 supp., tab 1127 at 47, 48) At PMR #10 in October 1988, appellant reiterated that attainment of reserves remained a "2nd priority" to supporting flight test and completion of OFP functionality (AF R4 supp., tab 1128 at 79). Appellant also stated that achievement of required memory reserve would be in doubt without reducing backup functionality in the software (*id.*).

117. At PMR #11 in February 1989, the parties met to discuss memory reserve. Insofar as pertinent, the minutes of the meeting state the following (AF R4 supp., tab 1129 at 203):

. . . Col Labeau [AF] stated that removal/reduction of functionality was not a topic of discussion. Richard Capria [GAC] stated that to meet the memory reserve requirements versus redundancy, as stated in the System Segment Spec . . . , that the removal/reduction of functionality is an issue unless the USAF and Grumman can come to a compromise. During and following the presentation the following items were discussed. . . .

. . . Grumman agreed to provide the USAF with a list of potential functions Grumman would like to remove which would not degrade the F-111A/E mission

. . . It was agreed to between the USAF and Grumman that a deviation request be submitted by Grumman to the USAF which defines the anticipated memory reserves that can be accomplished based on a more detailed analysis of the potential areas of memory savings

The USAF agreed to provide to Grumman their recommendations for potential memory savings.

Action Item #1 was written at PMR #11 which stated that appellant was to “provide plan for recovering space through optimization and clean-up of existing code while not affecting functionality.” (*Id.*)

118. Appellant performed a memory reserve investigation in response to Action Item #1. By letter to the contracting officer dated 27 March 1989, appellant advised that it was unable to meet contract memory reserve requirements, stating as follows (GAC R4, tab 2132):

. . . Achieving maximum redundancy between the Weapon Delivery Computer (WDC) and the General Navigation Computer (GNC) as required by paragraph 3.1.1 of Reference (b) [SSS, dated 21 April 1988], has resulted in designing backup functionality (redundancy) to the extent that the memory reserve requirement cannot be achieved. Since these objectives, redundancy and memory reserve, are not mutually exclusive, the results of Grumman’s initial investigation reflect the maximum reserves achievable without reducing the currently available backup functionality (redundancy) namely, 7.5% for the GNC and 10.0% for the WDC.

. . . If the results of the subject memory reserve assessment are not satisfactory to the Government, Grumman will recommend to the Government what backup redundancy may be eliminated to achieve the Government's desired memory reserve goal.

119. At PMR #12 dated 8 May 1989, appellant briefed memory reserve of GNC 0.25%, WDC 5.14% with combined GNC/WDC as 2.69% (GAC R4, tab 3452 at 9325). The AF discussed with appellant the results of its own memory saving investigation. By letter to appellant dated 22 May 1989, the AF provided its memory saving study to appellant, which pointed out techniques to achieve memory savings in the MC OFP (GAC R4, tab 2135). We find that this letter was not an out-of-scope contract direction, but merely provided recommendations for appellant's consideration. By letter dated 30 June 1989, the contracting officer advised appellant that appellant could achieve further code optimization and that the memory reserve requirements in the contract were valid (GAC R4, tab 2136).

120. Appellant replied by letter dated 19 July 1989, stating that its projected reserves of 7.5% and 10% at completion of the F-111A/E flight test program remained the same, notwithstanding the AF's suggestions (GAC R4, tab 2138). Throughout 1989, appellant continued to report memory reserve significantly below contract requirements. In late 1989, another meeting was held to discuss memory reserve issues. General Hammond, Commander, SMALC, attended on behalf of the AF, as did the contracting officer and a number of the AF program and production personnel. Messrs. Kramer and Capria attended on behalf of GAC. (Tr. 40/67-68) General Hammond advised appellant that he would not allow the contract to go into production because of appellant's memory reserve deficiencies, and he directed appellant to set up a group or team to recover memory in the GNC and WDC (tr. 40/81).

121. Throughout 1990, appellant sought to achieve greater memory savings. It achieved some gains but was still significantly below contract requirements. In September 1990, GAC tendered the F-111A/E MC OFP (Version 51) for acceptance by the AF. This MC OFP delivered the following memory reserve: GNC 9.16%, WDC 13.46%, combined reserves 11.31%. (GAC R4, tab 2142)

122. By letter to the appellant dated 5 November 1990, the contracting officer advised that the AF would accept the MC OFP although it did not meet contract memory reserve requirements, but that contract price consideration for the deficiency would be appropriate (GAC R4, tab 2142).

123. Appellant replied by letter dated 25 January 1991, indicating that contract price consideration was not warranted. Insofar as pertinent, appellant stated as follows (GAC R4, tab 2143 at encl. 1, page 1):

The System Segment Specification paragraph 3.1.1 states that “maximum redundancy of these OFPs is a design goal, commensurate with memory reserve requirements”. The Air Force has been well aware of the conflict between memory reserve and the mutually agreed to approach for maximum redundancy. This problem has been exacerbated by the Air Forces’ [sic] direction to incorporate many out-of-scope additions to the OFP. In spite of this the Contractor has spent untold hours regaining memory reserve to achieve the present numbers.

Grumman believes that it has satisfied the SSS requirements to the extent possible considering the back-up functionality requirements and additional scope changes levied on it by the Air Force.

The AF did not unilaterally reduce appellant’s contract price for failure to meet memory reserve requirements.

124. With respect to the EF-111A, the SOW provided the following pertinent provision (R4, tab 1 at 345):

1210 MISSION COMPUTER (MC)

1210.1 Integrate the two Mission Computers on the EF-111A aircraft. The Operational Flight Program (OFP) software in these computers shall be identical. . . .

125. The SSS for the EF-111A provided in pertinent part as follows (*id.* at 167):

3.0. REQUIREMENTS

. . . .

3.1.1 General Description The system shall be controlled by two Mission Computers. The two mission computer OFPs shall be identical and shall be controlled as one CPCI and CPIN. Each MC shall contain a MIL-STD-1553B mux bus controller. One MC shall assume bus control at power-up and the other shall act as a remote terminal. The roles shall be reversed in the event of bus controller failure of whichever MC is primary at the time of failure. . . .

126. However, the GPS SSS for the EF-111A, which modified the SSS, provided in pertinent part as follows (*id.* at 142, 152):

3.2.1 Performance Characteristics. Installation of the modified or new avionics system equipment and computer programs shall improve the aircraft reliability, maintainability, and mission effectiveness as defined herein. . . . *Functional operation of the avionics system shall be identical in primary and backup operation wherever feasible.* Provision shall be made for smooth transition of MIL-STD-1553B mux bus control and system functions in the event of failure of the primary bus controller or either MC. The alternate MC shall assume control of bus transmissions. Provisions shall also be made for direct computer-to-computer communication to allow the other MC to assume the backup functions in the event of primary computer failure. [Emphasis added]

....

3.3.1 Computer Programming

....

The MC OFP shall be designed such that the memory reserve is a minimum of 35 percent and that the useful throughput reserve is a minimum of 50 percent.

127. As was the case with the F-111A/E, appellant's design of the EF-111A mission computers did not provide for the memory reserve level set forth in the specifications. At PMR #9 on 15 August 1989, appellant briefed the memory reserve at 10.7%. Insofar as pertinent, the minutes of the PMR provided as follows (GAC R4, tab 3457 at 33080):

J. Chapman [AF]: Is Grumman going to meet the memory reserve spec?
R. Capria [GAC]: No
J. Chapman: What is Grumman shooting for?
R. Capria: Between 15-20%.

128. By letter to appellant dated 13 September 1989, the contracting officer advised, in part, as follows (R4, tab 690):

The contractor stated at the PMR that the Memory Reserve available at this time was only approximately 10.7% with a final expected value to approach only 20%. The Air Force considers this final value unacceptable and not in compliance with the System Segment Specification. In order to meet your contractual requirement, all feasible memory saving technics [sic] must be pursued. A formal response to this correspondence is required no later than 15 October 1989.

Appellant did not reply to this letter (ex. G-141 at 99).

129. The final MC OFP for the EF aircraft had roughly 18% of memory reserve, significantly below contract requirements. It appears that the AF also accepted this MC OFP with the noted deficiencies and did not take any reduction in contract price. (Ex. G-141 at 100)

130. In 1986, appellant made a business decision to use its Houston office technical personnel to develop the MC OFP, in lieu of using its Long Island technical staff. According to the AF lead engineer, Mr. Bob Tuttle, this decision created performance problems for appellant (tr. 6/33-34):

. . . The problem was – and we identified this right away, and it continued to be a problem throughout the project – is that those people not only had to learn about F-111s. They had to learn about airplanes.

. . . .

It wasn't uncommon for some of our people in the IV&V team to be on the phone for hours on a given day trying to go over fundamental navigation nuances or fixtacking – I say “nuances,” but fundamental fixtacking features and navigation features that the folks at Houston, though they were capable, they simply hadn't been exposed to and didn't understand.

131. The record indicates that memory reserve problems were attributable to personnel turnover at Houston, the lack of review of the software being produced by inexperienced Houston staff and the lack of an active program to monitor memory reserve as the software was being produced (tr. 6/30-32). Appellant did not call as a witness its manager of the Houston office, Mr. Eric Peters, to address any of these issues. Much of the memory reserve problem “was due to software developed in a hurried fashion without review by other technical people to provide feedback about inefficiencies and problems.” (Tr. 6/29)⁹ By letter to the AF dated 17 August 1988, appellant's president also conceded

that a contributing factor to appellant's MC software problems was that "in the interest of expediency, Grumman violated its own software procedures" (R4, tab 339). We find that all of the above problems were attributable to appellant.

132. During the laboratory and flight testing of the F-111A/E and EF-111A MC OFP, problems that would arise related to the operation of the software would be documented in software trouble reports (STRs) and field/flight problem reports (FPRs). There were many occasions when code changes would be required to fix these problems. These code changes would reduce memory reserve. As stated in GAC memorandum from Mr. Schenck to Mr. Kramer dated 21 November 1988 (R4, tab 1361.442 at 1371-72):

The continuing efforts on A/E MC OFP STR resolution, which typically lead to the addition of more code to correct problems, has finally reached the point where the GNC OFP requires more memory than is available in the MC.

There were at least **1100** STRs and FPRs issued under the contract, and appellant has asserted that only roughly **152** were out-of-scope and attributable to the AF (*see* STR/FPR section of this Opinion, *infra*). At the hearing, AF engineer Mr. Ben Alsop identified a number of STRs which were not claimed as out-of-scope (*i.e.*, appellant assumed contract responsibility for them), and resulted in code changes to the MC OFP that negatively impacted memory reserves (exs. G-106, -259), and we so find.

133. We find that the STRs, most of which were attributable to appellant, impacted memory reserve. We also find that during the contract the AF reduced a number of the weapon delivery modes originally required under the SSS, which served to free up memory reserve for appellant's use (ex. G-259 at 11).

134. Appellant sought recovery, *inter alia*, for its attempts to improve memory reserve pursuant to its 1991 REA which was revised in 1993 (R4, tabs 936, 979), and under its 1994 claim (R4, tab 991). The contracting officer addressed appellant's contentions on the merits and denied the claims on both occasions (R4, tabs 985, 999).

DECISION

The threshold question in addressing this claim is one of contract interpretation. The contract provided that for the F-111A/E MC OFP, appellant was to seek maximum redundancy as a "design goal." On the other hand, memory reserve was mandated by the contract at specified levels ("a minimum of 35%") and its performance was underscored as a contract "requirement." If a contract design goal impinges upon a contract requirement, the former must relent. As stated in the contract, maximum redundancy was a design goal "commensurate with memory reserve requirements." As for the EF-111A, the GPS SSS

provided that the functional operation of the system in primary and backup operation was to be identical wherever feasible, and also contained memory reserve “requirements.”

Given this contract language, we believe that appellant had the design discretion to delete backup functions in the computers and to reduce redundancy to insure compliance with memory reserve requirements. We believe that the AF, in a number of letters and meetings, impermissibly interfered with appellant’s design discretion in this respect.

However this does not end our analysis. Since appellant seeks to recover its additional costs related to memory optimization, it must show that the AF caused these additional costs. We are not persuaded that these additional costs were solely attributable to the AF. The record shows that appellant made memory-consuming code changes to address many STRs and FPRs that were its own responsibility. Appellant’s software developers were shown to be inexperienced and lacking in basic knowledge of aircraft systems, their work was hurried and without adequate review, and they violated their own internal procedures for software development and design. These problems also contributed to inefficient design and memory reserve problems that were appellant’s responsibility. We believe that appellant materially contributed to its memory reserve problems and the concomitant need to optimize code. Under these circumstances, we conclude that appellant is not entitled to an affirmative recovery on this claim.

For reasons stated, appellant’s backup functions and memory reserve claim is denied.

(6) FINDINGS OF FACT – Ballistics Data

135. Bomb characteristic data, known generically as “ballistics data,” provide information as to how a bomb falls upon its release from an aircraft. This information is composed of three elements: drag data, flow field data, and ejection velocity. These types of data were needed by appellant to write its software for weapons delivery as part of the MC OFP for the F-111A/E. (Ex. A-31 at 1-2)

136. Paragraph 3.2.1.2 of the F-111A/E GPS SSS spelled out appellant’s weapon delivery responsibilities as follows (R4, tab 1 at 121):

3.2.1.2 Weapon delivery. The modified Avionics System, in conjunction with retained equipment, shall provide the F-111A/E aircraft with the computational and control functions necessary to generate release signals for the delivery of all weapons indicated in the Weapons Stores List, Table 3.2. All of these weapons’ drag characteristics (CD vs Mach, CD vs Time, etc.) and Flow Field characteristics shall be stored in the WDC. These tables shall be loaded via the OFP load (default

load) or via the MDPE/DTS (automatic load). The format for storage and processing of weapon ballistics shall be identical to that used for the FB-111 AMP, except where Appendix I requirements dictate otherwise. . . .

137. Appellant was to develop its software from certain raw ballistics data so that it could be used in the MC OFP. SOW § 1640.2 provided as follows (R4, tab 1 at 463):

1640 SUPPORT AND OTHER SOFTWARE

. . . .

1640.2 Develop the software required to convert raw Coefficient of Drag (CD) vs Mach and CD vs time data to the format used in the F-111A/E MC OFP. This support software shall be hosted on the IBM processor and operating system used for the FB-111A AMP and other F-111A/E support software.

138. The drag data for the F-111 were developed in part by AF personnel and in part by GDC, the manufacturer of the F-111 for the AF. Flow field and ejection velocity data had been developed and revised by the AF and contractor OFP developers over a number of years. (GAC R4, tab 2082; tr. 68/253)

139. The source of the above data was not made known to appellant under this contract. The contract did not provide the data to appellant or otherwise identify where the data could be obtained, and it does not appear that the data were contained in the AMP library. Nor did the SOW indicate that appellant was to develop the data.

140. In September 1986, at appellant's request, SM-ALC provided certain ballistic data to appellant. On 7 November 1986, the Chief of the Avionics Modernization Program Office at SM-ALC wrote to Eglin AFB regarding the subject "Required Ballistics Data for the F-111 Avionics Modernization Program," and stated in pertinent part as follows (GAC R4, tab 2061):

1. Grumman Aerospace Systems Division (GASD) is the integration contractor for the F-111A/E AMP. Their integration task entails the replacement of the current analog bombing navigation system with a digital one. *As such, ballistics data for the entire set of aircraft stores will be needed by GASD for their software weapon delivery mechanization.* Grumman's need for this data will extend

through the completion of flight testing, approximately June 1989. [Emphasis added]

2. We request that you work with GASD to supply the information which they have identified previously and may identify in the future. . . .

141. By letter dated 2 January 1987, Eglin provided GAC with certain ejection velocity and other ballistics data (GAC R4, tab 2064). Eglin also provided flow field data for some, but not for all of the weapon stores listed in the contract. Eglin advised appellant that many different aircraft, other than F-111s, were used to develop the flow field data. (GAC R4, tab 2067) Appellant, per its ballistics data manager Dr. Jack E. Rubenstein, was aware in February 1987 that the validity of the flow field data as it pertained to the F-111A/E was in question. According to Rubenstein, appellant could either use the Eglin data, or discard it and use “zeroes” for the flow field coefficients for the corresponding weapons. (GAC R4, tab 2069)

142. In 1987, the AF advised appellant not to use the Eglin flow field data, but it appears that appellant used it anyway (GAC R4, tab 2103; R4, tab 1813.063 at 11). After weapons delivery problems for certain ordinance arose in testing in 1988-89, appellant had to rework its MC OFP to delete the Eglin flow field data and to use zeroes for the flow field coefficients for certain ordinance. We find that this additional work was appellant’s responsibility. For other weapons, appellant used the flow field data provided by the AF on a piecemeal basis through 1990. (GAC R4, tab 2103)

143. With respect to raw drag and ejection velocity data, the AF was unable to provide a complete and accurate set of data for all weapon stores within the time needed to timely code the MC OFP. The AF provided some data to appellant in January 1987, and provided revised data during flight test in August 1988, November 1988, December 1988 (GAC R4, tab 2097), and April 1990 (GAC R4, tab 2093).

144. In June 1988, the AF pointed out certain inaccuracies and errors in the weapon data tables in the OFP developed by GAC, including erroneous drag curves and incorrectly computed drag constants, a number of which were acknowledged by appellant (GAC R4, tab 2075; tr. 69/29).

145. In February 1990, the AF also provided an analysis of appellant’s F-111A/E OFP weapon constants tables, which showed a number of poor curve fits and numerous computer typographical errors (GAC R4, tab 2088; tr. 69/29). Under the contract, appellant was to develop the curve fit software program to derive coefficients for the equations to be used by the OFP to compute the coefficient of drag for a given mach number (ex. G-259 at 4). By letter to the AF dated 20 April 1990, appellant challenged a number of the AF findings but also conceded the validity of a number of them. Appellant’s

letter also identified the actions undertaken to correct its own work, which included the refit of curves and the correction of errors, and contained statements such as “We agree this is wrong. Needs further analysis before correcting.” (GAC R4, tab 2092) We find that the aforementioned errors by appellant were not attributable to the AF.

146. Appellant’s REA dated 10 June 1991, as revised on 7 May 1993, sought reimbursement for costs incurred relating to the changes in the ballistics related data provided by the AF, and also for their impact on weapon delivery software problems and STRs (R4, tabs 936, 979). By letter dated 26 August 1993, the contracting officer denied this request for the most part, contending that AF data submissions were timely and that flight test weapon delivery problems resulted from appellant’s improper software implementation. However the contracting officer found as follows (R4, tab 985):

I do find that a portion of STR 1055 and STRs 1116 and 1117 were due to ballistics and flow field data that was changed after CDR and caused an impact to Grumman on AMP. Further, I further find that STR 978 was generated as a result of inaccurate ballistics data. Accordingly, I find that Grumman is entitled to \$20,539.00 for these four STRs.

With respect to the portion of STR 1055 found to be recoverable, we find that said portion relates to the AF direction to appellant to incorporate the AF’s submission of flow field data in 1990 (ex. A-39 at 4.11-48, 49).

147. It appears that appellant did not accept the contracting officer’s assessment of its REA. Appellant reasserted entitlement for inadequate ballistics data as part of its larger claim dated 30 March 1994 (R4, tab 991). By decision dated 30 September 1994, the contracting officer again acknowledged entitlement in part, stating that certain MC OFP changes under STRs 978, 1055, 1116, 1117 resulted from changing and/or inaccurate AF ballistics data (R4, tab 999). No determination of quantum, however, was made in the decision.

148. The contracting officer reaffirmed his 30 September decision at trial. We find that appellant is entitled to recover the reasonably incurred costs related to the investigation and the correction of the STRs identified in the contracting officer’s decision.

149. Mr. Paul Marolf was one of appellant’s software engineers for weapon delivery, starting his work in March 1988 (ex. A-31 at 1). He testified, and we find that he expended a substantial amount of time to analyze the various data updates submitted by the AF between 1988 and 1990 (ex. A-31 at 2-3). However he did not testify that any defective ballistics data caused the issuance of any particular STR, or caused any particular MC OFP code change, or otherwise impacted the delivery accuracy of any particular ordinance. Mr. William Young, appellant’s lead flight test engineer, testified generally about ballistics

data and weapon delivery accuracy (ex. A-15), but also did not link any particular defective ballistics data to any particular STR. The Government's engineer, Mr. Ben Alsop, testified and we find that appellant's poor curve fits and code errors would affect weapon delivery accuracy and were the responsibility of appellant. (Ex. G-259 at 6-9, ex. G-261)

DECISION

GAC needed accurate ballistics data to help develop software for accurate weapons delivery for the MC OFP for the F-111A/E. As a threshold matter we must decide which party was responsible to provide the data.

The specifications provided that the weapons' drag and flow field characteristics were to be stored in the weapon delivery computer, but nothing in the SSS or SOW suggested that it was the contractor's responsibility to develop or to provide the underlying raw data. In fact, the raw data were developed over a number of years by AF activities or under AF contracts with private parties, but the AF did not provide or identify the data under the contract or include it in the data library.

We conclude that the raw data were not reasonably available to GAC outside AF channels. We conclude that this information was necessary for appellant to perform its work, and the AF was responsible to provide the data to appellant. While this information was not specifically called out on the contract's GFP list, we do not believe this to be determinative when the facts otherwise clearly show that the data had to be Government-furnished.

The AF had an obligation to timely deliver reasonably accurate and complete raw ballistics data to GAC to enable appellant to perform its work. It did not do so. The AF provided raw flow field, drag and ejection velocity data on a piecemeal basis over a period of years and well into the flight test period. Appellant is entitled to recover its costs to analyze the various data updates submitted by the AF between 1988 and 1990.

However, except for the few STRs acknowledged by the contracting officer, appellant has not established by a preponderance of the evidence that the state of the ballistics data caused the issuance of any specific STR, or caused any specific weapon delivery problem.

In summary, we conclude that appellant is entitled to recover the costs incurred to analyze the various ballistics data updates submitted by the AF between 1988 and 1990. Appellant is entitled to recover the costs incurred to investigate and correct STRs 978, 1055, 1116 and 1117. Appellant's ballistics claim is denied in all other respects.

(7) FINDINGS OF FACT – The Standard Inertial Navigation Unit and Kalman Filter

150. The Standard Inertial Navigation Unit (SINU) provided velocity, acceleration, position, heading, attitude and related navigation data to the aircraft navigation software, which used the information to calculate the position of the aircraft (tr. 5/168). The parties do not dispute, and we find that the SINU was GFP under this contract.

151. Contemporaneous with the F-111 avionics modernization program, the AF was working on a separate program for the development of a SINU that could be used on many different aircraft. The SINU program was managed by the Aeronautical Systems Division (ASD) at Wright-Patterson Air Force Base. Litton and Honeywell were two SINU manufacturers that participated in this program.

152. As part of this contract, Litton and Honeywell were to supply SINUs for appellant's avionics modernization effort as GFP, and appellant was to enter into associate contractor agreements with each vendor for this purpose. (R4, tab 1 at 58, 59) In accordance with F-111A/E SSS § 3.7.5, these units were to be designed in accordance with a specification known as SNU 84-1. Only one SINU was to be installed in each aircraft. (R4, tab 1 at 280) The contract at F-111A/E SSS § 3.2.1.5 provided that appellant was to design its system "to provide the capability to install any AF Standard INU designed to SNU 84-1 specification" (R4, tab 1 at 265). Hence, appellant's newly designed navigation system was also to be designed consistent with the SNU 84-1 specification, and was to be capable of integrating the Litton and Honeywell units and any other SNU 84-1 compliant boxes.

153. Given this common design baseline and the contract requirement above, we find that GAC had reason to expect that the SINUs from each manufacturer would be essentially interchangeable in form, fit and function and would be relatively transparent to GAC's integrated SNU 84-1 compliant design.

154. The contract's "AMP GFE Requirements List" provided that the AF was required to furnish three SINUs from each manufacturer to appellant, one in March 1987 for the MC STS; one in April 1987 for the laboratory integrated mockup; and one in September 1987 for the trial aircraft (R4, tab 1a at i-9). In accordance with the Government Property clause, said units were to be delivered by the required dates in a condition suitable for their intended use.

155. Shortly after contract award, SM-ALC foresaw integration problems for appellant with the Litton and Honeywell units. By telegram from the AF program office to ASD issued on 10 March 1986, the AF program office advised in part as follows (GAC R4, tab 1288):

2. . . . The F/EF-111A/E AMP integration contract requires integration of the standard navigation unit spec 84-1 INU at the specification interface level. It is our requirement that Grumman complies with our direction to perform laboratory and flight testing to verify STD INU ring laser gyro (RLG) interchangeability/compatibility.

3. We concur that integrating the INU RLG at the specification level should require only minor aircraft software (S/W) changes. *However, known differences in internal workings between the two current source INU RLG configurations suggest S/W impacts to an integrator [Grumman] which will far exceed minor changes even when only considered at the specification level.* [Emphasis added]

156. The AF delivered the SINUs to appellant a number of months later than prescribed by the contract. The first set was delivered on or around 30 April 1987 and the second set was delivered on or around 28 July 1987. (R4, tab 999 at 11)

157. In late 1987, the AF again voiced concern over the differences between the purportedly “standard” inertial navigation units. By memorandum dated 24 December 1987, the AF’s lead engineer, Mr. Robert Tuttle, advised the AF program managers as follows (GAC R4, tab 1361):

1. Attached is trip report submitted by Rockwell. The maturity of the RLG SINU program may not be what we think, i.e.
 - a. More spec [sic] changes coming
 - b. Known differences between Litton/Honeywell units
 - c. ASD not on top of issues – config [sic] management, etc.
 - d. Unknown turn-around for anomalies.

158. By memorandum to the contracting officer dated 5 February 1988 regarding “SINU Anomalies – Request for Direction,” appellant notified the AF of its general dissatisfaction with the SINUs furnished by the Government. No specific problem was identified in the memorandum, but appellant invited the AF to contact its engineering department for details of the problems. Appellant sought the contracting officer’s attention to these anomalies, and sought contract direction to remedy them. (GAC R4, tab 1372)

159. On 10 February 1988 a SINU meeting was held as part of an AMP Executive PMR to discuss pending SINU software problems and proposed fixes. AF, Grumman, Litton and Honeywell representatives attended. The contracting officer did not attend but

he received a written summary of the technical issues addressed at the meeting. By letter to appellant dated 23 February 1988, the contracting officer provided the minutes of the meeting to appellant and stated as follows (GAC R4, tab 1376):

We acknowledge your [5 February] letter . . . and share your concerns. We have taken the following actions in attempt to rectify the impact on the F-111A/E/EF AMP. Reference (b) minutes contain agreements between the SINU Program Office, both SINU vendors, SM-ALC, and Grumman. These agreements will result in the upgrade of the SINUs in Grumman's possession and establish a forum to resolve the vertical loop problem.

160. During 1988, GAC continued to experience problems with the Litton and Honeywell SINUs. By memorandum to the AF program office dated 15 July 1988, with a copy to the contracting officer, appellant documented these problems with particularity. GAC stated that a number of the problems resulted from specification inadequacies, inability of the SINU vendors to meet specification requirements, and differing interpretations of the specifications by the vendors which affected their interchangeability with GAC's OFP. (GAC R4, tab 1423)

161. Appellant's monthly cost performance reports, copies of which were provided to the AF program office and the administrative contracting officer (ACO), notified the AF of appellant's projected additional costs attributable to the SINUs. Grumman's January 1988 CPR, September 1988 CPR, January 1989 CPR and December 1989 CPR reported to the AF that the rough order of magnitude for additional scope/growth attributable to the GFE SINU had increased from \$22,000 to \$125,000 to \$400,000 to \$1,000,000 respectively. (AF R4 supp. tab 1023 at 2, tab 1031 at 2, tab 1035 at 2, tab 1046 at 2).

162. By memorandum to the contracting officer dated 28 April 1989, appellant sought the contracting officer's acknowledgment of past out-of-scope SINU problems and also sought an arrangement by which the AF would acknowledge future out-of-scope problems before appellant expended effort to provide a fix (GAC R4, tab 1522). It is unclear whether the contracting officer provided the information requested by this letter.

163. During the flight test period, the AF documented SINU problems for the SM-ALC Commander in a report entitled "Commander's Special Interest Item," dated 3 August 1989. Insofar as pertinent, this report stated as follows (GAC R4, tab 1564):

1. Grumman's version 42 of the F-111A/E software was received 26 Jun 89 and was scheduled to correct miscellaneous software problems. *Problems with GFE (SINU and GPS) has been a hindrance to testing of load 42. . . .* [Emphasis added]

2. The standard inertial navigation unit (SINU) is a dual sourced item. Honeywell and Litton are the two sources. *This unit is in development and we do not have a firm design. We are having problems with both units.* Another version of the Honeywell software is due around 15 Aug 89. It may be some time before the Litton problems are resolved.
[Emphasis added]

164. A meeting was convened on 16 August 89 during a PMR to discuss specific SINU problems. The contracting officer attended and was fully aware of the problems. (GAC R4, tab 1569)

165. On 13 December 1989, over 2-1/2 years after the units were furnished under the contract as GFP, the AF program manager wrote ASD about his continued frustration with the changing designs and inconsistencies between the purportedly “standard” inertial navigation units on the F-111 program (GAC R4, tab 1602):

. . . [O]f significance to our program are the areas involving transparency between the two INUs. We believe that INUs which are not transparent are not truly form, fit, and function (F3) and as such, have not met the goals and expectations of the STD RLG INU program. Additionally, the F-111 AMP program takes exception with continually being put in the position of having to pay our integrating contractor [Grumman] to correct and/or test problems which should not be present in a true F3 INU. We feel as though our program is doing development testing of the INUs, at our expense, when we should be paying just to integrate a fully-developed “off-the-shelf” INU.

As indicated in the memorandum above, as the SINU designs evolved the contracting officer directed appellant to test them. It appears that the AF has paid appellant for this additional testing work and these costs are not being claimed by appellant herein.

166. As of June 1990, the lack of transparency between the SINUs had not been fully resolved (GAC R4, tab 1602). As a result, GAC had to provide additional code in the system depending on which SINU was being used, and such code development also required additional code testing and validation (ex. A-25 at 7). It ended up that appellant in effect designed an OFP version dedicated to the Honeywell unit and an OFP version dedicated to the Litton unit (tr. 32/24). We find that the contract did not require separate OFPs for each unit. On the contrary, F-111A/E SSS § 3.2.1.5 called for a basic design that would accommodate any unit designed to SNU 84-1.

167. SINU defects, attributable to the AF, also impacted appellant's Kalman filter. The Kalman filter is part of the MC OFP and processes position measurement data from various sources, and among other things, inputs data to the SINU to keep the SINU navigational data as accurate as possible. When the Kalman filter would determine that the SINU's position information was in error, it would send a correction message to the SINU. However, the SINU boxes did not properly implement these corrections which resulted in the generation of inaccurate data. The SINU vendors reworked their boxes and appellant had to redesign the Kalman filter to accommodate these changes. Also, the Litton SINU did not time-tag data correctly. As a result, incorrect data was sent to the Kalman filter which caused the latter to create and to send incorrect correction data back to the SINU, which in turn further exaggerated the nature of the error. After Litton corrected this problem, the Kalman filter also had to be adapted accordingly. Appellant also encountered problems with the "best available true heading" (BATH) mode. When the aircraft was in this mode, the Kalman filter expected to receive a certain type of data from the SINUs, but instead they provided the Kalman filter with different information which caused certain data processing errors. GAC had to expend significant effort to determine the cause of these problems and to rework the Kalman filter as necessary. (Ex. A-25 at 2-5)

168. There were also problems with the baro-inertial loop in the SINU. The baro-inertial loop is a mathematical function that helps to determine altitude by taking into consideration vertical velocity and barometric altitude data which is input by the Standard Central Air Data Computer (SCADC). The SINU boxes were not correctly implementing the data received from the SCADC and as a result were generating inaccurate altitude data. (Ex. A-25 at 3) Two of these problems were identified at a SINU meeting on 16 August 1989 during integrated flight test. Insofar as pertinent, the minutes of said meeting provided as follows (GAC R4, tab 1569 at 34895):

. . . The first problem is that the altitude output from the Litton SINU would freeze when an invalid pressure altitude signal was received (for instance SCADC failure). Mr. Bruner [Litton] said that this problem was fixed in the -8-556 software. . . . The second problem in this area is one in which F02 corrections are not being applied properly to the baro-altitude loop. This problem will not be fixed until the -8-557 software which won't be available until approximately 7 September 1989. *This second problem causes effects [sic] the validity of accuracy events, such as weapons releases, and therefore SM-ALC has decided not to accept the -8-556 software.* A concern was raised about the time required for Litton to release the -8-557 software and for Grumman to certify it. Lt. Green took an action to press ASD for a quicker release of the -8-557 software. [Emphasis added]

The Honeywell SINU unit also had problems implementing altitude corrections received from the Kalman filter, which we find were attributable to the GFE SINU (ex. A-25 at 3, 4).

169. We find that the baro-inertial loop problems – and the additional effort incurred by appellant to address these problems in its MC OFP – were attributable to the GFE SINUs and the AF (ex. A-25 at 3, 4). We find that SINU defects and the lack of transparency between the so-called “standard” units also impacted flight testing to some extent and created additional cost for appellant.

170. GAC was of the view that STR Nos. 441, 476, 495, 520, 953 , and 1112 – and the software work needed to correct them – were also caused by SINU-related problems. However the Government’s expert Dr. DeBeau testified, and we find that none of these STRs was attributable to SINU defects and were instead attributable to Grumman (ex. G-98 at 12).

171. The AF has already paid appellant for additional work necessitated by changes to the SNU 84-1 specification. Under contract Modification No. P00025 dated 30 September 1987, the AF issued a unilateral order which, *inter alia*, revised the specification, and this change was definitized by contract Modification No. P00057 and executed by the parties in December 1988. This bilateral agreement provided that it was “a full settlement of any claims of the contractor arising out of or in connection with changes effected by P00025.” (AF R4 supp., Vol. 79, tab 1CE at 2 of 5)

172. The contracting officer testified at trial, and we find that the AF did not compensate appellant for any additional integration work and extension to flight testing caused by the condition of the SINUs (tr. 63/43). Appellant’s cost performance reports continued to identify SINU out-of-scope efforts after Modification No. P00057 was executed, through December 1989 (AF R4 supp., tab 1046 at 2).

173. Appellant included SINU-related costs as part of its 1991 REA, as updated in 1993 (R4, tabs 936, 979) and in its 1994 claim (R4, tab 991). The contracting officer addressed the merits and denied relief on both occasions (R4, tabs 985, 999).

DECISION

The Litton and Honeywell SINUs were Government-furnished property. Under the contract, they were to be timely provided and were to be reasonably complete, accurate and suitable so as to facilitate appellant’s performance of the contract work.

The record shows that these units were not timely delivered under the contract terms, nor were they reasonably accurate, complete and suitable for their intended purpose when they were delivered to appellant in 1987, nor for years thereafter. These

Government-furnished standard inertial navigation units were almost in a constant state of design flux between 1988 and 1990, and there were considerable problems with their standardization and use. Appellant did not cause these problems, nor did appellant have any contractual basis to expect such problems from this GFP.

Based upon our findings, we are persuaded that SINU problems caused GAC to incur additional integration costs – including extra work on the Kalman filter – for which the AF is responsible, with the exception of STR Nos. 441, 476, 495, 520, 953, and 1112. We are also persuaded that SINU-related problems contributed to flight test delay.

The AF contends that appellant was aware, pre-award, that the SINUs were not production or finished units and thus assumed the risk of any additional costs. The record, however, does not clearly show the extent of appellant's pre-award knowledge, if any. Assuming, *arguendo*, that appellant had some pre-award knowledge about these units, it had every reason to expect that since the units were designated as GFP, they would be reasonably accurate, complete and suitable by the date they were to be furnished under the contract. Clearly, this did not happen.

The AF also contends that this SINU claim must be denied because appellant failed to provide timely written notice of the defective GFP or of its SINU claim to the contracting officer. We do not agree. The record is replete with Grumman letters to the contracting officer and AF internal documentation which identified SINU problems and out-of-scope efforts. The contracting officer also wrote to appellant sharing his concerns about SINU problems, and even attended a technical meeting on SINU problems in August 1989. Appellant's cost performance reports also advised of the magnitude of the out-of-scope work on a monthly basis. Moreover, the contracting officer's decision addressed the SINU claim on the merits, and asserted no claim of prejudice due to lack of notice under the contract. Hence, the AF has waived the lack of notice defense under these circumstances. *Kumin Associates, supra; Dittmore-Freimuth Corp., supra; Central Mechanical Construction, supra*. Assuming, *arguendo*, that the AF has not waived notice, we believe the record shows that the contracting officer had adequate notice of appellant's SINU problems and its related claims.

We also hear the AF to argue that appellant's own errors were the cause of its additional integration costs. While we have found that certain STR-related costs should be borne by appellant, we are not persuaded by the evidence that any Grumman error was of such magnitude so as to preclude recovery of the extra costs incurred to address SINU-related problems. Nor are we persuaded that the parties settled these extra costs under Modification No. P00057.

We have considered the AF's remaining contentions but believe they are without merit. We conclude that appellant has established entitlement under its SINU and Kalman Filter claim.

(8) FINDINGS OF FACT – Standard Central Air Data Computer

174. In accordance with SSS § 3.7.8 for the F-111A/E and EF-111A, the Standard Central Air Data Computer (SCADC) received inputs representing air data, aircraft identification and aircraft system status, and computed related air data functions and transmitted selected air data to the associated aircraft system, which information was to be incorporated into the required functions of the MC OFP (R4, tab 1 at 200, 282). The SCADC was to be provided under the contract as GFP by GEC Avionics Ltd. (GEC).

175. As part of the contract work, appellant was to integrate the SCADC into the F-111A/E and EF-111A, replacing the existing central air data computer (CADC). For each aircraft, the SOW at Exhibit E identified “Time Compliance Technical Order” (TCTO) 1F-111-1343, “Replace Standard CADC,” which related to this contract work. In pertinent part, Exhibit E stated as follows (R4, tab 1 at 547):

All TCTOs must be considered in accomplishing the AMP design.

We find that TCTO 1F-111-1343 was part of the SOW and was to be followed in the replacement of this computer.

176. The version of this TCTO made available to appellant during the proposal stage, known as the “preliminary” TCTO, provided for the wiring of the flap angle probe from the aircraft wing to the SCADC (tr. 62/203). The record also contains a schematic diagram sent by the AF to GAC on 5 February 1985, prior to the submission of GAC’s proposal, which confirms this wiring (GAC R4, tab 1780). There is no dispute that appellant designed this wire run and fabricated and installed the wiring.

177. During contract performance, the AF made available to GAC an updated TCTO 1F-111-1343, known as the “final” or “installation” TCTO. This TCTO version did not contain the wiring in question. GAC technical personnel sought direction from the AF at a PMR session in December 1987. GAC sought guidance as to which version of the TCTO to follow. GAC repeated its request for assistance at a PMR in February 1988. At neither PMR did appellant advise the AF that the wiring and/or its testing was out-of-scope. (GAC R4, tab 1816)

178. It appears that the parties’ technical representatives discussed this matter in March 1988 (GAC R4, tab 1815) and in April 1988 (R4, tab 284). AF technical personnel told appellant to maintain the wiring installation per the preliminary TCTO that was in existence at the time of award. With respect to test procedures and documentation for the wiring installation, the parties agreed that the AF would provide GAC with a draft test procedure to verify the wiring interface, that GAC would provide corrections to the test

procedure if necessary and that GAC would provide the necessary changes to the affected technical orders. This agreement was confirmed by letter from the contracting officer to GAC dated 28 April 1988 (R4, tab 284).

179. As far as the record shows, appellant did not seek, nor did the AF agree to provide any additional payment for this work at the time this agreement was reached. Nor did GAC dispute the terms of the agreement when it received the AF's 28 April 1988 letter. The AF provided a draft test procedure to GAC, and GAC used it to prepare its own test procedure for the wiring installation in May 1988 (GAC R4, tab 1821). GAC's test procedure was quite similar to the one provided by the AF (tr. 9/87).

180. By letter to the contracting officer dated 11 August 1988, GAC contended that the wiring installation between the flap angle probe and SCADC was out-of-scope and that the cost impact would be provided under separate cover (GAC R4, tab 1830). The AF did not acknowledge responsibility for these costs. This matter was later reasserted in appellant's 1991 REA as updated in 1993 (R4, tabs 936, 979) and in appellant's 1994 claim (R4, tab 991), and was denied by the contracting officer on both occasions (R4, tab 999).

181. During flight test, the SCADC would shut down when the aircraft reached an air speed of Mach .44 (tr. 39/40-41). GAC investigated this problem, and determined that it was caused by a defect in the Government-furnished SCADC. GEC, the manufacturer of the SCADC, eventually provided the correction (tr. 39/41).

182. By letter to the contracting officer dated 11 August 1988, GAC notified the AF that the costs incurred to investigate the ".44 Mach SCADC cycle off" problem was out-of-scope (GAC R4, tab 1830). Appellant reasserted this matter in its REA and claim. The contracting officer denied appellant's SCADC claim as stated above, but did not specifically address this contention, nor did he state that he failed to receive timely notice of the claim.

183. During flight testing in 1988, there arose another problem with the operation of the SCADC, known as the power-up handshake discrepancy. When the SCADC was queried for its status upon system turn-on, *i.e.*, a transmit "last status mode command," it would respond inconsistently. (Ex. A-41 at 2)

184. Appellant inquired of GEC, the SCADC manufacturer, regarding this problem. GEC made the following recommendations by memorandum to GAC dated 22 November 1988 (GAC R4, tab 1848):

We recommend that you send a Reset Mode Command as the first command to clear the ' Last Status Word Register' . This

resetting [sic] operation will be completed within the 4 p-sec minimum inter-message gap time period.

Another option would be to send a Transmit BIT Word Mode Command or a valid SCADC Command message and look for a clear Status Word.

Appellant's software programmer, Mr. Engel, believed that GEC's memorandum acknowledged a defect in the SCADC hardware (ex. A-41 at 3, 4). The memorandum does not support this contention. The memorandum says nothing about a hardware defect or a defect of any sort in the SCADC. At the hearing, Mr. Engel was unable to identify any contract term or industry procedure that GEC failed to follow in the design or fabrication of the SCADC, nor was he able to address with any personal knowledge the details of any defective material or workmanship. Mr. Engel's testimony regarding the purported defect in the SCADC was not persuasive.

185. Based upon GEC's recommendations above, appellant modified its MC OFP code to send a reset mode command to the SCADC which resolved this difficulty. In its REA (R4, tabs 936, 979) and claim (R4, tab 991), appellant asserted that its investigation and coding effort to effectuate this so-called handshake interface with the SCADC was out-of-scope. The contracting officer denied appellant's SCADC claim on both occasions (R4, tabs 985, 999) but did not specifically address this issue.

186. Under the contract, appellant was to enter into associate contractor agreements (ACAs) with each of the suppliers of Government furnished equipment, including GEC. Appellant was paid \$1,417,808 to effect these agreements (R4, tab 1 at 30). Insofar as pertinent Clause H-1069, Associate Contractor Agreements, provided as follows (R4, tab 1 at 58-59):

b. The ACA shall provide the following:

(1) Coordination and exchange directly between the Associate Contractors of all information pertinent and essential to the design, fabrication, installation and delivery of supplies acquired under the affected prime Government contracts to the extent that such information is required to assure the compatibility of and utilization of said equipment.

187. We also find pertinent contract provision H-1049, Total System Responsibility, which states in part as follows (R4, tab 1 at 74):

a. The Contractor has Total System Integration Responsibility (TSIR) for the integration and software development in accordance with the Statement of Work and System Segment Specification for the Avionics Modernization Program for the F-111A/E and EF-111A aircraft. This responsibility is defined as:

(1) The contractor shall take any and all action necessary to insure the integration of all interfacing systems. These systems shall work in consonance with the equipment on the Government furnished aircraft.

(2) The Contractor shall take the necessary action to assure successful operation of the total integrated system, as defined by the System Segment Specification, subject to the GFP being furnished in accordance with the Government furnished property clause.

DECISION

Appellant was obligated under the SOW to integrate the SCADC in accordance with TCTO 1F-111-343, which at the time of award required installation of the wiring interface between the flap angle probe and the SCADC. That a different version of the TCTO, issued after award, omitted the wiring installation is irrelevant to appellant's contract obligation. Appellant has not shown that it is entitled to additional compensation for this wiring. Nor has appellant shown that it is entitled to additional compensation for providing test procedures and test-related documentation for work for which it was responsible to perform and test.

As for the SCADC's cycle-off at .44 Mach, we agree with appellant that the problem resided within the SCADC which was GFP. We find appellant entitled to the reasonable costs incurred to investigate and to address this problem.

With respect to the power-up handshake discrepancies, appellant has not persuaded us that the Government-furnished SCADC was not suitable for its intended use or was otherwise defective in this respect. Appellant had the contract responsibility to undertake reasonable efforts to integrate the SCADC under this contract. Appellant has not persuaded us that its efforts were beyond what should have been reasonably anticipated under the contract provisions.

For reasons stated, appellant's SCADC claim is sustained in part.

(9) FINDINGS OF FACT – True Air Speed In-Flight Alignment

188. As part of the contract work under F-111A/E GPS SSS § 3.2.1.1.1, appellant was to design the navigation system of the aircraft to provide for in-flight alignment of the SINU from a power off state (R4, tab 1 at 118). This alignment used factors such as true air speed, wind estimates, altitude, roll, pitch and best estimates of position (ex. A-25). This aspect of the navigational design was known as the “True Air Speed In-Flight Alignment” (TAS-IFA).

189. Neither the SOW nor the SSS prescribed any accuracy or performance standards or requirements for the TAS-IFA.

190. Appellant’s proposal also did not provide any accuracy parameters for the TAS-IFA. Appellant’s design engineer, Mr. William Lockwood, had seen some technical literature pre-award suggesting that a drift rate of 20 nautical miles per hour was reasonable (tr. 31/98-99, 102), but the record fails to establish any well recognized industry-wide performance standards.

191. During the testing on appellant’s software test station, appellant was able to obtain drift rates which appellant believed were reasonable (tr. 31/98-100). However, the test station could not comprehensively simulate all in-flight conditions, particularly variable wind patterns. During early flight tests, the alignment did not work satisfactorily (tr. 31/44).

192. The parties conducted post-flight debriefings. Mr. Lockwood attended the debriefings on behalf of appellant. Mr. Buck Rogers, who was a crew member and involved with flight testing for the AF, attended on behalf of the Government. The TAS-IFA results were discussed. Mr. Lockwood discussed the specific flight profiles he wanted the AF to fly for the in-flight alignment, and Mr. Rogers discussed his expectations as to TAS-IFA accuracy. In Mr. Lockwood’s view, these discussions were part of a “give and take” process (tr. 31/124).

193. Mr. Lockwood testified, and we find that Mr. Rogers did not demand or impose any specific TAS-IFA performance requirement on GAC (tr. 31/125). Mr. Rogers, however, did communicate to Mr. Lockwood a desire for improved performance. Mr. Lockwood testified that he viewed Mr. Rogers’ communications as pressure to do better. The Board sought clarification of Lockwood’s understanding of “pressure” (tr. 31/128-29):

JUDGE DELMAN: Well, how would they [the AF] put pressure on you?

....

THE WITNESS: . . . I' m referring to Buck Rogers, [who] said, "You should be able to do a TAS in flight alignment better than this. It would be more useful if you could," or "Why don' t you try and see if you can do it better?"

I guess in that sense.

. . . .

JUDGE DELMAN: Were you ever given the understanding by anyone that you were required to follow Captain Rogers' directions or desire?

THE WITNESS: No, Your Honor.

JUDGE DELMAN: You were not?

THE WITNESS: I mean, I wasn' t given direction I must follow him. I was told, "Well, you know, try and keep him, you know – you should try to meet him part way if we can." I guess in that sense.

Mr. Rogers was not authorized by the AF to order any additional work or to change the contract terms. Appellant received no direction from the contracting officer to increase TAS-IFA performance (tr. 32/72).

194. As a result of these debriefings appellant revised its software design and made code changes in an attempt to improve TAS-IFA performance. At times, appellant also had to correct errors in the software that came about from these changes (ex. G-98 at 17 to 22). Notwithstanding appellant's efforts, there was no consistent improvement in TAS-IFA performance by the end of flight testing (ex. G-98 at 17). The Government concluded that although there was no specified accuracy standard for the TAS-IFA, "[i]n most cases the navigation accuracy is not useable." (ex. G-102 at C-14).

195. As far as this record shows, the AF did not withhold contract payment or otherwise seek to claim against GAC for the lack of TAS-IFA performance.

196. During the flight test period of 1988-90, neither Mr. Lockwood nor any authorized GAC representative notified the contracting officer, verbally or in writing, that appellant's additional TAS-IFA work efforts were considered out-of-scope by Grumman.

197. Appellant's REA dated 10 June 1991, as revised on 7 May 1993, included a request for reimbursement for its TAS-IFA efforts to comply with claimed AF accuracy demands (R4, tabs 936, 979). After the REA was denied, appellant reasserted this matter in its claim dated 30 March 1994, which was denied by the contracting officer by decision dated 30 September 1994 (R4, tabs 991, 999).

DECISION

Appellant contends that the AF imposed excessive and unreasonable accuracy demands upon GAC for TAS-IFA, which constituted a constructive change or breach of the contract. Appellant has the burden to prove its claim by a preponderance of the evidence. We believe it has failed to do so for a number of reasons.

First, appellant has failed to establish that the AF imposed upon GAC – through unilateral order or direction – any specific TAS-IFA accuracy performance requirement or any other contract change. The evidence indicates that insofar as TAS-IFA was concerned, the flight debriefing process provided a forum through which the parties would discuss, in give and take fashion, their suggestions and expectations regarding performance of the contract work. Appellant did not timely advise Mr. Rogers, or any authorized Government representative, that it considered Rogers' debriefing comments to require out-of-scope activity and/or a contract price adjustment. This silence strongly suggests that appellant acquiesced in Mr. Rogers' observations that TAS-IFA results were poor, and that appellant willingly and voluntarily undertook efforts to improve the quality of its work. No AF order or direction was given to appellant. Hence, there was no AF-directed change to the contract.

Assuming, *arguendo*, that AF direction could be implied by Mr. Rogers' comments at the debriefings, appellant also must show that such direction came from a person authorized to direct additional work. Mr. Rogers was shown to be involved with flight testing, but that responsibility, alone, did not grant him the authority to direct additional TAS-IFA work under the contract, or to change the contract in any manner. Indeed, Mr. Lockwood conceded at trial that he was not required to follow Mr. Rogers' comments or recommendations. In addition, appellant has not shown that any purported direction was issued or ratified by the contracting officer, or by any other AF representative authorized to order additional work.

For reasons stated, we must deny appellant's TAS-IFA claim.

(10) FINDINGS OF FACT – Flight Data Acquisition and Processing System (FDAPS)

198. As part of the SOW, GAC was to provide the following for the F-111A/E aircraft (R4, tab 1 at 477):

4330 FLIGHT TEST INSTRUMENTATION

4330.1 Assist in the definition of system instrumentation requirements.

4330.2 Design, engineer, fabricate and install an integrated instrumentation system to support the trial aircraft flight testing. The contractor shall use the airborne components of the Flight Data Acquisition and Processing System (FDAPS), which will be provided as GFE.

GAC was also to perform this work for the EF-111A (R4, tab 1 at 366).

199. The integrated instrumentation system was to be installed on the test aircraft to collect mission data. A tape cartridge recorded data in-flight and could be removed for analysis (tr. 28/178, 29/45). The airborne components of the FDAPS were manufactured and supplied by Fairchild Weston Systems (FWS) as GFP, and as part of the contract appellant was to enter into an associate contractor agreement with this vendor to coordinate matters of design and system specifications (R4, tab 1 at 58, 59).

200. Appellant contacted FWS regarding the FDAPS prior to the submission of its proposal to the AF (R4, tab 35 at 4-18). It is unclear what information appellant obtained about the contents of the FDAPS at that time.

201. The contract did not define the content of the overall integrated instrumentation system to be installed under the contract. Nor does the record provide any credible evidence of the content of a standard or typical integrated instrumentation system. Under the SOW, appellant was to design the overall system and to assist in the definition of system instrumentation requirements. The components to be furnished by FWS were identified on the contract GFE list.

202. After award the AF, through FWS, provided the FDAPS components identified on the GFE list. GAC noted that these components did not include all items necessary for a complete and stand-alone instrumentation system. By memorandum to the AF dated 2 April 1987, appellant notified the AF of this matter and sought the additional items from the AF as GFE. GAC provided a list of the hardware to be added to the contract's GFE list and requested a delivery plan for these items. Appellant's letter stated that additional effort would be required to incorporate the added hardware, and that appellant would submit a contract change proposal to contractually update the contract's GFE list upon receipt of the AF's delivery plan. (GAC R4, tab 2428)

203. The contracting officer replied by letter dated 19 May 1987, and addressed each item on GAC's list. The contracting officer stated that some items would be

furnished by the AF as GFE, but that others were not available and GAC would have to procure or fabricate them. (GAC R4, tab 2429) It does not appear that appellant replied to this letter. Appellant provided the items necessary to complete the system.

204. By letter to the contracting officer dated 31 January 1989, appellant provided a change proposal for, *inter alia*, its claimed costs to provide the additional hardware for the instrumentation system (GAC R4, tab 2455). The AF did not acknowledge responsibility for those costs. Appellant reiterated its request for compensation in its 1991 REA as updated in 1993 (R4, tabs 936, 979), and in its 1994 claim (R4, tab 991). The contracting officer addressed the merits and denied the FDAPS claim on both occasions (R4, tabs 985, 999). The AF contended that it was appellant's contractual responsibility to design and provide the overall instrumentation system, to determine what elements were to be provided by FWS, and to provide what was otherwise unavailable from FWS but was necessary to complete the system in accordance with the contract.

DECISION

Appellant seeks reimbursement for the additional hardware it had to provide as part of the instrumentation system to support trial aircraft flight testing. Appellant contends that under the contract terms it had reason to expect that the Government would furnish all the instrumentation system hardware as GFP. We believe that this contention is without merit for a number of reasons.

First, the contract does not state that the AF was to furnish all hardware items as GFP, nor does it state that the AF or FWS was to provide a complete, stand-alone instrumentation system to appellant. Appellant contends that these items should have been included with the FDAPS components that were provided as Government-furnished property, but it provides no credible evidence in support of this proposition. The contract did not misrepresent the content of the instrumentation system. The contract's GFE list identified certain GFE components and they were provided to appellant.

Clearly, the SOW required appellant to *design, engineer, fabricate and install an integrated instrumentation system and to assist the AF in defining its requirements*. This suggests far more than the mere installation of a complete, stand-alone FDAPS to be provided by FWS. That appellant was required to use the airborne components of the FDAPS from FWS did not negate its overall contractual responsibility to design and fabricate the instrumentation system with all the hardware necessary to make it work in accordance with contract requirements. We are not persuaded that the FDAPS components provided to appellant under the contract were defective, incomplete or otherwise unsuitable.

For reasons stated, we deny entitlement on the FDAPS claim.

(11) FINDINGS OF FACT – Cockpit Video System

205. The FB-111 AMP trial aircraft contained cockpit video recorders as part of the test instrumentation to record certain cockpit displays and indicators. After award of the instant contract, the AF expressed a desire to include such a video system in the F-111A/E and EF-111A trial aircraft. The contract did not provide for such a system.

206. At a PMR splinter group meeting in August 1986, the AF requested this additional instrumentation from appellant. The meeting minutes reflect in pertinent part as follows (ex. A-24 at 4464):

- (c) For flight test debriefing and data analysis, add two remote VHS video cameras and two video recorders that will complement the cockpit CAVR: One camera will record the LCOS display during weapon delivery tests, if selected, and the other will record the TFR E-SCOPE and CARA indicator, if selected. Each recorder should also be capable of selecting the recording of either MFD.

The minutes of meeting acknowledged that this work was out-of-scope and that GAC would investigate cost impact.

207. In or around early 1987, the parties agreed to a modification of the contract's GFE list to provide that the Government would furnish the video cameras, recorders and control panels as GFE (GAC R4, tab 2428). By letter to appellant dated 19 May 1987, the contracting officer modified this agreement, stating that the video control panel should be procured or fabricated by GAC and that the camera and recorders would be provided as GFE. The contracting officer also directed that the video signed select assembly, the temperature switch and hardware mounts should be made or procured by GAC. (GAC R4, tab 2429)

208. This letter included the standard AF disclaimer that any directions contained therein should not be considered as changes to contract requirements. The letter, however, clearly directed changes to contract requirements insofar as the cockpit video system was concerned.

209. Appellant's change proposal dated 31 January 1989 included, *inter alia*, its costs for the additional work related to the video recording system in the trial aircraft (GAC R4, tab 2455). It does not appear that the AF acted on this proposal.

210. Appellant's REA of June 1991 as revised in May 1993 sought reimbursement for these costs (R4, tabs 936, 979). The contracting officer replied by letter dated

26 August 1993. Insofar as pertinent, the contracting officer stated as follows (R4, tab 985):

Finally, [I] find that the Cockpit Video System was not a contractual requirement for the F-111A or EF-111A AMP trial aircraft and thus was a change to the contract for which Grumman is entitled to be compensated. I further find that Grumman was directed to perform additional TFR measurements which was a change to the contract for which Grumman is entitled to compensation for the EF-111A trial aircraft [see *infra*]. Accordingly, I find that Grumman is entitled to \$344,729.00.

As far as this records shows, the AF did not pay GAC any amounts for this additional video system work.

211. Appellant reasserted its position in its claim dated 30 March 1994 (R4, tab 991). The contracting officer's decision dated 30 September 1994 again conceded Government liability, repeating verbatim the findings on entitlement above, but omitted the last sentence regarding quantum (R4, tab 999).

DECISION

Based on our findings we conclude that the AF-directed cockpit video system for the trial aircraft was out-of-scope and caused appellant to incur additional costs. Appellant is entitled to an equitable adjustment in contract price for this work. We grant entitlement on the cockpit video system claim.

(12) FINDINGS OF FACT – Terrain Following Radar (TFR)

212. As part of the contract work under SOW § 1230, appellant was to integrate a TFR system on the F-111A/E and EF-111A aircraft (R4, tab 1 at 346, 458). The TFR system was to be supplied by Texas Instruments as GFP, and appellant was to enter into an associate contractor agreement with this vendor (R4, tab 1 at 58, 59).

213. By letter to appellant dated 22 September 1987, the contracting officer provided appellant with a list that contained additional work regarding trial aircraft performance for the TFR system, stating that the list was for “parameters that must be added and observed in order to assess overall terrain following system performance” (GAC R4, tab 2438).

214. By letter to the contracting officer dated 30 October 1987, GAC notified the AF that it would provide the instrumentation capability directed by the contracting officer

but that it considered this work as out-of-scope, and stated that a proposal for equitable adjustment would be submitted (GAC R4, tab 2439). It does not appear that the AF took issue with this letter.

215. On or about 16 May 1988, appellant submitted its cost proposal to the AF, seeking an adjustment in the target price of the contract in the amount of \$145,341 for this additional work. A period of negotiations followed. In 1989, the parties executed contract Modification No. P00084 which increased the target contract price in the amount of \$135,250 for the additional TFR measurement capability installed on the F-111A trial aircraft. (R4, Vol. 79, tab 1DF)

216. The AF has admitted that it similarly directed GAC to provide additional TFR measurement capability for the EF-111A trial aircraft (answer ¶ 298). Appellant's REA dated 10 June 1991, as revised on 7 May 1993, sought recovery of these costs (R4, tabs 936, 979). By letter dated 26 August 1993, the contracting officer acknowledged responsibility for these costs but it appears that the AF has not paid them (R4, tab 985).

217. Appellant's claim dated 30 March 1994 reasserted appellant's TFR claim (R4, tab 991). The contracting officer's decision stated in pertinent part as follows (R4, tab 999):

I further find that Grumman was directed to perform additional TFR measurements which was a change to the contract for which Grumman is entitled to compensation for the EF-111A trial aircraft.

218. The Government has also admitted in these proceedings that appellant did in fact incur costs for this work on the EF-111A trial aircraft, but avers that appellant has not presented accurate quantum data to allow for settlement of the claim (answer ¶ 299).

DECISION

The evidence establishes that the AF directed appellant to perform additional TFR-related work for the EF-111A trial aircraft which was a change to the contract for which appellant is entitled to an equitable adjustment. We grant entitlement on the TFR claim.

(13) FINDINGS OF FACT – Reference Not Engaged Light

219. The F-111A/E aircraft contained a caution lamp on its main instrument panel known as the "reference not engaged" (RNE) light which, when illuminated, would alert the aircrew to abnormalities during aircraft operation in the automatic pilot (autopilot) and automatic terrain following radar modes. The RNE light would illuminate during autopilot

operation if the aircrew had selected an altitude hold sub-mode of the autopilot mode, but the sub-mode was not controlling the aircraft's altitude. (Ex. A-17 at 2) Generally, a pilot would check for the light to be extinguished to confirm correct mode engagement. If the lamp was not illuminated, the system selected was supposed to be engaged and functioning; if the lamp was illuminated it would mean that the system had failed to achieve the selected mode. (Ex. G-264 at 41-42)

220. As the system designer under this contract, appellant had total system integration responsibility in accordance with Clause H-1049 of the contract, which provided in pertinent part as follows (R4, tab 1 at 55):

TOTAL SYSTEM RESPONSIBILITY

a. The Contractor has Total System Integration Responsibility (TSIR) for the integration and software development in accordance with the Statement of Work and System Segment Specification for the Avionics Modernization Program for the F-111A/E and EF-111A aircraft. This responsibility is defined as:

(1) The Contractor shall take any and all action necessary to insure the integration of all interfacing systems. These systems shall work in consonance with the equipment on the Government furnished aircraft.

(2) The Contractor shall take the necessary action to assure successful operation of the total integrated system, as defined by the System Segment Specification, subject to the GFP being furnished in accordance with the Government furnished property clause. . . .

221. Appellant's total system integration responsibility included designing and installing necessary auxiliary equipment. The SOW at § 1500 provided as follows (R4, tab 1 at 461):

1500 AUXILIARY EQUIPMENT

1500.1 Modify, or develop if appropriate, other panels, wiring or equipment as necessary to integrate the AMP avionics on the F-111A/E aircraft.

222. With respect to the design and installation of wiring, the SOW at § 1100 provided in relevant part as follows (R4, tab 1 at 454):

1100 AIRCRAFT HARDWARE

....

1150 WIRING HARNESSSES

1150.1 During initial design and development, consider the combination of harness age and condition, together with the nature of the design modification, in arriving at the design decision to replace rather than modify particular harnesses. Replacement is the preferred approach. . . .

1150.2 Determine the new and/or revised wiring requirements for new avionics equipment.

1150.3 Design new wiring harnesses as required to replace existing wiring harnesses. . . .

223. One of the existing computers in the flight control system of the F-111A/E was the yaw computer. In the existing pre-AMP configuration of the F-111A/E, the RNE lamp was wired through the yaw computer (ex. A-17 at 5). Appellant offered no evidence to show that the RNE lamp and yaw computer interface was defective in the pre-AMP aircraft. Absent such evidence, we find that the RNE lamp worked properly in the existing aircraft as wired (ex. G-264 at 43).

224. The first aircraft to be modified by appellant was an F-111E aircraft with the tail number 040 (the 040 aircraft). As part of its modification work, appellant replaced all of the pre-AMP electrical wiring harnesses in the cockpit and forward equipment bay of the aircraft, and converted the aircraft's existing analog avionics system to a digital avionics system. As rewired, the RNE light was again connected through the yaw computer. During a ground check of the aircraft's systems late in 1988 or early 1989, it was noted that the RNE lamp remained dimly illuminated when it should not have been illuminated. As a result, the Air Force put the aircraft into stand-down status and declined to fly it until the matter was resolved. (Ex. A-17 at 2-10)

225. A team composed of Government and contractor technical personnel was assembled to investigate this issue (ex. A-17 at 3). After some testing, it was determined that a suppression diode, a 10 ohm resistor, was needed in the power line going to the RNE lamp from the yaw computer to keep the lamp from lighting improperly. This diode was not necessary in the pre-AMP aircraft because the existing system was an analog system that

contained extensive wiring that created its own impedance. When appellant removed the analog wiring pursuant to this contract it also removed, in essence, this impedance and created the need for this suppression diode (ex. A-17 at 8-10).

226. In the spring of 1988, appellant's instrumentation personnel had also observed and documented this same problem on the trial aircraft, and resolved it similarly through the addition of a diode (ex. A-17 at 10). It is unclear why this information was not timely passed along in order to eliminate the above problem in late 1988 and early 1989.

227. A 22 February 1989 flight test status report written by Mr. Young, appellant's lead flight test engineer, provided in relevant part as follows (ex. A-19):

Additional tests for the RNE light were conducted today. The aircraft grounds on aircraft 040 were checked for all inputs to the Yaw Computer. No problems were discovered. A 10 ohm resistor was placed into the power line going to the lamp. This additional load appeared to solve the intermittent light problem. All testing has been completed. The agreed upon ECO is planned for installation upon the aircraft tomorrow.

Mr. Young testified that the ECO referenced in the test report was an engineering change order that was agreed to by appellant and Government personnel. According to Mr. Young, the ECO provided for the addition of a suppression diode to the electrical system in the subject aircraft and in all of the F-111A/E production kits. (Ex. A-17 at 13) Mr. Young did not identify the AF personnel who allegedly agreed to this ECO, nor did he state that any AF representative committed to pay appellant extra for this work. Appellant also did not identify the ECO in the record. We find that no authorized Government contracting personnel directed appellant to install this suppression diode in the electrical system of the aircraft.

228. In addition to the 10-ohm resistor that appellant installed in the 040 aircraft wiring, appellant also added a suppression diode to each of the F-111A/E production kits which permanently resolved the problem with the RNE light (ex. A-17 at 13).

229. By letter dated 10 June 1991, appellant submitted an REA to the Government (R4, tab 936). As part of its REA appellant alleged that the yaw computer in the F-111A/E aircraft was missing a diode, causing the RNE light to remain dimly lit on the aircraft (*id.* at 95). Appellant's allegations of a missing diode continued in its updated REA dated 7 May 1993 (R4, tab 979 at 278). The contracting officer denied the request for equitable adjustment (R4, tab 985).

230. In its 30 March 1994 claim, appellant alleged that it “incurred substantial additional, unanticipated and out-of-scope costs relating to the identification and repair of a defect in the reference not engaged light” (R4, tab 991 at 80). The Government denied the RNE light portion of appellant’s claim by contracting officer’s decision dated 30 September 1994 (R4, tab 999 at 16).

231. We find that the following contract provisions are pertinent to this claim. Clause H-1056 TECHNICAL AND MANAGEMENT MEETINGS provided as follows (R4, tab 1 at 56-57):

The Procuring Contracting Officer is the only Government representative authorized to change the terms and conditions of this contract. All technical or management meetings held during the performance of this contract, attended by Government and Contractor personnel, must be conducted subject to this condition. The Contractor agrees that no request for equitable adjustment or claim for altering the terms and conditions of the contract shall be submitted based on the results of said meetings unless the Procuring Contracting Officer has authorized that change to the contract in writing. . . .

232. FAR 52.245-2 GOVERNMENT PROPERTY (FIXED-PRICE CONTRACTS) (APR 1984) provided, in relevant part as follows (R4, tab 1 at 70; ex. G-5):

(a) *Government-furnished property.* (1) The Government shall deliver to the Contractor, for use in connection with and under the terms of this contract, the Government-furnished property described in the Schedule or specifications . . . (hereinafter referred to as “Government-furnished property”).

(2) The delivery or performance dates for this contract are based upon the expectation that Government-furnished property suitable for use (except for property furnished “as-is”) will be delivered to the Contractor at the time stated in the Schedule or, if not so stated, in sufficient time to enable the Contractor to meet the contract’s delivery or performance dates.

(3) If Government-furnished property is received by the Contractor in a condition not suitable for the intended use, the Contractor shall, upon receipt of it, notify the Contracting Officer, detailing the facts, and, as directed by the Contracting

Officer and at Government expense, either repair, modify, return, or otherwise dispose of the property. After completing the directed action and upon written request of the Contractor, the Contracting Officer shall make an equitable adjustment as provided in paragraph (b) of this clause.

233. The GPS SSS at § 3.2.1 for the F-111A/E provided, in relevant part as follows (R4, tab 1 at 113):

3.2.1 Performance Characteristics. Installation of the modified or new avionics system equipment and computer programs shall improve the aircraft reliability, maintainability, and mission effectiveness as defined herein. This modification shall not alter the aircraft stability, control, performance envelope, or range, except as specified herein. The current F-111A/E system functional characteristics and performance shall not be degraded, limited, or eliminated by this modification unless explicitly specified herein. . . .

DECISION

Appellant alleges that the yaw computer in the Government-furnished existing aircraft was defective in that it failed to suppress stray voltages that caused the improper lighting of the RNE lamp. GAC has the burden to prove this claim, but has not done so. The RNE lamp, which was wired through the yaw computer, functioned properly on the aircraft prior to appellant's modification. It was not until GAC changed the aircraft's existing analog electrical system – containing extensive wiring and impedance – to a digital electrical system with less elaborate wiring and less impedance that the RNE lamp malfunctioned and a need for the suppression diode arose. Appellant has not persuaded us that the existing yaw computer in the F-111 A/E was defective or otherwise unsuitable.

Under this contract appellant had total system integration responsibility for the design, which included the responsibility to modify wiring or equipment as necessary to integrate appellant's design in the F-111A/E aircraft, and to ensure that the existing F-111A/E system functional characteristics and performance were not degraded by appellant's modifications. This is precisely what appellant did here. The addition of the suppression diode to ensure the proper functioning of the RNE lamp was consistent with appellant's design integration responsibilities under this contract, and does not entitle appellant to additional compensation.

In addition, we are not persuaded that any authorized Government contracting personnel directed the installation of the suppression diode, or otherwise agreed to pay for its design and installation. Appellant has failed to offer the purported ECO in support of its

position, and appellant's evidence with respect thereto is uncorroborated and unpersuasive. Appellant was aware, or should have been aware, based on the contract's Technical and Management Meetings clause, that the procuring contracting officer was the only Government representative authorized to change the terms and conditions of the contract and to order additional work, and that all technical meetings attended by Government and contractor personnel were to be conducted subject to this condition.

In view of the foregoing, we must deny entitlement on appellant's RNE light claim.

(14) FINDINGS OF FACT – NAV Ripple Mode

234. The pre-AMP F-111A/E had the capability to release a single bomb or a train/series of bombs at regular intervals through the stores management system of the aircraft. An effective bomb train is "centered" such that the bomb at the mid-point of the train is directly aligned with the target and the other bombs in the train are equally dispersed on either side of the target (ex. A-5 at 19). In the pre-AMP aircraft, the aircrew would center a bomb train manually by commencing the train at just the right moment so that the mid-point of the train would be aligned with the target. (*Id.*)

235. As part of the contract work under the F-111A/E AMP, appellant was to provide the aircrew with the capability to center a bomb train automatically by using the new digital computer complex (DCC). Section 3.2.1.2 of the F-111A/E GPS SSS provided in pertinent part as follows (R4, tab 1 at 124-25):

It [the system] shall also have an automatic bomb train centering capability for ripple releases when (1) an interval (in feet) and a number of release pulses are provided to the DCC via the MFDS and (2) ripple for F-111E, or train for F-111A is selected on the Weapons Control Panel (for F-111E) or Armament Select Panel (for F-111A). When NAV is selected on either of the above panels, all weapon release commands will be issued by the DCC.

The GPS SSS § 3.2.1 also provided that the pre-AMP weapon delivery capability was to be maintained unless otherwise specifically stated (R4, tab 1 at 113).

236. The SSS defined the Government's requirements for this new automatic bomb centering capability, but did not identify the materials, the wiring and the detailed design needed to design, engineer and to install this work. Under the contract appellant was to have total system integration and performance responsibility for the work. Clause H-1049 provided in pertinent part as follows (R4, tab 1 at 55):

a. The Contractor has Total System Integration Responsibility (TSIR) for the integration and software development in accordance with the Statement of Work and System Segment Specification for the Avionics Modernization Program for the F-111A/E and EF-111A aircraft. This responsibility is defined as:

(1) The Contractor shall take any and all action necessary to insure the integration of all interfacing systems. These systems shall work in consonance with the equipment on the Government furnished aircraft.

(2) The Contractor shall take the necessary action to assure successful operation of the total integrated system, as defined by the System Segment Specification, subject to the GFP being furnished in accordance with the Government furnished property clause. . . .

237. As part of appellant's design and integration responsibilities, SOW § 1500 tasked appellant as follows (R4, tab 1 at 461):

1500 AUXILIARY EQUIPMENT

1500.1 Modify, or develop if appropriate, other panels, wiring or equipment as necessary to integrate the AMP avionics on the F-111A/E aircraft.

SOW § 1150.2 also called upon appellant to "determine the new and/or revised wiring requirements for new avionics equipment" (*id.*).

238. Mr. Harold Ziegler, appellant's systems project engineer, was involved with GAC's bid proposal and contract performance in the weapons delivery area. He interpreted appellant's duties under SOW § 1500.1 above as follows (tr. 21/299):

A. As I said, we interpreted this paragraph to mean that on occasion during our design if we decided that we found a better way, a less expensive way to integrate the change in interface or do the software a little differently and we didn't have to go back to the Government for every little thing and ask for their permission and that's what we felt this clause was.

I had to change a switch position, the name, which we did ultimately on one of the panels, then I didn't have to go back to the Air Force to ask that. They gave us a latitude to do that.

In no way did it mean to modify deficiencies on any GFE systems.

239. Following contract award, Grumman sought to implement the new automatic bomb train centering capability in the F-111A/E aircraft by designing its MC OFP software to enable the new DCC to generate a series of timed release pulses to the stores management system (SMS) of the aircraft when the aircrew would enter the necessary data via the multifunction display set, then select "NAV," and then select "ripple" or "train" on the appropriate aircraft panel (ex. A-5 at 27-28).

240. In the spring of 1987, Grumman encountered difficulty with its implementation of the new automatic bomb train centering capability during the laboratory integration mock-up/software test station testing stage. The single release mode tested fine, but appellant could not get the system to release more than one weapon in the NAV ripple or NAV-train modes. (Ex. A-5 at 28)

241. In order to determine the cause of the difficulty, Grumman performed an investigation which revealed that the existing SMS circuitry would "latch" on receipt of the first external pulse and shut down the subsequent pulses in the series, thereby releasing only one bomb in response to a series of release pulses from the new DCC (ex. A-5 at 29). Appellant presented this matter to the AF during a F-111A/E weapon delivery splinter meeting on 2 June 1987. Insofar as pertinent, appellant summarized its findings as follows (GAC R4, tab 2507):

The following report is the result of an investigation by Grumman Systems Integration on the computer assisted delivery of non-nuclear munitions in the ripple modes for the F-111 A/E AMP aircraft. The outcome of this investigation is that the function of the computer generated ripple release pulses transmitted to the Stores Management Set (SMS) from the Digital Computer Complex (DCC) cannot be mechanized unless existing hardware and or software is modified. That is, automatic computer generated ripple release is not feasible as currently mechanized. Within this report two possible solutions are given: OPTION #1 which [a]ffects hardware only and OPTION #2 which [a]ffects hardware and software.

Neither design option proposed by appellant modified any GFE aircraft systems (ex. A-5 at 31).

242. By letter to appellant dated 12 June 1987, the contracting officer expressed a preference for technical option No. 2. Insofar as pertinent the contracting officer stated as follows (GAC R4, tab 2508):

. . . [W]e must remind you that no program requirements changed as a result of this [the above referenced 2 June 1987] meeting. The ripple bomb requirements expressed in the F-111A/E System Segment Specification still stand; it is Grumman's responsibility to find a technically and operationally sound method to meet them. Although we have expressed a preference for Option 2, we are not endorsing its technical feasibility.

The contracting officer also stated that the issuance of this letter did not constitute any contract change or warrant any increase in contract price.

243. Appellant implemented option No. 2, which allowed for the automatic bomb centering capability required by the specifications. Briefly stated, appellant's revised design included the design and installation of two new relays and two new wires (tr. 21/271).

244. By letter to the contracting officer dated 25 February 1988, appellant sought reimbursement for this work (GAC R4, tab 2509).

245. The contracting officer replied by letter dated 3 May 1988. The contracting officer stated that appellant's revised design and installation were within the scope of the contract. The contracting officer cited SOW § 1500.1 above, which he stated "is very explicit in stating 'Modify, or develop if appropriate, other panels, wiring or equipment as necessary to integrate the AMP avionics on the F-111A/E aircraft.'" (GAC R4, tab 2510)

246. By letter to the contracting officer dated 8 September 1988, appellant took issue with the Government's position and reasserted its entitlement to an equitable adjustment for its revised design, claiming technical order inaccuracies and a failure of the SSS to state that system modifications would be required (GAC R4, tab 2511). The contracting officer reasserted the Government's position by letter dated 3 May 1989 and disputed appellant's contention that any relevant technical orders were inaccurate or misleading (GAC R4, tab 2514).

247. Appellant's REA of 10 June 1991, updated 7 May 1993, included a request for equitable adjustment for the revised design but dropped its contention regarding the

inaccuracy of certain AF technical orders (R4, tabs 936, 979). The contracting officer denied recovery by letter dated 26 August 1993, contending *inter alia*, that SOW § 1500.1. imposed upon appellant the responsibility to make those modifications necessary to integrate the avionics on the aircraft (R4, tab 985).

248. Appellant's claim dated 30 March 1994 reasserted this NAV ripple claim, but made no mention of technical order inaccuracies (R4, tab 991). The contracting officer's decision denied the claim for reasons stated in the 26 August 1993 letter (R4, tab 999). At the hearing, Mr. Ziegler did not testify regarding any specific technical order discrepancies related to this claim.

249. In his prefiled testimony, Mr. Ziegler stated that during contract performance he discussed the NAV ripple problem with Mr. Brian Teague, a member of the Rockwell International team employed by the AF for technical support, and who was generally familiar with the F-111 aircraft. According to Mr. Ziegler, Mr. Teague stated to him that the drafters of the F-111A/E SSS erred in putting together the specifications as related to the NAV ripple function (ex. A-5 at 30). Appellant has made no showing that Mr. Teague was involved in specification preparation on behalf of the AF with respect to automatic bomb centering capability, or was privy to information from those who were so involved. We find this evidence to be uncorroborated hearsay, and we give it no weight.

250. Mr. Ziegler testified, and we find that the SMS in the pre-AMP aircraft functioned correctly based on what it was designed to do. After award, appellant was also able to ascertain that the system was still capable of accommodating both single and multiple releases as they were performed in the pre-AMP aircraft (tr. 21/281, 284).

251. Mr. Ziegler also testified that appellant's NAV ripple mode investigation revealed that other F-111 models, like the F-111F aircraft, contained different circuitry which could have handled the series of ripple releases from appellant's DCC without the need for additional relays and wiring (ex. A-5 at 29). Mr. Ziegler did not personally perform this investigation, nor did he offer any evidence to document this investigation. We also question the materiality and relevance of evidence regarding the circuitry of other aircraft to the aircraft under contract here. We give this evidence little weight.

DECISION

Appellant contends that the existing F-111A/E stores management capability or system could not accommodate the computer-generated release pulses transmitted by its newly designed DCC, and hence was defective or unsuitable for its intended purpose. It seeks reimbursement for its revised design which included the installation of two additional relays and wires to make the system work. The AF contends that appellant's revised design was part of its contract obligation under SOW § 1500.1.

Appellant has the burden to establish that the SMS capability of the existing F-111A/E aircraft was defective or unsuitable. We believe it has not met this burden. Indeed, appellant's key witness on this claim, Mr. Ziegler, conceded that the existing SMS capability functioned in accordance with its design and purpose.

In essence, GAC argues that it need only show that the existing stores management function of the F-111A/E did not accommodate its avionics modifications in the first instance in order to prevail on this claim. This argument would have some force if appellant was tasked to build and install the new avionics system in accordance with detailed Government design drawings and specifications as part of a validated technical data package, based upon the well settled principal of the implied warranty of Government specifications. *United States v. Spearin*, 248 U. S. 132 (1918). However, the AF did not provide appellant with such a detailed design package here.

Although the Government provided certain GFP to facilitate appellant's performance, we believe that the contract terms clearly placed upon appellant the responsibility for design, integration and performance. Clause H-1049 imposed upon appellant the general responsibility to integrate interfacing systems and to assure successful operation of the total integrated system subject to the suitability of GFP. Specifically, SOW § 1500.1 directed appellant to modify or develop, as appropriate, the panels, wiring or equipment for purposes of the integration. In this respect, the contract was in the nature of a performance specification. *See generally P.R. Burke Corp. v. United States*, 277 F.3d 1346 (Fed. Cir. 2002); *Blake Construction Company, Inc. v. United States*, 987 F.2d 743 (Fed. Cir. 1993). Our view is bolstered by the many preliminary and critical design reviews that the AF made part of this contract. If appellant were building to a validated AF design, these reviews would not have been necessary.

Appellant contends that other aircraft contained different circuitry which would have accommodated appellant's new DCC without the need for additional design effort. Assuming, *arguendo*, that this contention is factually accurate, we fail to see it as controlling appellant's design responsibilities for the F-111A/E aircraft under this contract.

We believe that appellant's design and installation of the two additional relays and wires fall under appellant's design and integration responsibilities under Clause H-1049 and SOW § 1500.1. Appellant's interpretation of SOW § 1500.1 is unsupported by the plain language of the clause and is unduly narrow and unreasonable.

For reasons stated, we must deny appellant's NAV ripple mode claim.

(15) FINDINGS OF FACT – Single Point Failure

252. While reviewing appellant's engineering drawings in November 1988, SSgt. Lloyd E. Cunningham, an AF avionics specialist, discovered what he believed to be a single failure point design error made by appellant. He described his findings in a quality deficiency report (also known as a "service report") on or about 8 November 1988 as follows (GAC R4, tab 2153 at 1515):

The GNC/MC1 and WDC/MC2 power switches, on the Avionics Power Panel (APP), *both receive 115 VAC power through GNC/WDC circuit breaker 7*. When the GNC/MC1 and the WDC/MC2 switches are placed to "ON", power coming through this single circuit breaker energizes the XK1 and XK2 relays and allows three phases of the 115 VAC power to be applied to each computer. Any fault that causes GNC/WDC circuit breaker 7 to "pop" would disable both the GNC/MC1 and the WDC/MC2 power switches on the APP, causing both computers to shut down. [Emphasis added]

There appears to be no dispute that appellant's design provided power to the GNC and WDC computers through one circuit breaker, circuit breaker No. 7, and we so find.

253. The quality deficiency report recommended a design change so that power to the panel power switches would be supplied through separate circuitry and separate circuit breakers in accordance with designs in other aircraft in the F-111 model series. SSgt. Cunningham's report did not cite to the SSS or SOW portions of the contract, nor did it otherwise state that appellant was in violation of any contract terms, or in violation of any generally accepted design or engineering practice. SSgt. Cunningham did not testify.

254. The AF forwarded this quality deficiency report to appellant for review. Appellant confirmed its design as stated in the AF report, but it did not concede that the design was an error or a violation of the contract. Appellant provided the AF with a study that analyzed the probability of loss of power due to circuit breaker malfunction which it determined was extremely low. This study did not account for the random-tripping of the circuit breaker due to sources unrelated to circuit breaker malfunction, however, which appellant believed was possible but speculative. (R4, tab 1829)

255. The parties discussed this subject at a service report review board meeting. The AF was of the opinion that appellant's design was unacceptable. By letter to appellant dated 18 August 1989, the contracting officer directed appellant to change its design, and took the view that this direction was in-scope and did not entitle appellant to an equitable adjustment. (GAC R4, tab 2153)

256. Appellant replied by letter dated 22 September 1989, advising that it viewed the contracting officer's direction as an out-of-scope direction with impact on contract price and possibly on schedule (GAC R4, tab 2154).

257. By letter to appellant dated 25 October 1989, the contracting officer reiterated its position that appellant's design was unacceptable and constituted a design error, although the contracting officer did not cite any specific SSS or SOW provision that appellant had purportedly violated. The contracting officer also suggested that appellant's design improperly deviated from the wiring configuration on the FB-111A aircraft, although he failed to cite a specific contract provision which required appellant to replicate the FB-111A circuitry. The contracting officer again directed appellant to change its wiring design and configuration. (GAC R4, tab 2156)

258. By letter to the contracting officer dated 22 December 1989, appellant proposed a revised wiring design as directed, and stated that it would submit a proposal for equitable adjustment. Appellant remained of the view that the current design was consistent with contract requirements and that neither the SOW nor the SSS specified that each mission computer be powered through a separate circuit breaker as the AF contended. (GAC R4, tab 2157)

259. By letter to appellant dated 17 January 1990, the contracting officer rejected appellant's proposed wiring design, stating that "[w]hile this design would achieve the desired result of eliminating the single-point failure area, it is not a 'sanitary' design and is therefore unacceptable as a permanent solution" (GAC R4, tab 2158). The contracting officer forwarded a marked-up copy of appellant's proposed design showing what would be acceptable to the AF. The contracting officer did not describe what he meant by an unsanitary design, nor did he cite to a contract provision which gave the AF the right to reject a contractor design for this reason.

260. After some further discussion, appellant decided to use the AF's design approach but reiterated that the new wiring design was not required by the contract, and that a request for equitable adjustment would be submitted. This position was confirmed by appellant's letter dated 8 February 1990. (GAC R4, tab 2159) Appellant reconfigured its original design to add another circuit breaker to the system.

261. Appellant's REA of 10 June 1991, updated 7 May 1993, included an equitable adjustment request for this additional work, which was denied by the contracting officer in August 1993 (R4, tab 985). Appellant's claim of 30 March 1994 also sought recovery for this work, which was denied by the contracting officer by decision dated 30 September 1994 (R4, tab 999).

262. The AF contends that its rejection of appellant's single circuit breaker design was proper because it was inconsistent with the backup redundancy requirements set out for

each mission computer in the F-111A/E. The SSS provided that each mission computer provide its own primary functions as well as the functions of its counterpart if the latter failed, commensurate with memory reserve requirements. (See finding 99, *supra*) According to the AF, this redundancy would be compromised if power was fed to each mission computer through one circuit breaker.

263. Appellant contends that its design and installation did, in fact, provide backup requirements as identified in the contract. Appellant designed operation flight program software for each mission computer in the F-111A/E so that each computer was capable of performing its own functions as well as the functions of its counterpart if the latter malfunctioned or failed. According to appellant, this functional redundancy – which was specified by the contract and which was accomplished by appellant – was unrelated to the AF’s newly imposed requirement to provide separate and distinct wiring and circuit breakers through the avionics power panel for each mission computer.

264. The AF also points to the “mux bus” specifications in support of its position. Simply stated, a mux bus is the interface that enables a computer to transmit data to, and receive data from other units. As part of the SSS at § 3.7.6, there were two MIL-STD-1553B multiplex data buses (“mux buses”) under the F-111A/E contract, one interfacing with the avionics boxes (AMUX) and one interfacing with the display boxes (DMUX). Each mux bus contained two separate wires so that if one wire were to fail during a transmission, the other could assume the transmission without a loss of data. (R4, tab 1 at 128, 281) Also, the SSS at § 3.2.1 provided that each mission computer be capable of controlling both buses in the event of a failure of the primary bus controller of either mission computer. The AF points to these features as illustrative of the contract’s intent to have full system redundancy, including the circuitry and circuit breaker in issue here. Also, the AF contends that the possible loss of power through a tripped circuit breaker would disable these buses which would then disable much of the avionics hardware and automatic bomb-drop capabilities of the aircraft, and would preclude mission completion.

265. Appellant contends that it did in fact design and install the above mux bus features provided for in the contract, but that these features were unrelated to the additional circuit breaker circuitry in issue here – which the contract did not mandate. As for the effect of the possible loss of power, appellant does not dispute the obvious impact of loss of power on mission completion. According to appellant, however, the contract does not impose upon appellant the design responsibility to guarantee mission completion against any and all conceivable power losses. According to appellant, the contract was silent on this circuit breaker issue and appellant had the design discretion under this performance specification to design its wiring through a single circuit breaker.

266. In support of its position, the AF also points to SOW § 1340.1, which required that appellant develop an avionics power panel for the F-111A/E that was “similar” to that of the FB-111A, using the FB panel as a baseline (R4, tab 1 at 460). According to the AF,

this provision also required appellant to design its circuitry in accordance with the FB-111A aircraft which provided for separate wiring and circuit breakers. According to appellant, this SOW provision related to the design of the avionics power panel only and not to general circuitry. There appears to be no dispute that appellant did in fact design and install a panel similar to the one in the FB aircraft.

DECISION

It is well-settled that when the Government rejects a contractor's work and demands correction, the Government has to show that the work did not meet the terms of the contract. *Southwest Welding and Manufacturing Company v. United States*, 188 Ct. Cl. 925 (1969). *Skip Kirchorfer, Inc.*, ASBCA No. 40516, 00-1 BCA ¶ 30,625 at 151,182. We have considered the arguments made by the parties and all the relevant evidence of record, and believe that the Government has failed to make such a showing here. The AF has failed to show that the design it rejected violated the terms of the contract, or failed to meet any generally accepted design or engineering standard or practice.

We acknowledge the Government's position that the change imposed by the Government made for a design that was arguably less susceptible to random events affecting power transmission. However, the issue before us is not to determine whether one design was "better" than the other, but rather to determine what the contract required with respect to the design. The contract was silent on the provision of separate wiring and circuit breakers for each mission computer. Appellant, as the system designer, was afforded the design discretion it employed here. If redundant circuitry was as important to the Government as it now professes, it should have clearly stated this requirement in the SOW or SSS. It did not do so.

We conclude that the AF's rejection of appellant's design and its direction to appellant to revise the design necessitated additional work and cost, and was a constructive change to the contract for which appellant is entitled to an equitable adjustment. We find entitlement on appellant's single point failure claim.

(16) FINDINGS OF FACT – Ground Velocity Signal Wires

267. The pre-AMP EF-111A aircraft's navigation radar set (NRS) was composed of several distinct boxes including an indicator which was an operator interface display, a modulator-receiver-transmitter, and an electrical synchronizer. The EF-111A SSS § 3.7.12 provided that appellant was to replace the existing modulator-receiver-transmitter and the existing electrical synchronizer, but not the indicator (R4 tab 1 at 202; ex. A-10 at 10). This new hardware was to be furnished as GFP under the contract by General Electric Corp. (ex. A-10 at 9-10).

268. The EF-111A NRS could be operated in different modes, one of which was the ground velocity mode. Ground velocity operation was used to track and to show on the indicator the movement of the aircraft relative to fixed positions on the ground. When operating in ground velocity mode, the pre-AMP EF-111A NRS utilized three off target bearing wires which provided a signal to the indicator for displaying the aircraft's movement on a flat plane. (Ex. A-10 at 7)

269. Pursuant to the contract, appellant entered into an ACA with General Electric for the EF-111A AMP NRS. General Electric subsequently provided appellant with the new NRS components and associated NRS data, including NRS interface wiring drawings. The NRS interface wiring drawings depicted the pre-AMP off target bearing wires as "not used" in the AMP-modified EF-111A system. (Ex. A-10 at 6-9; GAC R4, tab 2697 at 423-24)

270. Appellant reviewed the interface wiring drawings received from General Electric. During a 1 March 1988 PMR splinter meeting, appellant's engineering personnel questioned General Electric's depiction of the off target bearing wires in the drawings as "not used" in order to determine whether General Electric's new components would be compatible with the existing indicator. The splinter meeting was attended by representatives of appellant, General Electric, and the Government. (Ex. A-10 at 7, 9; GAC R4, tab 3432 at 32352-54)

271. In a 16 March 1988 Interface Memorandum (IFM) to appellant, which was also distributed to the AF, General Electric stated in relevant part as follows (ex. A-11):

At the referenced PMR meeting, GASD questioned the compatibility of the IP-1260/A Azimuth-Elevation-Range Indicator when operated as a unit of the AN/APQ-169(4) AMP radar set.

An operational compatibility evaluation of the IP-1260/A indicator was performed by GE in April of 1986. A GFP IP-1260/A indicator, S/N AF 056, was operated in an AMP configured radar set comprised of an AMP engineering model Radar Receiver-Transmitter, an AMP engineering model Electrical Synchronizer, and GFP APQ-114 LRU's.

The operational evaluation included a functional check of the IP-1260/A indicator front panel controls and an exercise of indicator and radar set operation in response to normal signal interchanges between the indicator and other LRU's of the radar set. The evaluation confirmed that the IP-1260/A

A-E-R Indicator functions as a compatible LRU of the AMP radar set.

272. Appellant's engineering manager, Mr. Schenck, reviewed the 16 March 1988 IFM in March 1988. He testified, and we find that General Electric's response in the IFM confirmed that the existing EF-111A indicator was compatible with General Electric's new components, and that the three off target bearing wires were not to be used. (Tr. 27/7; ex. A-10 at 12-14)

273. Appellant designed its new wiring harnesses and associated logistics data and hardware without installing the off target bearing wires. Mr. Schenck testified that he viewed the "not used" depiction as a basis for not installing the off target bearing wires because "[g]ood design practice and Grumman policy required that we not install wires which were not to be used." (Ex. A-10 at 15)

274. In subsequent tests of the AMP-modified EF-111A aircraft, appellant experienced problems with the indicator in ground velocity mode. Appellant's investigation identified the deletion of the off target bearing wires as the cause of the problems. (Tr. 26/323; ex. A-10 at 15)

275. In a 15 May 1989 IFM to General Electric, a copy of which was sent to the AF, appellant asked General Electric to confirm that the existing EF-111A NRS indicator required that the three off target bearing wires be connected in order for the indicator to work properly in the ground velocity mode (ex. A-10 at 16-17, ex. A-12; tr. 26/334-40).

276. General Electric responded in a 5 June 1989 IFM to appellant, a copy of which was sent to the AF, and confirmed that the off target bearing signal to the NRS indicator, furnished via a triplet wire set, was in fact required for proper ground velocity mode display in the AMP-modified NRS (ex. A-10 at 18, ex. A-13).

277. After General Electric's confirmation that the three off target bearing wires were required to be connected, appellant reconfigured its wiring harnesses to add the missing wires to the flight-test aircraft and subsequently to all of the EF-111A AMP production kits, and changed the associated drawings and paperwork. After the reconfiguration, the NRS tested properly in ground velocity mode. (Ex. A-10 at 18-19)

278. In its April 1989 EF-111A CPR to the AF, appellant indicated that "Ground Velocity Wiring," among other items, was causing "additional scope/growth" to the contract. In the May 1989 CPR, appellant again indicated that ground velocity wiring was causing additional scope/growth to the contract, and also stated that there was "[a]n unfavorable variance in Engineering Area due to the ARS integration task requiring additional test and troubleshooting time due to wiring omissions caused by erroneous information received from GFE vendor (G.E)." (AF supp. R4, tab 1090, tab 1091 at 2, 11)

Appellant continued to include these statements in subsequent CPRs (AF supp. R4, tabs 1092 to 1097).

279. By letter dated 10 June 1991, appellant submitted its REA to the AF. As part of the REA appellant stated that the “OFF TGT BRG” signal was indicated as “Not Used” on General Electric’s wiring diagram, causing appellant to configure its wiring harnesses for the EF-111A AMP without the off target bearing wires and causing appellant to incur significant additional costs to later incorporate the wires when it was discovered that they were in fact required. (R4, tab 936 at 98-99) Appellant reiterated these allegations in its updated REA dated 7 May 1993 (R4, tab 979 at 400-09). The contracting officer addressed appellant’s contentions on the merits and denied entitlement by letter dated 26 August 1993 (R4, tab 985).

280. In its 30 March 1994 claim, appellant alleged that General Electric, a GFE contractor, provided appellant with faulty information regarding the wiring of the NRS for the EF-111A AMP and that appellant incurred substantial out-of-scope costs in incorporating ground velocity signal wires that General Electric had originally indicated were not required (R4, tab 991 at 77). The contracting officer addressed appellant’s contentions on the merits and denied this aspect of the claim by decision dated 30 September 1994, stating in essence that if General Electric provided faulty information to appellant, appellant’s remedy was against General Electric and not against the AF (R4, tab 999 at 19).

281. The following contract provisions are relevant to this claim. Clause H-1049 TOTAL SYSTEM RESPONSIBILITY provided, in part as follows (R4, tab 1 at 55):

a. The Contractor has Total System Integration Responsibility (TSIR) for the integration and software development in accordance with the Statement of Work and System Segment Specification for the Avionics Modernization Program for the F-111A/E and EF-111A aircraft. This responsibility is defined as:

(1) The Contractor shall take any and all action necessary to insure the integration of all interfacing systems. These systems shall work in consonance with the equipment on the Government furnished aircraft.

(2) The Contractor shall take the necessary action to assure successful operation of the total integrated system, as defined by the System Segment Specification, subject to the GFP being furnished in

accordance with the Government furnished property clause.

282. The contract incorporated by reference FAR 52.245-2 GOVERNMENT PROPERTY (FIXED-PRICE CONTRACTS) (APR 1984) which provided, in relevant part (R4, tab 1 at 70; ex. G-5):

(a) *Government-furnished property.* (1) The Government shall deliver to the Contractor, for use in connection with and under the terms of this contract, the Government-furnished property described in the Schedule or specifications together with any related data and information that the Contractor may request and is reasonably required for the intended use of the property (hereinafter referred to as “Government-furnished property”).

(2) The delivery or performance dates for this contract are based upon the expectation that Government-furnished property suitable for use (except for property furnished “as-is”) will be delivered to the Contractor at the times stated in the Schedule or, if not so stated, in sufficient time to enable the Contractor to meet the contract’s delivery or performance dates.

(3) If Government-furnished property is received by the Contractor in a condition not suitable for the intended use, the Contractor shall, upon receipt of it, notify the Contracting Officer, detailing the facts, and, as directed by the Contracting Officer and at Government expense, either repair, modify, return, or otherwise dispose of the property. After completing the directed action and upon written request of the Contractor, the Contracting Officer shall make an equitable adjustment as provided in paragraph (h) of this clause.

283. The contract also included clause H-1051 GOVERNMENT PROVIDED DATA – WARRANTY which provided, in relevant part (R4, tab 1 at 56):

b. If and when a Contractor discovers a defect in any data provided by the Air Force, either as part of the Data Library presented to the Contractor at award or any subsequent Government furnished data, the Contractor will notify the SM-ALC/PCO of the defect and drawing number, including revision. . . .

284. Clause H-1069 ASSOCIATE CONTRACTOR AGREEMENTS provided, in relevant part (R4, tab 1 at 58-59):

a. It is recognized that a free and open exchange of management and technical information is necessary to expedite design engineering, integration and logistics support of certain Government Furnished Material (GFM) into the F-111 aircraft as part of the Avionics Modernization Program. To facilitate this exchange and provide for orderly integration, the Contractor establish shall [sic] Associate Contractor Agreements (ACA) with the following suppliers of the F-111 system indicated:

<u>SUPPLIER</u>	<u>SYSTEM</u>
General Electric	Attack Radar System

....

The purpose of these ACAs is to establish and maintain a close liaison with the suppliers on all matters pertaining to design, system specifications, engineering changes and production deliveries.

b. The ACA shall provide for the following:

(1) Coordination and exchange directly between the Associate Contractors of all information pertinent and essential to the design, fabrication, installation and delivery of supplies acquired under the affected prime Government contracts to the extent that such information is required to assure the compatibility of and utilization of said equipment.

(2) Coordination and evaluation of all proposed revisions to the specifications and drawings of the Associate Contractor that affect form, fit, function and interface.

....

c. The Contractor will be responsible for obtaining data and information from the Associate Contractors. The Contractor

will work with its associate [sic] Contractors to ascertain what data and information is necessary and when such data and information is required and to transfer this data and information. . . .

285. The EF-111A GPS SOW provided in relevant part as follows (R4, tab 1 at 322, 342, 349):

B. DEVELOPMENT AND PRODUCTION TASKS

. . . .

B.2 The contractor shall be responsible for the establishment and cost of Associate Contractor Agreements (ACAs) with the following manufacturers of equipment which will be provided as Government Furnished Equipment (GFE) during the development and production phases of this contract. The GFE listed below shall not be modified under this SOW.

. . . .

General Electric – Navigation Radar Set (NRS)

. . . .

1150 WIRING HARNESSSES

. . . .

1150.2 Determine the new and/or revised wiring requirements for new avionic equipment.

1150.3 Design new wiring harnesses as required to replace the existing wiring harnesses. . . .

. . . .

1400 NAVIGATION RADAR SET (NRS)

1400.1 Integrate the NRS on the EF-111A aircraft.

. . . .

1400.3 Develop and coordinate with the NRS contractor and Grumman Aircraft Company the interface and mechanizations required to support operation of the NRS.

....

1400.5 Review and provide technical evaluation of the NRS contractor's design changes, drawings, procedures, specifications, and schedule.

286. The EF-111A GPS SSS provided in relevant part as follows (R4, tab 1 at 153):

3.7 Functional Areas. The modifications to the navigation system shall include incorporation of the following equipment:

....

k. Navigation Radar Set (3.7.12)

The EF-111A SSS provided in relevant part as follows (R4, tab 1 at 202):

3.7.12 Navigation Radar Set (NRS). The EF-111A Navigation Radar Set shall be a modified, upgraded AN/APQ-160. The specific requirements for the radar shall be in accordance with General Electric specification 52585-035. The modification shall consist of replacement of the existing Modulator-Receiver-Transmitter with a newly designed Radar-Receiver-Transmitter and replacement of the existing Electrical Synchronizer with an Electrical Synchronizer similar to the AN/APQ-161 Electrical Synchronizer.

DECISION

Appellant contends that it was furnished defective GFP by General Electric, the Government's contractually identified agent for GFP for the NRS, causing appellant to undertake additional, out-of-scope effort to change its design and modify its kits following discovery of the defect. The AF contends that although the Government provided appellant with the NRS and its data through General Electric, appellant was required by the SOW to integrate the NRS into its design and was responsible for total system performance and integration, and that any faulty information provided by the GFE contractor was not the AF's responsibility.

We are mindful that Clause H-1049, Total System Responsibility, required appellant to insure the integration of all interfacing systems and to assure the successful operation of the total integrated system of the AMP-modified aircraft, but that responsibility was expressly made subject to the suitability of any Government-furnished property to be delivered in accordance with the Government Property clause. Section B.2 of the EF-111A SOW listed the NRS provided by General Electric as GFP. The Government Property clause provides that not only the hardware components, but the related data and information reasonably required for the property's intended use, are GFP. We believe the NRS interface wiring drawings provided by General Electric were GFP under this clause.

We believe that only General Electric, as the GFP manufacturer of the components, could reasonably be expected to know whether the three off-target bearing wires were to be used in the interface between the existing indicator and General Electric's new NRS components. This information was also reasonably required for the intended use of the system to be furnished by General Electric. Appellant reviewed and provided technical evaluation of General Electric's drawings as required by the contract when it questioned the "not used" reference in said drawings as it applied to these wires. We believe it was reasonable for GAC to rely upon the technical assurances of its GFP provider, and the drawings themselves, that these wires were not to be used.

In order to prove a claim under the Government Property clause, appellant has the burden to show that:

- (1) the property in question was intended to be furnished as GFP, (2) the property was not suitable, (3) the unsuitability relates to the property's intended purpose, and (4) the unsuitability was the proximate cause of the contractor's injury for defective GFP.

E-Systems, Inc., ASBCA No. 46111, 97-1 BCA ¶ 28,975 at 144,305. We believe that appellant has met this burden here. Appellant has persuaded us that the NRS data it received from General Electric was GFP and was not suitable, that the unsuitability related to the data's intended purpose, and that the unsuitability was the proximate cause of appellant's injury.

The Government contends that appellant's claim should be barred because appellant did not comply with the contract's notice provisions. We do not agree. The contracting officer considered this claim on the merits and said nothing about any lack of notice in his decision. When a contracting officer is able to reach the merits of a claim and does not assert prejudice due to lack of notice in making his decision, the Government has waived lack of notice as a defense. *Kumin Associates, supra*; *Dittmore-Freimuth Corp., supra*; *Central Mechanical Construction, supra*. The Government has not shown that it was prejudiced by appellant's failure to give any of the specific notices prescribed by the

contract. *See Selma Apparel Corp.*, ASBCA No. 30011, 88-3 BCA ¶ 20,928 at 105,771; *Central Mechanical Construction*, ASBCA Nos. 29431, 29432, 29433, 85-2 BCA ¶ 18,061 at 90,657-659. We also note that appellant's CPRs provided reasonable notice to the Government of this claim. We hold that appellant's claim is not barred by a failure to give timely notice.

For reasons stated, we find entitlement on appellant's ground velocity signal wires claim.

(17) FINDINGS OF FACT – F-111A Mod O¹⁰

287. Under the contract at SOW § 7130.1, the AF was to deliver to appellant an F-111E trial aircraft which was to be modified by appellant in accordance with the statement of work and specifications (R4, tab 1 at 516). This aircraft was identified on the contract's GFE Requirements list and was required to be delivered by April 1986 (R4, tab 1a at i-11). The AF was also to deliver an EF-111A trial aircraft which was to be modified by appellant, but it does not appear that appellant's claim relates to the delivery of this aircraft.

288. Under Clause H-1052 and SOW § 7400.1, appellant was to provide a production kit that would fit each aircraft tail number in the F-111A and F-111E fleet subject to modification (R4, tab 1 at 56, 519). Hence, appellant needed to become knowledgeable of the F-111A and F-111E fleet, specifically the configuration differences between the two models, as well as the differences amongst aircraft within the same model line. The aircraft drawings, technical orders and related documentation in the AMP data library, available pre-award, were to assist in this purpose. This information was also important to assist appellant in the manufacture of the F-111A/E "kitproof" kits (*see* finding 295, *infra*). The contract did not represent that all aircraft were identical in configuration. (Ex. G-126 at 13-14, 45)

289. After award, the AF was unable to deliver a F-111E trial aircraft to appellant. The AF had available, however, a F-111A aircraft for this purpose. In early 1986, the contracting officer initiated change proposal P00001 to, among other things, change the contract to substitute an "A" trial aircraft for the "E" trial aircraft. Whether an A or E trial aircraft was provided, appellant still had to provide production kits for all A and E aircraft subject to modification. Appellant also had to provide a "kitproof" kit for an F-111A aircraft and a kitproof kit for an F-111E aircraft to be installed by the AF.

290. Before P00001 was executed by the parties, the AF delivered to appellant a particular type of F-111A aircraft known as the F-111A "Mod O" aircraft ("the Mod O") (tr. 48/123-24). The F-111A Mod O was identified as tail number 67-050 and was part of the then-current F-111A fleet, which included other Mod O aircraft for which appellant had to provide modifications kits under the contract. Prior to the award of this contract, there

had been as many as 21 F-111A Mod O aircraft in the fleet, identified by tail numbers 67-037 through 67-057. By the time of award, four of these aircraft had been taken out of service and eight others had been converted into EF-111A aircraft, which left nine Mod O aircraft in the fleet (ex. G-126 at 14) out a total of 44 F-111A aircraft, as identified at F-111A/E SOW, Exhibit A, Effectivity (R4, tab 1 at 530).

291. Appellant was familiar with the F-111A Mod O. Appellant had converted a Mod O to an EF-111A under an earlier procurement (tr. 48/122).

292. Appellant did not advise the contracting officer that it objected to the F-111A Mod O trial aircraft when it was received. Contract Modification No. P00001 at paragraph (R) provided that all the changes identified therein – including the trial aircraft substitution – were to be performed at no additional contract price, stating: “The total contract price remains unchanged.” Appellant executed this contract modification without condition or qualification. (R4, tab 1AA)

293. The F-111A Mod O had certain configuration differences from other F-111A aircraft, primarily in the forward equipment bay (ex. G-126 at 14). Appellant was to account for these differences based upon, among other things, the AMP library documentation available pre-award. Appellant’s vehicle project engineer opined at the hearing that the Mod O was not representative of the “mainstream” aircraft (ex. A-46 at 3). However, even if we accept that the Mod O trial aircraft was not identical to the majority of the planes subject to modification, the contract did not represent that appellant would be provided with a trial aircraft that would be identical to the majority of the planes subject to modification, nor did P00001 so represent, nor did appellant ever voice such an objection prior to executing P00001.

294. We find that the F-111A Mod O aircraft was part of the F-111A fleet subject to modification, constituted a significant portion of that fleet, and was not an unsuitable trial aircraft as Government furnished property (tr. 70/190-91).

295. As part of the contract work, appellant was to provide a conforming AMP kit to be installed by the AF for each of the three different model aircraft: F-111A, F-111E and EF-111A (R4, tab 1 at 13, 14, 25). GAC was also to support the AF installation of these kits as provided by the contract at SOW § 7200 (R4, tab 1 at 518). This exercise was known as “kitproofing.” Each kitproof kit was to include the appropriate parts, equipment, wiring, drawings and instructions needed for the installation by the AF. (Ex. G-126 at 13).

296. The AF commenced the F-111E kitproof in April 1988. The kitproof exercise revealed many errors in appellant’s kit. The AF technicians who performed the kitproof installation recorded these discrepancies on documents known as “hot sheets.” Copies of hot sheets were provided to appellant’s on-site personnel (ex. G-263 at 5). Summaries of these hot sheets were also provided in writing to appellant’s New York office periodically

under AFTO Form 82, and appellant responded to the problems identified pursuant to SOW § 7200.4 (R4, tab 1 at 518). The parties also agreed to set up an audit procedure in which technical representatives of the parties reviewed the proposed corrective action for each hot sheet for adequacy and ensured that any proposed corrections were made to the drawings or TCTO, as appropriate (ex. G-263).

297. Typically, a hot sheet would describe the technical question or problem raised by the AF without ascribing blame or contract responsibility for its resolution. Similarly GAC agreed to make fixes when necessary without regard to fault (tr. 49/29-30).

298. At a PMR on 27 June 1988, GAC briefed the AF on F-111 kitproof problems. GAC identified the critical problem areas as “drawing deficiencies; parts deficiencies; drawing interpretation issues.” Appellant’s briefing slides including the following summary (AF R4 supp.2nd, tab 1737.198):

SUMMARY:

- ? KIT PROOF PROBLEMS RECOGNIZED;
- ? ACTIONS IDENTIFIED AND UNDERWAY TO RESOLVE ISSUES
 - ADDITIONAL ONSITE SUPPORT TO BE PROVIDED
 - INSTALLATION DRAWING ERROR PROBLEMS WILL BE RESOLVED BY END OF JULY
- ? GRUMMAN COMMITTED TO SUCCESSFUL, ON-SCHEDULE KIT PROOF COMPLETION.

299. Appellant did not notify the contracting officer of any claim against the AF for these kitproof difficulties at this time.

300. At the PMR on 18 July 1988, appellant briefed kitproof problem areas to the AF, noting errors in appellant’s installation drawings and that “Grumman has begun correcting drawings in response to hot sheets.” Again, it does not appear that appellant notified the contracting officer of any claim against the AF regarding kitproof problems. (GAC R4, tab 2435 at 54)

301. By letter to appellant dated 15 August 1988, the AF rejected appellant’s F-111E kitproof, stating that over 800 hot sheets had been written against the kitproof by the AF and that the kitproof effort was only approximately half-completed. The AF directed, *inter alia*, that a corrected F-111E kitproof kit be provided for a new installation by the AF, and directed appellant to provide a revised performance schedule. (R4, tab 336)

302. Appellant replied by letter dated 24 August 1988 with its proposed revised schedule. In this letter, appellant did not challenge the propriety of the kitproof rejection

by the AF, nor did it suggest that the AF was to blame, in whole or in part, for the kitproof failures. Rather appellant closed the letter as follows (R4, tab 343):

Grumman's objective is to restore Air Force confidence in our performance to effect production kit installations at the earliest possible date. . . .

303. The AF issued over **1,600** hot sheets on the F-111E kitproof, and a total of **3,089** hot sheets on the F-111E kitproof, the F-111E rekitproof and the F-111A kitproof combined (ex. G-126 at 37, 96). With respect to the initial F-111E kitproof, it is undisputed and we find that **157** hot sheets – less than 10 percent – required AF, not GAC action. There was also a small, insignificant number of duplicate hot sheets.

304. Mr. Stephen M. Farrell was responsible for managing the GAC engineers who designed and installed the AMP modification. He also managed the design of the mechanical portions of the kit and provided engineering support in connection with trial aircraft installation and kitproof activities. (Ex. A-46 at 1). We find instructive his internal memorandum to GAC personnel dated 24 August 1988, which states in pertinent part as follows (R4 supp., tab 1737.280):

Attached is a list of generic problems encountered on the F-111A/E kit proof effort at SM-ALC. In my office are copies of a few hundred hot sheets which further amplify this list. . . .

It is imperative that the problems encountered on the F-111A/E kit proofing NOT be repeated on the EF-111A. Towards that end you are directed to follow the EF-111A trial aircraft buildup closely to assure our drawings are clear and correct. . . . [Italics only added]

Our joint effort to remedy our F-111A/E mistakes and preclude EF-111A errors, will have a major bearing on our future business prospects with SM-ALC. Your ardent dedication to this task is requested. [Emphasis added]

305. In September 1988, General Alfred G. Hansen, Commander, Headquarters Air Force Logistics Command, wrote a letter to appellant's president, which states in pertinent part as follows (R4, tab 358):

. . . I have just completed a review of Grumman's performance on the F-111 AMP integration and am appalled at what I find. . .

....

2. I find your F-111 kitproof execution to be totally unacceptable. There are presently over 1000 kitproof discrepancies on the F-111E with significant effort remaining. This indicates to me a total lack of quality consciousness-rekitproof is absolutely necessary. . . .

3. . . . We need to meet immediately and set this program right. I have cleared my calendar on Thursday morning, 22 September 1988, to meet with you personally at Sacramento. I want you to see for yourself the shocking condition of the kitproof and discuss your plans to remedy F-111 integration program shortfalls.

306. As far as this record shows, appellant did not challenge General Hansen's kitproof findings at this time, or otherwise assert that the kitproof difficulties were of the AF's making.

307. By unilateral contract Modification No. P00050 dated 9 September 1988, the AF revised contract delivery dates, and established 1 May 1989 as the date for the new F-111E kitproof, known as the "rekitproof" (AF R4 supp., Vol. 79, tab 1BX). The AF completed this rekitproof in or around late December 1989.

308. Insofar as pertinent here, appellant's REA dated 10 June 1991 sought to recover unanticipated costs which appellant believed were attributable to the AF's furnishing of the F-111A Mod O trial aircraft in lieu of the F-111E model. Appellant also sought relief based upon its contention that there were numerous undocumented differences between the AF-furnished drawings and the actual F-111A/E aircraft, and because of AF imposed "drawing preferences" which were not required by the contract (R4, tab 936 at 114-16). Appellant did not contend at this time that it was entitled to an equitable adjustment for furnishing mono-detail drawings purportedly required by the AF, although this issue was raised at the hearing.

309. The contracting officer denied the REA by letter dated 26 August 1993. Insofar as pertinent, the contracting officer stated that appellant's execution of P00001 was a bar to recovery. He also stated that there were only minor differences between the F-111A Mod O aircraft and the other F-111A aircraft in the fleet, and that the vast majority of appellant's kitproof discrepancies were unrelated to these differences and were appellant's responsibility (R4, tab 985 at 39).

310. Appellant reasserted its contentions in its 30 March 1994 claim (R4, tab 991). The claim also did not seek recovery for furnishing mono-detail drawings. Appellant's claim was denied by contracting officer decision dated 30 September 1994 (R4, tab 999).

311. Appellant and the AF offered evidence at the trial as to who was to blame for the issuance of hot sheets. Appellant's evidence questioned roughly 146 hot sheets as AF-caused, which was a small fraction of the roughly 1,600 hot sheets issued under the F-111E kitproof, and even a smaller fraction of the total number of 3,089 hot sheets issued under all the F-111A/E kitproof exercises.

312. At the trial, appellant also contended that the AF directed appellant to produce certain mono-detail drawings that were not required by the contract. Appellant did not identify any such directive from the contracting officer in writing or from any other authorized AF official. The AF person who purportedly issued this direction also was not identified. Appellant also did not show that this claim had been previously submitted to the contracting officer for decision under the Disputes clause.

313. Appellant's chief witness on hot sheets was Mr. Raymond P. Thek, who was in charge of assembling and coordinating the data to prepare the TCTO that would be incorporated in the AMP modification (ex. A-47 at 1). The AF's chief witness on hot sheets was Mr. Charles C. Foster, who was the F-111 engineering section chief in the AMP office, and who was qualified as an expert witness (ex. G-126 at 2-6). Both witnesses were cross-examined thoroughly. Mr. Thek was impeached on a number of occasions through prior inconsistent statements (tr. 49/90-95, 181) and his recollection at times was weak (tr. 49/97-101). Mr. Foster was testy and abrasive on occasion (tr. 70/72-73, 92). Overall, however, we find that Mr. Foster's testimony was more credible with respect to hot sheet issues, and we have taken this into account in the issuance of our findings.

314. We find that only a small, insignificant number of the roughly 1,600 F-111E hot sheets issued were attributable to defective AF baseline drawings and documentation. We find that only a small, insignificant number of the roughly 1,600 F-111E hot sheets issued were attributable to out-of-scope drawing preferences imposed by the AF. Overall, the hot sheets issued by the AF were reasonable and justified given Grumman's poor design practices, inadequate attention to detail design and/or lack of quality control. (Ex. G-126 at 97-98).

315. Appellant's evidence also reflected that many of the hot sheet-related problems were within its control (tr. 49/18-27). Also, those few hot sheets that were AF-caused could not be quantified by appellant (tr. 49/103). Overall, we find that the AF's rejection of appellant's F-111E kitproof was primarily due to deficiencies in appellant's performance (tr. 71/18).

DECISION

We believe that appellant's Mod O claim is without merit for a number of reasons. First, with respect to the additional costs claimed as a result of the Government's delivery of the F-111A Mod O trial aircraft in lieu of the F-111E, we believe that such a claim is barred by bilateral contract Modification No. P00001. After receipt of the aircraft, appellant executed Modification No. P00001 at no change in contract price and without qualification or reservation. Appellant did not advise the contracting officer that it objected to the Mod O trial aircraft when it was delivered. Indeed, the record shows that appellant was familiar with the aircraft. We believe that appellant is precluded from reopening this bilateral contract modification.

With respect to the AF's rejection of the F-111E kit, the evidence overall shows that kit deficiencies – and the related hot sheets – were largely attributable to appellant. We agree with the AF's expert that the AF's rejection of the kitproof was primarily due to deficiencies in appellant's performance. While the record suggests that a certain number of hot sheets were attributable to the AF, they represent a small, insignificant portion of the total number of discrepancies identified by the AF, and appellant's costs related to the AF-caused hot sheets have not been shown to be quantifiable or capable of segregation.

As for appellant's mono-detail drawing claim presented at trial, we conclude that said claim was not presented to the contracting officer for a decision as required by the CDA, 41 U.S.C. § 605. Hence, we do not have jurisdiction over the claim. *Grumman Aerospace Corporation*, ASBCA Nos. 46834, 48006, 97-2 BCA ¶ 29,180. Assuming *arguendo*, that this claim was impliedly presented to the contracting officer as part of the Mod-O claim related to AF-imposed drawing preferences, appellant has not persuaded us that the contracting officer directed or ratified any additional work in this area.

For reasons stated, we must deny entitlement on appellant's F-111A Mod O claim.

(18) FINDINGS OF FACT – F-111E Kitproof Extension

316. Unilateral contract Modification No. P00050 dated 9 September 1988 confirmed the AF's rejection of the F-111E kitproof, established a date for the F-111E rekitproof and provided a revised delivery schedule for F-111E production kits (finding 307). The new rekitproof start date was 1 May 1989. Appellant was to deliver three production F-111E kits in December 1989. (R4, tab 1BX) Each production kit was to contain all the required hardware, drawings and instructions necessary to install the AMP modifications (ex. A-44 at 1).

317. As a result of kitproof, any and all changes to be made to the kit were documented through issuance by the AF of a final AFTO Form 82. Appellant needed this document to confirm the parties' agreed-upon kit changes and to prepare the final TCTO

documentation prior to performing a physical configuration audit and prior to the delivery of the production kits under the contract delivery schedule. (Ex. A-44 at 3-4)

318. Based upon the new delivery dates of December 1989 for the three F-111E production kits under Modification No. P00050, appellant believed that the AF needed to complete rekitproof by 31 October 1989 in order for appellant to complete the physical configuration audit and to meet the new delivery schedule (*id.* at 6-7). However, no kitproof completion date was identified in the contract.

319. The AF began the F-111E rekitproof installation on or about 1 May 1989 (ex. G-126 at 34). The AF continued to find discrepancies and errors in the kits and in the related drawings and data. The AF issued 410 hot sheets on the F-111E rekitproof (R4, tab 936 at 116). The hot sheets were reviewed by the parties individually and together in accordance with established procedures. Appellant has not shown that these hot sheets were attributable to AF error.

320. It appears that rekitproofing took longer than the parties anticipated, which placed the scheduled December 1989 production kit deliveries in jeopardy. The parties entered into a contract modification to change the F-111E delivery schedule in several important respects. Pursuant to Modification No. P00083, signed by appellant on 19 September 1989 and the AF on 4 October 1989, appellant was no longer obligated to furnish a final and complete TCTO package with the three F-111E production kits to be delivered in December 1989. Rather, Modification No. P00083 provided as follows (R4, tab 1DE):

The three kits shipped 15 December 1989 will be shipped with a preliminary TCTO and will require a delta kit to be shipped no more than 90 days after submission of final AFTO 82 forms . . .

Pursuant to this bilateral modification, additional production kits were also to be delivered beginning 1 April 1990, "or within 90 days of final AFTO 82 which ever [sic] is later."

321. We find that Modification No. P00083 extended and provided increased flexibility in the F-111E delivery schedule, giving due consideration to the existing pace of the rekitproof effort. Appellant agreed to this contract modification at no change in contract price.

322. The rekitproof process, including the processing of the validating documentation, was completed in or around late December 1989 (ex. A-44 at 7).

323. By letter to the AF dated 20 June 1990, appellant contended that the AF failed to timely complete the rekitproof, since three production kits and final documentation had

to be made in December 1989 pursuant to Modification No. P00050. Appellant failed to mention Modification No. P00083, however, which allowed for additional time and flexibility in these kit deliveries and their data as stated above. Appellant also advised that it would seek an equitable adjustment for the costs incurred to retain personnel for an extended period of time in support of rekitproof efforts (ex. A-45).

324. Appellant's REA dated 10 June 1991, updated 7 May 1993, included these same contentions, and also alleged that F-111E kitproof delay caused disruption to the planned flow of production fabrication and deliveries (R4, tab 936 at 100) Appellant did not identify any planned production fabrication and delivery schedule, or any written planned work sequence. The AF denied this portion of the REA by letter dated 26 August 1993 (R4, tab 985).

325. Appellant reasserted its position in its claim dated 30 March 1994 (R4, tab 991). The contracting officer denied the claim by decision dated 30 September 1994 (R4, tab 999).

DECISION

Appellant contends that the AF's performance of the rekitproof of the F-111E was untimely. We believe this claim is without merit for a number of reasons.

First, we reject appellant's contention that the contract created an implied obligation upon the AF to complete rekitproof by October 1989 in order to meet December 1989 production kit delivery deadlines. Appellant relies upon unilateral Modification No. P00050 in its claim but fails to consider bilateral Modification No. P00083 which was issued roughly a year after P00050. In essence, Modification No. P00083 accounted for rekitproof delay and extended the F-111E delivery schedule, and did not require appellant to make complete production kit and final documentation deliveries in accordance with Modification No. P00050. Hence, there was no need for the AF to complete rekitproof by October 1989, as appellant suggests. There was also no contract date set for rekitproof completion in either Modification Nos. P00050 or P00083.

Moreover, to the extent appellant seeks costs related to the extension of the delivery schedule, we note that appellant agreed to the delivery schedule modifications under P00083 at no change in contract price. There is no basis to reopen this bilateral contract modification.

Appellant also has the burden to show that the AF unreasonably delayed the performance of the rekitproof. It has not met this burden. The F-111E rekitproof was only necessary because of the AF's rejection of appellant's first F-111E kitproof kit in 1988, which we have found was primarily appellant's responsibility. The AF also issued hundreds of hot sheets during the rekitproof in 1989 which had to be reviewed and addressed by the

parties and which took considerable time. Appellant has failed to offer any persuasive evidence that these rekitproof hot sheets were attributable to AF error. We must conclude that these many write-ups – and their review and resolution – caused delay in the completion of the rekitproof and documentation validation for which appellant must assume the blame.

For these reasons, we must deny appellant's F-111E kitproof extension claim.

(19) FINDINGS OF FACT – EF-111A Kitproof Extension

326. The AF's rejection of the first F-111E kitproof also resulted in delay to the EF-111A kitproof (ex. A-44 at 3). Bilateral contract Modification No. P00062, effective 28 December 1988, revised the major engineering milestones for the EF-111A AMP to establish a new EF-111A kitproof start date of 1 May 1989 (AF R4 supp., tab 1CJ at 2).

327. Pursuant to the contract as modified, GAC was to deliver two EF-111A production kits to the AF in December 1989 (ex. A-44 at 10; AF R4 supp., tab 1BX at 4). According to appellant, since Grumman's deliveries of the first EF-111A production kits were due no later than December 1989, the AF was necessarily required to complete EF-111A kitproof no later than 31 October 1989 in order for appellant to accomplish other contract tasks precedent to production delivery (tr. 48/75-76). However, the contract did not provide a completion date for the performance of the EF-111A kitproof.

328. The AF did not commence EF-111A kitproof installation until June 1989, one month later than prescribed by P00062 (ex. A-44 at 9). The installation and the validation of data and documentation were completed in or around February-March 1990 (ex. A-44 at 10).

329. According to appellant, the AF's failure to timely complete EF-111A kitproof resulted in additional out-of-scope costs relating to the retention of on-site and home office manpower for kitproofing purposes (ex. A-44 at 10). Appellant's evidence did not show whether these persons were specifically retained for the kitproof under contract, nor did appellant show any planned versus actual manpower documentation in support of its contentions.

330. By letter to the AF dated 13 June 1989, appellant advised of potential problems with EF-111A production kit deliveries if the AF was to complete kitproofing in the December 1989 – January 1990 time frame (GAC R4, tab 2561).

331. By letter to the AF dated 20 June 1990, appellant advised that it would seek an equitable adjustment for AF-caused kitproof delay (ex. A-45).

332. Appellant's REA dated 10 June 1991, updated 7 May 1993, sought recovery for extended manpower costs and disruption to the scheduled flow of production fabrication and delivery attributable to the AF's late completion of EF-111A kitproofing (AF, tab 936 at 100). The contracting officer determined that appellant was entitled to \$28,232, attributable to the one-month delay in commencing EF-111A kitproof from May to June 1989, but denied the claim in all other respects (R4, tab 985). It does not appear that appellant agreed with the contracting officer's assessment, nor does it appear that the AF paid this amount to appellant.

333. Appellant's claim dated 30 March 1994 reasserted its position regarding kitproof and production kit delay and related costs (R4, tab 991). The contracting officer's decision dated 30 September 1994 acknowledged the one-month delay in commencing EF-111A kitproof installation but made no quantum findings, and denied the claim in all other respects (R4, tab 999 at 19).

334. Appellant's program manager, Mr. William Egner, was appellant's chief witness on kitproof extension and delay. Mr. Egner failed to identify any planned and actual fabrication and delivery schedules for the EF-111A in support of appellant's contention of disruption and delay. The record does not support appellant's contention of disruption and delay attributable to the extended EF-111A kitproof.

335. The AF issued **440** hot sheets during the EF-111A kitproof (R4, tab 936 at 116). It does not appear that appellant submitted to the contracting officer any contemporaneous objections to these hot sheets. Nor did appellant specifically address these EF-111A hot sheets at the trial.

DECISION

There is no dispute that the AF commenced the EF-111A kitproof roughly one month later than provided by Modification No. P00062. However, this fact alone does not automatically entitle appellant to recovery. In order to prevail on a claim, a claimant must show liability, causation and resultant injury. *Wilner Construction Co. v. United States*, 24 F.3d 1397, 1401 (Fed. Cir. 1994). Appellant's evidence on these latter two elements, to the extent it existed at all, was overly general and unpersuasive. Appellant has not persuaded us by a preponderance of the evidence that it incurred any additional costs beyond those bid that were attributable to this one-month delay in kitproof start-up.

As for appellant's claim for late EF kitproof completion, we agree with the AF that there was no express contract provision mandating AF completion of EF-111A kitproof by a date certain. In addition, appellant has not shown that the AF was primarily responsible for any delays in the completion of EF-111A kitproof. The AF issued hundreds of hot sheets against the EF-111A kitproof which appellant did not specifically challenge when they were issued, nor did appellant do so at trial. We must conclude that these write-ups – and their

review and correction – caused delay in the completion of kitproof installation and documentation validation for which appellant must assume the blame.

For reasons stated, appellant’s claim for EF-111A kitproof extension is denied.

(20) FINDINGS OF FACT – CARA Bug

336. Insofar as pertinent, the F-111A/E GPS SSS provided as follows (R4, tab 1 at 113):

3.2.1 Performance Characteristics. Installation of the modified or new avionics system equipment and computer programs shall improve the aircraft reliability, maintainability and mission effectiveness as defined herein. This modification shall not alter the aircraft stability, control, performance envelope, or range, except as specified herein. *The current F-111A/E system functional characteristic and performance shall not be degraded, limited, or eliminated by this modification unless explicitly specified herein. . . .* [Emphasis added]

337. The pre-AMP F-111A/E contained a round dial-type instrument on the pilot’s left main instrument panel known as the “Combined Altitude Radar Altimeter” (CARA) indicator. The CARA indicator’s main function was to display the height of the aircraft above the terrain directly below the aircraft, as determined from the CARA system radar receiver transmitters. A small triangular shaped pointer – known as the “CARA bug” – rotated around the center of the indicator dial, pointing to altitudes printed at the edge of the dial similar to a clock hand. The CARA bug was set by the aircrew using the CARA indicator control knob labeled “SET.” This control knob rotated the CARA bug pointer around the edge of the CARA indicator dial in order to set an altitude warning at a given altitude determined by the operator, and also applied power to the CARA system. As the aircraft descended to that predetermined altitude and the CARA pointer passed the set altitude on the indicator dial, a “pull-up” indication was displayed. If the CARA bug was set below 50 feet, the system issued a default “pull up” indication at 50 feet. This CARA bug capability was used in Airborne Instrument Low/Landing Approach (AILA) mode as an aid in landing the aircraft. (Ex. G-264 at 24-26)

338. This CARA bug function was not modified by the F-111A/E SSS or SOW (ex. G-264 at 27). Hence, in accordance with F-111A/E SSS § 3.2.1 above, the CARA bug function was not to be degraded by GAC in the performance of the contract work.

339. During PDR No. 2 for the F-111A/E MC OFP software on 22-26 September 1986, the AF technical team generated RID MC2-028, entitled “Entry for Pull-Up

Indication” (GAC R4, tab 2371). RID MC2-028 was initiated by CAPT John Gillis, the AF weapon systems officer assigned to the F-111A/E AMP, and the document was coordinated by AF’s lead engineer, Mr. Robert Tuttle (ex. A-5 at 35-37).

340. In the “Problem” section of the RID form, CAPT Gillis provided as follows (GAC R4, tab 2371):

Instead of using the CARA “bug”, an MFD entry of minimum altitude on which the pull up indication is based should be provided. Pre-AMP CARA “bug” indications and functions should be retained in all modes.

From these comments it is unclear to which modes CAPT Gillis referred. He did not testify.

341. The RID form was presented to Mr. Ziegler, appellant’s system project engineer, for a proposed solution. Based upon his understanding of these comments, GAC’s proposed solution was to take the Multi-Functional Display (MFD) console, which already provided for a pull-up indication in certain weapon delivery modes, and utilize it to implement an MFD entry for pull-up indication in AILA mode (tr. 20/90-91). According to Mr. Ziegler: “All we were saying here [the “Proposed Solution” block to RID MC2-028] was that we had an MFD entry for minimum altitude as we presented [at PDR No. 2], and we would use that same one [in] implementing this new direction of the CARA Bug function in AILA” (tr. 20/108). As far as the record shows, appellant did not advise the contracting officer that it viewed CAPT Gillis’ comments as an out-of-scope contract direction.

342. Neither CAPT Gillis nor Mr. Tuttle was a contracting officer, nor were they otherwise authorized to issue direction which modified the terms and conditions of the contract.

343. After PDR No. 2, GAC deleted the aircrew’s ability to manually enter altitude values via the CARA bug in AILA mode. Appellant did not provide for an MFD entry for altitude levels for pull-up indication in AILA as it had proposed in response to CAPT Gillis’ comments. Instead, it programmed a 50-foot default setting in the F-111A/E MC OFP software. Appellant’s B-5 development specification included this approach as part of its overall design. It appears that the AF approved appellant’s B-5, such that it permitted appellant to move on to the next phase of the design work, but the contract did not indicate that such a concurrence was a final or a binding acceptance of appellant’s work.

344. GAC briefed its design to the AF at the CDR in January 1987. The AF representatives questioned this aspect of the design. The AF issued RID MC3-10 which stated in part as follows (GAC R4, tab 2372):

Steering segment briefing indicated that the “pullup desired” command in AILA mode is set only if the CARA altitude input to the OFP goes below 50 ft. Grumman should make certain that the pitch steering commands generated during AILA mode should indicate “fly up” if the CARA output indicates descent below the manual CARA bug setting. (Fly-up indication may be done by the FDC.) Desired implementation would be use CARA bug or 50 ft. min during AILA

345. Appellant looked into the matter in response to this RID but made no further changes to its design. There is no dispute, and we find that appellant’s design provided no ability for the crew to manually select an altitude for a warning pull-up indication in the AILA mode as it could in the pre-AMP aircraft. Appellant’s OFP software would merely provide a default pull-up indication at an altitude of 50 feet.

346. Appellant’s proposed flight test plan, which was submitted to the AF in or around December 1987, was inconsistent with its B-5 specification. The test plan instructed the AF to test the CARA bug pull-up indication in one test case at 60 feet – which suggested the feasibility of a manual setting – and contained other statements that suggested that the ability to manually set the CARA bug was still part of appellant’s design (ex. G-264 at 33-34). Appellant’s systems avionics user’s manual of November 1988 was of like effect (*id.*).

347. During flight test in November 1989, the AF initiated a field problem report, FPR No. AE248, which referenced a hardware problem entitled “CARA Bug Is Not Functional in AILA,” which stated in pertinent part as follows (GAC R4, tab 2374 at 17):

PROBLEM DESCRIPTION: The current F-111A/E design does not provide for the use of the CARA Bug to give a pullup indication via the ADI/LCOSS pitch steering bars in AILA.

DESIRED OPERATION: AILA mode should provide the aircrew with the capability to use the CARA Bug at any altitude above 50’ (up to 5000’). If CARA Bug is set at 50’ or below, the pull-up indications will occur at 50’ AGL [above ground level]

The AF also cited to appellant’s user’s manual which suggested that CARA manual settings were still part of appellant’s design. The AF identified this FPR as a “Category No. 1” priority, which meant that it required a prompt fix.

348. By letter to the AF dated 8 December 1989, appellant identified those FPRs it considered out-of-scope, including FPR No. AE248 (AF R4 supp. tab 1863).

349. By letter to appellant dated 1 February 1990, the contracting officer took issue with appellant's view of this FPR, stating that FPR AE248 "addresses a preAMP capability which must be maintained during AMP . . ." The contracting officer directed appellant to implement the FPR as written. (GAC R4, tab 2373) Appellant did so, without waiving its right to challenge the AF's position.

350. Appellant's REA dated 10 June 1991 and updated 7 May 1993 sought to recover the costs incurred to comply with the contracting officer's direction on FPR AE248, which it viewed as inconsistent with authorized AF direction it claimed was given at PDR No. 2 in September 1986 (R4, tabs 936, 979). The contracting officer denied this request on 26 August 1993 (R4, tab 985). Appellant reiterated its position in its claim dated 30 March 1994 (R4, tab 991). The contracting officer denied the claim by decision dated 30 September 1994 (R4, tab 999).

351. Clause H-1056 of the contract provides as follows (R4, tab 1 at 56-57):

TECHNICAL AND MANAGEMENT MEETINGS

The Procuring Contracting Officer is the only Government representative authorized to change the terms and conditions of this contract. All technical or management meetings held during the performance of this contract, attended by Government and Contractor personnel, must be conducted subject to this condition. The Contractor agrees that no request for equitable adjustment or claim for altering the terms and conditions of the contract shall be submitted based on the results of said meetings unless the Procuring Contracting Officer has authorized that change to the contract in writing. (SMPMC1284)

352. The record does not show that the contracting officer authorized in writing any modifications to the contract resulting from the parties' technical meeting in September 1986, or at any other time regarding the pre-AMP CARA bug function.

DECISION

In the pre-AMP aircraft there existed the capability to manually set the CARA bug for a certain altitude in the AILA mode, and a "pull up" indication would be given when the aircraft reached that altitude. The F-111A/E SSS provided that the contractor was not to degrade the functional characteristics and performance of the pre-AMP aircraft unless explicitly specified in the contract. Neither the SOW nor SSS specified any change to this capability. Hence, appellant had to maintain it.

According to appellant, CAPT Gillis initiated RID Form MC2-028 at PDR No. 2 in September 1986 which directed appellant to eliminate this manual set capability in AILA mode. We believe that CAPT Gillis' comments were unclear in this respect, but even if we were to accept appellant's understanding, we conclude that such a change was a degradation of the pre-AMP aircraft system in violation of the contract's terms, and a contract modification was required to implement it.

Appellant, as moving party, has not shown that CAPT Gillis or any other AF technical staff member present at the PDR meeting had the authority to issue contract modifications. Nor has appellant shown that this so-called technical direction was ratified by the contracting officer. The contract's terms placed appellant on notice that the contracting officer was the only Government representative authorized to change the terms and conditions of the contract, and that no claim may be filed arising out of the results of said meetings unless the directive to modify the contract was authorized by the contracting officer in writing.

We conclude that neither CAPT Gillis nor any member of the AF technical team at the PDR No. 2 meeting was authorized to issue contract direction which had the effect of changing the terms of the contract. It follows that any design action taken by appellant to change the contract in response to this unauthorized direction was likewise unauthorized. The contracting officer's direction to appellant to restore CARA bug functionality, which had been degraded by appellant's design, was consistent with SSS § 3.2.1 (finding 336).

For reasons stated, appellant's CARA bug claim is denied.

(21) FINDINGS OF FACT – Extended F-111A/E Flight Test

353. Under the contract as awarded, the flight test for the F-111A/E, also known as "QT&E," was to begin on 15 February 1988 in Sacramento, California (R4, tab 1 at 60). As provided in the F-111A/E GPS SOW at § 4320, the AF was to conduct – and GAC was to support – 15 months of flight testing to verify system and software integration at an anticipated flight rate of 10 flights per month (R4, tab 1 at 323).

354. Appellant had to pass two milestone tests prior to moving to this comprehensive flight testing. First, the MC OFP had to successfully complete a formal qualification test (FQT). In brief, this was a test of appellant's developed MC OFP software on the STS, which was to be performed by the AF. Second, the trial aircraft as modified had to successfully complete a less comprehensive flight test regimen conducted by the AF, known as the functional flight test (FFT) at appellant's facility, per SOW § 4310 (R4, tab 1 at 475).

355. Under the contract as awarded, appellant was to make its MC OFP available for FQT by 15 December 1987 (R4, tab 1 at 38). There is no dispute, and we find that appellant's MC OFP was unable to successfully complete the FQT by this date. Given this fact, the AF agreed to allow appellant to demonstrate verification of only a portion of the software under Section 16 of FQT procedures to ensure that the aircraft was safe to fly for purposes of follow-on testing (GAC R4, tab 2577). The AF expected full FQT compliance, however, at a later date (tr. 64/46).

356. This Section 16 procedure, also known as the "pre-FFT software test," was scheduled by the contracting officer to take place on 5-7 April 1988. The contracting officer advised appellant in writing that "this need for pre-FFT lab testing is a consequence of not being able to conduct a successful FQT prior to FFT" (R4, tab 262).

357. The Section 16 test procedure did not take place as scheduled, but was performed by the AF on 13 May 1988. Section 16 procedures focused on safety of flight issues, and sought to ensure, at a minimum, that the MC OFP could be safely flown (tr. 30/142). Some sections of the test procedure were skipped due to time constraints or because they were not deemed critical for the follow-on functional flight test. (GAC R4, tab 2579)

358. With respect to that portion of the test that was performed, the results were generally satisfactory so as to allow appellant to move to FFT. Insofar as pertinent, the AF's conclusions and recommendations were as follows (*id.*):

3. Conclusions and Recommendations: The new A/E OFPs are ready to begin flight testing. Safety of flight concerns have been at least partially put to rest. Many small problems with the software remain to be corrected, but these will be easier for Grumman to tackle with the pressure to begin flight testing off of them. There is no doubt that running the full FQT procedure, or running even the full Section 16 portion, will uncover more deficiencies. Flight testing will reveal even more problems, as the aircrews become more familiar with the system design. . . .

359. As part of FFT, the AF conducted seven sorties over a number of weeks in May-June 1988. Under "Sortie Summary and Recap" report dated 8 June 1988, the AF test director stated as follows (GAC R4, tab 2580):

Further sorties at Calverton will not be cost effective. It would require a lengthy wait for another OFP release. It is now necessary to fully involve the data analysts at SM-ALC, with FDAPS data at hand, to determine the problems and sources of

the problems being experienced. Plans are to send both aircraft back to SM-ALC to begin active QT&E as soon as possible.

360. Contract line item 2013AA specified that appellant was to provide the AF with a trial installation kit that had successfully completed contractor flight test, *i.e.*, the FFT, for the contract price of \$2,133,122 (R4, tab 1 at 13). By letter to GAC dated 13 June 1988, the contracting officer agreed to accept the trial installation kit for purposes of contract line item 2013AA, with the exception of certain hardware items not pertinent here. The contracting officer stated that “the software required for AMP is not part of this delivery and acceptance. The software will be accepted by a separate action, at which time the disposition of the software trouble reports . . . will be reviewed.” (R4, tab 307)

361. The comprehensive integrated flight tests at Sacramento began in July 1988. The first few sorties by the AF revealed significant problems with the F-111A/E MC OFP. Given these problems, the AF determined that further testing against the approved test plan was not warranted. The AF suspended flight testing against the test plan on or about 13 July 1988 (tr. 64/85). Appellant’s witnesses at the trial conceded that the MC OFP was not in compliance with the SSS, and we so find (tr. 30/54-55, 74/216).

362. By letter dated 8 August 1988, the contracting officer issued a cure notice to appellant. The contracting officer advised that appellant’s failure to timely deliver conforming MC software was endangering the performance of the contract, and that “unless you respond with your plan for corrective action to the undersigned within 10 days of this notice, the Government may terminate for default” (R4, tab 331)

363. Appellant’s president replied to the cure notice by letter dated 17 August 1988. Insofar as pertinent he stated as follows (R4, tab 339):

Grumman is very aware of its obligations under the contract and wishes to assure the Air Force that a maximum effort has been generated to correct the mission computer software problems and to minimize further delivery schedule deterioration. In retrospect, it is evident that Grumman did not fully recognize the time required to accomplish the original software task. This condition was further exacerbated by our over reliance on available software from the FB-111 Program and the growth rate of additional software tasks; both in and out-of-scope. Further, an additional contributory factor was that, in the interest of expediency, Grumman violated its own software procedures. Consequently, Enclosure (1) is based on a strict adherence to good software practice and procedures.

In this letter, appellant's president did not contest the Government's decision to suspend flight testing, nor did he contest the existence of the problems in appellant's software which led to this suspension.

364. At the executive level PMR on 29 August 1988, appellant briefed the AF on the status of its software, the software trouble reports which had been issued by the AF relating to software problems and appellant's correction plan. Appellant identified 104 priority "1A" and priority "1" STRs, only 68 of which had been fixed to date. As far as the record shows, no GAC representative at this meeting disputed the seriousness of the STRs or their connection to the suspension of flight test. Appellant was of the view that its MC OFP, which it planned to correct by 16 September 1988, would be sufficiently mature to resume flight tests at that time, and it sought an AF production decision in April 1989. (R4, tab 346)

365. It appears that the AF viewed appellant's get-well plan as overly optimistic given the number of priority STRs outstanding. By letter dated 12 September 1988, the AF issued unilateral contract Modification No. P00050. Insofar as pertinent, P00050 stated as follows (R4, tab 1BX):

Due to delays in Grumman's delivery of an acceptable Operational Flight Program (OFP) and delay in passing the Formal Qualification (FQT) for the Mission Computer the start of flight test will be ten (10) days after receipt of an OFP that will sustain flight tests. . . .

366. Appellant did not like the fact that a date certain was not set for the restart of testing. According to appellant, the comprehensive test phase was now "open-ended," and the AF retained total discretion in determining when to restart testing (tr. 74/172).

367. However, testing was not open-ended. The contracting officer advised appellant in writing that the test program would restart once all priority "1A" and "1" STRs were fixed (R4, tab 397). Also, on 30 September 1988, the parties executed bilateral contract Modification No. P00046 which identified 15 February 1989 as the revised date to conduct the FQT for the MC software (R4, tab 1BT). By executing this modification, appellant manifested agreement with this revised schedule.

368. By letter to appellant's president dated 15 September 1988, General Hansen, Commander, AFLC, Wright-Patterson AFB, stated in pertinent part as follows (R4, tab 358):

. . . I have just completed a review of Grumman's performance on the F-111 AMP integration and am appalled at what I find. The operational flight program (OFP) software for the mission

computer is several months behind schedule. There are over one-hundred unresolved software trouble reports, one-fifth of which are critical and ten are considered highly critical. Your response to a recent cure notice was incomplete. Grave concerns still exist based upon a Sacramento team's review of your proposed methods to correct OFP problems.

General Hansen sought a meeting with appellant's president to discuss these matters. It appears that such a meeting did occur. The record does not show that appellant's president disputed General Hansen's findings in any material respect at that time.

369. After the AF suspended test flights against the approved test plan in July 1988, the AF continued to conduct flights – known as data gathering flights – to assist appellant in isolating software problems and to facilitate fixes (tr. 64/86). Appellant considered the AF cooperative in this respect (tr. 30/49).

370. By letter to appellant dated 21 October 1988, the contracting officer advised that problems under STR 535 had yet to be resolved, and that appellant's proposed resolution of this STR by December 1988 was unacceptable. STR 535 related to the backup functionality required of each mission computer (tr. 30/47-49). The contracting officer stated that the software was not yet sufficiently mature to restart testing given that all priority STRs had not been fixed and verified (R4, tab 397).

371. By letter to appellant's president dated 18 November 1988, the AF issued a second cure notice to appellant. Insofar as pertinent, the AF took appellant to task for its failure to make adequate progress in resolving the open STRs. (GAC R4, tab 2584) Appellant's reply, dated 12 December 1988, did not contest the cure notice or the legitimacy of the STRs (GAC R4, tab 2585).

372. On 1 March 1989, GAC's Mr. Robert Tuttle (who had previously worked for the AF as a lead engineer on the program) received from the AF a list of functions that needed to be working in the MC OFP prior to the restart of flight test. Mr. Tuttle sent the list by e-mail to GAC's Mr. Ziegler. The e-mail stated as follows (AF R4 supp., tab 2335.107 at 3; Gov' t br. at 281):

The following functions should be working prior to restarting QT&E. Even with these functions working, many workaround testing methods will be required in order to conduct "effective" QT&E testing. *The result will most probably be a significant amount of retesting and an extended flight test schedule.* The assumption is made that functions which appear to be working now will remain so. The assumption is also made

that regular OFP releases will continue to solve the remaining open problems. [Emphasis added]

373. The AF resumed MC OFP testing against the approved test plan in May 1989 (tr. 63/52). This phase of testing was basically completed in September 1990 (tr. 30/29-30).

374. The AF test plan and test matrix against which the trial aircraft was tested provided for a “graduated” testing approach or sequence, *i.e.*, starting with the test of basic navigation and steering functions through weapons delivery and backup functionality. The AF did not test in the sequence set out in the test plan. (Tr. 30/163-64) However, appellant’s software problems impacted the AF’s ability to strictly follow the test plan (tr. 30/173). Some of the flight profiles suggested by appellant to aid in data gathering to resolve STRs also were not consistent with the test matrix (tr. 30/170).

375. Appellant’s REA dated 10 June 1991, updated 7 May 1993, sought additional support costs for extended flight testing for which it contended the AF was responsible (R4, tabs 936, 979). The contracting officer denied this request by letter dated 26 August 1993 (R4, tab 985). Appellant reiterated its request in its claim dated 30 March 1994 (R4, tab 991). By contracting officer’s decision dated 30 September 1994, the AF denied the claim, stating that extended flight test was appellant’s responsibility because of appellant’s inability to deliver an adequate OFP to support a meaningful flight test program (R4, tab 999).

DECISION

Appellant contends that the Government, through its actions and inactions with respect to the delayed implementation of testing, was primarily responsible for extended flight test delay and the attendant extended support costs incurred by appellant. Appellant, as moving party, has the burden to prove this contention. We believe it has not met its burden.

We have found that the MC OFP was not fully compliant with the specifications when the trial aircraft was tendered for QT&E flight testing. That the AF may have been aware of certain MC OFP defects at this time but nonetheless permitted testing to begin did not serve to pass the responsibility for tendering a conforming product from appellant to the Government, nor did it serve to waive these defects.

Appellant also argues that the AF’s suspension of flight testing in July 1988 was improper. However, we find it instructive that appellant failed to dispute the basis for this suspension at the time it was issued, nor did it dispute the propriety of the AF’s cure notices which related to its software performance problems.

The evidence shows that the AF did not breach its contract obligations or abuse its discretion in temporarily suspending flight tests pending resolution of numerous priority software trouble reports. Nor are we persuaded that the AF acted wrongfully by insisting that priority STRs be fixed prior to the restart of testing. Nor are we persuaded that the AF should be held responsible for deviating from the graduated testing approach contained in the test plan, given that appellant's software problems impacted the plan and the tests to be conducted. Appellant adduced no persuasive evidence to show that the AF's tests sought to measure performance beyond that contained in the specifications or were otherwise contractually deficient.

We have found that SINU defects for which the AF was responsible served to prolong certain aspects of flight test (finding 169). However, appellant failed to segregate this AF-caused delay from the contractor-caused delays we have addressed herein. Absent such evidence, we are unable to conclude that the overall flight test delay claimed by appellant was attributable to the AF.

In conclusion, appellant has not shown that the AF was responsible for extended flight testing. Appellant's extended F-111A/E flight test claim is denied.

(22) FINDINGS OF FACT – Publications

376. As part of the contract at SOW § 6220.1.3, appellant was to produce and deliver a number of revised flight manuals to the AF for the modified F-111A/E and EF-111A aircraft. Under the contract at SOW § 6200.1, appellant was to deliver a technical order publication plan for AF review and approval that would discuss how and when the manuals were to be prepared. (R4, tab 1 at 512-13; tr. 27/202-03). *See also* CDRL AO1B (R4, tab 1, Vol. 2 at 7). Appellant proposed to use the following manual review procedures: a guidance conference to discuss contract requirements and to present its proposed publication plan; an in-process review (IPR) to obtain AF input for the manuals, a second IPR or "final" review to confirm the inclusion of comments from the first IPR, a pre-publication meeting at which the manuals would be proofread and reviewed for typographical errors; and then the printing of the manual and the delivery to the AF (tr. 27/202-05; ex. A-14 at 2-3). The record does not clearly show that these procedures – and their purposes as defined by appellant – were approved or accepted by the contracting officer or deemed by the AF to be contractually binding. The contract provided at CDRL AO1B that there would be a guidance conference, and indicated at SOW § 6220.5 that there would be a number of IPRs, but neither the SOW nor the SSS specified or limited the number of these meetings.

377. Mr. Richard Lamont, GAC's publications project manager, did not expect any major changes to the manuals after the first IPR (ex. A-14 at 2). However, appellant did not provide any SOW, SSS or other contract provision in support of this expectation, nor did it

cite to any provision of its publication plan in support of this expectation. We find this expectation was unsupported by the contract.

378. The parties held meetings to discuss both F-111A/E manuals and EF-111A manuals. Typically, appellant was represented at these meetings by its publications project manager, Mr. Lamont, and the AF was represented by its flight manual manager, Mr. Sealy Ralphs. As far as the record shows, neither Lamont nor Ralphs was authorized to issue contract modifications to the terms and conditions of the contract. There were also other AF technical representatives that participated in these meetings. Mr. Lamont was aware that these AF participants did not have the authority to issue contract changes. Mr. Lamont was aware that the contracting officer had this authority, but the contracting officer typically did not attend these meetings (tr. 27/83-87).

379. The record reflects that appellant received a number of telephone requests from AF technical personnel and from AF technical consultants to input certain data into the manuals, which occurred outside the meeting process (GAC R4, tabs 2470, 2471, 2474, 2475). According to the testimony of Mr. Lamont at trial, these requests were disruptive and caused appellant to perform unanticipated out-of-scope work (ex. A-14 at 4-5). Appellant did not identify any specific contract terms to support its position that this work was out-of-scope. Moreover, the record reflects that appellant generally performed this work voluntarily and without contemporaneously advising the contracting officer that it believed the work was out-of-scope.

380. According to Mr. Lamont, AF technical representatives also made substantive inputs to the manuals at the second IPR, or so-called final review, which should have been made at the earlier IPR, and also deviated from inputs they had provided at earlier meetings, which caused appellant to perform out-of-scope work (ex. A-14 at 3-4). Appellant did not identify any contract terms that the AF purportedly violated in this respect. The record also contains the minutes of a number of these so-called final reviews, signed by Mr. Lamont, that reflect that appellant had agreed to the inputs discussed therein (GAC R4, tabs 2485, 2496). Appellant also performed this work without advising the contracting officer that it believed the work was out-of-scope.

381. Clause H-1056, Technical and Management Meetings, provides as follows (R4, tab 1 at 56-57):

The Procuring Contracting Officer is the only Government representative authorized to change the terms and conditions of this contract. All technical or management meetings held during the performance of this contract, attended by Government and Contractor personnel, must be conducted subject to this condition. The Contractor agrees that no request for equitable adjustment or claim for altering the terms and

conditions of the contract shall be submitted based on the results said meetings unless the Procuring Contracting Officer has authorized that change to the contract in writing. (SMPMC 1284)

We find that the meetings between the parties referenced above were “technical meetings” for purposes of this clause. The contracting officer did not authorize the performance of the claimed additional work under Clause H-1056, or under any other contract clause.

382. At the IPR for the EF-111A flight manual, the AF representatives sought to add mnemonic or computer access data to flight manual TO 1F-111(E)A-1-5. Relying upon the minutes of said meeting, Mr. Lamont testified that this was out-of-scope work (GAC R4, tab 2476; ex. A-14 at 5). However the minutes state in pertinent part as follows (GAC R4, tab 2476):

Add in TO 1F-111(E)A-1-5, mnemonic (computer access) troubleshooting/analysis data for DCC as was previously requested for incorporation in TO 1F-111A-1-3. *Mnemonic data in greater detail than that as developed for TO 1F-111A-1-3 is considered out-of-scope by Grumman.* Grumman’s contract was to develop Flight Manuals in accordance with the FB-111A AMP Flight Manuals and the FB-111A Flight manuals do not contain any mnemonic data. [Emphasis added]

The record does not establish that appellant was directed to introduce mnemonic data into TO 1F-111(E)A-1-5 “in greater detail than that as developed for TO 1F-111A-1-3” so as to be deemed out-of-scope as indicated above. Appellant also failed to show any SSS or SOW section in support of its view that the subject flight manuals were to be furnished in accordance with the FB-111A AMP flight manuals. This IPR was also a technical meeting subject to Clause H-1056. Notwithstanding, appellant performed this work without seeking contracting officer authorization.

383. Insofar as pertinent, Mr. Lamont testified as follows (ex. A-14 at 5):

Q: Why did Grumman agree to perform all of this out of scope work?

A: Our priority was to support the customer. We wanted to get the job done first and worry about monetary adjustments later.

Appellant proceeded to provide the data requested without seeking contracting officer direction, knowing of the risk that GAC might ultimately have to pay for the work in question (tr. 27/97).

384. However, there were occasions when appellant did timely assert its contract rights with respect to claimed out-of-scope publications efforts. By letter dated 10 October 1989 to the AF, copied to the contracting officer, appellant notified the AF that certain inputs introduced by the AF at the pre-publication review of September 1989 were out-of-scope (GAC R4, tab 2492). Appellant provided a similar notice regarding certain late pre-publication inputs by letter dated 23 January 1990 (ex. G-37). The AF issued a bilateral contract modification, P00097, that included reimbursement for these manual changes (R4, tab 1DS). Bilateral contract Modification No. P00093 also reimbursed appellant for certain out-of-scope manual changes desired by the Government (R4, tab 1DO). Appellant's current claim does not deal with the manual changes that were the subject of these modifications.

385. Appellant's REA dated 10 June 1991, updated on 7 May 1993, sought costs for out-of-scope AF inputs to the manuals (R4, tab 936, 979). The contracting officer denied this request by letter dated 26 August 1993 (R4, tab 985). Appellant reiterated its request in its claim dated 30 March 1994 (R4, tab 991). The contracting officer denied the claim by decision dated 30 September 1994, stating that the AF did not provide any out-of-scope direction to GAC, nor did GAC timely notify the AF of any such direction under the contract (R4, tab 999).

DECISION

Appellant seeks recovery for claimed AF-directed changes to perform additional work to the flight manuals before, during and after certain review meetings. Presumably, appellant's claim is predicated upon AF action under the Changes clause based upon a "constructive change" theory. Appellant must show by a preponderance of the evidence that an AF direction to perform additional, out-of-scope work was issued or ratified by authorized contract representatives. *See Kos Kam, Inc.*, ASBCA Nos. 34682, 35440, 92-1 BCA ¶ 24,546 at 122,491. Appellant has failed to do so. First, appellant has failed to show that the nature of the work in question exceeded the terms and conditions of the contract and was thereby out-of-scope. It has also failed to show that the technical comments received were issued or authorized by appropriate AF contracting personnel. At all times relevant, appellant was aware that the AF's technical personnel did not have the contract authority to obligate additional work under the contract, but appellant knowingly and voluntarily chose to perform the work they requested without notifying the contracting officer, believing it preferable to do the work first and to worry about money later. The record also reflects that AF inputs at a number of the so-called final reviews were agreed to by appellant.

Clause H-1056 states that no contract adjustments are to be permitted based upon the results of technical meetings unless the contracting officer has authorized a contract change in writing. The IPRs and other reviews were technical meetings for purposes of this clause. Appellant has not shown that it sought, or otherwise received any such contract action from the contracting officer related to this claim.

In view of the foregoing, appellant's publications claim must be denied.

(23) FINDINGS OF FACT – MDPE Software

386. As part of the contract appellant was to develop the software specifications and provide the software for the mission data preparation equipment (MDPE) for the F-111A/E aircraft. Specifically, the SOW provided in relevant part as follows (R4, tab 1 at 463-65):

1640 SUPPORT AND OTHER SOFTWARE

....

1640.3 Mission Data Preparation Equipment Software

1640.3.1 Develop the software for the F-111A/E Mission Data Preparation Equipment (MDPE).

....

1640.3.5 Develop the software required to download data from the DTM [Data Transfer Module] and translate this information to engineering terminology. . . .

1640.3.6 Develop the software required to selectively output a hard copy of all mission data.

....

1640.3.11 Develop the specifications and documentation for the MDPE software. The specifications and documentation shall include: operator procedures/instructions, user manuals, program maintenance instructions, software development and product specifications (B-5, C-5) and the VDD.

387. The MDPE was composed of hardware and software which collected and analyzed weapons release data recorded during a mission on the aircraft's DTM. After a mission, the DTM would be removed from the aircraft and inserted into the MDPE

hardware. The MDPE software would generate reports based upon the data collected during the mission. (Ex. A-42 at 2)

388. The SSS identified the data/parameters that were to be captured for further review and analysis, and provided in relevant part as follows (R4, tab 1 at 252, 255):

3.2.1.2 Weapon delivery. . . .

. . . .

Whenever the DCC issues a weapon release command, release parameters shall be captured. This information shall be made available for display to the operator. It shall also be written to the DTS [Data Transfer System] for post flight analysis. The parameters to be captured are as follows:

- a. Release Number
- b. Ground Speed
- c. Wander Angle (INS X-axis to True North)
- d. Flight Path Angle
- e. True Airspeed
- f. SINU Vertical Velocity
- g. Target Elevation
- h. Aircraft System Altitude
- i. Cross-Track Miss Distance
- j. CARA Altitude
- k. SINU X-axis to Groundtrack
- l. SINU X-axis to FRL
- m. X & Y Coordinates of Bomb Range
- n. X, Y & Z Coordinates, Range to Target
- o. Drift Correction Angle (DCA)
- p. Weapon Release Range
- q. Trail
- r. Airmass Time-of-Fall

389. The MDPE software was developed for appellant by Smiths Industries under a subcontract (tr. 47/225-26). By letter dated 13 February 1989, the AF approved the MDPE software specification, or B-5, which had been provided by appellant through its subcontractor (GAC R4, tab 2675). This approval did not constitute a final acceptance of the contract work, but allowed appellant to proceed to the next design phase.

390. After evaluating the MDPE software during a 13 October 1989 flight test, the AF issued a field or flight problem report, FPR AE-245, dated 18 October 1989,

concerning the software. In FPR AE-245, the AF stated that “[e]ight sets of data were found to be incorrect when printed with the [MDPE] software.” The AF further stated that “[d]ata printed with MDPE should show correct values, i.e. the values actually recorded on the DTM.” (Ex. A-42 at 3, attach. A) We find that for eight sets of data, the values printed in the MDPE report were not the same values as those recorded on the DTM in flight.

391. Appellant’s MDPE software B-5 specification included “Table I-XII. Weapon Release Data Field Limits” (hereinafter Table I-XII) and “Table I-XIII. GPS Capture Data Field Limits” (hereinafter Table I-XIII). Table I-XII included all of the parameters listed in § 3.2.1.2 of the F-111A/E SSS but, unlike the SSS, also set forth the limits and display units for the listed data. For instance, for Table I-XII’s “Cross-track miss distance” data item, which corresponded to item “i” in SSS ¶ 3.2.1.2 above, appellant listed a limit of “0 to 9999.99” with display units of “feet.” According to FPR AE-245, the value for this data item printed in the MDPE report during the 13 October 1989 flight test was a string of asterisks. (Ex. A-42 at attach. A; GAC R4, tab 2689 at 37608-09)

392. Mr. Edward Samson, a GAC senior engineer who was appellant’s liaison with Smiths Industries for the development of some of the MDPE software, reviewed FPR AE-245 to determine why the discrepancies existed and to solve them. In a 16 February 1990 internal memorandum addressing FPR AE-245, Mr. Samson explained the asterisks as follows (ex. A-42 at attach. A; GAC R4, tab 2687 at 389-90):

This value, as printed in the MDPES downloaded DTM Data report, is a string of asterisks; the SM-ALC Flight Test software prints a value of -14763.69 (which is the desired display value).

Resolution: This is an overrange error. The B5 specification Table I-XII . . . indicates a limit of 0 to 9999.99 feet for this data. The above correct value is clearly outside of the specification limits and the string of asterisks is how Fortran indicates data that is overrange. To permit the correct value to be printed by the MDPE software required a limit change to 99999.99 feet and inclusion of a sign bit to permit positive and negative values to be displayed.

The other discrepancies identified in FPR AE-245 were substantially similar to the “Cross-track miss distance” problem described above.

393. In the 16 February 1990 internal memorandum, Mr. Samson also wrote, in relevant part as follows (*id.*):

2. The MDPE software used at McClellan AFB was in compliance with the requirements of the B5 specification. *The errors in the B5 specification were unknowingly incorporated into the MDPE software and resulted in the FPR being generated. . . .* [Emphasis added]

Mr. Samson testified to the same effect at the hearing (tr. 47/250). We find that appellant's MDPE software specification contained errors that were incorporated into the MDPE software.

394. Appellant's subcontractor modified the MDPE software to resolve the discrepancies identified in FPR AE-245 (ex. A-42 at 5-6).

395. In its December 1989 F-111A/E CPR, appellant indicated that "MDPE Software" was causing "additional scope/growth" to the contract, with a ROM cost impact of \$200,000. Appellant continued to include this information in subsequent CPRs. (AF supp. R4, tabs 1046 through 1052)

396. By letter dated 10 June 1991, appellant submitted its REA to the Government. In the REA, appellant alleged that during MDPE development it performed several enumerated tasks that were out-of-scope. The REA did not refer to FPR AE-245, or the actions taken by appellant and/or its subcontractor in responding to the FPR. (R4, tab 936 at 97-98)

397. In its 7 May 1993 updated REA, appellant continued its allegations concerning the MDPE, and also alleged that FPR AE-245 was an out-of-scope field problem report (R4, tab 979 at 359-65). The contracting officer denied recovery by letter dated 26 August 1993 (R4, tab 985 at 11).

398. In the 30 March 1994 claim, appellant alleged that it incurred out-of-scope costs in developing the MDPE software as a result of a number of improper Government acts¹¹. The contracting officer did not address appellant's MDPE software contentions in his 30 September 1994 decision, which denied appellant's claim in its entirety (R4, tab 999).

399. The contract incorporated Clause H-1049, Total System Responsibility, which provided in relevant part as follows (R4, tab 1 at 55):

a. The Contractor has Total System Integration Responsibility (TSIR) for the integration and software development in accordance with the Statement of Work and the System Segment Specification for the Avionics Modernization

Program for the F-111A/E and EF-111A aircraft. This responsibility is defined as:

(1) The Contractor shall take any and all action necessary to insure the integration of all interfacing systems. These systems shall work in consonance with the equipment on the Government furnished aircraft.

(2) The Contractor shall take the necessary action to assure successful operation of the total integrated system, as defined by the System Segment Specification, subject to the GFP being furnished in accordance with the Government furnished property clause.

b. The Contractor has Total System Performance Responsibility (TSPR) for the Avionics Modernization Program for the F-111 A/E and EF-111A aircraft. This TSPR is defined as:

(1) The Contractor shall take any and all actions necessary to assure the integrated system will meet the performance requirements as defined in the F-111A/E System Segment Specification and/or the EF-111A System Segment Specification.

DECISION

Appellant contends that the work it performed to investigate and solve the discrepancies identified in FPR AE-245 and the work performed by its subcontractor to implement the fix were out-of-scope because the MDPE software was designed in accordance with the requirements of the MDPE software B-5 specification which had been approved by the AF. Appellant contends that the changes required by the AF were a result of the AF wanting certain data to be presented in a different format from that which it had already approved.

Appellant was required under the contract's SOW to develop the MDPE software, including the MDPE software B-5 specification, and did so. We have found that the MDPE software specification contained errors that were incorporated into the MDPE software. Specifically, the value limits imposed on some of the data in Tables I-XII and I-XIII of the MDPE software B-5 specification were incorrect. These B-5 specification errors caused the values printed in the MDPE report to be different (*e.g.*, some of the data were printed as

asterisks, instead of numerical values) from the values recorded on the DTM during flight test. It was appellant, not the AF, that developed this B-5 specification.

We believe that the AF's approval of appellant's MDPE software specification was not a legally binding acceptance of the contract work, nor did it shift the responsibility for errors in that specification from appellant to the AF.

On the other hand, appellant had the responsibility under the contract's Total System Responsibility clause to assure that the systems it was developing and integrating met the performance requirements set forth in the SSS. The SSS listed the weapon release parameters that were to be captured and written to the data transfer system for post-flight analysis, but did not establish any data limits to be imposed on the data items to be printed in the MDPE report. It was the MDPE software B-5 specification, developed by appellant, that set forth the data limits that led to the errors detailed in FPR AE-245. Appellant's MDPE software did not accurately produce a report of the data recorded on the DTM, and appellant was responsible for the errors in the software that it developed.

For reasons stated, appellant's MDPE software claim is denied.

(24) FINDINGS OF FACT – TSPI/FDAPS Data

400. Under the contract at SOW § 4320.7, appellant was to analyze the flight data produced by the comprehensive integrated flight tests conducted by the AF to resolve flight test anomalies and prepare a flight test report which addressed the test results (R4, tab 1 at 477).

401. One aspect of flight test data analysis was verification of certain flight test events or parameters. For instance, if during a flight test certain aircraft systems indicated that the aircraft was at an altitude of 10,000 feet at a certain place and point in time, it was necessary to verify whether the aircraft was actually at 10,000 feet at that place and time in order to verify system performance. Such verification was facilitated by "Time Space Position Information" (TSPI) data.

402. TSPI data were data gathered by an AF ground-based system on specially equipped AF test ranges which measured and recorded the aircraft's position, velocity and acceleration. The AF planned to use such test ranges for testing under this contract, SSS § 10.5.1 (R4, tab 1 at 132). The data were recorded on a magnetic data tape, known as a TSPI tape, and a time stamp was attached to each of the different performance parameters (*i.e.*, position, velocity, etc.) (ex. A-16)

403. The aircraft also recorded information concerning certain parameters (*i.e.*, position, velocity, etc.) on its instrumentation data tape. The aircraft's instrumentation system – which was part of the FDAPS furnished to appellant as GFP (finding 199) –

applied a time stamp to each parameter that was recorded. Since TSPI data and the data recorded on the aircraft's instrumentation system were both time stamped, the values recorded could be compared to verify the aircraft's system performance and to determine the magnitude of any errors. (Ex. A-16) Such analysis also had to account for "data/latency," that is, the delay between the actual or "time-valid" parameter and the time at which the parameter was time-tagged by the onboard aircraft recorder and FDAPS tape (tr. 55/132-34).

404. The comprehensive flight test was performed by AF crews in accordance with an AF-approved test plan. The test plan required the use of TSPI data for the evaluation by appellant of GPS-I Navigation Mode, I and I-TAS Navigation Modes, the GPS Navigation Modes (GPS and GPS-TAS), Primary Update Modes, Altitude Calibration, Wind Update, Heading Update, DCC Aided Radar Deliveries, DCC Aided Visual Deliveries and Bombing Submodes/Functions during flight test. (GAC R4, tab 2576) The parties do not dispute, and we find that there was no way for GAC to obtain the TSPI data other than through the AF.

405. We find that the AF was to provide, and appellant was to use TSPI data for evaluation purposes and to perform its contractually required data-evaluation duties under the SOW. We find that the TSPI data were GFP.

406. Prior to flight testing, the parties held meetings wherein the importance of synchronizing TSPI and FDAPS time was emphasized. For instance, at a meeting on 4 June 1987 to discuss flight test instrumentation and test planning, the parties discussed the following (GAC R4, tab 2625):

Time synchronization of FDAPS tapes, GPS instrumentation tapes, GPS telemetry, and range time must be assured for data analysis purposes.

Similar views were expressed at the Test Plan Working Group Meeting of 6-7 August 1987 (GAC R4, tab 2627 at 903).

407. At the beginning of flight testing, the Government-furnished TSPI data tape and the test aircraft time code generator – part of the Government-furnished FDAPS – were not set to a common absolute time code. The TSPI data were time stamped using GPS satellites, while the time code generator on the aircraft had to be set manually. It is impossible to manually set a clock and have it synchronize with a clock set by GPS (ex. A-16 at 3). As a result, appellant spent considerable time trying to come up with a way to use the TSPI data without having these clocks synchronized (ex. A-16 at 6).

408. The AF suspended integrated flight testing against the approved test plan in July 1988 due to problems with appellant's MC OFP (finding 361). During the suspension

period, the AF flew sorties at appellant's request in an attempt to isolate and fix MC OFP problems. For most of the sorties during this period, TSPI data were not needed (tr. 29/77).

409. Integrated flight testing was reinstated by the AF in May 1989 (finding 373). By memorandum dated 9 September 1989 from appellant's lead flight test engineer to the AF's flight test director, appellant notified the AF as follows (GAC R4, tab 2629):

[B]ecause of limitations in the FDAPS software, an accurate merge of the data with the inflight data cannot be achieved. A limited amount of data (position and altitude) has been gleaned for two of these missions from the TSPI tape itself by using a manual time merge of GPS time on the bus that is sent to the DTM and determining a delta time to the IRIG-B time of the inflight tape to correlate the data. This is extremely time consuming and still denies the velocity information that is essential for detailed and accurate analysis. . . .

Appellant also briefed this matter to the AF at the F-111A/E PMR No. 14 on 12 December 1989, stating in pertinent part as follows (GAC R4, tab 2638):

? Time Correlation Problem (FDAPS vs TSPI Tapes)

- On-Going Problem
- Requires Manipulation of FDAPS/TSPI Events For Time Synch. (Time Consuming)

Appellant estimated that roughly 23-25 manhours per week were expended in attempting to achieve reliable, accurate TSPI data beginning 30 April 1989 (GAC R4, tab 2641 at 4).

410. The AF flight test director replied to appellant's concerns by memorandum dated 2 October 1989. He stated, in pertinent part as follows (R4, tab 2346):

. . . We have been working diligently to expedite TSPI deliveries from the various ranges we use. Unfortunately, we have little control over their individual workloads, but they are generally beginning to be more responsive to our requests. Three of the ten missions referenced in your memo were flown to Navy Fallon range (no TSPI) because the OFP was not mature enough for me to waste money on TSPI data on every mission. *The four missions to Yuma Proving Grounds resulted in TSPI data which was difficult to merge with FDAPS data. This required a software merge procedure be developed which was completed on 14 Sep 89. Aircraft 050*

has also had a new GPS time code generator installed for more accurate, and easier data merges. The TSPI data from the mission flown to Nellis was initially lost, then requested again, received and processed. The two missions flown to Edwards were flown on 25 Aug and 30 Aug and the TSPI data was received on 8 Sep and 19 Sep, respectively (longer than desired due to heavy workloads). TSPI merges generally are accomplished the same day they are received at SM-ALC. [Emphasis added]

411. By letter to appellant dated 28 February 1990, the contracting officer replied to appellant's concerns regarding the reliability and usability of TSPI data for purposes of flight test analysis. The contracting officer denied any AF responsibility and contended that appellant was obligated to develop analytical tools to solve the correlation problem (GAC R4, tab 2640 at 3580):

. . . The inability to merge the flight data with the TSPI data does not indicate a flaw in the accuracy of the TSPI or that the TSPI is bad, but could indicate that different and more effective analysis tools need to be utilized.

412. Both AF letters to appellant above referred to a software merge procedure and an analytical method developed by an AF consultant, Ball Systems Engineering Division (Ball), in 1989 which allowed for some data correlation, and which was offered for GAC's consideration. It does not appear that the contracting officer ordered appellant to use this methodology. Appellant did in fact consider the Ball method, and developed its own correlation methods using Ball's methodology for certain data correlations, but those efforts were still quite time-consuming, and nonetheless did not assist in the analysis of data for weapon release. (GAC R4, tab 2641 at 2-4)

413. Dr. Christopher Debeau, Ball's lead engineer and an AF expert witness, testified as to the need for the development of the Ball technique, as follows (tr. 54/173-74):

Q Right. But it [the Air Force] couldn't merge the tapes accurately because of the problems it was having with the [on board] time code generator, isn't that correct?

A I think we were asked to develop – well my opinion, *we were asked to develop the technique because the data correlation was insufficient.* [Emphasis added]

. . . .

Q Okay. Ball's technique – merge technique was essentially a workaround, wasn't it?

A It wasn't to find an alternate solution. It was to find a better – it was to find an adequate solution.

Q Right. Because the other merge technique – the merging wasn't accurate.

A *The date correlation wasn't accurate.* [Emphasis added].

414. We find that the Government-furnished TSPI and FDAPS data could not be reasonably and accurately correlated which necessitated the additional data correlation efforts required by Ball and GAC herein.

415. In 1989, the AF installed a new GPS time code generator in the test aircraft “for more accurate, and easier data merges” (R4, tab 2346). Synchronization problems remained, however (ex. A-16 at 4). In April 1990, the AF installed another GPS time code generator in the test aircraft (tr. 55/211). Appellant's data correlation problems were resolved at this time (ex. A-16 at 5).

416. In 1990 and 1991, the parties exchanged a number of letters ascribing to each other the responsibility for data correlation difficulties (GAC R4, tabs 2645, 2647, 2648). On 10 June 1991, appellant filed an REA with the contracting officer which sought recovery for these data correlation costs (R4, tab 936). The REA was updated on 7 May 1993, and in the update appellant sought these data correlation costs for most of the flight test period, from July 1988 through April 1990 (R4, tab 979). By letter dated 26 August 1993, the contracting officer denied this portion of the REA on the merits, contending that GAC knew of the FDAPS capabilities prior to award, and that after award GAC was provided the Ball methodology. The contracting officer did not assert that the appellant failed to give timely notice of its claim. (R4, tab 985)

417. Appellant's claim dated 30 March 1994 also sought recovery on this cause of action (R4, tab 991). The contracting officer's decision dated 30 September 1994 denied the claim on the merits for the same reasons asserted in the 26 August 1993 letter. Again, no mention was made by the contracting officer of any lack of notice of claim under the contract. (R4, tab 999)

DECISION

Under the contract, the AF was to conduct integrated flight testing of the test aircraft on AF test ranges with AF ground-based data instrumentation which generated TSPI data, which data had to be used by appellant in performing its test related duties under the contract. This data constituted GFP. The AF was also to provide as GFP the on-board FDAPS instrumentation needed to identify and record certain flight test events or parameters, which data appellant was required to verify and analyze – using TSPI data for certain modes-and which had to be included in appellant’s contractually prescribed test report. In furtherance of its contract obligations, appellant had a right to expect that the data provided by these Government-furnished systems could be reasonably and accurately correlated for purposes of data evaluation.

These Government-furnished systems did not provide data that could be reasonably and accurately correlated. The AF’s expert from Ball testified, and we have found that the Ball methodology tasked by the AF was necessary because data correlation was insufficient and inadequate. The AF also installed new GPS time code generators on the test aircraft to facilitate data correlation. These AF actions underscored the nature of the problem and the need for corrective action.

We conclude that appellant is entitled to recover its reasonably incurred costs to correlate TSPI and FDAPS data which were necessitated by the fact that the Government-furnished data systems failed to provide reasonably accurate data correlation during flight testing. However, flight testing was suspended for a number of months in late 1988 through early 1989, and during this period properly correlated TSPI data was of limited value to appellant. The data correlation problem was also basically solved by April 1990. We believe that a reasonable measure of the impact would be from 30 April 1989 through 31 March 1990.

The Government asserts a number of defenses to appellant’s claim, none of which has any merit. First, with respect to the AF defense of lack of timely notification of claim, we note that the contracting officer twice addressed this cause of action on the merits – in reply to appellant’s REA and in reply to the later filed claim, and did not assert at either time that he was unable to address the claim due to lack of notice. The AF has therefore waived this defense *See Dittmore-Freimuth Corp. v. United States, supra; Selma Apparel Corp.*, ASBCA No. 30011, 88-3 BCA *supra* at 105,771.

The AF also contends that TSPI data were not GFP under the contract because appellant failed to put TSPI range data on the contract GFE/GFP list. However, we believe this fact is not determinative because the contract clearly contemplated that the data were to be Government-furnished from AF test range instrumentation and were to be used by appellant during flight testing. Indeed, the AF test plan – the flight test data from which GAC was contractually obligated to analyze – required the use of AF-generated TSPI data

for purposes of certain system and data evaluations. As far as this record shows, at no time during the program did the AF take the position and advise the appellant that it was not entitled to TSPI data, nor did the contracting officer's decision so state. Moreover, the "Respondent's Reply to Appellant's Brief on Entitlement" concedes at page 93: "Admit TSPI was necessary for some flight test sorties and TSPI data was provided by the AF"

The AF argues that appellant failed to timely complain about the defects in the Government-furnished TSPI data. We do not agree. Our findings show that the AF was fully aware of appellant's position regarding the lack of usability of the TSPI data at all times relevant, and well before the filing of the REA in June 1991.

The AF also contends that appellant's claim must fail because it was aware of the TSPI/FDAPS data correlation problem pre-award. However, it offers no credible evidence in support of this proposition. Even if appellant was generally aware of the FDAPS capabilities for purposes of writing up its proposal, the evidence does not show that this constituted any pre-award awareness of the Government test range – TSPI data correlation problem at issue here.

The AF also suggests that appellant is at fault for its failure to properly apply the Ball technique to correlate data. However, it does not appear that the contracting officer ordered appellant to use the Ball methodology, nor does it appear that the Ball technique satisfied all of appellant's data verification needs. Lastly, the AF argues that appellant's claim should be denied because appellant was responsible for the additional costs incurred during this time period due to its own mistakes and problems with its MC OFP. However, the AF has failed to provide any specific, credible evidence linking any of these problems to the TSPI/FDAPS data correlation costs incurred here so as to bar this claim.

For the foregoing reasons, appellant's TSPI/FDAPS data claim is sustained.

(25) FINDINGS OF FACT – MTS Installation Slip

418. The maintenance trainer sets (MTSs) were training benches that had all of the aircraft systems installed and wired similar to the aircraft. The MTSs were used to train maintenance personnel in a laboratory environment. Since the pre-AMP aircraft were being updated under this contract, the pre-AMP MTSs also had to be updated. As part of the contract, appellant was to provide MTS upgrade kits which would then be installed by the AF in the existing MTSs. (Ex. A-43 at 1-2) Specifically, appellant was to deliver eight MTS upgrade kits on or before 1 December 1988 (R4, tab 1 at 36A). Under SOW § 2100, appellant was also to provide technical support for the AF installation (R4, tab 1 at 16, 467, 533).

419. The subject claim involves the contractually prescribed technical support that appellant was to provide the AF for the installation of the upgraded MTS kits. The contract as awarded did not specify a beginning or ending date for this support.

420. By unilateral contract Modification No. P00050 dated 9 September 1988, the AF, *inter alia*, changed the delivery date for the eight upgraded MTS kits to on or before 1 December 1989 (R4, tab 1BX). In May 1989, the parties executed bilateral Modification No. P00072 which accelerated the delivery date for the eight MTS kits to 15 June 1989 and established a firm start date of 7 September 1989 for contractor support for the MTS kit installation (R4, tab 1CT).

421. Appellant delivered the MTS kits by 15 June 1989, as required by Modification No. P00072, and was prepared to provide the contractually prescribed support for kit installation on 7 September 1989 (tr. 71/78; ex. A-43 at 2, 3, 5).

422. In a letter received by appellant on 30 August 1989, the contracting officer delayed the installation of the MTS kits, and perforce appellant's installation support, stating in relevant part as follows (GAC R4, tab 2520):

1. *At the request of the using commands, subject modification has been delayed.* The E-model trainer at RAF Upper Heyford UK will now be modified between January and March of 1990, and the A-model trainer at Mountain Home AFB Id. [sic] will be modified June through August, 1990. Specific dates will be provided when available. [Emphasis added]

2. This letter is issued with the understanding that it does not result in any change to the contractual requirements which would warrant an increase in contract price an[sic]/or extension of the delivery schedule or time of performance. The contractor's written notice of concurrence or non-concurrence with this understanding shall be provided to the PCO within fourteen (14) days of receipt hereof. If the contractor is not in agreement with such understanding and an increase in contract price and/or an extension of delivery schedule or time of performance is considered to be warranted, this direction shall be null and void. Failure to notify as herein provided shall constitute the contractor's concurrence and agreement herewith.

423. Appellant replied to the contracting officer by letter dated 14 September 1989, notifying the AF that the schedule change would result in a cost and schedule impact and

stating that appellant was reviewing the impact and would “submit a proposal for an equitable adjustment as soon as this effort is completed” (GAC R4, tab 2521).

424. By letter dated 27 September 1989, the contracting officer notified appellant that the MTS kit installation at RAF Upper Heyford, UK would begin on 15 January 1990. This letter, like the AF’s earlier correspondence, contained the disclaimer paragraph specifying that the letter was issued with the understanding that it did “not result in any change to the contractual requirements which would warrant an increase in contract price an[sic]/or extension of the delivery schedule or time of performance.” (GAC R4, tab 2522)

425. Appellant responded by letter dated 17 October 1989, requesting the Government to rescind the disclaimer language in its 27 September 1989 letter, or to notify appellant if the Government did not concur with appellant’ position (GAC R4, tab 2523).

426. By letter dated 18 October 1989, the contracting officer replied to appellant’ s 14 September 1989 letter stating in relevant part (GAC R4, tab 2524):

2. In response to reference letter, the Air Force hereby notifies Grumman that we believe that the change in the F-111A/E MTS modification schedule is a result of overall program delays and therefore should not incur a cost and schedule impact charge to the government.

3. The MTS is to be modified to support training on AMP modified aircraft. The failure of the original kitproof, and the lack of mature software has driven delays in the overall production schedule for the aircraft and therefore forced a delay in the modification of the MTS. In addition, lack of mature software will degrade training[. T]herefore, modification of the trainers cannot be accomplished until a useable Operational Flight Program is developed.

Although the AF cited program delay as a reason for MTS kit installation delay, we find that the AF was well aware of program delay in May 1989 when it executed P00072 which provided for a firm MTS kit installation start date of 7 September 1989 (findings 361-373).

427. By letter dated 31 October 1989, the contracting officer replied to appellant’ s 17 October 1989 letter, stating that it would not rescind the disclaimer language in its 27 September 1989 letter which advised of kit installation on 15 January 1990 because it was the AF’s position that the installation delay was due to appellant-caused delay in the overall program (GAC R4, tab 2525).

428. By letter dated 27 November 1989, appellant again notified the AF that it did not concur with the AF's position. Appellant further stated, in relevant part, as follows (GAC R4, tab 2527):

. . . The issue is not one of "overall program delays" but, rather, the delays and proposed changes since [Modification No. P00072] which are Air Force initiated. Based on [Modification No. P00072], the Contractor brought personnel on the program to plan and get ready for the MTS Kits installation support. Due to Air Force delays, these personnel must be sustained under the subject contract less [sic] their availability to support such installation is lost. These additional sustaining costs, driven by the Air Force's proposed change, are out-of-scope to contractual requirements.

429. By letter dated 21 December 1989, the contracting officer stated that "[a]s a result of contractor program delays," the kit installation was rescheduled to begin in April 1990 (GAC R4, tab 2528).

430. In its December 1989 CPR, appellant indicated that "MTS Kit Inst. Slip" was causing "additional scope/growth" to the contract with a rough order of magnitude cost impact of \$150,000. Appellant continued to advise the AF of this cost impact in subsequent CPRs. (AF R4 supp., tabs 1046 through 1052)

431. Appellant replied to the AF's 21 December 1989 letter by letter dated 15 January 1990, stating that it did not agree that the schedule change was a result of contractor-caused program delay. Appellant stood by its position in its 27 November 1989 letter, stating that "the Government has postponed the installation start date for its convenience since the MTS kits installation is not dependent upon any of the Contractor's other contractual responsibilities." Appellant notified the AF that it considered the 21 December 1989 schedule change to be null and void but that it was attempting to find other temporary assignments for its MTS support personnel until such time as they were required to support MTS installation. (GAC R4, tab 2529)

432. By letter dated 31 January 1990, the AF informed appellant that MTS installation at RAF Upper Heyford, UK would begin on 2 April 1990 (GAC R4, tab 2531).

433. By letters dated 16 February 1990, 28 February 1990, and 5 March 1990, appellant again voiced disagreement with the AF's position. Appellant submitted a proposal for an equitable adjustment with a target price of \$104,324 and a ceiling price of \$111,776. (GAC R4, tabs 2532 through 2534)

434. The MTS kit installation began in April 1990. From 7 September 1989, the installation date set by Modification No. P00072, to April 1990 when the installation actually began, appellant retained on the AMP program the personnel it required to perform the MTS installation support. During this period of delay, appellant put these personnel on other jobs on a part-time basis but there was no work for them to perform on a full-time basis. (Tr. 48/58-63; ex. A-43 at 4-5)

435. By letter dated 10 June 1991, appellant submitted its REA to the AF (R4, tab 936). In the REA appellant alleged that as a result of AF delay, appellant incurred out-of-scope costs to retain specialized personnel until they were required to support the MTS installation. Appellant reiterated its position in its 7 May 1993 updated REA (R4, tab 979) and in its claim of 30 March 1994 (R4, tab 991). The contracting officer addressed the merits and denied recovery under the REA and claim (R4, tab 985 at 10, tab 999 at 17)

436. Insofar as pertinent, the contract contained Clause H-28, NOTIFICATION TO CONTRACTING ACTIVITY (NOV 1984) AFLC FAR SUP 52.290-9004, and incorporated by reference FAR 52.243-1 CHANGES – FIXED-PRICE (APR 1984) and FAR 52.243-7 NOTIFICATION OF CHANGES (APR 1984) (R4, tab 1 at 46, 70).

DECISION

Appellant seeks reimbursement for out-of-scope costs incurred as a result of the AF's delayed installation of the upgraded MTS kits, and the attendant delay to appellant's installation support work. The AF contends that appellant was responsible for the MTS installation delay because installation of the MTS kits was tied to the aircraft delivery schedule and schedule delays were caused by appellant.

The Government's position is without merit. Under Modification No. P00072, the parties established 7 September 1989 as a firm start date for kit installation, and hence for contractor installation support. MTS kit installation was not tied to the contract delivery schedule. Appellant was prepared to perform this contract work on 7 September 1989 as required, but the AF repeatedly delayed appellant and did not allow it to perform its work as required by the contract as modified. According to the AF, the delay was initially "at the request of the using commands." After appellant notified the AF that the postponement would have a cost and schedule impact, the AF then linked the MTS kit installation delay to program delays purportedly caused by appellant.

We must conclude that the AF reneged on the MTS kit installation start date of 7 September 1989 which was mandated by the contract, as modified. The AF must be held responsible for MTS kit installation delay, and the delay to appellant's installation support work. The Government violated its implied contract duty not to unreasonably interfere with appellant's performance of the contract work. *See generally, Lewis-Nicholson, Inc. v.*

United States, 550 F.2d 26, 32 (Ct. Cl. 1977); *Die-Matic Tool Co.*, ASBCA No. 31185, 89-1 BCA ¶ 21,342 at 107,601-602.

The AF asserts that appellant did not provide the Government with timely notification of its MTS kit installation support claim as required by the contract's various notice provisions. This contention is without merit. The record shows that two weeks after receiving notice of the Government's first MTS kit installation postponement, appellant notified the contracting officer in writing that the schedule change would have a cost and schedule impact and that appellant would submit a proposal for an equitable adjustment. In subsequent letters to the AF, appellant continued to assert that the delays were the responsibility of the Government and that appellant was sustaining MTS kit installation support personnel on the program and was incurring out-of-scope costs. These assertions continued through appellant's CPRs, its REA and claim.

We conclude that the AF was well aware of the operative facts of this claim, and has failed to show that it was prejudiced by appellant's lack of strict compliance with any of the contract's notice provisions. *See A.R. Mack Construction Co., Inc., supra*. We also note that the contracting officer's decision considered appellant's claim on the merits. In such a circumstance, the notice requirement is deemed waived. *See Dittmore-Freimuth Corp. v. United States, supra; Selma Apparel Corp.*, ASBCA No. 30011, 88-3 BCA *supra* at 105,771.

For reasons stated, appellant's MTS Installation Slip claim is sustained.

(26) FINDINGS OF FACT – Crew Station Review Team Meetings

437. Under the contract, a crew station review team (CSRT) meeting was to be held one day prior to each program management review on the F-111A/E and EF-111A aircraft. SOW § 5110.3 (R4, tab 1 at 483). The contract did not expressly state the purpose of these meetings. Appellant understood that they were to be used by the AF to review appellant's design of the MFDS and control display unit (CDU) display pages and the general cockpit layout for each aircraft (tr. 36/162), and we so find.

438. The MFDS and CDU were computer screens surrounded by a series of buttons, similar to our familiar ATM bank computer screen. Aircraft-related information would be accessed on the screens by pressing adjacent buttons. Each subset of information to be accessed and shown was referred to as a "display page." (Tr. 36/150-51)

439. The software which generated the MFDS display pages was known as the SFP OFFP. The software which generated the CDU display pages was known as the "integrated communications – navigation – identification set operational flight program" (ICNIS OFFP).

440. The MFDS and CDU display screens and related software were also part of the FB-111A avionics modernization contract performed by General Dynamics Corporation. The subject contract encouraged commonality, where feasible, between the FB-111A, F-111A/E and EF-111A aircraft. Specifically, the SFP OFP for the F-111A/E was to be adapted from the existing FB-111A MFDS software “with an emphasis on maintaining commonality of function, design, code and operation where feasible.” SOW § 1620.1 (R4, tab 1 at 462). The ICNIS software was to be adapted from the existing FB-111A ICNIS software “with emphasis on maintaining commonality of function, design, code and operation where feasible.” SOW § 1630.1 (*id.* at 463).

441. The F-111A/E SSS § 3.2.1.6 provided in pertinent part as follows (R4, tab 1 at 265):

3.2.1 Performance Characteristics

....

3.2.1.6 Displays and Data Entry. The allocation of display pages and pushbutton select functions shall be similar to the FB-111, where commonality exists. Differences shall be as specified herein or as modified by Crew Station Review Team (CSRT) agreements. ...

442. With respect to the EF-111A aircraft, its SFP OFP was to be adapted from the newly modified F-111A/E MFDS software “with emphasis on maintaining commonality of function, design, code and operation where feasible” (R4, tab 1 at 351). Similarly, its ICNIS software was to be adapted from the newly modified F-111A/E ICNIS software “with emphasis on maintaining commonality of function, design, code and operation where feasible” (*id.*). The EF-111A SSS § 3.2.1.6 similarly provided as follows (R4, tab 1 at 183):

3.2.1 Performance Characteristics

....

3.2.1.6 Displays and Data Entry. The allocation of display pages and pushbutton select functions shall be similar to the F-111A/E, where commonality exists. Differences shall be specified herein or as modified by Crew Station Review Team (CSRT) agreements. ...

443. Based upon the above contract terms, appellant’s proposed F-111A/E design included a number of existing FB OFP display pages, known as the “FB-common display

pages.” Appellant also created new display pages as required by the contract (ex. A-27 at 2). This proposed design was also consistent with the approach set out in its bid proposal (tr. 36/191-92).

444. At the CSRT meetings for the F-111A/E, the AF rejected many of these FB-common display pages and issued action items to appellant which directed changes to them (R4, tab 1907). These action items were approved by the contracting officer in writing, and appellant was directed to perform this work without change in contract price. One such letter was from the contracting officer to appellant dated 18 September 1986 relating to CSRT 2 and action items SDA-3, SDA-4, SDA-8, SDA-16, SDA-18, SDA-21, SDA-23, SDA-25, SDA-26 (R4, tab 1897). Another such letter was from the contracting officer to appellant dated 6 January 1987 relating to CSRT 3 and action item 3-3, and CSRT 4 and action item 4-15 (GAC R4, tab 2382). Appellant advised the contracting officer in writing that these AF directions were out-of-scope (GAC R4, tabs 2381, 2383).

445. We find that appellant and/or its subcontractors incurred additional costs to perform the work ordered by the AF under these action items (R4, tab 1907; ex. A-27 at 6).

446. Similarly, at the CSRT meetings for the EF-111A there were instances where the AF rejected display pages that were consistent or common with the F-111A/E design. The AF issued action items, subsequently approved by the contracting officer, to change these pages (ex. A-27 at 7). One such letter was from the contracting officer to appellant dated 2 October 1987 relating to action item CSRT 2-16 (GAC R4, tab 2400); another was from the contracting officer letter to appellant dated 14 January 1988 relating to action item CSRT 3-7 (GAC R4, tab 2406).

447. Appellant advised the AF by letter and in its cost performance reports that CSRT-action items were out-of-scope and were causing appellant to incur additional costs (GAC R4, tabs 2402, 2407, 2408; AF R4 supp. tabs 1083, 1084, 1085, 1086). We find that appellant and/or its subcontractors incurred additional costs to perform this work.

448. Appellant also objected to the AF’s practice of issuing action items to appellant at later CSRT meetings rather than at earlier meetings, and to the AF’s modification of certain action items that it had issued at earlier meetings (ex. A-27 at 6). Accordingly to appellant, the contract precluded the AF from taking such actions. However, appellant cites to no contract language in support of its position, and we have found none.

449. By letter to the AF dated 2 July 1987, appellant submitted a proposal for equitable adjustment for those action items for the F-111A/E which it believed were out-of-scope (R4, tab 1907).

450. The contracting officer replied by letter dated 15 July 1988. In this letter, the contracting officer generally discussed the differences between the FB and the AE aircraft

and their missions, and stated that the AF never intended the two aircraft and their crew stations to be “identical.” However, appellant never took the position that these aircraft and their crew stations were to be identical, nor is there any evidence to show that appellant’s proposed F-111A/E design was identical to the FB aircraft design. The contracting officer also did not address the contract language in the SOW above which talked to the emphasis on commonality of function, design, code, and operation where feasible. (GAC R4, tab 2412)

451. The contracting officer’s letter also provided a point-by-point rebuttal of the disputed action items, contending that most were within the scope of the contract, but conceding that under CSRT action items SDA-1, SDA-12, SDA-13, SDA-21, SDA-25 and CSRT 4-15 the AF sought new requirements at the CSRT meetings for which appellant was entitled to contract price adjustment (*id.*). The record reflects that the contracting officer had also acknowledged appellant’s entitlement to an equitable adjustment for these same action items in an internal AF funding memorandum dated 21 June 1988 (GAC R4, tab 2411).

452. By letter to the AF dated 2 December 1988, appellant reiterated its claimed entitlement for all disputed action items (GAC R4, tab 2414). In an internal AF memorandum to technical staff dated 26 January 1989, the contracting officer stated as follows (GAC R4, tab 2417):

We have agreed to pay the following CSRT items on the attached CSRT proposal:

SDA-1	CSRT 4-15
SDA-21	
SDA-25	

Do we still agree with this? Are there other ones we should pay for?

453. The AF technical representative, Mr. Terry Weston, replied to the contracting officer as follows (*id.*):

Should include SDA-12 and SDA-13.

These latter two CSRT action items had been included in the contracting officer’s 15 July 1988 letter, but for some unexplained reason were not included in the contracting officer’s 26 January 1989 memorandum.

454. By letter to the AF dated 25 June 1990, appellant advised that it was withdrawing a number of its undefinitized proposals for equitable adjustment, including its

2 July 1987 CSRT proposal, in order to update them and present them in a single omnibus REA covering all out-of-scope issues (R4, tab 1361.592).

455. Appellant's REA was filed on 10 June 1991 and updated on 7 May 1993 (R4, tabs 936, 979). Insofar as pertinent, the REA sought reimbursement for all CSRT action items issued by the AF for the F-111A/E and EF-111A aircraft that were claimed to be out-of-scope.

456. By letter to appellant dated 26 August 1993 (R4, tab 985), the contracting officer for the most part denied recovery, citing Clause H-1053 and SOW § 5110.3 in support of his position. Clause H-1053 states as follows (R4, tab 1 at 56):

H-1053. CREW STATION REVIEW

The results and inputs from the Crew Station Review meetings are within the scope of this contract and are binding on the Contractor and the Government after PCO approval. The results of each of these meetings shall be incorporated into all applicable documentation. (SMPMC1284)

SOW § 5110.3 states as follows (R4, tab 1 at 483):

5110 TECHNICAL PLANNING & CONTROL

....

5110.3 A Crew Station Review Team (CSRT) meeting shall be held one day prior to each Program Management Review (PMR). A CSRT meeting will be held for each PMR through aircraft CDR. The results of each CSRT meeting shall be incorporated into all applicable documentation.

457. According to the contracting officer, the above contract provisions required appellant to incorporate all approved inputs from CSRT meetings into its design at no additional cost. However, the contracting officer listed seven approved CSRT action items issued by the AF from these very same CSRT meetings which he conceded were out-of-scope, as follows (*id.*):

SDA-1	VARIABLE FIX POINT QUALITY
CSRT 3-8	ABORT FIX/CAL/DESIGNATION ROUTINES
CSRT 4-15	TIME LIMIT FOR UHF TIME
CSRT 2 AI 6	AUTO PILOT CONTROL OF ORBITS

CSRT 2 AI 9 ORBIT DATA ENTRY
CSRT 2 AI 11 COCKPIT REVIEW/MFD “ORBIT”
CSRT 2 AI 13 ORBIT MODE TYPES

For some unexplained reason, the contracting officer’s letter failed to list action items SDA-12, SDA-13, SDA-21 and SDA-25 as out-of-scope, which he had determined were out-of-scope in July 1988 (finding 451).

458. Appellant’s claim dated 30 March 1994 reiterated its demand for reimbursement for all disputed action items (R4, tab 991). The contracting officer’s decision dated 30 September 1994 denied the claim except for the same seven action items listed in his 26 August 1993 letter. The contracting officer also contended that appellant’s failure to provide a “system design aid” (SDA) as required by SOW § 4420 for use at CSRT 1 contributed to the AF’s identification of CSRT problems, but failed to identify the nature of these problems. (R4, tab 999)

DECISION

Having been tasked by the SOW to emphasize commonality of function, design code and operation of the software where feasible, appellant had the discretion to determine the extent of software design commonality between the FB-111A and F-111A/E aircraft, consistent with overall contract requirements. *See also* “Commonality” section of this Opinion, *supra*. Based upon this design discretion, appellant’s proposed design for the F-111A/E included a number of FB common display pages for the MFDS and CDU. The AF rejected these display pages, and directed changes which caused additional cost. The AF has not persuaded us that the FB-common pages designed by appellant violated any contract requirements. We conclude that appellant is entitled to an equitable adjustment in contract price as a result of these AF rejections.

Similarly, the SOW gave appellant the discretion to determine the extent of software design commonality between the F-111A/E and EF-111A aircraft. Appellant’s proposed design for the EF-111A included a number of F-111A/E common display pages for the MFDS and CDU. Again, the AF rejected this design and directed changes which caused increased cost. The AF has not persuaded us that any of the F-111A/E common pages designed by appellant violated any contract requirements. Appellant is also entitled to an equitable adjustment as a result of these Government actions.

The AF argues that appellant’s claim must fail because Clause H-1053 and SOW § 5110.3 provide that any and all AF approved direction resulting from CSRT meetings is automatically within the scope of the contract and must be performed at no change in contract price. We question the reasonableness of this interpretation because it was not consistently applied by the contracting officer, whose contracting officer’s decision found

entitlement for appellant on a number of out-of-scope AF directions arising out of these very same CSRT meetings.

Nor are we persuaded that SSS § 3.2.1.6 supports the AF position. In pertinent part, this provision provided for similarity of display pages and push button select functions where commonality existed, and that differences would be identified in the SSS or pursuant to CSRT “agreements.” Appellant did not agree with these disputed action items, and timely advised the AF that they were out-of-scope.

The AF also contends that appellant failed to timely provide a SDA for use at CSRT meetings. Assuming, *arguendo*, that this is true, the Government has not shown how this failure justified the AF’s rejection of the commonly designed display pages at issue here. Since we have found entitlement with respect to this aspect of the claim, we need not address appellant’s other arguments in support of relief.

Appellant also claims that certain other AF-directed action items were beyond the scope of the contract. We are persuaded by the evidence that action items SDA-12, SDA-13, SDA-21 and SDA-25 under CSRT 2 for the F-111A/E fall into this category (findings 451, 452). Otherwise, appellant’s evidence with respect to other action items was uncorroborated and unpersuasive. The REA alleges entitlement regarding these items, but such allegations alone do not constitute proof. *Cascade General, Inc.*, ASBCA No. 47754, 00-2 BCA ¶ 31,093 at 153,531.

For reasons stated, appellant’s CSRT Meetings claim is sustained in part.

(27) FINDINGS OF FACT – Software Trouble
Reports and Field Problem Reports

459. An STR was generated to note problems or concerns with the software that Grumman was developing under the contract. An STR could result from flight testing, lab testing or anytime the software was exercised. (Ex. A-38 at 6) Field or flight problem reports, also known as FPRs, were generated after flight test sorties. An FPR could be software related, in which case it would be converted into an STR and would be assigned an STR number. (Ex. A-38 at 6).

460. After certain STRs and FPRs were written, the AF would prioritize the fixes by assigning a priority number to each report in descending order, from “1A” to “3,” with the “1A” designation referring to flight critical issues which required immediate resolution.

461. During comprehensive integrated flight test at Sacramento, many STRs and FPRs were issued. The AF issued a cure notice to appellant by letter dated 8 August 1988 to the effect that appellant’s failure to meet mission computer software delivery requirements was endangering contract performance (R4, tab 331). Appellant’s reply to

the cure notice, dated 17 August 1988, identified 61 outstanding STRs, including a number which appellant considered to be out-of-scope (R4, tab 339, encl. 3).

462. GAC sought direction from the contracting officer with respect to its claimed out-of-scope STRs by letter dated 20 September 1988 (GAC R4, tab 2195). The contracting officer provided this direction by letters dated 26 September 1988 and 3 January 1989 (GAC R4, tabs 2196, 2202).

463. Appellant's F-111A/E CPR for December 1988 informed the AF that its claim for out-of-scope STRs was "TBD" or "to be determined" in additional scope/growth under the contract (AF R4 supp., tab 1034 at 2).

464. By letter to appellant dated 2 February 1989, the contracting officer provided a status report on STRs. The contracting officer identified roughly 80 STRs as flight-verified and currently closed, roughly 40 STRs of high priority yet to be resolved, and roughly 37 other STRs which needed further work by appellant (GAC R4, tab 2205).

465. By letter to the AF dated 7 March 1989, appellant advised it would file a claim with respect to STRs 367, 419, 437, 438, 440, 468, and would perform STRs 439 and 606 as in-scope and without contract price adjustment (GAC R4, tab 2207).

466. By letter to appellant dated 18 July 1989, the contracting officer directed appellant to correct roughly 62 outstanding FPRs (GAC R4, tab 2218). GAC replied by letter dated 28 July 1989, stating that it would work on roughly 35 of the FPRs identified by the AF, but would need specific contract direction on the balance (GAC R4, tab 2222).

467. The contracting officer provided direction by letter dated 18 September 1989, stating in pertinent part as follows (GAC R4, tab 2230):

1. The Avionics Modernization Program has encountered many Category 1 Field Problem Reports (FPRs) since the beginning of flight test. Unless these problems are corrected flight test can not [sic] continue. . . . [T]he Air Force is hereby directing you to correct as expeditiously as possible all category 1 FPRs on the attached list dated 16 September 89 and all category 1 FPRs added during flight test. The Air Force will carefully review all category 1 FPRs to make sure they are categorized properly. If after review and discussions with the Air Force you still feel a category 1 FPR is out-of-scope you should submit a claim under the disputes clause. Do not wait for these discussions to be concluded before correcting the category 1 FPR. . . .

468. In a letter dated 8 December 1989 responding to the AF's letter above, GAC informed the AF that it intended to "submit a proposal for equitable adjustment to the Contract including its reasons for entitlement for those Category 1 FPR's judged by the Contractor to be an increase-in-scope. . ." (GAC R4, tab 2262).

469. Appellant's F-111A/E CPR for March 1990 informed the AF that its claim for out-of-scope STRs had a rough order of magnitude of \$1,150,000 in additional scope/growth under the contract (AF R4 supp., tab 1049 at 2).

470. By letter to GAC dated 12 April 1990, the contracting officer directed correction of all open FPRs for the EF-111A, prioritizing the fixes using the same priority number system as above (GAC R4, tab 2323). Appellant's letters to the AF dated 25 April 1990 and 27 August 1990 continued to update its list of claimed out-of-scope reports (GAC R4, tabs 2328, 2357).

471. In late 1990 or early 1991, appellant began to prepare an omnibus REA, to include all out-of-scope issues under the contract. As part of this effort, Mr. Mitchell Engel, a GAC software engineer, was tasked to review STRs and FPRs to determine whether they were out-of-scope and to assess their impact. Mr. Engel was also one of the individuals who had been assigned to analyze STRs and FPRs as they were issued in 1987-1989 (ex. A-38 at 7, 10).

472. Appellant's REA dated 10 June 1991 (R4, tab 936) contained a detailed analysis of out-of-scope STRs and FPRs which reflected the work performed by Mr. Engel (ex. A-38 at 10). Included in this section was a list of roughly 152 STRs and FPRs for which appellant sought equitable adjustment, and which presently constitutes appellant's STR/FPR claim. (Ex. A-39)

473. After a period of fact-finding with the AF, appellant modified its REA and resubmitted it to the contracting officer under date of 7 May 1993 (R4, tab 979). In this submission, appellant dropped 12 STRs/FPRs from the REA – FPR 300, STRs 430, 439, 550, 606, 776, 367AE, 430AE, 437AE, 438AE, 440AE, 427AE – and added 4 new ones – STRs 530, 679, 1124 and 1127 – for a total of 144 reports claimed as out-of-scope (R4, tab 979 at 109). Appellant did not explain why it dropped these 12 reports from its out-of-scope list. Mr. Ben Alsop, the AF's technical witness in this area, reviewed these 12 reports and determined that they did not relate to out-of-scope work (ex. G-259 at 17), and we so find.

474. By letter dated 26 August 1993 the contracting officer, for the most part, denied the REA, contending (1) that many of the FPRs/STRs which required code changes were necessary to correct appellant's OFP; (2) that certain STRs/FPRs only called for appellant's investigation of flight problems which effort was included in the contract price under SOW §§ 4320.1 and 4320.7; and (3) that A/E code changes which were incorporated

into the EF-111A mission computers benefited appellant's EF-111A work effort. However, the contracting officer found for appellant on a number of reports, as follows (R4, tab 979 at 8):

Finally, I find that STRs 1080, 158, 1060, 1162, 1023, 1066, 437, 438, and 440 were out-of-scope. Accordingly, I find that Grumman is entitled to \$40,949.00.

475. Appellant did not agree with the AF's assessment, and reasserted its full entitlement by claim dated 30 March 1994 (R4, tab 991). Unlike the REA, the claim did not specifically identify the STRs and FPRs that were claimed to be out-of-scope.

476. By contracting officer's decision dated 30 September 1994, the contracting officer reaffirmed his position as per his 26 August 1993 letter, conceding entitlement with respect to the nine STRs above but denying recovery on the balance for reasons stated in the 26 August letter. However, unlike the 26 August letter, the contracting officer's decision did not quantify the value of appellant's entitlement. In neither document did the contracting officer state that appellant failed to provide the AF with timely notice of its STR/FPR claim under the Notification of Changes clause. In both documents the contracting officer addressed appellant's claims on the merits.

477. Under SOW § 4320, appellant was to provide the following services as part of the contract price (R4, tab 1 at 476-77):

4320 INTEGRATED FLIGHT TEST AT SM-ALC

NOTE: One year of flight testing will be conducted by SM-ALC to verify system and software integration of the modified avionics systems

4320.1 Provide follow-on technical and engineering support to correct problems encountered during integrated flight test of the new hardware, software and firmware.

. . . .

4320.7 Perform analyses of flight test data for evaluating and resolving flight test anomalies and for preparation and submittal of a flight test report. (DI-T-3718A/T)

478. During pre-trial discovery, the AF asked appellant in interrogatories to identify the STRs and FPRs it claimed were out-of-scope. Appellant identified the 152 STRs and FPRs from the REA dated 10 June 1991. At trial, appellant maintained that these same

reports were out-of-scope (ex. A-39). We find that there were at least **1,100** STRs and FPRs issued on the program (tr. 46/231). Given the foregoing, we find that the vast majority of the STRs and FPRs issued were within the scope of the contract and were required to be addressed by appellant at no change in contract price.

479. As stated earlier, Mr. Engel was involved in analyzing the STRs and FPRs during the contract, and was involved in identifying the 152 reports claimed to be out-of-scope. We find that Mr. Engel's analysis was generally sound and accurate, and overall, we find that he was a technically competent and persuasive witness. Based upon our review of the record, we find that these 152 STRs and FPRs were out-of-scope, except as otherwise provided in this Opinion and with the exception of FPR 179 which was dropped at trial (tr. 46/257).

480. Mr. Engel divided the claimed out-of-scope reports into seven categories. Categories (4) and (6) related to STRs and FPRs for which appellant provided "investigation only," that is, appellant responded to AF inquiries about perceived anomalies by investigating the matter and assuring the AF that the system in question was properly working as designed. These two categories included the following STRs: STRs 172, 358, 402, 417, 1024, 419, 457, 461, 467, 527, 550, 592, 895, 649, 693, 719, 1006, 753, 120, 119, 932, 121, 1000, 812. Also included in these categories were the following FPRs: FPRs 107, 116, 154, 220, 237, 275, 285, 297, 300, 301, 302, 310, 321, 323, 326, 330. (Ex. A-39 at 4.11-5, -6, -7)

481. Mr. Engel identified Category (5) as those reports related to improving memory reserve in the mission computers. These STRs were as follows: STRs 011, 044, 067, 080, 128, 154, 990, 1043, 1051, 1064, 1067, 1098, 1099, 1100, 1106, 1107, 1122, 1123, 1141, 1160, 1161. (Ex. A-39 at 4.11-5, -6, -7) See Claim (5) of this Opinion, *supra*, which deals with appellant's memory reserve claim.

DECISION

Based on our findings, we conclude that appellant is entitled to recover its additional costs to address its claimed STRs and FPRs, except as otherwise provided in this Opinion. A number of these exceptions are addressed below.

Memory Recovery STRs

Appellant seeks compensation for certain STRs which relate to efforts to recover memory in the mission computers. We have concluded that GAC is not entitled to recover on its memory reserve claim (*see* Claim (5) *supra*). Hence, the STRs related to the recovery of memory are not compensable.

STR/FPR Investigations

Appellant seeks compensation for the costs incurred to reply to AF questions regarding the operation of appellant's operation flight program software which were documented on certain STRs and FPRs. Appellant seeks reimbursement for the time it took to investigate AF inquiries to advise the AF that the systems were properly working as designed.

We are not persuaded that this work is compensable under the Changes clause of the contract. We conclude that this work was consistent with appellant's contract responsibilities to provide flight test support as part of the contract price under SOW § 4320 (finding 477).

The Dropped STRs/FPRs

When appellant updated its REA after fact-finding, it dropped 12 STRs and FPRs from its out-of-scope list. Absent persuasive evidence from appellant to the contrary, we view this as a concession that these reports did not reflect out-of-scope work. Also, based upon Mr. Alsop's testimony we have found that these reports did not relate to additional, out-of-scope work (finding 473). Appellant is not entitled to an equitable adjustment for any work related to these reports.

Concessions by GAC

By letter dated 7 March 1989, appellant dropped STRs 439 and 606 from its out-of-scope list (finding 465). Appellant dropped FPR 179 from the out-of-scope list at trial (finding 479). We conclude that appellant is not entitled to an equitable adjustment for any work related to these reports.

The AF contends that appellant's overall STR/FPR claim must fail because it has not shown authorized AF direction to fix the STRs and FPRs. We do not agree. The record contains numerous letters from the contracting officer providing express direction to appellant to attend to outstanding STRs and FPRs. Indeed, we believe that the very system of problem identification, documentation and fix prioritization adopted by the AF constituted adequate direction for these purposes.

We also reject the AF argument that appellant failed to provide timely notice of claim under the contract's notice clauses. The record includes a number of contractor letters and cost performance reports to the AF that reflected appellant's position regarding the out-of-scope STRs and FPRs, which we believe provided adequate notice to the AF under the circumstances. Moreover, the contracting officer fully analyzed appellant's REA and claim on the merits, and it does not appear that he was unduly constrained by any lack of notice. The AF's ability to address the claim on the merits belies its present position that

it was prejudiced by lack of notice. See *Kumin Associates, supra*; *Dittmore-Freimuth Corp, supra*; *Central Mechanical Construction, supra*.

For reasons stated, we conclude that appellant is entitled to an equitable adjustment for out-of-scope STRs and FPRs consistent with this Opinion.

(28) FINDINGS OF FACT – Excessive Documentation

482. As has been stated heretofore, appellant’s contract work under the SOW included the design and production of MC software, MFDS SFP software and STS software for the F-111A/E, and the development of the relevant user’s manuals, specifications and documentation. As for the EF-111A, the SOW generally provided that appellant was to adapt the EF-111A MC OFP and SFP OFP from the F-111A/E software, and adapt the EF-111A STS from the F-111A/E STS, and also required appellant to develop the corresponding documents, specifications and manuals. (R4, tab 1 at 350-51, 353-54, 368, 370, 462-63, 465-66, 479, 481) More specifically, §§ 6130 and 6140 of the F-111A/E and EF-111A SOWs required appellant to deliver a number of B-5 and C-5 specifications, including the MC OFP B-5s, SFP OFP B-5, STS MC B-5, STS PDG B-5, STS MC C-5, and the STS PDG C-5, as well as the user’s manuals for all test stations (R4, tab 1 at 402-03, 510-11).

483. In furtherance of its contract obligation for the F-111A/E to provide the above referenced documentation, appellant submitted, *inter alia*, revised and/or updated FB-111A documents to the Government for review and approval. Mr. Harold Ziegler, appellant’s systems project engineer, testified that the FB-111A documents were “[n]ot always” provided to appellant in a timely manner. (Ex. A-28 at 2). However, the record does not affirmatively show that the contract required the AF to provide all such documents to appellant in the first instance. For example, we have found that the FB-111A OFP documentation and data were not GFP, and the AF was not contractually obligated to provide any such documentation beyond what it had made available to the appellant in the AMP data library pre-award. See Claim (1), *supra*. Indeed, the record shows that appellant had versions of a number of these documents prior to contract award (tr. 6/112-13, 37/217; R4, tab 56), and presumably obtained them from the library.

484. On the other hand, we have found that the FB-111A B-5 and C-5 specifications for the STSs were GFP (finding 47). We have found that the Government failed to timely provide appellant with reasonably accurate and complete versions of these specifications and that this failure impacted appellant’s ability to timely provide complete and accurate F-111A/E B-5 and C-5 specifications to the Government as required by the contract. See Claim (2), *supra*.

485. With the exception of the FB STS documentation, the record does not show any AF obligation to provide all the subject FB documents as GFP. Mr. Ziegler's testimony to the contrary was not persuasive.

486. Mr. Ziegler also testified that appellant expected to submit each required document to the Government twice, once for comments and once as a final document, except for the B-5 specifications, for which appellant expected to make three submittals: a preliminary version, an updated version, and a final version. (Ex. A-28 at 2, 4; tr. 38/69-70) On cross-examination, Mr. Ziegler admitted that there was no specific contract provision that spoke to how many times the required documents were to be submitted, and he had no personal knowledge of appellant asking the AF prior to award about the number of times a given document was to be submitted. Mr. Ziegler also stated that he never asserted to the Government that there was an industry standard for no more than three submittals of each document. (Tr. 37/213, 219) In its proposal, appellant stated that it would submit revisions to its software specifications and test station user's manuals "as required" (GAC R4, tab 3344 at 276-78).

487. We find that appellant did not communicate to the Government prior to contract award any expectation as to the number of submissions that would be required under this contract. We find that the contract did not specify or limit the number of document submissions.

488. Mr. Ziegler also testified that when appellant made its submissions, the AF refused to approve them and required appellant to change them, with some documents being submitted as many as six times. Mr. Ziegler gave the following explanation for the changes required by the Government (ex. A-28 at 2-3):

Basically, the Air Force would decide that it wanted something different after we had submitted our final document. Sometimes the Air Force made changes to its own changes. Sometimes the Air Force would learn that the original FB-111A AMP baseline information which it had previously given Grumman was incorrect and expected Grumman to make the necessary changes without compensating us for the extra work. On other occasions, when we had drafted and/or revised the documents in accordance with the correct FB-111A AMP baseline documents, as we were required and proposed to do under the contract, the Air Force would decide it simply wanted the documents drafted some other way.

On the other hand, the contracting officer testified in detail that the Government's disapprovals of the documents and appellant's resubmissions were the result of problems in appellant's submittals (ex. G-141 at 49-59). We find the contracting officer's

testimony persuasive. We have also reviewed the Government's letters of record which disapproved appellant's submissions. There is nothing in the letters to indicate that the Government's reviews and comments were excessive or inappropriate. (*See, e.g.*, R4, tabs 83, 89, 119, 120, 188)

489. Mr. Ziegler also admitted that subsequent to contract award he never provided notice to the contracting officer that documents which were submitted more than twice, or more than three times for the B-5s, constituted additional or out-of-scope work (tr. 37/213-14). Appellant has provided no evidence that it ever notified the Government that it believed the Government's document reviews were excessive, or that it considered the multiple resubmissions to be beyond the scope of the contract, prior to its REA of 1991.

490. By letter dated 10 June 1991, appellant submitted its REA to the Government. In the REA, appellant alleged that appellant incurred out-of-scope costs as a result of excessive and repetitive document reviews by the Government. Appellant continued its allegations in its 7 May 1993 updated REA. (R4, tab 936 at 108-11, tab 979 at 379-90) The contracting officer denied recovery by letter dated 26 August 1993 (R4, tab 985).

491. In its 30 March 1994 claim, appellant alleged that the Government never provided appellant with FB-111A baseline documents, that the Government engaged in excessive and repetitive document review, that it demanded that appellant make changes not required by the AMP contract, and that it issued multiple sets of comments to the same documents, causing appellant "to incur substantial additional, unanticipated and out-of-scope costs resulting in the use of additional manpower and delays and disruption to Grumman's software development efforts" (R4, tab 991 at 77-78). The contracting officer denied this portion of appellant's claim in his final decision dated 30 September 1994 (R4, tab 999 at 18).

DECISION

Based upon our findings, we conclude that the AF failed to timely provide appellant with accurate FB-111A STS B-5 and C-5 specifications which were GFP, and that this failure impacted appellant's ability to produce the required F-111A/E STS B-5s and C-5s. To this extent, appellant's claim has merit. However, appellant has not met its burden of proof with respect to the other claimed FB-111A documents. We conclude that the AF had no contract obligation to provide such documents to appellant beyond what it had provided in the AMP data library.

As for the Government's review of appellant's submittals, we conclude that nothing in the contract served to limit the number of times the required documents were to be submitted. Appellant has not persuaded us that these AF reviews were attributable to any wrongful conduct on behalf of the AF. The evidence, overall, suggests that these reviews were necessary because of the lack of quality of appellant's submissions. Moreover,

appellant's lack of contemporaneous notice to the Government that it considered the Government's reviews to be excessive or that the document resubmissions were out-of-scope indicates to us that appellant did not hold such a belief at the time. In sum, appellant has failed to show that the AF excessively reviewed or improperly withheld approval of appellant's documents.

For reasons stated we find entitlement, in part, on appellant's excessive documentation claim.

CONCLUSION

The appeal under ASBCA No. 51526 is denied. The appeal under ASBCA No. 48006 is sustained to the extent provided herein. Specifically, we have found entitlement, in whole or in part, on Claim Item Nos. (2)(a), 3, 6, 7, 8, 11, 12, 15, 16, 24, 25, 26, 27, and 28.¹² ASBCA Nos. 46834 and 48006 are remanded for purposes of negotiation and settlement.¹³

Dated: 14 March 2003

JACK DELMAN
Administrative Judge
Armed Services Board
of Contract Appeals

I concur

I concur

MARK N. STEMLER
Administrative Judge
Acting Chairman
Armed Services Board
of Contract Appeals

RONALD JAY LIPMAN
Administrative Judge
Acting Vice Chairman
Armed Services Board
of Contract Appeals

NOTES

¹ We cite to the record as follows: With respect to AF documents, "R4" shall refer to the original Rule 4 documents filed by the AF; "AF R4 supp." shall refer to the

AF's first supplement, and "AF R4 supp.2nd" shall refer to the AF's second supplement. The AF trial exhibits are designated as "ex. G-___". With respect to appellant's documents, "GAC R4" shall refer to appellant's first supplement to the Rule 4 documents, and "2nd GAC R4" shall refer to appellant's second supplement to the Rule 4 documents. Appellant's trial exhibits shall be designated as "ex. A-___". The trial transcript is cited by volume and page.

2

Having duly considered the magnitude of these appeals early in the proceedings, the Board exercised its discretion to issue a pretrial order which required the parties to prefile the direct testimony of expert witnesses, and which authorized the parties to prefile the direct testimony of fact witnesses. With respect to fact witnesses both parties took advantage of this opportunity for some, but not for all of their witnesses. In general, the practice followed at trial was to mark the prefiled testimony as an exhibit when the witness took the stand. The witness adopted the prefiled testimony under oath, and authenticated any project records referenced therein, subject to *voire dire* and objection. The Board then entertained any objection to the prefiled testimony before admitting it into evidence and turning the witness over for cross-examination. If a party had any written objections, they were marked as an exhibit and admitted into the record. The Board believes that the use of prefiled testimony by both parties saved many weeks of trial time. The Board's findings of fact herein have duly considered the prefiled testimony of record, the written objections thereto, the trial examination of the witnesses as well as all the other relevant evidence of record.

3

Per contract clause B-10(c), Clause L-637 and all RFP clauses under Sections K, L, and M were incorporated into the contract by reference (R4, tab 1 at 32).

4

The GPS SSS and GPS SOW materially revised certain provisions of the underlying SSS and SOW but left other provisions intact. Our citations in the record to the "SSS" or "SOW" will be to the underlying SSS and SOW unless otherwise indicated as GPS.

5

The Government also filed a motion for summary judgment seeking denial of a number of appellant's claims for failure to comply with the Notification of Changes clause. In view of our disposition of the notice issue in our discussion of the various claims herein, we deny this motion.

6

With respect to a related notice issue, we note that the contracting officer on many occasions issued letters to appellant related to the scope of the work, and required appellant to advise the contracting officer within 14 days as to whether it viewed the contracting officer's letter as requiring any change or out-of-scope work warranting

an equitable adjustment. In so doing, we find that the contracting officer sought to impose upon appellant an additional notice obligation which was inconsistent with the notice provisions in the Changes and Notification of Changes clauses, and had no legal effect.

7 The Government filed a motion for summary judgment on the issue of superior knowledge. In view of our disposition herein, we deny the motion as moot.

8 The AF's draft SOW identified only one mission computer. Prior to issuance of the RFP the contracting officer advised the prospective offerors, including GAC, on 8 November 1984 that it would add a second mission computer to the basic architecture but that full redundancy was not intended (see appellant's complaint, Appendix, tab 24 at 5).

9 During the trial, the AF filed a motion seeking sanctions and adverse inferences for destruction of project documents, specifically purged Houston status reports and schedules. The record contains a written note from appellant's project software engineer, Mr. Warner, to the effect that appellant's files were "purged" of 1987 status reports and schedules (see AF motion, ex. 1). Although appellant provided some Houston-related documentation in discovery, it failed to provide any weekly reports for the January-February 1987 period or from April through July 1987 (app. reply to motion at 4), and failed to provide any reports for the entire year of 1986. Appellant failed to satisfactorily explain the disappearance of these important reports. Given the foregoing, we exercise our discretion to draw adverse fact inferences, finding that these missing reports would generally confirm the findings herein regarding the personnel and technical problems experienced by the Houston office, none of which were of the AF's making. To this extent, the AF motion is granted.

10 The Government filed a motion for summary judgment seeking denial of appellant's Mod O claim. In view of our disposition herein, we deny the motion as moot.

11 In its claim, appellant stated that the alleged improper acts included: "(a) Submission of multiple sets of conflicting comments to the same B-5 specification; (b) Unilateral change of the contractually-specified rehost hardware; (c) Unilateral changes in GPS keycode design; and (d) Unilateral extension of contractor support period" (R4, tab 991 at 76). Appellant did not present evidence at the hearing on these allegations and did not address them in its brief. It appears that appellant has abandoned these allegations. If not abandoned, we must deny them for lack of proof.

12

In its claim and complaint, appellant also sought recovery for ongoing changes to the Government–furnished Global Positioning System (GPS) during the course of the contract (claim at ¶¶ 242, 243). The AF admitted liability in its answer (answer at ¶¶ 242, 243) but averred that contract Modification Nos. P00019 and P00090 fully compensated appellant for these additional costs. It does not appear that appellant provided any evidence at trial in support of its entitlement to recover amounts over and above that awarded under these contract modifications, nor did appellant brief the issue. Appellant’s reply brief states that “Grumman has not asserted a GPS claim” (reply at 56), which appears to be at odds with its claim as referenced above. In any event, we make no findings and render no decision on GPS issues in this opinion. However given the aforementioned undisputed contract modifications which are of record and the Government’s answer, appellant remains free to argue for purposes of quantum that the GPS–related costs that are the subject of these contract modifications were the responsibility of the AF.

13

During roughly four years of pre-trial discovery and a 77 day trial, the parties filed, and the Board disposed of countless motions. A few motions remain outstanding and are addressed below.

We deny the AF motion for sanctions for intentional destruction of documents and for contractor abuse of privilege objections during depositions. The AF has not persuaded us that appellant improperly concealed or wrongfully destroyed the documents which are the subject of this motion. *McDonnell Douglas Helicopter Systems*, ASBCA No. 50341, 99–2 BCA ¶ 30,546 (adverse inference denied where no willful conduct or misconduct shown re missing workpapers). The Board is also not persuaded that appellant concealed from the AF the so–called “room of privileged documents” so as to warrant the imposition of sanctions. The nonprivileged documents were ultimately provided to the AF during discovery, the Board granted the AF additional time for discovery, and no material prejudice has been shown. With respect to the documents that appellant failed to disclose to the contracting officer during fact–finding on the REA, even if we assume, *arguendo*, that appellant should have been more forthcoming and should have disclosed documents that were arguably relevant to the contracting officer’s document requests, we do not believe that the AF has shown that appellant’s failure to disclose the documents during fact–finding was misconduct which would support the imposition of sanctions against appellant in these proceedings.

With respect to the question of the behavior of counsel for both parties at depositions, we believe that appellant counsel’s assertions of privilege at the depositions were generally made in good faith and under colorable legal authority, even if not always correct. Sanctions would be inappropriate under the circumstances. With respect to AF lead counsel’s occasional use of profanity and

mean-spirited language during the depositions (app. cross motion at 16–22), we find that the language used by counsel was inappropriate and inconsistent with good professional practice, but do not believe it reflected a pattern of misbehavior so as to warrant sanctions. Appellant’s cross motion for sanctions pertaining to the deposition conduct of AF lead counsel is denied.

We deny the AF motion for sanctions and adverse inference due to improper spoliation of evidence. The AF has not persuaded us that appellant improperly concealed or wrongfully destroyed the documents which are the subject of this motion. *McDonnell Douglas Helicopter Systems, supra*.

We also deny the AF motion to strike certain portions of the appellant’s brief relating to the AF’s obligations concerning GFE and GFE data on the grounds of lack of jurisdiction. These GFE-related issues were alluded to in the claim, either directly or indirectly. There was no change in the essential nature or the basic operative facts of the claim. Under such circumstances, we agree with appellant that the development of additional facts or a different legal theory at trial does not divest the Board of jurisdiction. *J & J Maintenance, Inc.* ASBCA No. 50984, 00-1 BCA ¶ 30,784.

I certify that the foregoing is a true copy of the Opinion and Decision of the Armed Services Board of Contract Appeals in ASBCA Nos. 46834, 48006, 51526, Appeals of Grumman Aerospace Corporation, rendered in conformance with the Board's Charter.

Dated:

EDWARD S. ADAMKEWICZ
Recorder, Armed Services
Board of Contract Appeals