

Statement Of

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Before The

**HOUSE OF REPRESENTATIVES
COMMITTEE ON GOVERNMENT OPERATIONS
LEGISLATION AND NATIONAL SECURITY SUBCOMMITTEE**

February 2, 1994

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Mr. Guido William Aru

Mr. Aru is the Project Leader for the System Architecture and Integration Section of the Space-Based Surveillance Division of The Aerospace Corporation. He is responsible for the system architecture and integration of the Defense Support Program (DSP), Follow-on Early Warning System (FEWS) and Talon Shield programs. He leads a team which is responsible for performing concept analysis, planning and recommending technical direction so that present and future early warning system architectures meet the strategic and tactical users' requirements. He also performs systems analysis and system comparison studies, including technical risk management, cost, and schedule assessments, to help ensure the proper integration between military requirements, technical capability and fiscal constraints.



Previously, Mr. Aru was a Project Engineer in the Special Applications Directorate. He was responsible for providing general system engineering and integration support to various Army and Navy space initiatives, specifically in the application of space surveillance systems to meet the tactical warfighters' needs. He provided analysis and technical recommendations which contributed to the Army's successful execution of the Tactical Surveillance Demonstration (TSD) program. The TSD program served as the basis for the Air Force's Talon Shield program and the joint Army/Navy Joint Tactical Ground Station (JTaGS) program.

Prior to joining Aerospace in 1987, Mr. Aru was the Lead Engineer for tactical applications of the Defense Support Program at Aerojet ElectroSystems. He was responsible for executing Air Force and Navy programs to study and implement systems which provide tactical exploitation of DSP and other space-based surveillance systems.

Mr. Aru was born on July 20, 1963 in Los Angeles, California. He pursued undergraduate studies in chemistry and computer science at San Bernardino Valley College and The University of Redlands. He earned a bachelor of science degree in computer science from National University, and he has completed thirty units of graduate studies in computer science.

Mr. Aru holds DoD Top Secret, Sensitive Compartmented Information, and other national security clearances. His Special Background Investigation was last updated in August 1993.

(Current as of January 1994)

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I. Introduction

Mr. Chairman and distinguished members of the Committee:

Good Morning, and thank you for this opportunity to testify before the committee. I am the Project Leader for the System Architecture and Integration Section of the Space-Based Surveillance Division at The Aerospace Corporation; this division has responsibility for the Defense Support Program (DSP), Follow-On Early Warning System (FEWS) and Talon Shield programs. The Aerospace Corporation, however, has asked me to emphasize that I am testifying as a private citizen and not as a representative of the Corporation.

I have been involved with space surveillance systems for over ten years; the last six years at Aerospace and previously with Aerojet ElectroSystems, the manufacturer of the infrared sensor for the DSP satellite. I am currently ranked in the top 15% of my division of fifty-four people, and my salary/maturity curve rating places me in the top 10% of the corporation overall.

My testimony this morning will detail how senior leadership of the Air Force and The Aerospace Corporation attempted to suppress and then discredit a Congressionally-mandated study which showed that potential upgrades to the DSP system could provide between \$6 and \$10 billion in savings compared to the acquisition of FEWS. I will describe how certain individuals have systematically provided misleading and false information to the Office of the Secretary of Defense (OSD) and Congress in order to justify the FEWS program. I will also testify that the Air Force and Aerospace leadership of the Space-Based Early Warning System Program Office provided proprietary data from a DSP contractor to the FEWS contractors in order to gain their assistance in discrediting the study of DSP upgrades. Finally, I will detail the retributive actions taken against some of the individuals who participated in the study of DSP upgrades.

I conclude my testimony with my thoughts on some of the issues confronting Space Based Early Warning. I also provide some suggestions for consideration by Air Force, OSD, and Congressional decision-makers.

Mr. Chairman: Colonel Mangold, Colonel Dietz, and I appear before you today because our experiences illustrate that there are serious problems with the institutions entrusted to acquire and operate our Nation's military space systems. Our experiences also illustrate that these problems are not just institutional, but involve unethical and perhaps illegal conduct by some of its senior leadership.

The three of us, each in our own area of responsibility, attempted to identify ways to provide military space capabilities consistent with a post-Cold War world and the fiscal constraints of a declining defense budget. We unfortunately discovered that the leadership of our Nation's military space institutions are more concerned with protecting their own parochial interests.

Vice President Gore has challenged all of us involved in Government procurement to uphold the public trust and treat the taxpayer's hard-earned dollars with respect. The Vice President wrote in his report on *Reinventing Government*, that:

"The National Performance Review can reduce the deficit further, but it is not just about cutting spending. It is also about closing the *trust* deficit: proving to the American people that their tax dollars will be treated with respect for the hard work that earned them."

President Clinton and Vice President Gore also said during their campaign that:

"We must reward the people and ideas that work and get rid of those that don't."

Mr. Chairman, we do not ask for a reward for the ideas that we have put forward. We only ask for your help in completing the formidable task that we unknowingly started: the task of reforming our Nation's military space institutions for the post-Cold War era.

II. Congressionally-Mandated DSP Upgrade Study

From November 1992 through June 1993 I was the leader of a study to determine how an upgraded Defense Support Program and the planned Brilliant Eyes (BE) system could together meet the Nation's Tactical Warning/Attack Assessment (TW/AA) and Global Protection Against Limited Strike (GPALS) requirements. This study was conducted in response to fiscal year 1992 Congressional Language requesting that the Air Force review and provide an assessment of alternatives to their plans for the acquisition of the FEWS and Brilliant Eyes programs.

At the direction of the Air Force, my study team consisted of not only engineers from The Aerospace Corporation, but also personnel from the DSP contractors (Aerojet and TRW), an independent cost analysis contractor (Tecolote), and the Air Force itself. Colonel Edward Dietz and Major Roger Hall were my principal Air Force counterparts for the study. The study determined that a series of evolutionary upgrades could be made to the DSP satellite and ground processing system which would improve performance and reduce life-cycle costs. Independent cost analysis performed by Tecolote showed that this concept, which has become known as DSP-II, would save over \$3 billion in the Future Years Defense Plan (FYDP) (95-99) and approximately \$10 billion life-cycle through the year 2015 when compared with the baseline FEWS program. The study also demonstrated that a synergistic DSP-II/BE system could meet the Tactical Warning/Attack Assessment and GPALS requirements. The Government spent approximately \$500,000 to conduct this study.

Suppression Of DSP Upgrade Study Results From OSD And Congress

Major General Garry Schnelzer and Lt. Colonel Jeff Norton (Air Force Space Command) were briefed on the conclusions of the study on February 3, 1993. Major General Schnelzer rejected the DSP-II concept with the stated reason that it did not employ direct satellite-to-satellite communications crosslinks and space-based mission processing which were Air Force requirements. Major General Schnelzer ordered that the DSP-II concept be replaced with a 1991-vintage DSP upgrade concept known as DSP++. This concept had been previously

rejected by the Air Force during the 1991 Cost and Operational Effectiveness Analysis for FEWS because it was not cost-effective and did not meet the Air Force's requirements. DSP++ did not offer any significant performance advantages over DSP-II, but its costs were comparable to FEWS whereas DSP-II offered significant savings. Major General Schnelzer's rejection of DSP-II and inclusion of DSP++ was done over the objections of the DSP Program Director, Colonel John Kidd and his deputy, Colonel Edward Dietz.

I would like to note that the JCS validated requirements for space-based early warning were documented in the 11 page Joint Requirements Oversight Council Memorandum 2-91 (JROCM-002-91) dated February 4, 1991. Air Force Space Command had also drafted a 100 page, unapproved, Operational Requirements Document for the Follow-on Early Warning System, dated October 7, 1992. This draft document included requirements which greatly exceeded those specified and approved by the JROC, and it included requirements which are physically impossible for any system, including FEWS, to achieve. Furthermore, many of the requirements specified in the Air Force Space Command document were derived from now obsolete Cold War strategies of fighting a protracted global nuclear war.

On May 21, 1993 Major General Schnelzer submitted his report to Congress which included the DSP++ option and excluded DSP-II. The exclusion of DSP-II allowed Major General Schnelzer to conclude his report with the finding that "For (the) TW/AA Mission FEWS Provides The Least Cost Option." The Air Force Inspector General's investigation, conducted by Major General Marcus Anderson, concluded that Major General Schnelzer "had a good reason" to suppress the DSP-II concept from OSD and Congress because DSP-II did not meet the Air Force's requirements. Major General Anderson did not address the fact that the DSP++ did not meet the Air Force's requirements either, although virtually every page of Major General Schnelzer's report which discussed the DSP++ was marked with a statement saying "DSP++ does not meet requirements." Major General Anderson also did not address the fact that Major General Schnelzer greatly understated DSP's performance and overstated the estimates of FEWS' performance in his report.

When OSD directed at the end of May, 1993 that another DSP option should be included, Major General Schnelzer again ignored the DSP-II option and submitted an option known as "DSP Forever" or "DSP-26." This option was to simply build cookie-cutter DSP Block 23 satellites through the year 2015. This option was a twenty-year procurement with no allowance for investment in technology insertion or pre-planned product improvements to reduce life-cycle costs and enhance capabilities. As a result, DSP-Forever's performance was less than that achievable with DSP-II, but its costs were significantly higher -- as with DSP++ , the costs were comparable to FEWS. Colonel Dietz, who was then the DSP Program Manager, and I both protested vigorously, but unsuccessfully, against the DSP-Forever option and the continued exclusion of DSP-II.

The Air Force's views on the issue of upgrading DSP versus acquiring FEWS are summarized in Brigadier General Dickman's February 10, 1993 letter to Major General Schnelzer, written after his representative, Lt. Colonel Norton, was briefed on DSP-II:

"You stated an Air Force position in the 3 February meeting that I would like to echo. The Vice Chief position was that FEWS was, and is, the Air Force and DoD ITW/AA solution of choice - supported by JROC-validated requirements, supported by full funding in the BES, supported by two Air Force summits, and supported by a Milestone I DAB review."

In my opinion, this shows the Air Force was never interested in doing the analysis and answering the question asked by the Congress: the Air Force already had the answer it wanted.

Suppression Of Information Within The Air Force

The Air Force also withheld information on DSP-II from its own personnel responsible for establishing its budget. Colonel Sanford Mangold was the Resource Allocation Team Chief for the Air Force's Space, Command and Control, Intelligence, and Nuclear Deterrence programs from June 1, 1992 through June 23, 1993. Colonel Mangold was told of the DSP++ , DSP-Forever, and FEWS budget requirements, but he was never informed of the DSP-II option and its potential cost savings.

III. The Disinformation Campaign

In parallel with the preparation of Major General Schnelzer's report to Congress, Major General Donald Hard testified before Congress on the need for the FEWS program. On May 11, 1993, before the House Committee on Appropriations Subcommittee on the Department of Defense, Major General Hard testified for the record that:

"The Air Force and the Department of Defense have looked at the issue of continuing DSP, upgrading DSP or developing a new system such as FEWS many times in recent years. The answer keeps coming back to the development of a new system. This...has been reviewed again in an Air Force study now being prepared for Congress.... We have studied a number of ways to incorporate changes to DSP...the cost of incorporating these changes quickly approaches the cost of development and producing a new system like FEWS" (ref. Hearing pages 391 and 392).

I believe Major General Hard's testimony was misleading. The DSP-II option briefed to Major General Schnelzer on February 3, 1993 showed DSP could be upgraded at a savings of approximately \$10 billion compared to the baseline FEWS program. Subsequent analysis of DSP-II and comparison against a reduced-cost FEWS (with less capability than the baseline FEWS) showed DSP-II would still save approximately \$6 billion. These savings were subsequently validated by Mr. Everett, The Institute for Defense Analysis (IDA), and the DoD Cost Analysis Improvement Group (CAIG). In addition, a GAO report on Early Warning Satellites dated November 1991, prepared for the House Committee on Appropriations Subcommittee on the Department of Defense, concluded that:

"... there are indications that an enhanced DSP could be nearly as effective and would cost billions of dollars less than a fully capable FEWS. Five separate studies provide a basis for these conclusions."

During questioning by Mr. Young on the performance of FEWS compared with DSP, Major General Hard answered twice that:

"...with FEWS we can get accuracies that allow us to tell the Scud hunter in the F-16 where to look, within an area about the size of RFK stadium, instead of an area the size of Washington, D.C." (ref. Hearing page 393).

Major General Hard's testimony was incorrect. DSP's real-time launch site estimates reported during Desert Storm were significantly smaller than an area the size of Washington, D.C. In addition, the DSP ground processing improvements advanced by the Army's Tactical Surveillance Demonstration (TSD) program and adopted by the Air Force under the Talon Shield program provide missile launch point estimation which is comparable to the FEWS specification. A Technical Support Group headed by Mr. Robert Everett compared DSP and FEWS at the request of Dr. John Deutch, Under Secretary of Defense for Acquisition and Technology. Mr. Everett concluded that FEWS provides only "marginal advantage" over DSP for launch point estimation.

General Charles Horner, who cited FEWS as his number one priority program, has also provided similar misinformation in testimony before the Senate and in briefings to General McPeak and OSD. It is interesting to note that Major General Hard was hired by The Aerospace Corporation immediately after his retirement last fall. Mr. Hard is now the General Manager for Aerospace in Colorado Springs, and one of his primary missions is to expand the company's support to US Space Command and Air Force Space Commands, both headed by General Horner.

IV. The Aerospace Corporation's DSP-II Report

Major General Schnelzer's report to Congress coincided with the distribution of the Aerospace DSP-II report. This report was prepared at the direction of Colonel Kidd and Colonel Dietz to document the DSP-II concept; they provided this direction in February 1993 after Major General Schnelzer rejected DSP-II from consideration for his report to Congress. The 500 page DSP-II report documents a technology insertion and pre-planned product improvement approach to achieve an upgraded DSP system with reduced life-cycle costs. Performance improvements would be achieved through upgrades of the satellite's infrared sensor and enhancement of the ground processing based on concepts proven by the Tactical Surveillance Demonstration and Talon Shield programs. Life-cycle costs would be reduced by life-extension enhancements to the satellites and the use of the Atlas IIAS medium launch vehicle versus the Titan IV used today.

The DSP-II report compared the cost, risk, performance and schedule of the proposed DSP-II with the Air Force's baseline FEWS program. The report questioned the military utility of some of the FEWS requirements relative to a budget-constrained post-Cold War world. The report addressed the potential use of non-space systems, such as in-theater radars, to address some of the draft requirements levied on FEWS by Air Force Space Command. The report did not make any recommendations with regard to the FEWS program, but it did recommend that technology insertion and pre-planned product improvements be applied to the DSP satellites already built and in storage to increase their performance and extend their operational life. The report also recommended that evolutionary ground processing improvements be made to increase system performance. The report stated that these were cost effective improvements which should be undertaken regardless of the destiny of FEWS.

Recall Of The DSP-II Report

General Horner was informed of the DSP-II report and its comparisons of DSP-II and FEWS on May 20, 1993. On that day, General Horner telephoned Mr. E.C. "Pete" Aldridge, the

President of The Aerospace Corporation. Mr. Aldridge then ordered the DSP-II report recalled. In a May 24, 1993 letter from General Horner to Mr. Aldridge, General Horner said that the DSP-II report "was flawed technically, operationally, and politically." General Horner also wrote, "This kind of 'work' is unprofessional and is not representative of the type of government-industry team I want -- especially when it ends up in Washington in the Navy Staff. Please help." However, in a handwritten note attached to his letter, General Horner added, "If I'm wrong educate me..." General Horner's letter and his conclusions are particularly interesting, however, since at the time neither US Space Command nor Air Force Space Command had received a copy of the DSP-II report - they had only received a few unclassified pages from the executive summary.

Mr. Aldridge wrote General Horner on June 22, 1993 saying that there was "no excuse for the advocacy tone of the report." He also wrote that he had counseled all the employees on this issue, and that "The role of program advocacy should be played, if at all, by the military program office, the military services or other government agencies." Mr. Aldridge then concluded his letter by writing, "On a final note, I am most disturbed about the 'rumor' that Aerospace does not support FEWS.... FEWS is the only system that will give us confidence in providing launch warning and tactical missile defense tip-off." Mr. Aldridge also wrote that he had called Dr. John Deutch and Dr. George Schneiter to explain the situation and that he also talked to Major General Hard and Major General Schnelzer "to determine what else we can do to put this issue to rest."

Major General Anderson concludes in his investigation that "Mr. Aldridge ordered the recall of the Aerospace (report). He did so initially to read the report, then he affirmed the decision after review by an independent Aerospace team." That independent team initially tried to discredit the report, but their analysis was subsequently shown to be flawed. The IDA conducted a four-month review of the DSP-II report and found that "DSP-II is a technically sound, low risk concept" and "It represents what a good program manager would come up with for fixing known problems and reducing life-cycle costs." It is interesting to note that Mr. James Slattery, who headed Aerospace's independent review team, was promoted to Principal Director for the FEWS program shortly after completing his review of DSP-II.

Unauthorized Disclosure Of Competition Sensitive Information

The Space-Based Early Warning System Program Director, Colonel Joseph Bailey, and his Aerospace Corporation counterpart, Mr. John Parsons (General Manager, Space-Based Surveillance Division), provided the DSP-II report to the FEWS contractors, TRW and Lockheed Missiles and Space Company (LMSC) in an effort to help discredit and refute the report. The DSP-II report was specifically provided to Mr. Elliot Bailis, TRW's FEWS program manager, and Mr. Wayne Craft, a senior executive at LMSC responsible for military utility analysis of FEWS. Mr. Craft is a retired Air Force Colonel and former DSP Program Director.

The Aerospace DSP-II report contains "Competition Sensitive" information from Aerojet ElectroSystems, one of the DSP contractors. The DSP-II report is explicitly marked with the restriction that it is not releasable outside the U.S. Government and The Aerospace Corporation. The report was provided to TRW and LMSC after normal business hours on Friday May 21, 1993 and again on Saturday May 22, 1993. This action was taken only hours after I specifically told Colonel Bailey and Mr. Parsons in a 10 AM meeting on May 21, 1993 that the report contained "Competition Sensitive" material and could not be provided to contractors. I told them this in response to their request that I prepare a version of the report for release to the FEWS contractors. When they continued to insist that I prepare a releasable version of the report, I told them that it must first be reviewed with the Air Force and Aerospace's legal offices as well as with Aerojet since it included their data. I also told them that this could not be done immediately since Aerojet is on a four-day work week and they are closed on Fridays.

Despite the restrictive markings on the document and my personal statements to them, Colonel Bailey and Mr. Parsons elected to provide the report to Aerojet's competitors. Although I am not qualified to judge whether their actions are in violation of the Procurement Integrity Act or the Trade Secrets Act, I do know that they violate the ethical standards that those of us involved with Government procurement are expected to abide by. Major General Anderson's report states that this incident "was investigated by a separate inquiry which concluded that proprietary data was, in fact, inappropriately released."

Suppression And Discredit Of The DSP-II Report

Major General Anderson's report substantiated "that the Government attempted to discredit the Aerospace (report)." Major General Anderson concluded, however, that: "This is an unusual situation because the Government and the leadership of Aerospace Corporation (Mr. Pete Aldridge) had good reason to discredit the report. It had not been coordinated with the user or the PEO, had been approved at an intermediate level at Aerospace, discounted JROC-validated requirements, and was written in advocacy tone. Mr Aldridge was embarrassed with the report, as was the Air Force about the content and the way the report was coordinated and distributed." These conclusions demonstrate a clear misunderstanding of the proper role and mission of The Aerospace Corporation and its policies and procedures.

The role and mission of The Aerospace Corporation is to perform objective analysis and make recommendations to our customer. This is established in Air Force SSD Regulation 800-8, dated March 13, 1992, which sets out the policies and procedures for The Aerospace Corporation. Paragraph (1) and (2.a) define Aerospace's General System Engineering and Integration (GSE&I) responsibilities to include:

"providing cost/benefit analyses for changes or additions; and providing comments and recommendations in writing to the Government Program Director and/or Project Officer as an independent technical assessment for modifying the program."

In the case of the DSP-II report the customer was the DSP System Program Office, and the report was requested and approved by the DSP System Program Director, Colonel Kidd. There was and is no requirement to coordinate with the user and the PEO for such reports. Nor, in my opinion, should there be because it would inhibit Aerospace from being objective in assessing military requirements relative to technical capabilities and fiscal constraints. Aerospace would simply become a publisher of position papers for the user and the PEO, which I do not believe is an appropriate role for an FFRDC.

Paragraph (5.c) of Regulation 800-8 states that:

"Aerospace will designate a Systems Engineering Director or Principal Director for each program for which the Corporation is assigned a GSE&I role. The Aerospace Director will act on behalf of the Corporation in discharging Aerospace's contractual responsibility to the Air Force."

The DSP-II report was reviewed and approved by Mrs. Barbara Ching, Associate Principal Director for Systems Engineering for DSP, and by Mr. Everett Bersinger, Principal Director for the DSP Program. This approval was consistent with Regulation 800-8 and with internal company policies and practices. Unclassified sections of the report were provided to Mr. Richard Allman, Vice-President For Space Program Operations, at his request for review one month prior to publication, but I received no comments. My previous manager, Dr. Philip Diamond, Principal Director For Special Applications, reviewed the cost, performance and risk comparisons between DSP-II and FEWS with Dr. George Paulikas, Executive Vice-President of The Aerospace Corporation. Dr. Paulikas asked Dr. Diamond to have me complete the report and put him (Dr. Paulikas) on the distribution list. On August 18, 1993 Dr. Paulikas told me, "I read your report, all five hundred pages, and thought it was an excellent technical report. It is the type of work Aerospace should be doing."

In regard to the contention that the report "discounted" JROC-validated requirements, the DSP-II report did not discount either validated or unapproved requirements. It assessed them for their military utility relative to their cost and technical risk. This was justified because one of the key value-added functions of The Aerospace Corporation is to help ensure the sensibility and cost effectiveness of the military requirements for space systems. This is clearly delineated in the Mission Statement of The Aerospace Corporation, a portion of which reads:

"The Aerospace Corporation shall perform system engineering and integration; shall recommend technical direction; shall work closely with the U.S. Air Force in long range planning, systems analysis and systems comparison studies, including technical risk management, cost, and schedule assessments. The Aerospace Corporation reviews ideas and concepts generated throughout industry and government, and helps to ensure the proper integration between military requirements, technical capability and fiscal constraints."

The DSP-II report questioned the military utility of many of the unapproved requirements proposed by Air Force Space Command in their draft Operational Requirements Document for FEWS. The report also addressed the cost and risk associated with meeting these requirements. The report concluded that many of the unapproved Air Force requirements were excessive in a post-Cold War world. Requirements related to survivability in a protracted global nuclear war are included in this category. The report also concluded that many of the unapproved requirements were un-achievable by any system, including FEWS, because they violate the laws of physics, or as Dr. Paulikas remarked to me during a discussion on August 18, 1993: "Some (of the FEWS requirements) violate the laws of physics and thermodynamics simultaneously."

The IDA, in its review of the DSP-II report, concluded that the "current requirements (for FEWS) are not justified" and that they were "developed when policy was nuclear war-fighting" and that the "requirements (are) difficult to justify even under this policy." IDA also concluded that the system drivers of sensitivity, revisit rate, and processing for FEWS are "highly questionable."

As far as the distribution of the DSP-II report is concerned, this was also done in accordance with all applicable policies and practices. According to Regulation 800-8 Paragraph (4.d.3.6) the System Program Director "Reviews, accepts/approves and processes technical reports (TRs) and reviews, approves, or revises the distribution list for Technical Operating Reports (TORs) delivered by Aerospace for fulfillment of contractual requirements." The DSP-II report was included in the TOR category. Its distribution was approved by Colonel Kidd, who was then the DSP System Program Director. The content of the DSP-II report was also approved by Colonel Kidd because, as permitted under Regulation 800-8 Paragraph (5.c.2), the Air Force provided some of the cost and schedule data used in the report.

In his June 22, 1993 letter to General Horner, Mr. Aldridge says that "It was the unauthorized distribution (of the DSP-II report) which caused the problem." As required by Regulation 800-8 Paragraph (4.d.3.6), Colonel Kidd approved the distribution list which included Mr. Dudley Reese of the Navy Space Systems Activity at Los Angeles Air Force Base. Colonel Kidd also

approved the Distribution Statement which stated "Secondary distribution authorized to U.S. Government agencies and The Aerospace Corporation." Therefore, any secondary distribution to government agencies such as the Navy Staff in Washington, OSD, and Congress was authorized. The only unauthorized distribution of which I am aware was the distribution of the report to the FEWS contractors.

As to why Mr. Aldridge was embarrassed by the report, you will have to ask him. If asked, I would speculate that he was embarrassed because the DSP-II report raised the possibility that The Aerospace Corporation's long-term support of the FEWS program was not justified. For example, our public 1992 Annual Report, states:

"The (Aerospace developed simulation) was used to analyze the benefits of the Follow-On Early Warning System (FEWS) in support of DoD decision processes.... The Aerospace activities were instrumental in the program's entrance into a two-year demonstration and validation phase."

In his June 22, 1993 letter to General Horner, Mr. Aldridge wrote "FEWS is the only system that will give us confidence in providing launch warning and tactical missile defense tip-off." Our internal semi-annual Technical Reports to our Board of Trustees, however, paint a different picture. Every report since December, 1992 states:

"FEWS designs have been driven by strategic requirements and the strategic concept of operations.... Concerns have been raised by some users (e.g., the Navy and Army) that FEWS may not be configured to fully support their future needs.... The military war-fighting added value of enhanced surveillance information has been somewhat difficult to quantify, as clear metrics have not been delineated. An understanding of how end-users will and can take advantage of accurate and timely surveillance data must be established, so that tradeoffs of military utility can be performed."

The DSP-II report provided a review and assessment of the military utility of a lower-cost surveillance system. The subsequent independent reviews of DSP and FEWS by the Bottom-Up Review, the IDA, Mr. Everett's Technical Support Group, and OSD concluded that FEWS was unnecessary.

I would also speculate that Mr. Aldridge may have been concerned about challenging General Horner's "number one priority program" given that Aerospace was and is actively trying to expand our business base with US Space Command and Air Force Space Command. These are both headed by General Horner. Mr. Aldridge may also have been concerned about the more immediate impact on The Aerospace Corporation's budget if the FEWS program were to be canceled. Aerospace's funding is determined on a program-by-program basis, and FEWS accounts for approximately 4%-5% of Aerospace's total budget.

V. The Bottom-Up Review

Despite the efforts of the Air Force and The Aerospace Corporation to suppress the DSP-II report, news of its conclusions reached OSD and eventually Congress. One of the Navy's representatives at Space and Missile Systems Center sent their copy of the report to his superiors in the Pentagon on May 24, 1993 as the Air Force was attempting to retrieve it from him. Mr. Derek Vander Schaaf, the acting DoD Inspector General, had a copy of the report seized from the Air Force on May 26, 1993 to ensure that at least one copy would survive.

On June 8, 1993 Dr. William Lynn, Director for Program Analysis and Evaluation, wrote Dr. Deutch saying that DSP should be included in the Bottom-Up Review. Dr. Lynn wrote:

"The Air Force staff has rejected the DSP-II/BE alternative primarily because it does not meet requirements, and also maintains that the Aerospace report understates the technical risks and costs of DSP-II. Given the FY 95-99 fiscal outlook, however, we need to consider seriously alternatives that may fall short of meeting all established requirements yet offer the potential for significantly lower costs."

The Bottom-Up Review of DSP and FEWS was headed by Dr. George Schneider. Dr. Deutch also appointed Mr. Robert Everett to head an independent Technical Support Group with the tasking to "Review and recommend options for future U.S. space-based infrared surveillance capability." The Space-Based Early Warning System (SBEWS) System Program Office (SPO) supported both the Bottom-Up Review and Mr. Everett's review. Colonel Jeff Quirk, SBEWS Director for System Engineering, was responsible for the performance and cost estimates of the DSP and FEWS options evaluated in the reviews.

Although Mr. Everett requested that I brief his entire Technical Support Group on the DSP-II concept, his request was denied by Mr. Aldridge. Mr. Aldridge made this denial despite Mr. Lynn's letter and Major General Schnelzer's explicit request to fully cooperate with the OSD reviews. Mr. Aldridge later consented to allow the DSP-II development team to brief one member of Mr. Everett's group, Dr. Parney Albright of the IDA.

DSP And FEWS Performance Estimates

In my opinion, the performance estimates submitted by the SBEWS SPO to OSD and Mr. Everett were misleading and biased towards FEWS. While it is not possible to discuss the specifics of the DSP and FEWS performance estimates in an unclassified forum, I can say that the estimates of DSP performance were poorer than the performance already demonstrated by the Army's Tactical Surveillance Demonstration Program (TSD) and specified for Talon Shield.

The DSP performance estimates provided by Colonel Quirk did not include the "projected upgrade" improvements which were included in the cost estimates provided to OSD. Approximately \$1 billion was included in the cost estimates for DSP sensor and ground processing enhancements. The performance estimates also excluded the contribution of an additional "adjunct system," even though its costs, reported by Colonel Quirk as \$4.3 billion, were included in the DSP cost estimates and not the FEWS estimates.

Colonel Bailey, in an October 13, 1993 letter to Major General Anderson, acknowledged that the DSP performance estimates prepared by Colonel Quirk ignored the "projected upgrade" performance and the contribution of the adjunct system. Colonel Bailey wrote:

"DSP performance is quoted throughout the community in several ways, e.g.: (1) existing/demonstrated mono performance; (2) existing/demonstrated stereo performance; (3) spec values (DSP or Talon Shield); (4) Talon Shield-level stereo performance estimates; (5) other 'projected upgrade' performance estimates.... DSP Performance has been reported to AFSPACECOM, the Bottom-Up Review, and Mr. Everett's Technical Support Group in two ways: current DSP performance and DSP/Talon Shield which we have used to characterize future DSP system performance."

FEWS, on the other hand, was assumed to operate better than required by its classified specification. In my opinion, the optimistic projections of FEWS performance were inappropriate considering that:

- (1) The FEWS program was only in the Demonstration/Validation Phase, with the preliminary design review still years away;
- (2) Two contractors with radically different approaches were competing for the down-selection which was expected by mid-1994.
- (3) The cost and risk estimates for FEWS were based on meeting specifications, not performance projections. In my experience, no one is likely to spend additional money to meet performance projections which, by the time the first FEWS satellite would have been delivered, would be ten years old.

Other people besides Colonel Dietz and myself expressed their concerns on the performance estimates being provided to OSD. For example, Major Roger Hall, Team Chief for Architecture and Integration in the SBEWS SPO, wrote a memorandum to Colonel Quirk that explained his position that:

"When there are many ways to answer questions of FEWS vs DSP, the answer chosen is usually the one which portrays FEWS to the best advantage."

Major Hall elaborated his concerns and provide details on how the performance comparisons of DSP and FEWS were contrived to portray FEWS in the best light. Major Hall concluded his memorandum to Colonel Quirk by writing:

"SPACECOM stated -- advertised -- publicized FEWS performance is becoming more and more overstated and incredulous (i.e., 'Washington, D.C. / football stadium charts', statements made about FEWS cueing based upon single hits, and General Horner's statements related to SS-21s, clouds, and low-altitude cruise missiles, etc.). Some of the more recent claims are probably beyond the capability and capacity of any space-based asset and may damage SPACECOM's credibility."

DSP And FEWS Cost Estimates

In my opinion, the DSP and FEWS cost estimates -- as well as the basis for those estimates -- were also biased towards FEWS and specifically constructed to prove General Horner's assertion that "FEWS is cheaper than DSP." Colonel Quirk manipulated the costing ground rules to

ensure this. For example, for FEWS he assumed the entire DSP Block 23 satellite contract would be canceled at a savings of \$700 million in satellite costs and \$800 million in booster costs. For the DSP++ and DSP-26 options, he assumed that all DSP Block 23 satellites would be purchased. For DSP/MLV (aka. DSP-II) he assumed that only one of the three DSP Block 23 satellites would be purchased at a savings of \$140 million from a \$1.2 billion contract. Thus, for what is otherwise a low cost option, DSP-II was made to look worse by the addition of a single billion dollar satellite.

Colonel Quirk also manipulated the costs for an "adjunct system" which he claims was required by DSP, but not by FEWS. During the 1991 Cost and Operational Effectiveness Analysis for FEWS, the cost of this additional system was estimated at \$1.1 billion (converted to FY93). In February, 1993 the cost of this system was re-estimated at \$1.7 billion. In June, 1993 it was re-estimated at \$2.1 billion. By August it had grown to \$3.3 billion, and in September it jumped to \$4.3 billion. Mr. Everett concluded, however, that this adjunct system was unnecessary for both DSP and FEWS.

No details were ever provided to justify these estimates -- they were hidden under the cloak of secrecy. I know the circumstances of these estimates, their constraints, and the other lower-cost options available which could provide the same capability. I cannot discuss these in an open forum, but I would do so in the proper environment. I would also note that I repeatedly asked to discuss these issues with Major General Anderson's investigators in a proper security environment, but they refused.

VI. Retribution

The most unfortunate aspect of this experience has been the retribution taken against many of the individuals who worked on the DSP-II concept, and on some individuals who had nothing to do with DSP-II but were targeted for reasons that I can only describe as pure vengeance. The message being sent is clear -- oppose FEWS and you are history.

The actions of Major General Anderson's investigative staff helped to ensure that people understood the risks of speaking-out. During the investigation, his staff provided two subjects of his investigation (Colonel Quirk and Colonel Bailey) with confidential material originally provided to *this Congressional Committee* to assist it in its investigation. His staff also compromised a letter provided to Major General Anderson by Mr. Carl Fisher, President of Aerojet Electronic Systems Division. Mr. Fisher's letter, which was provided in confidence to Major General Anderson, detailed Aerojet's allegation of misconduct against SBEWS SPO and others. Everyone in the Program Office quickly learned of these compromises which occurred at the very beginning of Major General Anderson's investigation. My conversations with member of the SBEWS SPO confirm that this inhibited many people from being fully open with the investigators. The loss of anonymity could allow retribution -- the full story, therefore, has yet to be told.

Retribution Against Aerospace Employees

Many of The Aerospace Corporation employees who worked on the DSP-II concept and the report have subsequently suffered in their performance reviews. For example, of the seven non-supervisor employees from the DSP program office who worked on the report, all but one moved down in 1993s ranking relative to their ranking in 1992. Four of the seven employees were moved into the bottom third of the rankings where they are subject to lay-off. In the previous year, none of these people were in the bottom third, and only one was not ranked in the upper-half.

One of the significant management changes that occurred coincident with the report was the promotion of Mr. Parsons to the position of General Manager with responsibility for both the DSP and FEWS programs on May 1, 1993. Mr. Parsons was previously the Principal Director for FEWS. In his new position, Mr. Parsons was responsible for establishing the rankings of the DSP employees.

Mr. Paul Montag, a Senior Project Engineer in the DSP Program Office, was responsible for performing satellite availability analysis. His analysis helped form the basis for the Air Force's original decision to procure the DSP Block 23 satellites. Mr. Montag also supported the DSP-II study by performing the analysis necessary to determine the number of satellites needed to operate the system through the year 2015. Although Mr. Montag was ranked in the upper-half in 1992, he was laid-off in October, 1993 by Mr. Parsons.

My principal co-author on the DSP-II report, Mr. Carl Lunde, also suffered in his performance review. Mr. Lunde has been at The Aerospace Corporation for over ten years and has always received excellent marks in his reviews. In October of 1993, however, Mr. Lunde was denigrated in his performance review by his management in the Engineering Group. This in spite of the fact that he was on-loan to my section in the Programs Group for nine months of the twelve-month review period, and that the manager who wrote Mr. Lunde's review was only his supervisor for the last two weeks of the review period.

Mrs. Ching, as the manager with day-to-day responsibility for Mr. Lunde during the nine months he was on loan, prepared a rebuttal. I also talked personally about Mr. Lunde's situation to Mr. Allen Boardman, Group Vice President for Administration, Mrs. Susan Lowenstam, Vice President, General Counsel and Secretary, and Dr. Paulikas. To date, the Corporation has not taken any steps to expunge Mr. Lunde's record of this derogatory review.

Retribution Against Others

TRW's DSP Program Manager, Mrs. Joanne Maguire was recently reassigned and replaced by Mr. Elliot Bailis at the request of the Air Force. Some have asserted that this was done as retribution for TRW having raised allegations of Air Force impropriety to Dr. Deutch. This impropriety was the alleged delivery to LMSC of TRW's proprietary information on its multi-spectral sensor system. Mr. Bailis was previously TRW's FEWS Program Manager.

Mr. Fisher has alleged that:

"In discussion with senior TRW executives, they asserted that they could not help because they had been threatened and intimidated by senior Air Force officers who warned TRW not to support opponents of FEWS."

VII. Space-Based Early Warning Issues And Recommendations

~~The Air Force is currently proceeding with plans to terminate the Defense Support Program (DSP) Block 23 satellite contract in favor of a new program start.~~ This effort was initiated based on claims made by specific contractors that they could build the DSP Block 23 satellites for less cost than the current contractors (TRW and Aerojet). This new start has been referred to as the "son of FEWS."

In my assessment, the termination of the DSP Block 23 contract goes against the best interests of the Government and our national security. It will result in a loss of approximately \$500 million of the \$1.2 billion contract without the delivery of any satellites. The Government's future liability and risk is also significantly increased through the termination of the Fixed-Price DSP Block 23 contract and the initiation of a new start under a Cost-Plus contract. Additional funds will also be required in the FYDP not only to support development of a new satellite, but also to accomplish the significant DSP ground processing and communications network changes required to accommodate a new spacecraft and sensor.

Our national capability to provide strategic early warning and theater missile surveillance will also be jeopardized by the termination of the DSP Block 23 contract. Mr. Everett found that the DSP constellation needs immediate replenishment due to its age and degraded state. Stretching out the launch of DSP Satellites 17-22 until a new satellite could be designed, developed, tested, and readied for launch will further degrade our capability to provide tactical ballistic missile surveillance in support of US and allied forces in the Middle East and Korea.

The decision to cancel the DSP Block 23 contract and initiate a new start is being conducted in a vacuum. No consideration is being given to OSD policy for exploring technology insertion and pre-planned product improvements to existing systems rather than initiating a new program start. No consideration is being given to the role of DSP or a new start within the context of other space-based IR programs, nor is any consideration being given to the role of space-based IR in the context of other strategic and theater surveillance programs. This is in spite of Congressional language from the past two years which has directed the Air Force and the OSD to examine the basis for the multiple existing and planned space-based infrared (IR) programs.

Threats - Real And Imagined

The alleged threat "driving" the decision to cancel DSP Block 23 and initiate a new start is the proliferation of tactical missiles to the Third World. The principals in this action are ignoring the capabilities of DSP demonstrated during Desert Storm as well as the significant performance improvements provided by the Talon Shield and the Joint Tactical Ground Station (JTAGS) programs. They are also ignoring the performance achievable through data fusion with other space-based systems as well as in-theater organic surveillance assets.

General Horner has stated that a new system is required to detect extremely short-range Tactical Ballistic Missiles (TBMs). These include the SS-21, which has a range of approximately 140 km. This conclusion ignores the findings of the SDIO Phase One Engineering Team (POET), the IDA, and Mr. Everett's Technical Support Group which have all concluded that warning of missiles with ranges less than 300 km should be handled with in-theater systems, not space-based systems. These short-range TBMs burn out at low altitudes (below cloud-cover) and, therefore, are not detectable by space-based IR systems during the times they are most likely to be launched. During Desert Storm, for example, a number of the Iraqi TBM launches occurred under cloud cover to inhibit Scud hunting Coalition aircraft. Furthermore, space-based IR warning would not be timely enough to provide any significant utility due to the short flight time of these missiles.

This action will divert funds from other new systems required to defeat the real threat of the future - cruise missiles. Just as the US and the former Soviet Union have moved away from tactical ballistic missiles and towards cruise missiles, so will the Third World. Space-based IR systems such as DSP, FEWS, and the proposed new start have no capability against the low-altitude, air-breathing cruise missile threat. The decision we face is analogous to that faced by France in the mid-1930s. France had limited resources to prepare for World War II. Their General Staff believed the threat was another round of the trench warfare that had decimated France in the first War, so they sacrificed effective armored and air forces to build a better, "high-tech" trench known as the "Maginot Line." Unfortunately for France, the Germans had chosen mobile warfare over better trenches. As a result, the Germans merely bypassed the Maginot Line as they went on to crush France in the Spring of 1940.

The Repercussions Of Terminating The DSP Block 23 Contract

The DSP Block 23 contract is a Multi-Year Procurement (MYP) for Satellites 23, 24, and 25. It is a Fixed-Price Incentive (FPI) contract valued at approximately \$1.2 billion and includes effort required to support the launch of previously-built DSP Satellites 18-22. The contract was signed in June after two years of evaluation and negotiation. The recent Bottom-Up Review and Mr. Everett's Technical Support Group evaluation, both requested by Dr. Deutch, concluded that DSP Satellites 23, 24, and 25 were required to ensure credible early warning coverage and tactical ballistic missile surveillance capabilities. In addition, the fiscal year 1994 Appropriations language funds the Multi-Year Procurement (MYP) of DSP Satellites 23 and 24.

Termination of the DSP Block 23 MYP contract will result in a net loss of \$500 Million with no satellites delivered. This figure includes \$200 million of sunk costs (through 3/94) and \$300 million of additional costs which will be incurred to support the launch of Satellites 18-22. The wisest approach is to complete the procurement of all three DSP Block 23 satellites, since it is impossible for a new start to provide three satellites within the \$700 million remaining from the Block 23 contract. A new start will also require a Cost-Plus contract which greatly increases the Government's risk and liability compared with the current Block 23 Fixed-Price contract.

A new satellite will require significant changes to the DSP ground processing systems and communications networks which will further increase cost. The DSP ground system consists of:

1. Three Large Processing Stations (Conus Ground Station (CGS), Overseas Ground Station (OGS), and European Ground Station (EGS));
2. Six Mobile Ground Stations (MGSs);
3. A Centralized Tactical Processing Element (CTPE) aka., Talon Shield;
4. Six Joint Tactical Ground Stations (JTAGS) under procurement by the Army and Navy;
5. Pre-launch test and integration facilities;
6. On-Orbit Test Facilities; and
7. The various communications networks supporting DSP.

The cost and schedule risks associated with a new start are significant. It is for these very reasons that Maj. Gen. Schnelzer strongly supported and ultimately executed the DSP Block 23 contract for DSP Satellites 23, 24, and 25 this past June. In testimony submitted by the Air Force to the House Committee on Appropriations Subcommittee on the Department of Defense last May, the Air Force strongly defended the need for the acquisition of DSP Satellites 23, 24, and 25 because of the need to replenish the DSP constellation and the potential for delays and problems with a new program start. This was done at a time when the FEWS contracts were well underway and proceeding through the various acquisition milestones. Now that the FEWS program has been canceled, and its requirements and funding have been rejected by the OSD, additional studies and requirements definition must be done prior to the preparation of any RFP for a new Early Warning System contract. This is needed to ensure that the limited funds available are expended prudently and in a manner consistent with the best interests of the United States. These studies will take time to complete. This means that the need for DSP Satellites 23, 24, and 25 is greater than ever.

An analogy which illustrates the cost, schedule, and national security risks associated with canceling DSP and initiating a new program can be drawn with the Milstar program. Imagine if the DSCS program had been canceled in the late 1970s when Milstar was being planned, or if it had been canceled in the early 1980s when the first launch of the satellite was scheduled for the mid-1980s. Given that the first Milstar satellite is only now about to be launched, our military communication capabilities during Desert Storm would have been devastated had we relied solely on the expectations of early 1980s. Another analogy can be drawn from the Challenger disaster which greatly limited our access to space because we chose to rely solely on the Space Shuttle for heavy-lift. Other examples of the risks associated with a new start can be found in programs such as the B-1, B-2, C-17, and GPS Block IIR.

Canceling the DSP Block 23 contracts and beginning the development of a new family of spacecraft will eliminate the Nation's capability to ever build another fixed-price DSP satellite. The Government will be locked into a Cost-Plus contract for which it will have no alternative but to continue at any cost. The Fixed-Price DSP Block 23 contract protects the Government's interests and limits its liability.

The Spinning Satellite Myth

One of the principal reasons the Air Force cites in advocating the need to replace the DSP satellites with a new system is the fact that DSP is a spinning satellite. In testimony submitted by the Air Force to the House Committee on Appropriations Subcommittee on the Department of Defense last May, the Air Force states "The DSP satellite scans for targets by spinning the sensor. Since this sensor rotates at a fixed spin rate, the satellite can only see targets as often as the satellite spins around again. If the satellite would spin faster it could detect and construct missile tracks faster. However, this faster spin rate would result in less sensitivity, with the possibility of missing some of the target which it is currently able to detect."

The speed at which any system scans the earth will affect its sensitivity, whether or not the scan is accomplished by rotation of the satellite or by the use of mirrors. It is analogous to the shutter speed of a camera. You cannot take pictures in dim light (or see dim targets) if you use a high shutter speed. Increasing the sensitivity of the film, on the other hand, improves the capability to take pictures in dim light. The sensitivity of DSP's focal plane, its film speed if you will, can be improved through technology insertion. However, the factor that limits the ability of any space-based infrared system to see targets against the Earth is the background radiation of the Earth itself. Using a space-based infrared system to detect some of the targets that FEWS was required to detect would have been like trying see a match in front of a flood-light -- it cannot be done.

The fact that the entire DSP spacecraft spins greatly simplifies the design of its infrared sensor. There are no moving parts in the optical path which can decrease the accuracy of a sensor. On-orbit experience with other programs demonstrates the loss of accuracy that occurs when complex moving-mirror schemes are employed.

The rotation of the DSP satellite at six revolutions-per-minute provides for the capability to revisit a target every 10 seconds. This is more than sufficient to support the global surveillance requirements for strategic early warning. Some, however, have argued that shorter revisit times are necessary to support theater surveillance. With DSP, this can be accomplished through the use of add-on small-field-of-view sensors.

Potential Alternatives To A New Early Warning System Program

The IDA, Mr. Everett's Technical Support Group, and the Bottom-Up Review all concluded that the current DSP is sufficient to support our nation's strategic early warning needs. Furthermore, these groups also concluded that DSP with Talon Shield processing is "adequate" for tactical ballistic missile surveillance needs, but that some improvements in system capabilities are desirable.

Technology insertion and pre-planned product improvement options to the DSP system are explored in the DSP-II report. Technology insertion and pre-planned product improvements to existing DSP satellites can be used to preserve FEWS detector, thermal control, and power generation technologies developed under previous contracts. System performance can be greatly improved and operational costs reduced through the consolidation of DSP ground processing stations and the implementation of evolutionary ground processing upgrades proven by the Army's Tactical Surveillance Demonstration (TSD) and the Air Force's Talon Shield program. Such improvements would provide near-term performance enhancements at the lowest possible cost and risk.

~~The DSP satellite's theater missile detection performance can be improved through the use of add-on sensors which was also discussed in the DSP-II report. Such sensors would provide surveillance of theater-sized regions with shorter revisit rates and higher sensitivities. Shorter revisit rates and higher sensitivities are accomplished simultaneously since the add-on sensor would scan only a relatively small area of the Earth (i.e., a theater-of-operation). Such an add-on sensor could be mounted in place of the existing LASER Crosslink System (LCS) ballast.~~
The LCS program was canceled and we have been flying, and will continue to fly, several hundred pounds of ballast in its place. This ballast can be replaced with a useful piece of equipment such as an add-on sensor.

The global surveillance mission would not be impacted because the add-on sensor would not interfere with DSP's existing infrared sensor. Unused telemetry downlink capacity, which was reserved for the LCS, already exists on the DSP satellites today. This downlink could be used

to send down data from an add-on system, again with no impact on the existing global surveillance mission. An add-on sensor experiment was flown on DSP Satellite 14 in place of the LASER Crosslink System. Although not designed nor used operationally, it did collect background and target data for the SDIO. It also served as a proof-of-concept for flying a future operational payload in place of the LCS ballast.

An add-on sensor which scans a relatively small area of the Earth would be significantly less complex and costly than a sensor which must scan both the entire Earth and a theater region simultaneously. Once such an add-on sensor were developed, it could also be flown on other hosts beside the DSP satellite. This would potentially allow the use of other orbits which would provide improved surveillance of potential theaters of conflict throughout the world.

An add-on sensor program is also significantly less costly and risky than starting an entire new surveillance system. The primary DSP infrared sensor would not be impacted. The add-on sensor could be integrated with whichever DSP satellite is ready for launch when the add-on sensor is ready; the LCS ballast for that satellite simply would be removed and not flown. Evolution of the ground system can also be accomplished in a low-risk manner without impact to existing capability.

The DSP-II study also evaluated the feasibility of using the DSP Flight 12/13-sized spacecraft to enable the use of the Atlas IIAS Medium Launch Vehicle (MLV). It was concluded that this was feasible and could be accomplished by Satellite 23. However, due to the structure of the Titan IV buy, using a MLV prior to Satellite 26 will actually cost the Government an additional \$60 million per launch as compared with the Titan IV. Using an Atlas IIAS starting with Satellite 26, however, provides opportunities for significant savings.

The Brilliant Eyes program also provides opportunities to preserve technology developed under the FEWS program and to develop new technologies unique to Brilliant Eyes (e.g., active cooling systems). Once Brilliant Eyes becomes operational, its data can be used with data from an upgraded DSP to enhance overall system performance. This also represents a low-risk approach in that it does not jeopardize our current national early warning capabilities which are centered around DSP.

Another option, which was reported in *Defense News*, is to synergistically combine DSP and Radiant Agate data. According to Navy spokesmen speaking to *Defense News*, Radiant Agate is a proposed Navy program to provide polar EHF communications and also carry an IR sensor for intelligence collection and tactical missile surveillance. The Radiant Agate spacecraft is based on the Navy's UHF Follow-on program which uses the Hughes HS-601 bus.

A system like Radiant Agate, designed to provide polar communications, would probably use a Molniya orbit as is favored by the former Soviet Union for communication satellites. Such an orbit would provide IR surveillance capabilities for a majority of the world's hot-spots where tactical ballistic missile exchanges are likely. The orbit also permits direct downlink of the satellite's data to the CONUS, thus eliminating the need for crosslinks or terrestrial data relays. This permits transmission of the high data rates required for intelligence applications and for low Signal-to-Noise Ratio (SNR) target detection (e.g., tactical missiles). Direct viewing of the satellite from the CONUS could also be advantageous for survivability purposes should it become desirable to process the Radiant Agate IR data in a survivable Mobile Ground System.

As stated in *Defense News*, the Radiant Agate IR sensor would be based on an existing intelligence collection sensor. If true, this would provide an additional opportunity to apply technology insertion and pre-planned product improvements to an existing sensor and its associated ground processing system(s). It could also have the potential to preserve some technologies developed under the FEWS program. This represents a low-risk approach compared to a new program start.

As with Brilliant Eyes, synergistic processing of DSP and Radiant Agate data could provide a low-risk and low-cost approach to enhance the nation's surveillance capabilities. Radiant Agate and a DSP upgrade program represent low-risk approaches to provide enhancements in system performance as compared to a new early warning system program. DSP availability would not be jeopardized as it is with the approach currently advocated by the Air Force

Recommendations on Space-Based Early Warning

The United States should concentrate its limited resources on developing new systems to address threats against which the nation has only limited or no capabilities -- we cannot afford our own Maginot Line. Our precious resources should not be expended on re-inventing existing capabilities. The cancellation of the DSP Block 23 contract violates common sense and is not in the national interest. All termination activities should be immediately stopped and the contract fully-funded and continued. Furthermore, the following actions are also recommended:

1. The individuals who are found to have engaged in unethical or illegal conduct should be immediately suspended of their authority over government procurement. The interests of the Government and the rights of the taxpayers must be protected. Considering the financial and national security implications of the decision to terminate the DSP Block 23 contract, the integrity of the acquisition system and the individuals making such a decision must be beyond reproach.
2. The Secretary of Defense and the Director of Central Intelligence should conduct a comprehensive study of the nation's space-based IR surveillance requirements within the context of all existing and planned strategic and tactical surveillance programs. Cost-effective alternatives for meeting those requirements should also be addressed and fully explored. The cost and risk associated with a major new space program demands this type of comprehensive review, which has previously been requested by the Congress. Systems such as DSP, Brilliant Eyes, the Navy's Radiant Agate program, NRO programs, and in-theater surveillance systems (e.g., GBR, JSTARS, RPVs, etc.) should be assessed for overlap in functions and/or capabilities, and the potential for inter-system synergy to meet war-fighting requirements should be evaluated. This should be done prior to the initiation of any new start, and definitely prior to the termination of the existing DSP program.
3. Regardless of the decision to continue DSP or initiate a new start, the Government should invest in technology insertion and pre-planned product improvements for DSP satellites

which could be retrofitted prior to launch. This is a cost-effective method to increase satellite performance, extend useful on-orbit satellite life, and provide additional data to support decisions on future space surveillance systems. Such an investment is supported by OSD policy and reflects the late Dr. Deming's Total Quality Management (TQM) principles of continuous product improvement.

VIII. Conclusions

Major General Anderson's report identified "the intense competition for dollars in DoD and among its defense contractors ('survival' mentality)" as a major contributing factor in the FEWS/DSP controversy. Dr. William Perry, the Secretary of Defense nominee, has stated that he expects several defense contractors to go out of business, and that the government will stand by and watch this happen. We are clearly entering desperate times for the military-industrial complex: the events described in our testimony are clear indications that desperate times are evoking desperate measures. Nevertheless, the events we have described are merely harbingers of what will come when, as Dr. Perry expects, only one DoD procurement dollar will remain where three once stood. The Department of Defense, and if necessary the Congress, must ensure that bureaucratic imperatives and parochialism do not replace the long-term National Interest as the deciding factor in where the scarce money will go.

The events and actions we have described also show the potential for abuse in the relationship between FFRDC's and their sponsoring organizations. The basic problem stems from the fact that it is difficult to say "No" to your sole customer on important issues. The following suggestions are offered for your consideration:

1. The OSD should consider strengthening its independent technical assessment arm. This would decrease OSD's reliance on results and analysis from "captive" FFRDC's. This could be accomplished by increasing its current direct support (e.g., IDA), or by transferring some or all of the sponsorship of FFRDC's to the OSD.
2. The Aerospace Corporation should be returned to its original values that caused the government to create it in the first place. These were established in the 1959 discussions of this Committee which led to the formation of Aerospace:

"The value of such an organization rests on its disinterested position; the advice it gives should be based exclusively on the best interests of the government [emphasis added]."

This is in contrast to the current Corporate vision statement, which states that one of our corporate goals is to "enhance the role of the Air Force in Space." It is my belief that some independent agency, such as The Aerospace Corporation, must be able to objectively assess the role of space systems in supporting all of the Armed Services and civilian agencies (i.e., the government) that depend on these systems. This is critical because budgetary constraints will prevent the development of all possible systems: we must ensure that decision-makers have the use of objective and rational analysis as they allocate resources.