

Originally Processed With FOIA(s):
2005-0336-F

FOIA Number:
2005-0336-F

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Record Group/Collection: George H.W. Bush Presidential Records
Collection/Office of Origin: Science and Technology Policy, Office of (OSTP)
Series: Bromley, D. Allan, Files
Subseries: National Security Files

OA/ID Number: 62071
Folder ID Number: 62071-004

Folder Title:
National Security: General [2 of 3] [1991]

Stack:

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Position:

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Mary Suit

"CORRESPONDENCE TRACKING"

TYPE: MEETING REQUEST DOCUMENT NUMBER: 9123482
ORIGINATOR: 02 STATUS I DIRECTORATE STATUS

FROM: PANOFSKY, Wolfgang K.H.: NATIONAL ACADEMY OF SCIENCES,
COMMITTEE ON INTERNATIONAL SECURITY & ARMS CONTROL

TO: DR. D.A. BROMLEY

DATE OF
CORRESPONDENCE: 08/13/91

SUBJECT: REQUEST TO MEET AND GIVE A BRIEFING ON THE POLICY
STUDY, "THE FUTURE OF THE US-SOVIET NUCLEAR
RELATIONSHIP".

DIRECTORATE STAFF
ASSIGNED: NATIONAL SECURITY ASSIGNED:

ACTION STAFF
REQUIRED: FOR DAB'S SIGNATURE AS ACTION:
NECESSARY

SENDER'S DUE DATE:
OSTP DUE DATE: 08/29/91 STAFF DUE DATE
DATE COMPLETED: DATE COMPLETED/DEPT: 9/3/91 - National Security

COPIES TO: D. Allan Bromley
INTERNATIONAL/POLICY

WHITE HOUSE TRACKING #: CONTACT PERSON:
PHONE: EXT:
REMARKS:

Copy of response attached.

CLOSED

OSTP RECEIVED: 08/15/91 FILE: P-NATIONAL SECURITY
DEPT RECEIVED:

THE WHITE HOUSE

WASHINGTON

September 3, 1991


Dear Wolfgang,

Thank you for your offer of a briefing on your latest report on the future of the U.S.-Soviet nuclear relationship. In fact, Frank Press graciously sent me a copy of your report some weeks ago. In view of the extraordinary developments in the Soviet Union, which we have been privileged to witness, do you still plan to meet your September 5th release date, or will you be rewriting the report to reflect these changes? I would be interested in hearing the Committee's thoughts on these historic events.

Sincerely,



D. Allan Bromley
Assistant to the President
for
Science and Technology

Dr. Wolfgang K. H. Panofsky
Committee Chair
Committee on International Security
and Arms Control
National Academy of Sciences
Washington, DC 20418

MKVAN CLEAVE:jw:9/3/91 9123482

3482

NATIONAL ACADEMY OF SCIENCES
COMMITTEE ON INTERNATIONAL SECURITY AND ARMS CONTROL
2101 Constitution Avenue Washington, D.C. 20418

August 13, 1991

Dr. Allan Bromley
Assistant to the President
Office of Science and Technology Policy
Old Executive Office Building
17th Street & Pennsylvania Avenue, N.W.
Washington, D.C. 20506

Dear Allan,

On September 5th the Committee on International Security and Arms Control (CISAC) of the National Academy of Sciences will release a major new policy study, "The Future of the U.S.-Soviet Nuclear Relationship." For the past year, the committee has been examining the need to articulate new objectives for U.S. nuclear weapons policy in light of the breathtaking changes in U.S.-Soviet relations and, particularly, the changing political-military environment in Europe.

In reevaluating what missions remain for nuclear weapons in this new security environment, the committee has examined the possibilities for cooperative security arrangements in Europe and Asia, and cooperative efforts to inhibit further nuclear proliferation. Future alternatives for the number, characteristics, and structure of the nuclear forces as they relate to these new missions are examined in detail. The report emphasizes the role that arms control can play in achieving significantly reduced, but stable, nuclear forces, as well as enhancing the stability of nuclear operations, particularly in times of crisis. We hope the study will contribute to the policy discussions about next steps to take advantage of the achievement of START.

We would like to offer you the opportunity of a briefing on the study on September 4th, prior to its public release, or the afternoon of September 5th, following the release. A list of committee members and a brief description of our activities is enclosed. A member of the CISAC staff will call your office to discuss whether it will be possible to arrange a meeting. We hope that it will be possible to arrange a convenient time to share the results of our work with you.

Sincerely,


Wolfgang K.H. Panofsky
Committee Chair

enclosures

April 15, 1991

National Academy of Sciences

COMMITTEE ON INTERNATIONAL SECURITY AND ARMS CONTROL

W.K.H. Panofsky, chairman
Director Emeritus
Stanford Linear Accelerator Center
Stanford University

Robert Axelrod
Arthur W. Bromage Professor
of Political Science and Public Policy
University of Michigan

Ashton B. Carter
Director
Center for Science and International
Affairs
Harvard University
John F. Kennedy School of Government

Paul M. Doty
Department of Biochemistry
and Molecular Biology; and
Director Emeritus, Center for
Science and International Affairs
Harvard University

Alexander H. Flax
President Emeritus
Institute for Defense Analyses; and
Home Secretary
National Academy of Engineering

Richard L. Garwin
Science Advisor to the Director
of Research
Thomas J. Watson Research Center
IBM Corporation

Marvin L. Goldberger
Professor of Physics
University of California-Los Angeles

David C. Jones
General (USAF, Ret.)
Private Consultant

Spurgeon M. Keeny, Jr.
President
Arms Control Association

Catherine Kelleher
Director
Center for International Security
Studies
School of Public Affairs
University of Maryland

Joshua Lederberg
University Professor
The Rockefeller University

Michael May
Director Emeritus
Lawrence Livermore National Laboratory
University of California

William J. Perry
Chairman & CEO
Technology Strategies & Alliances

Jonathan D. Pollack
Corporate Research Manager
for International Policy
The RAND Corporation

Malvin Ruderman
Pupin Physics Laboratories
Columbia University

John D. Steinbruner
Director
Foreign Policy Studies Program
The Brookings Institution

Robert Wertheim
Rear Admiral (USN, Ret.)
Private Consultant

Jerome B. Wiesner, consultant to
chairman
Institute Professor
Massachusetts Institute of
Technology

+++++

James Wyngaarden, ex officio
Foreign Secretary
National Academy of Sciences

Glenn Schweitzer
Acting Executive Director
Office of International Affairs
National Research Council

Mitchel Wallerstein
Acting Director

Jo L. Husbands
Acting Staff Officer

La'Faye Lewis
Administrative Secretary

COMMITTEE ON INTERNATIONAL SECURITY AND ARMS CONTROL (CISAC)

The Committee on International Security and Arms Control (CISAC) was created in 1980 to bring to bear the scientific and technical talent of the NAS on the problems associated with international security and arms control. The committee, which is chaired by Dr. Wolfgang Panofsky (Professor and Director Emeritus of the Stanford Linear Accelerator Center), has a rotating membership of distinguished scientists and experts in the security and arms control area.

The committee's objectives are to study and report on scientific and technical issues germane to international security and arms control; engage in discussion with similar organizations in other countries; develop recommendations, statements, conclusions and other initiatives for presentation to both public and private audiences; to respond to requests from the executive and legislative branches of the U.S. Government; and to expand the interest of U.S. scientists and engineers in international security and arms control.

The principal current activity of the committee has been a continuing program of private bilateral meetings on issues of international security and arms control with a comparable group representing the Soviet Academy of Sciences. The soviet delegation, currently headed by Academician Yuri Ossipian, is also made up of senior scientists and experts in the security and arms control field. There have been seventeen meetings to date. The first meeting was held in Moscow on June 23-24, 1981, at which time agreement was reached on procedures and a broad agenda for future discussions. The meetings have since alternated between the US and the USSR on a regular basis. In October 1990, the committee held its seventeenth meeting with the Soviet group in Moscow. The next meeting is scheduled for May 1991 in the U.S.

Contiguous to the regular joint meeting in October 1986, a special CISAC subgroup, chaired by Dr. Joshua Lederberg, Rockefeller University, met with a Soviet group in Moscow to discuss ways to prevent the development and use of biological weapons and related confidence-building measures. A second meeting on this subject took place in May 1988 in Washington, resulting in the decision to establish smaller working groups that would meet more regularly. Two working group sessions were held in 1989; the most recent meeting took place December 5-7, 1990 in the U.S.

All of these joint U.S.-Soviet meetings have dealt in depth with a wide range of security and arms control issues in a serious, constructive manner. The October 1990 meeting, for example, included discussions on: the military impact of the political changes in Europe, including German unification; the conversion of R&D and Industry from military to peaceful purposes; international cooperation on measures to safeguard the safety and certainty of control of nuclear weapons; and technical issues associated with the destruction of chemical weapons. The meetings also provide an opportunity for extensive informal exchanges of views among the participants outside the formal meetings. Although these meetings have no official status, appropriate officials of the U.S. Government have been kept fully informed on the plans for and the proceedings of these meetings. In order to encourage frank discussion, it has been agreed that the meetings should be private without communiques, joint statements or public reports.

In support of its meetings with the Soviet Academy, the committee has reviewed on a continuing basis security policy, weapons programs, and on-going arms control negotiations. This review has also put the committee collectively, and its members individually, in a better position to advise the executive and legislative branches of government as well as the Academy and its members on related policy issues.

In 1988, as a result of several years of preliminary conversations between the Presidents of the NAS and the Academia Sinica, CISAC initiated a new program of dialogue with Chinese scientists and military affairs experts on international and regional security issues. A first informal meeting took place in Beijing in October 1988, with the Commission on Science, Technology and Industry for National Defense as the sponsoring organization on the Chinese side. The committee hopes a regular program of discussions will evolve over the coming years; however, events in China have interrupted the planned pace of bilateral meetings. A second meeting is scheduled for July 1991 in the U.S.

In recognition of the growing interest of the European scientific and technical community in security matters, CISAC began to expand contacts with its European colleagues in 1986. An initial exploratory meeting was hosted by CISAC in June 1986 in Washington, and many follow-up discussions between CISAC members and individual European scientists and academies have taken place since that time. The Italian Accademia dei Lincei and the British Royal Society have formed active committees similar to CISAC, and the French Academy of Sciences has established an exploratory committee. CISAC will continue to interact with these new European academy committees and to support their development as appropriate.

Interaction with the Academy membership on issues of international security continues to be an important committee function. In connection with the 121st NAS Annual Meeting in 1984 the committee organized a two-day Tutorial on Arms Control and International Security for Academy members. This tutorial, attended by over 200 members of the Academy, covered recent technical developments relating strategic offensive systems and ballistic missile defense as well as the full range of current nuclear arms control agreements and proposals. Nuclear Arms Control: Background and Issues, published by the National Academy Press in December, 1984, was a product of this first seminar. The book was distributed widely to NAS members, members of Congress, policymakers and the press, and has been widely acclaimed as a text book.

Since 1985, CISAC has conducted or co-sponsored annual seminars for the Academy membership on: Strategic Defense; Crisis Management in the Nuclear Age; Implications of Deep Reductions in Strategic Nuclear Arsenals; and Challenges for the 1990's for Arms Control and International Security. CISAC publications resulted from most of these seminars.

The extraordinary changes in the Soviet Union and Eastern Europe--and their implications for evolving East-West political and military relations--present CISAC with unprecedented opportunity and challenge. In regard to the Soviet dialogue, we see the challenge as one of designing an agenda which remains ahead of the pace of change in U.S.-Soviet security relations. In

part, this means discussing with our foreign colleagues the implications of these changes for international security, particularly longer term issues such as arrangements for cooperative security in Europe.

At the same time, the kinds of issues CISAC has discussed with its Soviet colleagues since 1980--radical reductions in strategic arms after a START agreement; conventional arms reductions and restructuring; and proliferation of nuclear, conventional, biological and chemical weapons and technology to third world regions--remain unquestionably relevant and deserving of independent expert analysis. CISAC believes it essential to maintain the consistency of bilateral dialogue regardless of political climate that has been its hallmark. To do otherwise would be shortsighted.

Also in response to the changing international scene, CISAC is working on a major policy study on the future of the U.S.-Soviet nuclear relationship. The study will be discussed at a seminar preceding the official opening of the 1991 Annual Meeting of the NAS. CISAC hopes to undertake policy studies on other topics in the future.

"CORRESPONDENCE TRACKING"

TYPE: INFORMATION

DOCUMENT NUMBER: 9123145

ORIGINATOR: 02

STATUS C

DIRECTORATE STATUS

FROM: PERKINS, Wesley B.

TO: PRESIDENT BUSH

DATE OF
CORRESPONDENCE:

SUBJECT: HE HAS BEEN SUBJECTED TO BEHAVIOR MODIFICATIONS VIA
TORTURE EXPERIMENTS BY THE CIA.

DIRECTORATE STAFF
ASSIGNED: ASSIGNED:

ACTION STAFF
REQUIRED: ACTION:

SENDER'S DUE DATE:
OSTP DUE DATE: STAFF DUE DATE
DATE COMPLETED: DATE COMPLETED/DEPT:

COPIES TO: NATIONAL SECURITY

WHITE HOUSE TRACKING #: CONTACT PERSON:
PHONE: EXT:

REMARKS:

CLOSED

OSTP RECEIVED: 08/01/91
DEPT RECEIVED:

FILE: P-NATIONAL SECURITY

3145

Addressee;
President George Bush
Executive Office of the President
Office of Science and Technology Policy
Old Executive Office Building
17TH Street & Pennsylvania Ave., N.W.
Washington, DC 20506

RECEIVED

Aug
91 JUL 1 AIO: 15

OFFICE OF THE
DIRECTOR

Sir;

I was kidnapped January 9TH , 1988 in the Early morning hours while I was asleep at my grandmother Perkins house in Fort Worth , Texas . I was held unconcious till the morning of January 16, 1988. During the kidnapping illegal electronics were surgically implanted inside my body. A combination monitor-transmitter was conected to my nervous system plus a receiver electrical input device also connected to my nervous system. "They" have been torturing me for over three years totally in violation of the U.S. Constitution. Since you swore on TV (I saw you) to up hold the Constitution , you must not know that the CIA is doing illegal behavior modification medical experiments via light torture using remote controlled activation of illegally surgically implanted neuro-stimulators connected to experimental torture subjects nervous systems. I had some X-Ray photographs made recently that showed some interesting shadows on the X-Ray film. My older brother Brian Alvin Perkins Junior is connected to the CIA ; he informed me that he is getting revenge on me (in his taking part in assisting the government to hurt me and steal from me). I live in an intelligence family of sorts , but nobody admits it but me. I'm not in on intelligence work , and I WILL NOT be a U.S. Government intelligence employee. I suspect someone forged my signature on some government ^{document} such that somebody thought it would be legal to subject me to the behavior modification via torture experiments. Most of my family know some of the facts , I don't know if anyone in my family knows the whole story. My father I think has sick fantasies of living out his stupid suicidal SPY aspirations through his children.

My tort claim filed at the Fort Meade , Claims Office has a number 91-131-T099 to designate my claim. My claim is valid please pay me.

Maybe you can tell me why people are being tortured to death in some cases , with illegal government issued remote controlled electronics . I want to know how it's thought to be legal by your employees that they have been doing light torture on me for several years?

I have heard that you have about 2 million employees , I understand that you can't keep up with all of them all the time . I know that sometimes a couple get out of line some. Please see that I get my money/compensation for the thousands of felonies committed against me , also I want government harassment to stop , also I want all the electronics CAREFULLY correctly completely surgically removed from my body without damaging me.

I caught your guys stealing my inventions from me for over 5 years now without paying any money, I can get a better deal from any industrialized country .

Please rectify my criminal-government problem as soon as possible.

Have a nice day Sir,

Thanks

Wesley B. Perkins

3116 Waits, Fort Worth, Texas 76109 July 29, 1991

Wesley B. Perkins

P.S. Right now I've got literally over two hundred new products/inventions/ideas for systems, in my invention books. Government habitual criminals have stolen/scrutinized all of them via probably illegal surveillance. I've been doing pragmatic engineering design since I was a child . Why are your employees stealing from me without paying me for the stolen inventions?

I read somewhere that Germany appreciates able/talented inventors, your people steal and pay nothing, that's illegal and a really stupid business practice.

No reflexion on you sir, some of your employees are Real Criminals inside Texas.

"CORRESPONDENCE TRACKING"

TYPE: INFORMATION

DOCUMENT NUMBER: 9123113

ORIGINATOR: 02

STATUS C

DIRECTORATE STATUS

FROM: WATKINS, James D.: THE SECRETARY OF ENERGY

TO: DR. D.A. BROMLEY

DATE OF
CORRESPONDENCE: 07/30/91

SUBJECT: DESIGNATION OF MR. DAVID W. PYATT TO SERVE AS THE
DOE CO-CHAIRPERSON ON THE INTERAGENCY NUCLEAR SAFETY
REVIEW PANEL FOR THE UPCOMING COMET RENDEZVOUS
ASTEROID FLYBY AND CASSINI MISSIONS.

DIRECTORATE

STAFF

ASSIGNED:

ASSIGNED:

ACTION
REQUIRED:

STAFF
ACTION:

SENDER'S DUE DATE:

OSTP DUE DATE:
DATE COMPLETED:

STAFF DUE DATE
DATE COMPLETED/DEPT:

COPIES TO: D. Allan Bromley
NATIONAL SECURITY
PHYSICAL SCIENCES

WHITE HOUSE TRACKING #:

CONTACT PERSON:

PHONE: 202/586-2407 EXT:

REMARKS:

CLOSED

OSTP RECEIVED: 07/31/91
DEPT RECEIVED:

FILE: P-EAC-CABINET*NAT'L SECURITY



The Secretary of Energy
Washington, DC 20585

July 30, 1991

3113
RECEIVED

91 JUL 31 12:08

OFFICE OF THE
DIRECTOR

The Honorable D. Allan Bromley
Assistant to President for
Science and Technology
The White House
Washington, D.C. 20506

Dear Dr. ^{Allan} Bromley:

In response to Admiral Richard H. Truly's request to form an Interagency Nuclear Safety Review Panel (INSRP) for the upcoming Comet Rendezvous Asteroid Flyby (CRAF) and Cassini missions, I have designated Mr. David W. Pyatt from the Office of Nuclear Safety (NS) to serve as the DOE's co-chairperson.

Mr. Pyatt was involved with the Ulysses safety review and has been involved with space nuclear power systems since 1966. Mr. Steven M. Blush heads the Office of Nuclear Safety, an independent oversight group reporting directly to me, and will provide any additional information regarding the role of NS if you have any questions. He can be reached at (202) 586-2407.

Sincerely,


James D. Watkins
Admiral, U.S. Navy (Retired)

"CORRESPONDENCE TRACKING"

TYPE: INFORMATION DOCUMENT NUMBER: 9122941
ORIGINATOR: 02 STATUS C DIRECTORATE STATUS

FROM: CHARLES, Mary S.: DEPARTMENT OF THE TREASURY

TO: DR. D.A. BROMLEY

DATE OF
CORRESPONDENCE: 07/26/91

SUBJECT: A TAPE ON THE KUWAIT OIL WELL FIRES WHICH DILLION
RIPLEY SENT TO THE SECRETARY FOR REVIEW ALONG WITH A
COPY OF THE CHAIRMAN'S LETTER

DIRECTORATE STAFF
ASSIGNED: ASSIGNED:

ACTION STAFF
REQUIRED: ACTION:

SENDER'S DUE DATE:
OSTP DUE DATE: STAFF DUE DATE
DATE COMPLETED: DATE COMPLETED/DEPT:

COPIES TO: NATIONAL SECURITY
ENVIRONMENT
D. Allan Bromley

WHITE HOUSE TRACKING #: CONTACT PERSON:
REMARKS: Tape to DAB. PHONE: EXT:

CLOSED

OSTP RECEIVED: 07/26/91 FILE: P-NATIONAL SECURITY
DEPT RECEIVED:



DEPARTMENT OF THE TREASURY
WASHINGTON

RECEIVED

July 26, 1991

91 JUL 29 P 3: 39

OFFICE OF THE
DIRECTOR

Dr. D. Allan Bromley
Assistant to the President
for Science and Technology
358 Old Executive Office Bldg.
Washington, DC 20500

Dear Dr. Bromley:

On behalf of Secretary Brady, I have enclosed a tape on the Kuwait oil well fires which Dillon Ripley, Chairman of the Darwin Scientific Foundation, Inc. sent to the Secretary for review. I have also enclosed a copy of the Chairman's letter.

Mr. Brady thought the information might be of use to your staff.

Sincerely,

Mary S. Charles
Confidential Assistant
to the Secretary



NHB Room 336
SMITHSONIAN INSTITUTION

Washington, D.C. 20560
U.S.A.

29 June 1991

The Honorable
Nicolas Brady
Secretary of the Treasury
The Department of the Treasury
Pennsylvania Avenue at 15th Street
Washington, D.C. 20220

Dear Nick,

It was fortuitous to run into you briefly at the investiture, yesterday, of Joseph Reed as a recipient of a high Papal honor. I am reminded of encounters of long ago with your Aunt, who was such a friend, in World War II times, of Cardinal Eugenio Pacelli, later Pope Pius XII.

The matter of which I had wanted to speak to you is of a totally different nature but one which transcends many other matters of equal seriousness. This is the question of the fires in Kuwait, and what is to happen over the years to come from the human medical wreckage that may well be created. The fumes can produce cancer-causing results in time, just as the nuclear accident at Chernobyl has done, and yet, on a vastly greater scale, I am afraid. That is why a group of us, in our Darwin Scientific Foundation, have been concerned, and are worried about how to bring this to the attention of the President and also some of his close allies and advisors such as yourself.

I do hope you will have a few moments to spare in viewing the short tape, which we have created, some ten to fifteen minutes only, and seeing what counsel you might be able to give us about moving forward in this dire emergency.

It was good to see you and to be reminded of the old days at the Smithsonian, which are not so old, of course. I wish that we had been able to forgather a little bit more at that time, but your presence on our Council was just at the close of my own tenure as Secretary.

With warm good wishes, and hoping to hear from you in due course, I am,

Always sincerely yours,

S. Dillon Ripley
S. Dillon Ripley
Secretary Emeritus

"CORRESPONDENCE TRACKING"

TYPE: ACTION DOCUMENT NUMBER: 9122807
ORIGINATOR: 02 STATUS I DIRECTORATE STATUS

FROM: WEST, Togo D.: NORTHROP

TO: DR. D.A. BROMLEY

DATE OF
CORRESPONDENCE: 07/25/91

SUBJECT: INQUIRIES AND COMMENTS WELCOME REGARDING THE
NATIONAL DEFENSE AUTHORIZATION BILL FOR FY92/93 AND
A REQUEST TO CALL MEMBERS OF THE SENATE TO URGE
THEIR SUPPORT FOR FULL FUNDING OF THE B-2.

DIRECTORATE STAFF
ASSIGNED: NATIONAL SECURITY ASSIGNED:

ACTION STAFF
REQUIRED: AS NECESSARY ACTION:

SENDER'S DUE DATE:
OSTP DUE DATE: 07/26/91 STAFF DUE DATE
DATE COMPLETED: DATE COMPLETED/DEPT: 7/29/91 - National Security

COPIES TO:

WHITE HOUSE TRACKING #: CONTACT PERSON:
PHONE: EXT:

REMARKS: No action required.
Coordinated at Kenya.
Schiff

CLOSED

OSTP RECEIVED: 07/25/91 FILE: P-NATIONAL SECURITY
DEPT RECEIVED:

2807
RECEIVED

NORTHROP

91 JUL 25 P 1: 16

Northrop Corporation

Washington Office
1000 Wilson Boulevard, Suite 2300
Arlington, Virginia 22209
Telephone 703 525-6767

OFFICE OF THE
July 23, 1991
DIRECTOR

Dr. D. Allan Bromley
Assistant to the President for Science &
Technology
358 Old Executive Office Building
Washington, DC 20506

Dear Dr. Bromley:

As you know, the Senate is scheduled to bring to the floor later this week its national defense authorization bill for FY92/93. The vote will be critical for the continuation of the B-2 bomber production program, as the House has already voted to zero procurement funds and terminate the program at fifteen aircraft.

If you agree with the President and the Secretary of Defense that the B-2 is vital to America's national security posture over the coming decades, you may wish to call members of the Senate who represent you or with whom you are acquainted to urge their support of full funding for the B-2 this year. Because the Senate vote is imminent, now is the time to call.

To update you on recent events concerning the B-2 program, I have enclosed the following:

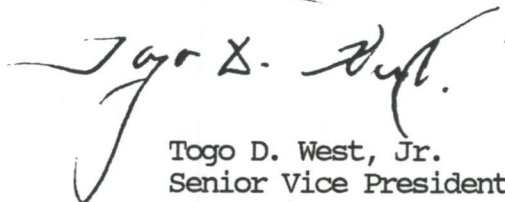
the June and July 1991 issues of our newsletter, the "B-2 Update";

excerpts from the President's July 9 speech to the American Defense Preparedness Association in Washington, in which he vowed to veto any defense bill which does not provide adequate funding for the B-2; and

a copy of an article which appeared in the Los Angeles Times on June 30 by Tom Clancy, author of, among others, The Hunt for Red October and Red Storm Rising.

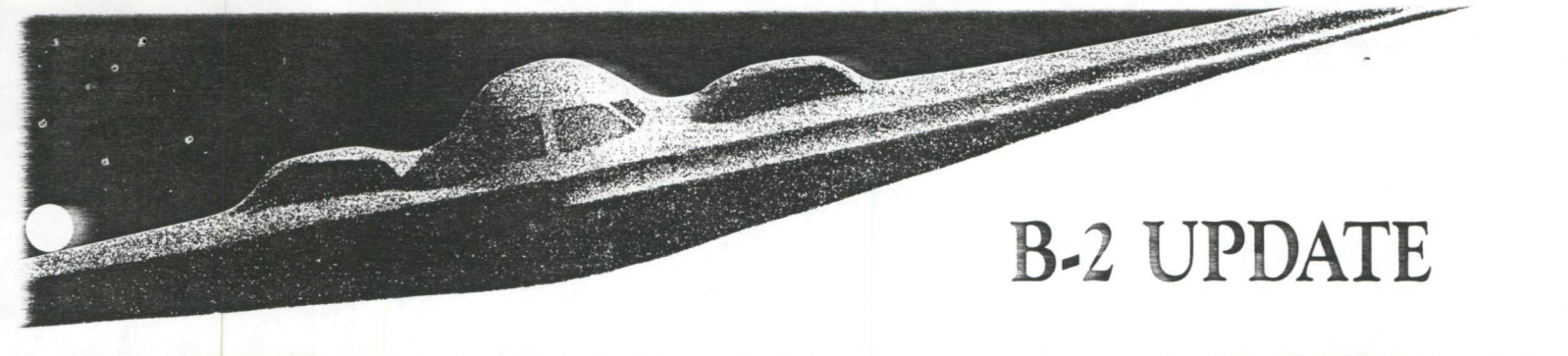
We appreciate your interest in the B-2 program, and welcome your inquiries and comments.

Sincerely,



Togo D. West, Jr.
Senior Vice President - Government
Relations

Enclosures



B-2 UPDATE

Volume 2, Number 4

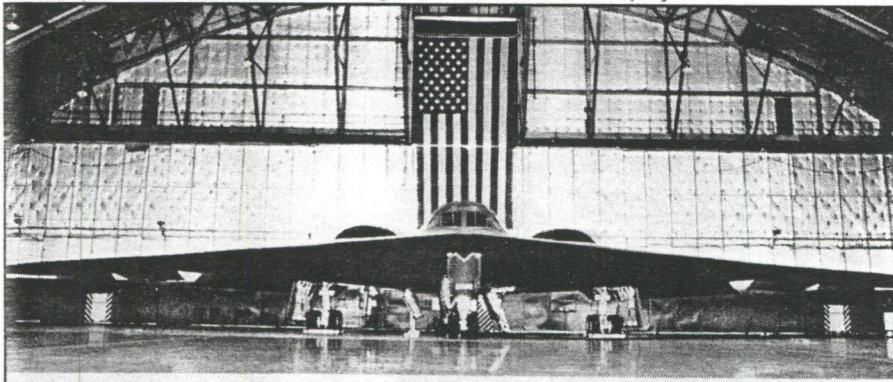
June 1991

President Bush Vows to Fight for B-2

President Bush, in remarks on June 11 while viewing the B-2 and other weapons systems incorporating stealth technology displayed at Andrews Air Force Base during **STEALTH WEEK** (June 10-14), saluted the Senate Armed Services Committee for supporting those systems and called on Congress to give the B-2 its full support. The President stated:

"The success of the [F]-117 is a tribute to those men and women who could see, even in the seventies, the potential of stealth, the need for stealth, and had the strength and perseverance to see it through."

"[T]here is now no question, **stealth works**, and it's been proven in combat, and it broke the Iraqis' back and it saved precious American lives. It flew hundreds of sorties through the most heavily defended areas without a scratch. And the B-2 takes the next generation of stealth and applies it to a strategic bomber. This leap in technology will make a unique contribution to nuclear deterrence and will deliver the enhanced conventional capabilities the F-117 pilots say they'd most like to have--more range, more payload. The B-2 has five to six times the range and ten times the payload of the F-117."



B-2 bomber on display for "STEALTH WEEK" at Andrews Air Force Base. Photo by Glenn Stubbe/ The Washington Times.

"Some claim they don't understand the mission of the B-2. Well, let me try to clear it up. **The mission of the B-2 is deterrence**, nuclear deterrence, conventional deterrence, deterrence all across the spectrum. And with the smaller forces and budgets that we're looking at in the nineties, that's the kind of flexibility and value that America needs."

"**We need the B-2 bomber.** We cannot allow the House actions that would terminate this vital program to stand."

"**I'll fight for stealth and I will fight for the B-2, and I appeal to the leaders here today and to others in Congress to step up to the challenge and give it full support and full funding this year.**"

Third B-2 Flies Joins Test Program

The third B-2 bomber, AV-3, completed its maiden test flight from the B-2 production facility to Edwards Air Force Base in California on June 19, 1991.

With the flight of AV-3, the B-2 flight test program concludes its second full year with three aircraft currently under evaluation. The B-2 test program is more sophisticated than any previous bomber test program and differs significantly from the B-1B test program which preceded it. The B-1B program was highly accelerated with the last production aircraft delivered before the completion of all testing. In contrast, the B-2 flight test program will be completed by 1995, when only ten operational aircraft will have been delivered to the Strategic Air Command, and when only 40% of the planned production aircraft will have been authorized.

Furthermore, the Congress has mandated that procurement of the B-2 is conditional on meeting the achievement or performance milestones spelled out in the *System Maturity Matrix*, an official Air Force document setting standards against which B-2 test results are evaluated. Under the law, funding for the B-2 cannot be obligated or released unless performance milestones in mission performance, low observables,

(continued on page 3)

FOR FURTHER INFORMATION ON THE B-2, PLEASE CONTACT:

BOB HELM, VICE PRESIDENT, LEGISLATIVE AFFAIRS, NORTHROP CORP. AT (703) 525-6767

B-2 UPDATE

Volume 2, Number 5

July 1991

SASC Bill Authorizes Full B-2 Funding

Senator Sam Nunn and Senator John Warner, the Chairman and Ranking Minority Member of the Senate Armed Services Committee, announced on July 12, 1991, that the committee had approved the Administration's full budget request of \$4.763 billion for the B-2 bomber, including \$2.456 billion to procure four aircraft.

During a news conference announcing agreement on the defense bill, Senator Warner stated:

"I am confident the Senate will adopt a strong B-2 program for two reasons. One, that it's integral to the START I concept, which I anticipate will in due course be signed and brought before the Senate. And second, there is absolutely no diminution in the Soviet modernization program of its strategic forces and the B-2 is needed for that role."

Senator Nunn added:

"I think the B-2 ... also has a tremendous conventional role in the future...the ability to project power from our shore and to do so rapidly.... The B-2 five years from now, ten years from now, I think, will be a mainstay of our ability to project power in the world, and by that I mean far beyond nuclear power. The nuclear role will be one mission. But the conventional role, in my view, will be a much more important mission over the lifetime of the B-2."

FOR FURTHER INFORMATION ON THE B-2, PLEASE CONTACT:

BOB HELM, VICE PRESIDENT, LEGISLATIVE AFFAIRS, NORTHROP CORP. AT (703) 525-6767

President Urges Congress to Support the B-2

In recent letters to Senate leaders and in remarks before the American Defense Preparedness Association on July 9, President Bush urged the Congress to support the Administration's request for four B-2s this year as an important step on the way to acquiring a fleet of 75 stealth bombers efficiently.

The President wrote:

"The B-2 Stealth bomber is vital to our defense in the next century and necessary to ensure that the United States has the ability in the future to employ air power effectively over long distances in well-defended areas around the globe. B-2 bombers purchased today will be the backbone of our bomber force for decades to come."

"I urge your Committee to support the Administration's defense budget to ensure strong and affordable defenses for America's future. We



President Bush speaking at the ADPA breakfast, July 9, 1991. Photo by Warren Mattox.

seek to work with the Congress to provide those defenses. However, if Congress should send me a defense bill that is inadequate, as is the House-passed bill, I will veto it."

In his speech on July 9, the President stated:

"I have asked for 75 B-2 bombers, the most revolutionary military aircraft in our nation's history. And when you hear certain members of Congress complain about the B-2's cost, remember that a single B-2 does the job of literally dozens of aircraft, tankers, escorts, suppression and surveillance aircraft, and other bombers."

"And when people argue coyly that we need only a few B-2s because they're so technologically advanced, ask yourselves: Should we risk our security, the lives of our sons and daughters, and our national credibility just because some do not want to acknowledge the revolutionary advantage this weapon system will give the nation? Should we enter the 21st century reliant upon a bomber designed in the '40s and built in the '50s?"

"Think about the costs, think about military operations, think about our long-range national security needs, and you'll conclude that we do indeed need two full wings of the B-2."

EXCERPTS FROM PRESIDENT BUSH'S ADDRESS TO THE
AMERICAN PREPAREDNESS ASSOCIATION BREAKFAST

J.W. MARRIOTT HOTEL
WASHINGTON, DC

TUESDAY, JULY 9, 1991

...

Recognizing the changing international environment, and taking into account domestic fiscal constraints, our administration has proposed a tough, lean defense budget, a proposal that consumes a smaller percentage of our gross national product than any defense budget since the Great Depression.

Now, you don't have to have an accounting degree or a chest full of medals to understand that under present circumstances every penny we spend on unnecessary defense items will come at the expense of defense muscle. I know that budget cuts are going to hurt, they're going to hurt some right here in this room and I understand that. But we will have to set new priorities and focus on only our most important, absolutely vital programs.

As President, I have a duty to serve the national interest, and our national interest demands a defense budget that guarantees our security at the lowest feasible cost. And last August, I announced plans to restructure our armed forces in light of the Cold War's end and the emergence of a new kind of world. And I might say that that proposal was carefully thought out by the top people in the Pentagon; not only the Joint Chiefs, but others, people in whom I have so much confidence.

And that proposal recognized some fundamental facts: One, we don't have a blank check for defense, never have. We must live within our means.

Two, instabilities around the globe still threaten us, and many nations have acquired weapons of mass destruction, and when despots such as this Saddam Hussein combine modern weapons and ancient ambitions, they do threaten us all. And Saddam Hussein isn't the only despot around, and nor, regrettably, will he be the last. And meanwhile, the Soviet Union remains a military superpower with an increasingly sophisticated war machine and a program to modernize -- to modernize many of its weapons systems.

And three, we need the right kind of military. Our forces must have the strength here and abroad to discourage aggression, the mobility to meet unexpected challenges, and the flexibility to deal with everything from ICBMs to regional conflicts, to hostage crises.

These considerations lie at the heart of our administration's defense proposals and any defense bill that fails to incorporate them will get my veto.

With that in mind, let me talk about a few items that I consider absolutely crucial, beginning with the B-2 Stealth bomber. I have asked for 75 B-2 bombers, the most revolutionary military aircraft in our nation's history. And when you hear certain members of Congress complain about the B-2s cost, remember that a single B-2 does the job of literally dozens of aircraft, tankers, escorts, suppression and surveillance craft, and other bombers. And when people argue coyly that we only need a few B-2s because they're so technologically advanced, ask yourselves: Should we risk our security, the lives of our sons and daughters, and our national credibility just because some do not want to acknowledge the revolutionary advantage this weapon system will give the nation. Should we enter the 21st century, reliant upon a bomber designed in the '40s and built in the '50s? Now, the B-2 combines the range and payload of the B-52 with the advantages, the enormous advantages, the proven advantages, of stealth technology. And in the end it offers deterrence -- nuclear deterrence, conventional deterrence, deterrence all across the spectrum.

Think about the costs, think about military operations, think about our long-range national security needs, and you'll conclude that we do indeed two full wings of the B-2.

...

Let me tell you now, if the Congress sends me a defense bill that is inadequate, that fails to fund needed programs and wastes money at the expense of defense muscle, no matter how big a bill, how urgent, I will veto it.
(Applause)

PERSPECTIVE ON WEAPONS

Stealth Makes Power Usable Again



The B-2 bomber can restore to America the role of deterring conflict in places we often fear to go.

By TOM CLANCY

There's a new and urgent mission for a stealth platform. If Iraq continues to hide its nuclear weapons manufacturing capability, how will we take it out?

The lessons learned from the Persian Gulf War are still being analyzed, but one of them seems pretty clear. One bit of new military technology that saw a great deal of use was Lockheed's F-117A. Called "Stealth fighter," it isn't really a fighter since it lacks air-to-air offensive or defensive capability, lacks supersonic performance, lacks the agility of a true fighter and has decidedly poor pilot visibility. With that list of debits, you have to wonder why the Air Force bothered building it at all. Except for one thing: It's the nearest thing to the invisible man since H.G. Wells.

Back in 1985, when I was researching "Red Storm Rising," I traveled to Langley Air Force Base, headquarters of the Tactical Air Command, to discuss Stealth aircraft with some of the Air Force's thinkers. Stealth was still very "black" then, though I did learn a new term—"low observables." The only thing those people were willing to tell me was, "Son, you may safely assume that an invisible airplane is tactically useful."

Exactly how useful stealth is can be discerned from the fact that in the Gulf War we lost examples of nearly every aircraft in the inventory, but not one of the 44 F-117As deployed had as much as a nick. That is remarkable for two reasons. First, while the F-16 and F-15E are superb high-performance birds with every feature an airplane driver could wish—heavy weapons load, speed, agility and optimum pilot visibility—they can be spotted fairly easily, and are evolutionary developments of their antecedents.

Second, the F-117A was the aircraft that owned the skies over Baghdad. It was the "Black Jet" that went "down-town" into the densest part of a highly refined air-defense network. Indeed, the first bomb dropped by the 37th Tactical Fighter Wing took out the Iraqi air-

defense headquarters, and that is a subtle and interesting statement right there. The first tactical employment of stealth was a brain shot that had the effect of dislocating the entire Iraqi air-defense network with a single weapon. Remember that the crisis had been going on for months; that the signals we'd sent to Iraq could scarcely have been more clear; that the Iraqis must have been at a high state of alert, and that they had state-of-the-art equipment.

Yet, due to stealth technology, we were able to send a single aircraft into the very center of their defense system, and, with the first shot, destroy its headquarters.

Military historians will look long and hard at the Gulf War. One thing they are certain to note is that a new chapter of military history was opened by the 37th Tactical Fighter Wing. Stealth works. Stealth invalidated fully 50 years of technological progress.

The odd thing is that the F-117A is a relatively primitive aircraft. It's subsonic, small, modest in range and able to carry only two bombs. Conceived in the 1970s, and first built around 1983, like most pioneering efforts it was a cautious first step into a new world. Its effectiveness results from the fact that it is relatively difficult to counter. Effective or not, it's time for the next step.

That next step is the B-2 bomber, being built by Northrop.

Let's turn the clock back to July 31, 1990. The CIA has determined that Saddam Hussein has either misread or disregarded signals from the U.S. government, and has issued the "Go" order to his commanders. We'd like to stop him—but how?

Let's further assume that we had the B-2 in the inventory and that a group of four had been quietly dispatched to Diego Garcia. One of those four is then loaded with 40 tons of sophisticated ordnance. The aircraft lifts off and heads northwest toward the Persian Gulf. At about 3 in the morning, the U.S. ambas-

sador phones in an urgent request to meet with the Iraqi leader, and in a fit of largess, the meeting is agreed to. While our ambassador is waiting for this world leader to shave, the B-2 crosses over

Baghdad, at an altitude of about 40,000 feet. Its bomb doors open and inertially aided munitions are dropped out. Perhaps an air-defense radar crew notes a brief bit of electronic noise directly over their capital city, a ghostly blip appears, then disappears a few seconds later, and they think no more of it. But 40 1,000-pound bombs are falling. Their semi-smart guidance packages aim them at the river that meanders through the city. The river is wide enough that they all hit it in a brief but violent ripple of noise that creates a lot of foam and spray, but does nothing more than wake people up and break some windows.

"What was that?" our ambassador asks in some alarm soon after meeting the Iraqi strongman. "Oh, by the way," she adds. "While your people are checking that out, we need to make it clear that we'd prefer that you did not tell your army to march. I wonder what all that noise was. . . ."

Would Saddam have marched? Maybe. Maybe not.

The B-2 is a weapons system about which I was, until recently, highly dubious. Designed as a penetrating strategic bomber to attack the Soviet Union, its mission appeared to have been invalidated by the changes now transforming the world. But the "strategic" appellation means more than dropping nuclear weapons. The business of the U.S. military for the next 20 years will be to forestall conflict. Historically that has meant sending conventional forces to hot spots. That used to be called gunboat diplomacy. The proliferation of sophisticated weapons to the most unlikely of places has made that increasingly dangerous. What used to be a free demonstration of power is now something else—while we can easily defeat and/or overwhelm nearly any country in the world, it cannot be done without some cost, and our people place a higher value on human life than most.

What stealth does is invalidate the weapons behind which some world leaders might be encouraged to hide with impunity. In simple terms, the B-2 bomber, with its range, payload and relative invulnerability, offers the same power as nuclear weapons, but with the added precision that makes its use

politically possible. Its remarkable capabilities allow a strategic platform to be employed in a tactical mode, but with strategic effects. It is, in fact, a nightmare come to life for any tin-pot despot who's been able to purchase SAMs for cash from any of several willing markets. The Stealth bomber for the first time offers the capability of applying the deterrence principle to people against whom deterrence has lost its value.

The point is a subtle, but valid, one. Libya, for example, cannot defeat a determined attack from a single U.S. Navy aircraft carrier, but can use its Soviet and French air-defense systems to threaten us with some losses. America prefers not to lose any of its young men, and that political fact, in deterring us from applying force, sometimes encourages others to take bold action.

The B-2 presents such enemies with a new and very different threat. This aircraft can reach thousands of miles, can effectively ignore the most sophisticated air-defense systems in the world and can deliver enormous firepower without warning. One such bomber could, for example, eliminate an entire air base and all its aircraft. It could also perform that mission with near-complete deniability. The B-2 can deliver the same guided bombs that were used to drop bridges in Iraq, but can deliver between 20 and 40 of them—not the two that the F-117A can deliver—in a single pass, and be heading away before the first one lands. All the money spent by all the Third World dictators for all those weapons would end up generating nothing more than additional targets to be attacked with impunity. That's called leverage.

One can talk about the cost, but such discussions have acquired a metaphysical element in Washington. A less polite observation would be to call a lot of the

talk outright lies. When a B-2 rolls out of the Northrop plant, and the keys—or whatever—are given to the Air Force, the cost is about that of two Boeing 747s. That does not seem terribly unreasonable. People who oppose the B-2 cite cost figures that often include 20 years of operation and support, plus the research-and-development funding that they themselves supported. (Many of these people opposed the B-1B in favor of supporting development of the B-2, and now that the B-2 is ready to enter service, they attack that program—yet another example of political integrity.)

The basic issue is a simple one: Is this capability useful? Is it in the national interest of our country to purchase a weapon that can deter (read: intimidate) the Saddam Husseins of the world? Is this a weapon likely to forestall conflict? Will it discourage people from offending our country and abusing our citizens? If the answer to these questions is *yes*, then does it not make sense for the government to spend roughly what a handful of American air carriers will spend on Boeing airliners? Oh, yes, do remember that this capability will also discourage people from blowing such airliners out of the air.

This weapon is a revolution. Revolutions are not cheap, but this one is not outrageously expensive. The principle has been validated. We made history with it. It works, and it will enable us to project American power into places where we often fear to go. It's worth the cost. In the past decade we've seen that peace is the dividend of a judicious investment in power. This additional investment will pay more dividends still.

Tom Clancy, author of "Clear and Present Danger" (Putnam), is a novelist and military analyst.

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"CORRESPONDENCE TRACKING"

TYPE: ACTION DOCUMENT NUMBER: 9123208
ORIGINATOR: 02 STATUS I DIRECTORATE STATUS

FROM: BREWER, G. Daniel

TO: DR. D.A. BROMLEY

DATE OF
CORRESPONDENCE: 07/23/91

SUBJECT: A COPY OF THE BOOK, "HYDROGEN AIRCRAFT TECHNOLOGY"
AND A REQUEST TO REVIEW THE DEVELOPMENT PROGRAM
RECOMMENDED IN THE REPORT IN ORDER TO PERSUADE YOU
TO SUPPORT INITIATION OF IMMEDIATE ACTION.

DIRECTORATE STAFF
ASSIGNED: PHYSICAL SCIENCES ASSIGNED:

ACTION
REQUIRED: REVIEW FOR DAB

STAFF
ACTION:

Unable to review, not having book. Please close out of Phys Sci responsibility. 108E 8/7

SENDER'S DUE DATE:
OSTP DUE DATE: 08/15/91 STAFF DUE DATE
DATE COMPLETED: DATE COMPLETED/DEPT:

COPIES TO: D. Allan Bromley
NATIONAL SECURITY
Carl Bretscher

WHITE HOUSE TRACKING #: CONTACT PERSON:
PHONE: EXT:
REMARKS: Enclosure to DAB; please forward after review to Physical Sciences for action as necessary.

OSTP RECEIVED: 08/02/91
DEPT RECEIVED:

FILE: P-NAT'L SECURITY*PHYSICAL SCI

CLOSED

"CORRESPONDENCE TRACKING"

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Carl Bretscher

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PHONE:

EXT:

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OSTP RECEIVED: 08/02/91

DEPT RECEIVED:

FILE: P-NAT'L SECURITY*PHYSICAL SCI

No answer

3206

The Honorable D. Allan Bromley
Assistant to the President for Science & Technology
Old Executive Office Building
17th Street & Pennsylvania Ave.
Suite 358
Washington, D.C. 20506

RECEIVED

91 AUG 2 P2:44

July 23, 1991

OFFICE OF THE
DIRECTOR

Dear Dr. Bromley:

The enclosed is a complimentary copy of my book, "HYDROGEN AIRCRAFT TECHNOLOGY", which has just been published by CRC Press, Inc. I thought you might find it of interest in connection with the Energy Policy proposals which are currently being considered.

Recognizing the many demands on your time, may I suggest that you might find the first five pages of Chapter 11, The Outlook for Hydrogen: A Summary, (starting on page 399) of particular interest in obtaining a synopsis of the content. In addition, if time permits, Chapter 6, starting on page 301 presents a discussion of potential benefits the military services could derive from use of hydrogen.

Obviously, my objective here is to put the book in the hands of someone who might be motivated to influence positive action to initiate development of LH₂ for aircraft. For your information, I am also sending a copy of the book to Representative George Brown of California in connection with his proposed Bill H.R. 2793, A Hydrogen Research & Development Program, which he introduced in the 1st Session of the 101st Congress. You will recognize this as a companion of Senate Bill S. 639 carrying the same title which was introduced by the late Senator Spark Matsunaga of Hawaii.

A report "Hydrogen Fuel for Subsonic Transport Aircraft", dated April 1991, recommends an appropriate initial course of action. The report was prepared by Atlantic Research Corporation and Eagle Engineering, Inc. for NASA Office of Aeronautics, Exploration and Technology, under Contract NASW 4430. I hope perusal of my book and review of the development program recommended in this report will persuade you to support initiation of immediate action.

Thank you for your consideration.

G. Daniel Brewer

G. Daniel Brewer
1214 San Julian Drive
Lake San Marcos, CA 92069

A circular logo with the letters "CRC" in a stylized, bold font.

CRC

HYDROGEN AIRCRAFT TECHNOLOGY

G. Daniel Brewer

A circular logo with the letters "CRC" in a stylized, bold font.

CRC

PRESS



GEO-CENTERS, INC.

7/9

Mary,

July 8, 1991

Please put in the system & close out. DAB did NOT comply with Mr. Beers' request.

Ms. Damar Hawkins
Office of the Science Adviser
White House

Thanks,

Marian

Dear Ms. Hawkins:

I know this is last minute, but everything is a case of hurry up and wait in dealing with the Kuwaiti government. We have been dealing with them for several months with the active assistance of the Commercial Section of the U.S. Embassy in Kuwait. Mr. Gnehm's people have been most helpful. As described on the phone, the Kuwaitis have a limited understanding of sophisticated U.S. technology and rely heavily upon letters of introduction and recommendation. After you have presented an outstanding technical proposal (we have) and supported it with letters from half a dozen Defense Agencies (we have), they ask for more. They seem to collect letterhead.

Based upon the high stock of the U.S. at this point, personified by George Bush, the "Godfather" of Kuwait, any recommendation on White House letterhead would receive enormous weight. Since the GEO-CENTERS approach seeks to take advantage of high technology, developed by and for the U.S. Department of Defense and currently available nowhere else, a letter from Allan would be particularly persuasive.

If you could rework the enclosed letter based upon the information provided and get Allan to sign it, it would be greatly appreciated. If and when available, I could get an associate to pick it up at the Old EOB. If you have any questions, please give me a call. Thank you so much.

Sincerely,

Richard H. Beers

Richard H. Beers, Ph.D.
Vice President

RHB/jr

10903 Indian Head Highway
Fort Washington • Maryland • 20744
(301) 292-1010

BOSTON
WASHINGTON, D.C.
ALBUQUERQUE



GEO-CENTERS, INC.

July 8, 1991

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Office of the Science Adviser
White House

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Sincerely,

Richard H. Beers, Ph.D.
Vice President

RHB/jr

Ms. Damar Hawkins
July 8, 1991
Page 2

P.S. Allan may not remember me after 21 years, but I sure remember him. Actually, I did a parody of him as a "Roman Emperor" after his Emperor Tandem van der Graf accelerator at a Physics Department Christmas Party in 1967, which I'm sure he does remember - I hope with favor.



GEO-CENTERS, INC.

July 8, 1991

Mr. Edward W. Gnehm, Jr.
Ambassador to Kuwait

Dear Mr. Ambassador:

As you review the letters of recommendation and introduction concerning GEO-CENTERS, INC. and their efforts to secure the Explosive Ordnance Disposal (EOD) Projects Management Contract from the Kuwait Ministry of Defense (MOD), I am sure it is clear that this Company is well regarded in the Defense community and that the technology developed may well be uniquely suited to the massive mine/ordnance clearance project at hand. The technology described has been developed to support the United States Department of Defense efforts to rid the U.S. of hazards resulting from munitions development and testing, as well as current problems associated with mine warfare. It appears to be unique and the result of a major development program sponsored by many participants from the Defense community.

The balance of technology between the high risk/high pay-off approaches supported by the Defense Advanced Research Projects Agency (DARPA) and the field hardened, soldier-friendly variety favored by the Army Corps of Engineers is certainly necessary to undertake a massive production-type job, but one never encountered before - the environmental restoration of Kuwait.

Any assistance that you can provide to GEO-CENTERS in their efforts in Kuwait, particularly in competition with foreign companies, would be good for the advancement of applied U.S. technology, good for the Kuwaiti people and good for American business.

By the way, Dr. Richard H. Beers, Vice President and co-owner of GEO-CENTERS, received his Ph.D. from Yale in 1968, where I was, and continue to be, a faculty member. He was a student of one of my close friends and associates, Vernon Hughes.

Sincerely,

D. Allan Bromley
Assistant to the President
for Science and Technology



Kuwait City, Kuwait

June 16, 1991

H.E. Shaikh Ali Sabah Al-Salem
Ministry of Defense
Kuwait Armed Forces
Kuwait

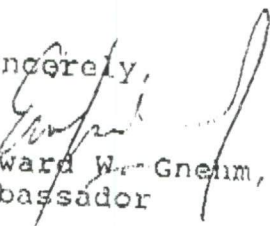
Your Excellency:

I would like to introduce and recommend for your consideration GEO-CENTERS, Inc., the leading developer of vehicular mounted ordnance and mine detection equipment. GEO-CENTERS currently has major contracts with the U.S. Army, Navy, Marine Corps and Defense Advanced Research Projects Agency.

As E.O.D. firms clear the five sectors established by the Ministry of Defense, it will be necessary to include steps to safeguard against mines which may have been overlooked. GEO-CENTERS has the advanced technology to ensure the quality of ordnance disposal.

I greatly appreciate your taking a close look at the proposal presented by GEO-CENTERS, Inc. Their services would serve well the people of Kuwait.

Sincerely,


Edward W. Gnehm, Jr.
Ambassador

COMMITTEES
ARMED SERVICES
SMALL BUSINESS
SELECT COMMITTEE ON
INTELLIGENCE

CHAIRMAN
ARMED SERVICES SUBCOMMITTEE ON
INVESTIGATIONS

WASHINGTON OFFICE
2334 RAYBURN HOUSE OFFICE BUILDING
WASHINGTON, DC 20515
(202) 225-8020

Congress of the United States
House of Representatives
Washington, DC 20515

SALFIM, MA 01970
(508) 745-5800

STARPORT LANDING
157 THE LYNNWAY, UNIT 3B
LYNN, MA 01902
(617) 599-7105

10 WELCOME STREET
HAVERHILL, MA 01830
(508) 372-3451

TOLL FREE WITHIN
MASSACHUSETTS
(800) 272-0730

June 12, 1991

Mr. Edward W. Gnehm, Jr.
Ambassador to Kuwait

Dear Ambassador:

This letter is written to introduce GEO-CENTERS, Inc. as an outstanding research and development firm with head quarters in Massachusetts with, and an 18 year history of support to the Department of Defense. GEO-CENTERS is the leading developer of vehicular mounted ordnance and mine detection equipment in the U.S. with major contracts with the U.S. Army, Navy and Marine Corps as well as the Defense Advanced Research Projects Agency (DARPA). Their expertise has been found useful to the Kuwaiti Ministry of Defense resulting in a request for a more formal proposal which has been prepared. In addition, the Kuwaiti Minister of Defense, Sheik Ali Sabah Al-Salem Al Sabah, personally requested letters of introduction from pertinent Department of Defense sponsors as well as the from the American Ambassador in Kuwait.

GEO-CENTERS has secured the necessary documents from the Department of Defense in the U.S. and has sought my support in obtaining a suitable letter of introduction from your Embassy. Dr. Richard H. Beers, Vice President of GEO-CENTERS, and an associate Mr. Fenoy Butler will be arriving in Kuwait on Saturday, June 15, with plans to meet the Defense Minister. Dr. Beers is prepared to give you copies of his Defense Department letters as well as related documents of interest to you.

As appropriate, I would request that you assist GEO-CENTERS in their efforts to apply their DOD-sponsored technology to the Kuwait Reconstruction Project. Your assistance is appreciated.

Sincerely,


Nicholas Mavroules
Member of Congress

NM/jhs



DEPARTMENT OF THE ARMY

US ARMY BELVOIR RESEARCH, DEVELOPMENT AND ENGINEERING CENTER
FORT BELVOIR, VIRGINIA 22060-5606

REPLY TO
ATTENTION OF

June 11, 1991

Countermine Systems Directorate

SUBJECT: Vehicular Mounted Mine Detection Research as Conducted
by GEO-CENTERS, INC.

Sheik Ali Sabah Al-Salem Al Sabah
Minister of Defense
Government of Kuwait

Your Excellency:

This letter serves to introduce GEO-CENTERS, INC. as a major contractor to the Countermine Systems Directorate located at the U.S. Army Belvoir Research, Development and Engineering Center (BRDEC). Since 1987 GEO-CENTERS has been under contract to this Directorate to develop multi-sensor, vehicular mounted instrumentation suitable to the detection of shallow-buried anti-personnel (AP) and anti-tank (AT) mines, both plastic and metallic. The detection of plastic mines has long been deemed a major short-coming in conventional defense technology.

Since 1987 and continuing at present, GEO-CENTERS has been the leading contractor in the development of vehicular mounted systems using both its own electromagnetic methods in conjunction with nuclear, electromagnetic and acoustic methods under development by its subcontractors, both domestic and foreign. Funding for these research efforts to date have been in excess of \$2.5M and have come from the U.S. Army (BRDEC), the Defense Advanced Research Projects Agency (DARPA), and the U.S. Marine Corps (USMC).

Still early in the development cycle, testing to date has been restricted to laboratory measurements and has centered heavily upon the detection of plastic AP and AT mines in sand. Extensive outdoor field tests are scheduled in the United States later this year in an exercise to compare the performance of emerging countermine technologies. The ground penetrating radar approach adopted by GEO-CENTERS has shown promise and is based upon its more mature technology already deployed as part of the U.S. range clearance programs. Based upon technical results to date, GPR is expected to be a necessary component in any sensor suite adopted for mine detection.

While these emerging technologies may not be immediately applicable to the reconstruction program within Kuwait, they will most probably be applicable to the longer term clean-up efforts. Moreover, these technologies do represent the best understanding of the problem known to exist, and their application, immediate or long term, is of interest to this laboratory.

Lastly, while it is not the policy of the U.S. Government to recommend or endorse the efforts of any particular technical approach or contractor, I can attest to the technical and professional integrity of GEO-CENTERS. They have worked closely with this office to bring the best available technology and service to the problem. While I cannot guarantee technical success, I can ensure competence and integrity. If I might be of further assistance, please feel free to contact me at the Countermine Systems Directorate, telephone number (703) 664-5680.

Sincerely,



David C. Heberlein
Director
Countermine Systems Directorate

Enclosure

Copies Furnished:

Mr. Faisal Al-Dawoud
Undersecretary
Ministry of Defense

Mr. Edward W. Gnehm, Jr.
U. S. Ambassador to Kuwait



DEPARTMENT OF THE NAVY
NAVAL RESEARCH LABORATORY
WASHINGTON, D.C. 20375-5000

IN REPLY REFER TO:

6110-271:JRM

11 June 1991

To Whom It May Concern:

Re: Ordnance Detection Equipment - STOLS and RADAR, Developed by GEO-CENTERS, INC.
under Contract to the U.S. Department of Defense

Dear Sir:

This letter is written at the request of GEO-CENTERS, INC. and will document our knowledge of their expertise in the development of new instrumentation concepts for detection and location of unexploded ordnance (UXO). GEO-CENTERS, INC. has been under continuous contract to the U.S. Naval Research Laboratory (NRL) since 1984 tasked with the design, development, construction, demonstration and testing of vehicular mounted instrumentation suitable for efficient wide area surveys to detect and locate UXO. The research effort, had as a prime goal the development and proof of principle demonstration of two automated technologies, STOLS (which uses a ganged array of seven cesium vapor magnetometers for detection of magnetic anomalies) and GPR (which uses a ganged array of four radar antennas for the detection of subsurface dielectric discontinuities). This program took place under the overall sponsorship of the U.S. Army Corps of Engineers (ACE), under the U.S. Department of Defense (DOD), Defense Environmental Restoration Program (DERP). As the DOD lead service for explosive ordnance disposal (EOD), the U.S. Navy through the Explosive Ordnance Disposal Technology Center (NAVEODTECHCEN) and the NRL was tasked with developing new technologies for surveillance instrumentation capable of accurately and effectively mapping large areas suspected of ordnance (or other types of) contamination.

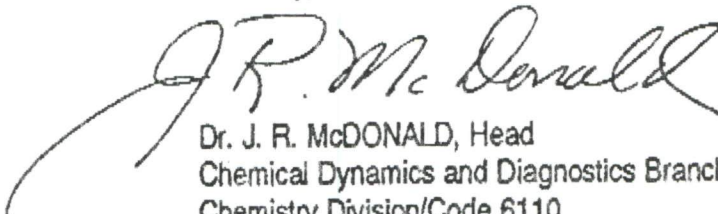
In part, based upon their long-standing expertise in the field of geo-technical measurements, GEO-CENTERS, INC. was selected as a prime contractor to develop the two primary technologies which are the subject of this letter. With approximately \$10M invested to date, preprototype versions of each of these systems has been built and demonstrated in several field trials and delivered to the Naval Research Laboratory. These instruments are currently in the custody of the Department of Defense and are undergoing further testing and modifications to improve their performance and usefulness for real-world field operations. GEO-CENTERS, in a follow on contract with NRL is tasked with conducting these further tests and designing upgrades and improvements to the systems. It is possible, if appropriate sponsorship is identified, that construction of second generation instrumentation will be undertaken with the goal of manufacturing fully field worthy prototype equipment.

The design goal of the recently completed program was to create equipment for proof of principle demonstration. It was envisioned that the primary use of this technology would ultimately be in sites that posed no immediate explosive threat, such as decommissioned military sites or practice ranges. The current instrumentation therefore is inappropriate for direct use in circumstances as they currently exist in

Kuwait as a primary range survey and clearance tool. Much more hardened designs would be required as would remoting capabilities for equipment operation. Never-the-less, to our knowledge the STOLS and GPR systems are the only equipment of their kind in the world offering the potential capabilities for automated sensitive wide-area surveys of sites for unexploded ordnance. The rights to this technology, to replicate this equipment, or to create further improvements or follow on designs are not restricted and could be undertaken by GEO-CENTERS or other concerns with the expertise and experience to conduct such programs.

While the U.S. Government in no way expressly warrants or recommends any specific technology or any specific contractor, we feel confident that the technology which has been developed and demonstrated in this program has significant potential for effective post battlefield clearance operations requiring wide area surveys for UXO. If this technology is further developed for application in Kuwait, the results would be of great interest to us. If further information is required, inquiries can be directed to this office by letter, phone or telefax.

Sincerely,



Dr. J. R. McDONALD, Head
Chemical Dynamics and Diagnostics Branch
Chemistry Division/Code 6110

Sheik Ali Sabah Al-Salem Al Sabah
Minister of Defense
State of Kuwait

Your Excellency:

The U.S. Army Toxic and Hazardous Materials Agency (USATHMA) is an Agency of the Army Corps of Engineers (ACE) having among its missions the investigation and restoration of sites contaminated with hazardous materials, including unexploded ordnance (UXO). The ACE has since 1984 continuously funded GEO-CENTERS, INC. through the Navy Explosive Ordnance Disposal Technology Center (NAVEDTC) and the Naval Research Laboratory (NRL) to develop state-of-the-art vehicular mounted instrumentation dedicated to the detection and location of UXO.

Two major systems - the Surface Towed Ordnance Locator System (STOLS) and Ground Penetrating Radar (GPR) - have been developed and built by GEO-CENTERS. At present, each of these systems is currently being used, under my direction and funding, to survey large areas of the Aberdeen Proving Ground (APG) heavily contaminated with UXO. The systems are performing well and have proven effective in surveying extended areas in short periods of time - up to 20 acres per day under favorable site conditions. The particular beauty of these instruments are the detailed computer generated maps which show the areas surveyed (or missed) and the exact location of targets.

While the mission is still ongoing, well over a thousand buried items have already been discovered in a single 50 acre site, ranging from mines, artillery and mortar shells, and small munitions. The ACE and USATHMA are pleased with the systems' performance and additional funding is being provided for even further development.

It is my understanding that GEO-CENTERS intends to replicate versions of these technologies for quality assurance applications in Kuwait. The instrumentation is highly suited to this use and GEO-CENTERS has demonstrated continued competence in this area. Moreover, I have personally worked with the two GEO-CENTERS Program Managers who are addressing the needs in Kuwait: Dr. Richard H. Beers and Mr. Fenoy Butler. Each enjoys superb credentials and excellent reputations in their respective fields. Their involvement and the capabilities of the proposed equipment would offer excellent promise in the UXO/Mine clearance efforts, and the ACE would be most interested in the results should this instrumentation be deployed.

Sincerely,

James Arnold

"CORRESPONDENCE TRACKING"

TYPE: INFORMATION

DOCUMENT NUMBER: 9121930

ORIGINATOR: 02

STATUS C

DIRECTORATE STATUS

FROM: WEST, Togo D.: NORTHROP

TO: DR. D.A. BROMLEY

DATE OF
CORRESPONDENCE: 06/24/91

SUBJECT: RE: RECENT COMMENTARY ON THE B-2 PROGRAM.

DIRECTORATE
ASSIGNED:

STAFF
ASSIGNED:

ACTION
REQUIRED:

STAFF
ACTION:

SENDER'S DUE DATE:

OSTP DUE DATE:
DATE COMPLETED:

STAFF DUE DATE
DATE COMPLETED/DEPT:

COPIES TO: D. Allan Bromley
Steve Olson
NATIONAL SECURITY
Ken Yale

WHITE HOUSE TRACKING #:

CONTACT PERSON:
PHONE:

EXT:

REMARKS:

CLOSED

OSTP RECEIVED: 07/01/91
DEPT RECEIVED:

FILE: NATIONAL SECURITY-DEFENSE

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NORTHROP

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OFFICE OF THE
DIRECTOR

June 24, 1991

Northrop Corporation

Washington Office
1000 Wilson Boulevard, Suite 2300
Arlington, Virginia 22209
Telephone 703 525-6767

Dr. D. Allan Bromley
Assistant to the President for Science &
Technology
358 Old Executive Office Building
Washington, DC 20506

Dear Dr. Bromley:

To keep you apprised of recent commentary on the B-2 program, I enclose the following materials:

an excerpt from President Bush's commencement address at the Air Force Academy on May 29, 1991;

the text of President Bush's remarks at Andrews Air Force Base during "Stealth Week";

a letter by nine members of the House Appropriations Defense Subcommittee urging House Armed Services Committee Chairman Aspin to achieve an outcome in the authorization conference that will continue B-2 procurement;

an excerpt from Chairman Aspin's speech, "The B-2 Stealth Bomber: How Many and for What?" to the Electronic Industries Association on June 11; and

"The Relevance of High-Intensity Operations," a paper by Lt. Gen. Glenn A. Kent, USAF (Ret).

Again, please feel free to contact me for additional information concerning the B-2 program.

Sincerely,



Togo D. West, Jr.
Senior Vice President -
Government Relations

Enclosures

Excerpt from the President's Commencement Address to the Air Force Academy Class of 1991, 29 May 1991, regarding the value of stealth and the requirement for the B-2:

"Gulf lesson one is the value of air power. (Applause.) I remember meeting with General McPeak up at Camp David, and in his quiet but forceful way he told me exactly what he felt air power could do. And after he left, I turned to my trusted National Security Advisor who's with me here today, former political science professor here at the Academy and a pilot, General Scowcroft, and I said, "Brent, does this guy really know what he's talking about?" And General Scowcroft assured me he did, and General McPeak, like the entire Air Force, was right on target from day one. (Applause.) The Gulf war taught us that we must retain combat superiority in the skies.

And then there's Gulf lesson two, the value of stealth. Surprise is a classical principle of warfare. And yes, it depends on sound intelligence work. But, stealth adds a new dimension of surprise. Our air strikes were the most effective, yet humane, in the history of warfare. The F-117 proved itself by doing more, doing it better, doing it for less, and targeting soldiers, not civilians. It flew hundreds of sorties into the most heavily defended areas without a scratch. The F-117 carried a revolution in warfare on its wings.

And the next step in that revolution is the Stealth bomber, the B-2. Not only for its contribution to nuclear deterrence, but also from the standpoint of conventional cost effectiveness, the B-2 has no peer. It carries over ten times the conventional load of an F-117, and can fly five times further between refuelings. It gets the job faster -- gets to the job faster with more tons of ordnance, without the force buildup and time we needed prior to Desert Storm, and without needing foreign air fields in the immediate proximity of a conflict. And it replaces B-52 aircraft approaching twice the age of you graduates.

And I say that respectfully. (Laughter.) Yet last week, the House of Representatives voted to terminate the B-2, redirecting those funds at unnecessary weapons. And anyone who tells you the B-2 is too expensive hasn't seen flak up close lately. America needs the B-2 bomber, and I'm going to fight for it every inch of the way! (Applause.)"

REMARKS BY PRESIDENT GEORGE BUSH
ON STEALTH TECHNOLOGY
DURING HIS VISIT TO ANDREWS AFB

INTRODUCED BY: DICK CHENEY, SECRETARY OF DEFENSE

ANDREWS AIR FORCE BASE, MARYLAND
TUESDAY, JUNE 11, 1991

SEC. CHENEY: Gentlemen, I want to thank you for being here this afternoon on behalf of the Department of Defense and the Air Force, and for taking a couple of minutes to look at what we think is extremely important new technology from the standpoint of the Department and the future of our military capabilities.

But, with that, I'd like to turn it over to the President of the United States, the Honorable George Bush.

PRESIDENT BUSH: Well, let me -- (applause) -- let me -- hey, come on! Thank you all very much. And I hope everybody's enjoyed this tour as much as I have. And first, let me pay my respects to the men and women of the US Air Force. I was telling General McPeak and the Secretary that I am always so impressed by you all's dedication, certainly service, and I'm just delighted to be here with those that have made this exhibition possible from the research stage and right on up to now. I want to salute Dick Cheney, of course, our leader -- one of our leaders. Bob Dole is with us today. Don Rice, of course, our Secretary. General McPeak, you've heard me speak about him. And members of the Senate who took the time to come out here today, our Chairman, Sam Nunn, and others. ... And I'm just delighted you all are here.

Senator Warner, Senator Nunn, and the members of the committee have been strong supporters of stealth technology, even before the first prototype F-117 in 1977. And we've now seen the promise of stealth fulfilled with the remarkable success of the F-117 in Desert Storm. The F-117 carried a revolution in warfare on its wings over Baghdad. And these remarkable aircraft flew only about 2 percent of the combat sorties, but struck over 40 percent of the strategic targets. The success of the 117 is a tribute to those men and women who could see, even in the '70s, the potential of stealth, the need for stealth, and had the strength and perseverance to see it through.

Among those who deserve special credit for this accomplishment are the members of this committee who gave that plane, the F-117, their strong and continuous support. And there now is no question stealth works. And it's been proven in combat, and it broke the Iraqis' back and it saved precious American lives. It flew hundreds of sorties through the most heavily defended areas without a scratch.

And the B-2 takes the next generation of stealth and applies it

to a strategic bomber. This leap in technology will make a unique contribution to nuclear deterrence and will deliver the enhanced conventional capability that F-117 pilots say they'd most like to have — more range, more payload. The B-2 has five to six times the range and 10 times the payload, 10 times the payload of the F-117.

Some claim they don't understand the mission of the B-2. Well, let me try to clear it up. The mission of the B-2 is deterrence, nuclear deterrence, conventional deterrence, a deterrence all across the spectrum. And with the smaller forces and budgets that we're looking at in the '90s, that's the kind of flexibility and value that America needs. We need the B-2 bomber. We cannot allow the House actions that would terminate this vital program to stand.

Partners with the B-2 in deterrence are the new Cruise missiles that also embody stealth technology, and they will provide a cost-effective way to keep some of older bombers viable and they add a unique capability to even our modern systems. No student of the Gulf War can doubt how combination of Cruise missiles and manned aircraft can overwhelm an enemy's air defenses.

And finally, Desert Storm should have made the importance of control of the air crystal clear to all. Air superiority — air superiority enabled the allied forces, air and surface, to operate with an effectiveness that amazed the world, and thank God, to operate with allied casualties as low as possible.

Today's generation of fighters drove the Iraqi Air Force from the skies. The F-22 that we see here, the prototype of the next air superiority fighter, combines stealth and maneuverability in a way that ensure the American forces in the next century will be able to count on control of the air. Stealth has really brought a revolution to air power. It is a leap in technology. It comes from American genius and ingenuity. It works and it's needed.

And it's an edge that can help guarantee our security in the ever more complex world that we will face in the future, and it's an edge that I want to give our country, and an edge that America's fighting men and women deserve to have should they ever be called on again. I'll fight for Stealth and I will fight for the B-2, and I appeal to the leaders here today and to others in the Congress to step up to the challenge and give it full support and full funding this year.

And I want to thank you again, everybody from the Senate that took the time to come out here today, and for those that are committed, let me tell you, please let us know what we can do, because this is priority, not simply to the administration, but in my view, to the country.

Thank you all very much for taking the time to join us.
(Applause.)

END

Congress of the United States
House of Representatives
Washington, DC 20515

June 12, 1991

The Honorable Les Aspin
U.S. House of Representatives
2336 Rayburn HOB
Washington, DC 20515

Dear Les:

We are writing to advise you of our strong support for production funding for the B-2 bomber in the Fiscal Year 1992 budget.

We are firmly convinced that this weapon has revolutionary potential for projecting conventional military power at intercontinental ranges. The B-2 uniquely combines the qualities of stealth that were so dramatically illustrated in Operation Desert Storm, with five times the range and ten times the payload of the F-117. It takes the advantages demonstrated by the F-117 and allows us to utilize them in a cost-effective manner that does not rely on forward basing, or an adversary that allows us months of preparation. The B-2 will also play a central role in our future strategic deterrent forces, especially under a START treaty emphasizing more stabilizing systems.

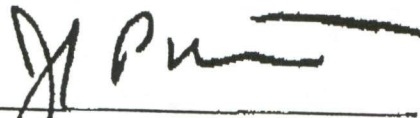
Clearly, a majority of the Defense Appropriations Subcommittee members support proceeding with this program in a manner that will provide us with what a recent RAND study on the future bomber force has called a critical element in retaining U.S. military superiority into the next century.

In light of the action on the Defense Authorization bill in the House, we reluctantly deferred without prejudice requested production funding for this system in the Appropriations bill. Yet we recognize the political reality that this is the highest priority production program for the President, and he has clearly indicated his intention to veto any defense spending bill that does not include B-2 production funds.

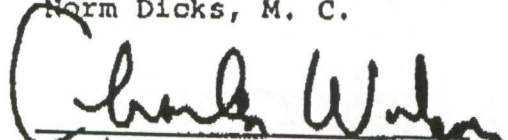
Therefore, this issue must ultimately be resolved in conference on both the authorization and appropriations bills, subsequent to expected Senate approval of the Administration request for the B-2. We hope that our two committees can work together to achieve an outcome after conference providing us with a credible B-2 program, and with a resolution that will allow us to proceed in a cost-effective manner with a long-term commitment.

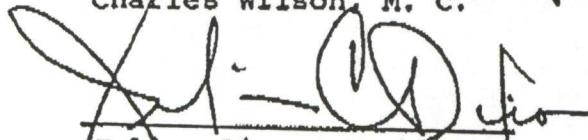
We are determined, in any event, to assure that this production program continues in the appropriations bill as finally enacted.

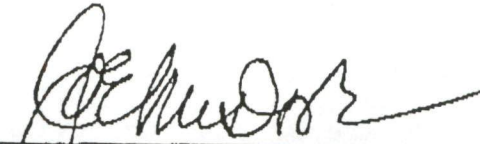
Sincerely,

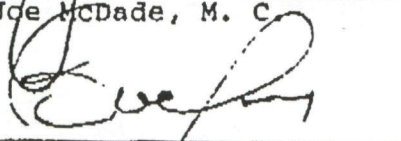

John P. Murtha, M. C.

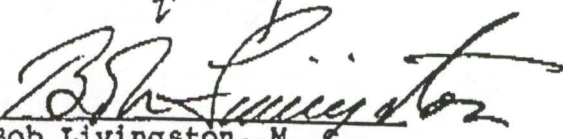

Norm Dicks, M. C.


Charles Wilson, M. C.

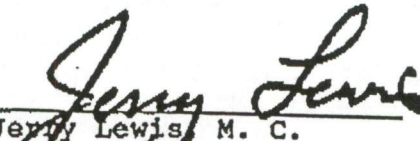

Julian Dixon, M. C.


Joe McDade, M. C.


Bill Young, M. C.


Bob Livingston, M. C.


Clarence Miller, M. C.


Jerry Lewis, M. C.

EXCERPT FROM
REMARKS BY:

REPRESENTATIVE LES ASPIN, D-WI,
CHAIRMAN, HOUSE ARMED SERVICES COMMITTEE

ELECTRONIC INDUSTRIES ASSOCIATION
LEGISLATIVE AFFAIRS COUNCIL LUNCHEON

TUESDAY, JUNE 11, 1991

...

We all witnessed the stunning success of the American and coalition air power in the Gulf War, saw television clips of the F-117 delivering precision-guided munitions to the front door or down the elevator -- the ventilator shaft, and the Air Force and, in particular, the pilots who flew those missions and put their lives at risk deserve a tremendous amount of credit.

The success of this whole operation in Operation Desert Storm has not been overlooked by supporters of B-2 who want to use it to bolster the case for the Stealth bomber.

Now, the logic goes something like this: We have the F-117, which is stealthy and can deliver precision-guided bombs, and we have the B-2 -- B-7 -- B-52, which has a tremendous range and payload. The B-2 puts it all together in one package -- it puts the stealthiness together with the range and payload and would offer a terrific, although -- albeit a very expensive conventional capability.

The Air Force, in all of this, I think might well be right. Before the Cold War ended and the Gulf War began, everyone, including the Air Force, thought of the B-2 as a nuclear bomber that had some conventional capabilities. It might now make much more sense to think of the B-2 as a conventional bomber that has some nuclear capability.

B-2 stealthiness is likely to be more important in a conventional role than in a nuclear role. Two reasons for that. First, in a conventional war, the aircraft is likely to be doing repeated sorties, and if you have a two percent loss rate, you'll be down to less than about half of your initial force after a 40-day air war like the one we had in Desert Storm. In a nuclear role, much lower survivability would be acceptable because, in a sense, it's just a one-time deal.

Second, in a conventional war, the B-2 would be going into early -- going in early in a conflict with little or no suppression on the other side's air defenses. In the nuclear role, ICBM and SLBM warheads would be used to suppress Soviet air defenses before the B-2s or other bombers got there, so it's a lot tougher to have a coordinated air defense after thousands of nuclear warheads have detonated in your country.

So, in short, there's a good case for the B-2 as a conventional bomber. The case, however, depends on a couple of things. First, the B-2's advantage over current B-52s and B-1s is its stealthiness. Therefore, we need to be sure that it's going to be as stealthy as advertised, which means getting more testing done. We've only completed four percent of flight testing and one percent of stealth testing on the B-2 today.

Second, the Air Force needs to make sure that the B-2 can deliver relatively inexpensive precision-guided munitions like the laser-guided bombs the F-117s used so successfully in the Gulf. The baseline B-2 program only includes one precision-guided munition, which is the Tri-service Standoff Attack Missile, or TSAM. Its existence has been recently revealed in the press. TSAM is a stealthy cruise missile with more than a hundred-mile range, but it runs almost \$2 million a copy, and that may be a stumbling block.

The B-2 and this weapon would be a potent combination, but the B-2 needs to be able to employ the much cheaper precision-guided munitions that we saw in the Persian Gulf to be really cost effective in a large-scale war. Now, the Air Force is working on that, and some of their early results seem to be encouraging.

If we can put the right munitions on the B-2, what unique capability might it offer?

Essentially, there are three scenarios that you could see using the B-2 in in the conventional role. First, a Libya-style raid.

The 1986 United States raid on Libya included 84 combat aircraft and 35 support aircraft, which came from two carrier battle groups and eight foreign bases. Six B-2s supported by six tankers could, in fact, carry out an equivalent raid, of about -- dropping of about 120 tons of conventional bombs, and they could do it really operating only from the United States. Good capability.

Second is this concern -- is -- is the possibility of a silver-bullet role. In a war like -- a war like Desert Storm, a few B-2s could be used as a silver bullet for going after well-defended deep targets. The Air Force, for example, said that they had some targets in Iraq that were too well defended for the B-52s to go after and too far for the F-117s to hit, at least until later in the war.

So the combination of range, payload, and stealth that we would have with the B-2 would make it ideal for going after such conflicts -- targets at the outset of a conflict. This would be an additional capability that we don't -- didn't have here in Desert Storm.

The third conventional mission for the B-2 is -- could be to use it a little bit like we used the F-117 -- as the leading edge of a larger air attack. Combined with the cruise missiles, B-2s could easily essentially poke out the eyes and ears of the enemy air defenses so that other less stealthy systems could penetrate with impunity. The leading edge of B-2s could supplement F-117s in scenarios when tactical aircraft were available.

So essentially what we're looking at is using [it] these three -- in those three -- those three kinds of conventional roles. So buying the B-2 for conventional missions really can, I think, make some sense -- maybe more sense than buying them from the strategic missiles, at least until we see where the Soviets are going with their air defense.

...

THE RELEVANCE OF HIGH-INTENSITY OPERATIONS

Glenn A. Kent

Lieutenant General, USAF (Ret.)

Four decades after World War II the European scenario still dominated U.S. planning. This scenario stemmed from the presence of many Soviet divisions on the Intra-German border. Military forces were to underline and enforce the stated national security objectives: Prevent the Soviet Union from dominating Western Europe; deter Soviets from large-scale military aggression against our NATO allies; prevent success of such an aggression if launched.

The European scenario centered on a key military objective: Provide a forward defense. To achieve this objective, the United States deployed Army forces and Air Force forces in the sovereign territory of some of our NATO allies and a line of defense was established on the NATO front. These forward-deployed forces were to be rapidly reinforced from the CONUS by deploying tactical aircraft and by airlifting Army troops. These troops were to marry with their tanks, APCs, and other heavy equipments previously stored in Germany.

At the same time, U.S. planners were aware that planning should also consider scenarios that were quite different. The United States could be required to insert forces to block an enemy's advance in circumstances where there was no organized line of defense, no basing infrastructure, and no large stocks of pre-positioned equipment.

Two historic events have completely changed our concepts about which type scenario is more relevant. First, the events unfolding in Europe (the unraveling of the Warsaw Pact and the agreements designed to greatly reduce, if not eliminate, the threat of

Soviet military actions against Western European countries); and second, the events in the Persian Gulf since last August.

In fact, there is now convergence between Persian Gulf-type scenarios and the new European scenario. In the new European scenario, the United States, after having withdrawn most of its forces in Europe, might be called upon to deploy a "covering" force to assist the Atlantic Alliance in some now unforeseen crisis. While this new European scenario is somewhat similar to a "Gulf" scenario, planners will understand that Gulf-like scenarios are more relevant and probably more tasking.

The essence of planning the structure and capabilities of future military forces is to grasp a vision of where and under what circumstances military power will be called upon to enforce security objectives defined and stated by the President. The correct approach to such planning is to know what threats we should worry about and how we are to react to such threats. The wrong approach is to try and arrange the world into collectors about conflict--high, medium, and low.

I have always quarreled about a formulation that classifies conflicts (wars) according to intensity. Intensity is defined as the amount of action per unit of space and time. Intensity is not to be confused with scope and duration. Intensity is an important concept, but not in the way it is commonly used. Intensity does not depend on the size of the forces or countries. Rather, intensity describes the mode of operation (the rate of action) with respect to a particular mission area within a particular phase of a stated conflict. If, in a particular mission area, a commander has the forces and battle control to do so, he will surely conduct operations in that mission area at the highest intensity feasible and appropriate.

To repeat, intensity has to do with the rate that a combatant commander conducts particular operations in a particular mission area in a particular phase of an overall campaign or war. The rate may be high for one combatant in a particular mission area during a particular phase and low for the other.

For example, in the Persian Gulf the United States conducted air operations at high intensity to gain air supremacy quickly in order to decrease the duration and scope of the war. The United States had the capability to do so. The Iraqis lacked such a capability and were forced to operate their forces at low or no intensity--and much to their detriment.

Now back to planning. The vision of a New World Order will frame the background of our future planning. Such a vision mandates the objectives of quickly projecting sea power, air power, and ground power to the far reaches of the globe and of being able, once deployed, to sustain high-intensity operations as required.

Global Reach/Global Power captures this concept:

- Project effective fire power early on--a few hours.
- Project massive fire power soon thereafter--hours to days.
- Deploy very capable ground forces--days to weeks.
- Sustain high-intensity combat operations as long as required.

The statements above are generic and sound too much like doctrine. Going through some scenario makes one think more perceptively about the relevance of intensity. The trouble is that scenarios invented by planners are not taken seriously until they happen, and then not for long. To try and pass the test of plausibility, I will build on a scenario that has already happened.

The year is 1999, we are engaged in a post-war analysis of a scenario that had its beginnings nine years before.

On August 2, 1990, Iraq invaded Kuwait. The United States responded and, beginning January 18, 1991, engaged in massive air strikes. On January 21, 1991, Saddam Hussein, much to the surprise of most and chagrin of some, chose a strategic course. He chose to save his forces to fight another day. On that date, Saddam Hussein ordered all his forces to withdraw from Kuwait. He achieved a cease-fire by accepting all the U.N.

resolutions. The forces in Kuwait were seriously pounded prior to the cease-fire. However, the Republican Guard were still relatively intact.

The President had to appear pleased, the Congress was relieved, and the public applauded. However, a few pundits had dire visions of events to come.

Saddam was subsequently relieved of office; the strongman had acquiesced to the Great Satan. There arose a new strongman. The bad news: He had the same expansionist views as Saddam. The worse news: He was much smarter. The worst news: There emerged a tenuous alliance between Iraq and Iran.

Now we shift to August 2, 1998. Iraq invaded Saudi Arabia. The invasion force did not stop to park in the sand at the border, but proceeded in a relentless drive to occupy key areas of Kuwait and Saudi Arabia before any effective countervailing military action could be mounted. A major drive was directed at capturing the ports and oil fields in the Eastern Province. Also a large ground force proceeded toward Riyadh to capture airfields in that area and to unhinge the Saudi government. At the same time, Iraqi aircraft and missiles attacked Saudi ports, airfields, and other assets.

The President responded immediately and decisively and declared this aggression would be halted and reversed. The President quickly committed U.S. forces to the region to enforce this objective.

This scenario was more testing than the scenario of Desert Storm. Here the United States did not have the luxury of an invading army parking in the desert to allow the President time to form a coalition, to project air power to bases with unscathed infrastructure, and to disembark ground forces at intact ports and without contest.

In the new scenario, the commander of allied forces declared it absolutely critical to achieve three operational objectives early on:

- Disrupt the enemy command and control.
- Slow or halt the invading armies.

- Maintain the viability of the ports and airfields.

Most of the B-2 force was assigned the first two objectives: Disrupt the enemy command and control; and slow or halt the invading armies. The B-2s operated from bases in Diego Garcia and the CONUS. Some B-2s were on airborne alert at sea and were over their targets in less than two hours after Presidential go-ahead which was 30 minutes after border crossing. Those bombers on ground alert in Diego Garcia arrived in six hours. Those based in CONUS in 13 hours. Once in the region, the B-2s assigned to attack the moving columns on invasion routes were "controlled" by a director in the back end of JSTARS. The JSTARS monitored the movement of enemy forces along the invasion routes and provided general "targeting" to the incoming B-2s. The JSTARS was already on hand since several were owned and operated by the Saudis. The United States, had previously seen the wisdom of providing (selling) the Saudis a dozen of these surveillance and control centers. This decision was based, in part, on the previous success of AWACS. We had come to depend on the JSTARS as a central control element in interdicting mobile and moving forces for air-to-ground operations just as AWACS became a central control element in engaging enemy aircraft in air-to-air operations.

By virtue of having forces capable of quickly mounting effective attacks, the United States was able to conduct high-intensity counterforce operations early on, and such operations had a decided effect on the duration and scope of war.

Another critical objective was to defend the two ports in the Eastern Province and the airfields in North Central Saudi Arabia.

Initially, the Saudi F-15 force was dedicated to defending these assets against enemy air attacks. This fighter force was now equipped with the "best" of air-to-air missiles--the AMRAAM--and gave a good account of itself in terms of enemy kills versus friendly losses. But the fate of the ports and airfields hung in the balance.

A number of the Air Force's newest fighter, the ATF, arrived 24 hours after the President's go-ahead. The low observables, the high sustained speed, and the far superior air-to-air missiles of this new fighter brought new dimensions to air-to-air combat. The concept of few Blue on many Red and many Red on few Blue had no relevance. Each Blue aircraft could engage many Red, but Red aircraft could engage only a few Blue. Lanchester's square law no longer applied. The fighter pilot's dream had come true: Unobserved entry into the battle; many shots with impunity; and disengagement at will. Although outnumbered, the United States could and did operate in the high-intensity mode and the enemy attacks were stopped.

Iraq now possessed surface-to-surface ballistic missiles of greatly increased range and accuracy, and these missiles posed a serious threat to the ports, bases, and oil fields.

The President, in his State of the Union Address in 1991, set forth the objective of protecting against limited strikes. In military terms, this became known as "counter-missiles" along side "counter-air"--the ability to cover our deployments and operations from enemy attack--air or missiles.

By avoiding the starts and stops attendant to most programs in the acquisition process, the United States had been able to equip four ships with batteries of long-range interceptors that could protect fairly large areas against attacks by ballistic missiles. We had already deployed two of these ships in the Persian Gulf and two in the Red Sea. These ships, along with extended-range Patriots already in Saudi Arabia and more deployed from CONUS, proved quite effective.

Some of the F-117As and F-15Es were tasked to accomplish a mission popularly known as "SCUD Hunting"--even though the missiles were no longer SCUDs. The concept for countering enemy tactical ballistic missiles had become an operational art. Center stage to the whole operation was JSTARS with its powerful radar. But the operators and directors in the back end of the JSTARS were the key to success. By correlating and associating the data from many sensors aboard other platforms, including satellites, these operators were able to

"target" a good number of the enemy launchers before they fired and "target" nearly all of them in near real time once they fired. "Shooters" on airborne alert were then directed to the appropriate coordinates to engage and kill. We were able to conduct very effective counterforce operations against the enemy's launchers. A combination of high-intensity counterforce and active defense against ballistic missiles saved the day--the ports and airfields remained viable.

Most of the remaining USAF combat aircraft were deployed to bases somewhere in the region in the next few days. Some of the bases had scant infrastructure. This posed no great problem. Beginning in 1991, the Air Force had taken purposeful action to implement concepts of maintenance and supply so that combat aircraft could quickly commence operations at such bases and then sustain operations at high intensity thereafter.

Operating the high-observable aircraft (primarily F-16s and F-15s) demanded the suppression of enemy defenses, especially radar-controlled SAMs (surface-to-air missiles). The Air Force now has an EC-X. The EC-X is a system to jam enemy radars from large standoff distances. The concept of standoff jamming is not a new concept. What is new is that the power of this new jammer is quantum leaps beyond previous jammers. Thoughtful planners saw to it that this powerful jammer was mounted on a long-range aircraft so rapid deployment was possible.

The JSTARS had also been equipped to control attacks against enemy SAM batteries. The operators in the JSTARS were again the key. By correlating and associating data from all other platforms, they were able to "tag" the blobs on their radar screens. Once tagged, the director declared "Tally Ho" (a particular blob is indeed an enemy SAM), and assigned a shooter on airborne alert to attack each located battery.

The essence of the overall concept is captured as follows: Once an enemy radar emitted, it was jammed with enough power so that it could not complete an engagement. Kill of the radar was then ensured, even if the radar turned off, before it could move or move far. By the combination of jamming in real time and real-time battle control to

accomplish sure-kill shortly thereafter, Blue aircraft experienced very low attrition from ground defenses--even for the high-observable aircraft. We had the battle control and the forces to engage enemy defenses in the most effective mode--high intensity.

Once we began to achieve air superiority, the ground forces were rapidly deployed to the region by air lift and sea lift. In the ensuing years since 1991, considerable effort had been directed toward the objective of being able to deploy massive ground power in a short time:

- The Army adopted a new measure of merit, "The most combat capability per ton."
- The number of wings of transports (active and reserve) were increased.
- More air lift capability was made available from civilian sources.
- The capability for fast sea lift was much greater.
- More heavy equipment was pre-positioned on ships in the Indian Ocean.

I will not elaborate further with respect to this scenario. I am glad to report that all the objectives set by the President were achieved and enforced.

We had superior aircraft, equipped with superior weapons, piloted by superior pilots. The combat forces were supported by superior battle control centers operating in real time. We had real-time assessment of damage to targets, and a planning system that could respond immediately to this information.

We had it all ways. By virtue of high-intensity operations, we gained air supremacy in a short time. Blue air forces attacked Red ground forces and other assets at will. Conversely, Red air did not, and could not, attack Blue assets. Blue ground forces could move at will. Red ground forces could not and were forced to dig in.

We had control centers (especially AWACS and JSTARS) that could correlate and associate data, in near real time, from a myriad of sensors on board other platforms. This capability, coupled with the disruption and destruction of the enemy's structure for command and control, gained "C³I Intelligence Supremacy." This meant that Blue knew about Red activity and could act accordingly, but Red could do neither.

Because of all of the above, and especially because of very effective real-time battle control and "shooters" that could respond to this control, we had the initiative and the wherewithal to engage in high-intensity operations, to unhinge the enemy, and to gain objectives quickly and with minimal casualties.

That is the real meaning of high intensity. We see now that intensity is not a sterile descriptor of conflict of forces according to the size of opposing forces. Rather, high intensity describes tactics and operations of the superior force. Lesser forces are relegated to low intensity or even none. Intensity modifies operations--nothing else.

Now a brief digression as to the critical role the B-2 force played in slowing the advance of the invading armies.

First, very effective weapons were employed:

- Clever engineers had designed a smart submunition that was two things: It was quite small; at the same time, it was quite effective in one-on-one engagements against trucks and transporters and also against armored vehicles.

Each B-2 carried several weapons, each containing many of these smart submunitions, for a total of 800 submunitions per aircraft. Planners expected that for the case of large columns of vehicles on roads, some 500 enemy vehicles would be at risk by each B-2 sortie and one-third of these vehicles would be damaged or destroyed.

- Clever engineers had also designed an extended-range, off-road mine. This mine was first conceived in the mid-70s. "Purposeful" planning coupled to a "streamlined"

acquisition process had made it possible to put this mine into our operational forces in a little over 20 years. [sic] The killing element of this mine is a variant of the same smart submunition referenced above. Each B-2 carried several weapons containing mines for a total of 500 mines. Each B-2 sortie employed mines along 25 kilometers of highway. They were activated at the appropriate time by a command from JSTARS. Planners expected the mines from each B-2 to create an ambush involving more than 500 enemy vehicles and again to damage or destroy a third of them.

Planners had considered employing these mines along selected highways even before border crossing by the Iraqi force. However, authority to do so was not forthcoming until just minutes prior to border crossing.

The first question: Are the capabilities described above mostly fantasy? The smart (and small) submunitions capable of killing trucks, transporters, and armored vehicles have been demonstrated. What is required is to provide the means of dispensing these submunitions in somewhat of an ordered manner over their intended targets so that they can do their thing--engage and kill hot engines in the end game.

The second question: Why was the B-2 force front and center in delaying the invasion forces early on? One, the B-2 had the range to operate from bases under our control (CONUS, Diego Garcia, and perhaps elsewhere). Two, the B-2, by virtue of low observables, could be used over enemy territory and enemy forces prior to our gaining air superiority. Three, the B-2 force could project enough fire power to make a significant difference in the rate of advance of the invading forces.

Cruise missiles from battleships, submarines, and other bombers were launched within hours against selected targets. However, the total capability provided by these force elements was limited. For example, the total number of smart submunitions carried aboard all the cruise missiles in each battleship was about the same as the total number of smart submunitions carried aboard all the weapons in each B-2 bomber. The capability per submarine was one-half that of each B-2. Also, the number of battleships and submarines

"on station" at the beginning was limited. Once these ships completed their sortie (fired out their load of cruise missiles), the turnaround time for the next sortie was several days, compared to one or two days for the B-2s with their weapons and the high-observable bombers with their cruise missiles.

The third question: Why weren't there more ships and bombers with more cruise missiles in the first place? Years earlier someone in the Office of the Secretary of Defense (OSD) commissioned a COEA (Cost and Operational Effectiveness Analysis). There were several inputs to this analysis.

First, some operational inputs. Low-observable bombers can operate in the vicinity of a target and, thus, use some form of a bomb. Battleships and submarines cannot, and must use long-range standoff cruise missiles. Bombers with high observables must also use standoff cruise missiles until defense suppression operations achieve air supremacy.

Now some monetary inputs. Bombs, including smart bombs, do not cost much. Long-range cruise missiles cost a lot. Taking into account the number of weapons to be expended and the cost of smart bombs versus smart cruise missiles, it turned out that it was quite cost-effective to invest in a carrier that could use smart bombs (the B-2) in order to save on the cost of expended weapons. The crossover point was a dozen sorties, i.e., after a dozen B-2 sorties, the monies saved by using smart bombs instead of smart cruise missiles paid for acquiring the B-2 bomber in the first place. Besides, the B-2 puts a man on the scene that can react to real-time battle control. Controlling attacks on moving columns with JSTARS is straightforward for the case of the B-2. Cruise missiles could only be targeted against fixed targets of known status. Also, given the sensors on the B-2 and the man-in-the-loop, the B-2 can accomplish its own targeting.

I have emphasized the relevance of having the "best" so that high-intensity operations are possible. This is somewhat at odds with analyses that focus on measures of merit such as "Least Cost Per Kill." Such measures are perhaps relevant if all "costs" are

taken into account. But, generally the costs taken into account are strictly monetary and neglect the larger costs to the nation.

There may be "opportunity costs." The President might not commit the prestige and might of the United States because he was not confident that the military option was viable if it had to be executed. That is, not viable in the sense that the President was not confident the mean time to success by the military was comfortably shorter than the mean time to failure of congressional and public support.

Or, worse still, the cost may be one of "Cost of Execution." The war could drag on, casualties could mount, public support would erode, and eventually the United States could fail to enforce the objectives stated by the President.

In either case, "Opportunity Cost" or "Execution Cost," leadership by the United States erodes and the New World Order becomes a blur.

Fielding forces that can engage in high-intensity operations does not come easily. Almost without exception, all of the so-called high-tech items in the war in the Persian Gulf were, at some stage or another, close to termination.

The AWACS is a case in point. In the early stages, some otherwise respected technical people said it would not work. Amendments presented on the floor of the Senate to delete the program were only narrowly defeated. Fortunately, wisdom prevailed. Technical people worked diligently to establish proof-of-principle in such a fashion to finally mute the most fervent critics, i.e., to demonstrate it really was feasible to get 58 decibels clutter rejection so that we could indeed detect and track low-flying aircraft against ground clutter from an airborne platform. At the same time, operators held the vision and concept that AWACS was to be the eyes of commanders around the world and would be central to the control of high-intensity, air-to-air operations in far-distant lands. We hope that such outcomes will be the case for programs in the years before us.

The decision by the President to announce to the world that he was committing the prestige and might of the United States to halt and reverse the invasion by Iraq was not easy.

Central to such a decision and commitment and freedom of action was the conviction that if military action became necessary, our forces could enforce and achieve the stated objectives in a relatively short time with minimal casualties.

If the United States intends to play a central role in a New World Order, then we must have a planning and acquisition process that ensures the President is backed by truly superior forces when aggressors sorely test our resolve in critical regions. If our military forces are not capable of high-intensity operations, the President will not be inclined to assert leadership and to assemble the political and military power to counter these aggressors. The rogues and tyrants will come to know this and act accordingly, much to the detriment of world stability and our own national interests.

#####

"CORRESPONDENCE TRACKING"

TYPE: INFORMATION

DOCUMENT NUMBER: 9121730

ORIGINATOR: 02

STATUS D

DIRECTORATE STATUS

FROM: WALKER, W.D.: DUKE UNIVERSITY

TO: DR. D.A. BROMLEY

DATE OF
CORRESPONDENCE: 06/12/91

SUBJECT: RE: THE NUCLEAR SITUTATION.

DIRECTORATE STAFF
ASSIGNED: ASSIGNED:

ACTION STAFF
REQUIRED: ACTION:

SENDER'S DUE DATE:
OSTP DUE DATE: STAFF DUE DATE
DATE COMPLETED: DATE COMPLETED/DEPT:

COPIES TO: D. Allan Bromley
NATIONAL SECURITY

WHITE HOUSE TRACKING #: CONTACT PERSON:
REMARKS: PHONE: EXT:

OSTP RECEIVED: 06/13/91
DEPT RECEIVED:

FILE: NATIONAL SECURITY

9121730

Duke University

DURHAM
NORTH CAROLINA
27706

WILLIAM D. WALKER

J.B. DUKE PROFESSOR OF PHYSICS

June 12, 1991

RECEIVED

91 JUN 13 P 1:05

TELEPHONE 619-684-8210

OFFICE OF THE
DIRECTOR

DEPARTMENT OF PHYSICS

Dr. D. Allan Bromley
Presidential Science Advisor
Office of Science and Technology
Washington, DC 20500

Dear Allan:

It seems to me that the time is ripe to begin to defuse the nuclear situation.

One of my long term nightmares is that the Soviet Union would break up and fall into anarchy. The only organized group would be the Defense. They own some 10 - 20 thousand nuclear weapons! These they can readily peddle to various countries - like Iraq, Syria, North Korea, Pakistan etc.. I don't know what they could get per weapon - but probably lots. They could support themselves for years.

Before we do anything more for the Soviet Union we should require the destruction of one or two nuclear weapons per One Million Dollars of subsidy - or something like that. We should offer to do away with ours on a one to one basis. Take the Pu or U235 from the weapons and grind it up and mix it with other Pu - a less useful isotope or U238 in the case of U235 and convert into reactor fuel. This is a one-time possibility and should be seized.

Nothing has ever happened on the NSF board. Jesse Helms recommended me last summer.

With best regards,



W. D. Walker
J. B. Duke Professor of Physics

dlr

"CORRESPONDENCE TRACKING"

TYPE: MEETING REQUEST DOCUMENT NUMBER: 9121740
ORIGINATOR: 02 STATUS I DIRECTORATE STATUS

FROM: ISAACS, John: COUNCIL FOR A LIVABLE WORLD EDUCATION FUND

TO: DR. D.A. BROMLEY

DATE OF
CORRESPONDENCE: 06/12/91

SUBJECT: REQUEST FOR A MEETING TO DISCUSS NATIONAL SECURITY
ISSUES AND THE ROLE THAT THE SCIENTIFIC COMMUNITY
CAN PLAY IN FORMULATING U.S. POSITIONS ON CRITICAL
SECURITY QUESTIONS.

DIRECTORATE STAFF
ASSIGNED: NATIONAL SECURITY ASSIGNED:
red 07 14

ACTION STAFF
REQUIRED: FOR DAB'S SIGNATURE ACTION:

SENDER'S DUE DATE:
OSTP DUE DATE: 06/28/91 STAFF DUE DATE
DATE COMPLETED: DATE COMPLETED/DEPT: JUN 19 1991
Natl Security

COPIES TO: D. Allan Bromley
INTERNATIONAL/POLICY

WHITE HOUSE TRACKING #: CONTACT PERSON:
PHONE: EXT:
REMARKS: DAB: I recommend that you decline to meet with
this group. They are a left/liberal organization that consistently
takes positions contrary to President Bush's policies. They will
seek to use a meeting with you to demonstrate they are
influential within the White House. I do not see that you
would gain anything by meeting with them. *imh* JUN 17 1991
OSTP RECEIVED: 06/14/91 FILE: NAT'L SECURITY*MEETING REQUEST
DEPT RECEIVED:

"CORRESPONDENCE TRACKING"

TYPE: MEETING REQUEST DOCUMENT NUMBER: 9121740
ORIGINATOR: 02 STATUS I DIRECTORATE STATUS

FROM: ISAACS, John: COUNCIL FOR A LIVABLE WORLD EDUCATION FUND

TO: DR. D.A. BROMLEY

DATE OF
CORRESPONDENCE: 06/12/91

SUBJECT: REQUEST FOR A MEETING TO DISCUSS NATIONAL SECURITY
ISSUES AND THE ROLE THAT THE SCIENTIFIC COMMUNITY
CAN PLAY IN FORMULATING U.S. POSITIONS ON CRITICAL
SECURITY QUESTIONS.

DIRECTORATE STAFF
ASSIGNED: NATIONAL SECURITY AS:

ACTION
REQUIRED: FOR DAB'S SIGNATURE ST:
AC:

SENDER'S DUE DATE:
OSTP DUE DATE: 06/28/91
DATE COMPLETED: DATE C(

COPIES TO: D. Allan Bromley
INTERNATIONAL/POLICY

WHITE HOUSE TRACKING #: CONTACT PERSON:
PHONE: EXT:
REMARKS:

OSTP RECEIVED: 06/14/91 FILE: NAT'L SECURITY*MEETING REQUEST
DEPT RECEIVED:

Charles Herzfeld
Michelle V.C.
Please advise
DOB

Completed
JUN 19 1991
Natl Security

THE WHITE HOUSE

WASHINGTON

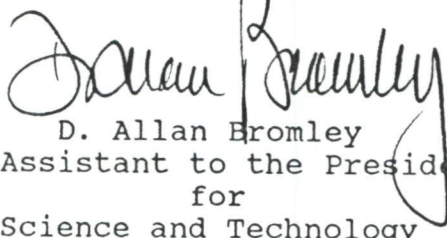
June 19, 1991

Dear Dr. Isaacs:

Thank you for your letter of June 12 requesting a meeting on national security concerns. I believe, as I'm sure you do, that the scientific community has a great deal to contribute to our nation's security and can take pride in those contributions.

As I am certain you can appreciate, my calendar is extremely full, so it is difficult to say when we might find a mutually convenient time to meet. However, I would welcome receiving your views and those of the Council as matters arise which you believe I might find of interest. Please feel free to write me here and to send us your publications.

Sincerely,



D. Allan Bromley
The Assistant to the President
for
Science and Technology

Dr. John Isaacs
President
Council for a Livable World
Education Fund
20 Park Plaza
Boston, Massachusetts 02116

MKVAN CLEAVE:pn:06/19/91 9121740

9121740

COUNCIL FOR A LIVABLE WORLD EDUCATION FUND

20 Park Plaza, Suite 602, Boston, Massachusetts 02116

Phone: (617) 542-2282 Fax: (617) 542-6695

91 JUN 14 A10:25

OFFICE OF THE
DIRECTOR

June 12, 1991

GEORGE RATHJENS

Chairman

JEROME B. WIESNER

Honorary Chairman

WAYNE T. JAQUITH

President

JOHN ISAACS

Washington Director

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Sociologist/Writer

JANE SHARP

Peace Research, SIPRI

WILLIAM E. TARLOW

Business Executive

PAUL C. WARNKE

*Attorney
Clifford & Warnke*

JEROME B. WIESNER

*Past President
Mass. Institute of Technology*

Dr. D. Allan Bromley
Assistant to the President for Science and Technology
358 Old Executive Office Building
17th and Pennsylvania Avenue, NW
Washington, D.C. 20506

Dear Dr. Bromley:

Council for a Livable World Education Fund would like to request a meeting with you to discuss national security issues and the role that the scientific community can play in formulating U.S. positions on critical security questions.

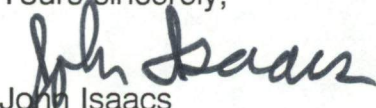
While most of our Board members are in Boston, we would be glad to set a time at your convenience.

We would proposed that the following distinguished scientists attend the meeting:

Dr. Dudley Herschbach - Harvard University
Dr. Edward Purcell - Harvard University
Dr. Matthew Meselson - Harvard University
Dr. George Rathjens - MIT
Dr. Jerome Wiesner - Past President, MIT

Please call me at the Washington, D.C. office in order to work out the details.

Yours sincerely,


John Isaacs
President

110 Maryland Avenue NE, Suite 211, Washington, DC 20002

Phone: (202) 543-4100 Fax: (202) 543-6297

"CORRESPONDENCE TRACKING"

TYPE: INFORMATION

DOCUMENT NUMBER: 9121651

ORIGINATOR: 02

STATUS C

DIRECTORATE STATUS

FROM: COOPER, Henry F.: DEPARTMENT OF DEFENSE, SDIO

TO: DR. D.A. BROMLEY

DATE OF
CORRESPONDENCE: 06/07/91

SUBJECT: RE: THE APPOINTMENT OF LIUTENANT COLONEL PATRICK K.
TALTY TO ACT AS LIAISON OFFICER BETWEEN SDIO AND
OSTP.

DIRECTORATE STAFF
ASSIGNED: ASSIGNED:

ACTION STAFF
REQUIRED: ACTION:

SENDER'S DUE DATE:
OSTP DUE DATE: STAFF DUE DATE
DATE COMPLETED: DATE COMPLETED/DEPT:

COPIES TO: D. Allan Bromley
NATIONAL SECURITY
Ken Yale
ADMINISTRATION

WHITE HOUSE TRACKING #: CONTACT PERSON:
PHONE: EXT:
REMARKS:

OSTP RECEIVED: 06/07/91 FILE: ADMIN-PERSONNEL*NAT'L SECURITY
DEPT RECEIVED:



DEPARTMENT OF DEFENSE
STRATEGIC DEFENSE INITIATIVE ORGANIZATION
WASHINGTON, DC 20301-7100

RECEIVED

June 3, 1991
91 JUN 7 A 8:49

OFFICE OF THE
DIRECTOR

Honorable D. Allan Bromley
Assistant to the President
for Science and Technology
Old Executive Office Building
17th Street & Pennsylvania Avenue, NW
Washington, DC 20506

Dear Dr. Bromley:

I am appointing Lieutenant Colonel Patrick K. Talty to act as the liaison officer between the Strategic Defense Initiative Organization and your organization. He is replacing Lieutenant Colonel Edward Pogue who is retiring this summer. Colonel Talty will make himself available to you and your staff to the depth necessary.

Colonel Talty has extensive experience in a number of key positions in my organization. Currently, he is Program Manager, Defense Acquisition, in the Acquisition and Mission Operations Directorate. He has served as the Executive Assistant to the Director, the Associated Deputy for Technology and is currently developing acquisition strategy for the Strategic Defense Initiative program. Previous assignments include Air Staff duty, assignment to Lawrence Livermore Laboratory as a research associate, and the Deputy for Engineering on the F-16XL program. Colonel Talty has a master's degree in Materials Engineering and served as an Assistant Professor of Engineering Mechanics at the U.S. Air Force Academy. He has an in-depth understanding of all aspects of the SDI program. This appointment will ensure a better coordination of our efforts in supporting the administration.

Sincerely,

HENRY F. COOPER
Director

"CORRESPONDENCE TRACKING"

TYPE: INFORMATION

DOCUMENT NUMBER: 9121723

ORIGINATOR: 02

STATUS C

DIRECTORATE STATUS

FROM: JELEN, George F.: ADVISORY GROUP SECURITY COUNTERMEASURES

TO: DR. D.A. BROMLEY

DATE OF
CORRESPONDENCE: 06/06/91

SUBJECT: RE:J THE NATIONAL OPERATIONS SECURITY AWARDS.

DIRECTORATE STAFF
ASSIGNED: ASSIGNED:

ACTION STAFF
REQUIRED: ACTION:

SENDER'S DUE DATE:
OSTP DUE DATE: STAFF DUE DATE
DATE COMPLETED: DATE COMPLETED/DEPT:

COPIES TO: D. Allan Bromley
NATIONAL SECURITY

WHITE HOUSE TRACKING #: CONTACT PERSON:
REMARKS: PHONE: EXT:

OSTP RECEIVED: 06/12/91
DEPT RECEIVED:

FILE: NAITONAL SECURITY

9121723
RECEIVED

ADVISORY GROUP/SECURITY COUNTERMEASURES

91 JUN 12 12:41

Washington, D.C. 20505

OFFICE OF THE
DIRECTOR

NATIONAL OPERATIONS SECURITY ADVISORY COMMITTEE

NOAC 006-91

6 June 1991

MEMORANDUM FOR: Honorable D. Allan Bromley
Assistant to the President for Science
and Technology

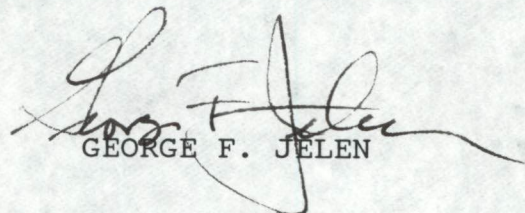
FROM: George F. Jelen
Chairman, National Operations
Security Advisory Committee (NOAC)

SUBJECT: National Operations Security Awards

1. On behalf of the NOAC, I thank you for your participation in the National Operations Security Awards Program. A total of 23 nominations were received--9 for the National Operations Security Organizational Achievement Award and 13 for the National Operations Security Individual Achievement Award. Needless to say, the selection committee had a very difficult decision to make. All of the nominees have made significant contributions in the field of operations security and are to be commended for their outstanding achievements.

2. I am pleased to announce that the U.S. Secret Service has been selected as the winner of the Organizational Achievement Award and General H. Norman Schwarzkopf, USA, as the winner of the Individual Achievement Award. Both of these non-monetary awards will be presented at the Second Annual National Operations Security Conference to be held July 22-26 at the McLean Hilton Hotel in McLean, Virginia. The Award Ceremony is scheduled for the evening of July 23 beginning at 6:00 p.m. followed by a reception in honor of the awardees. Approximately 800 U.S. Government representatives and supporting contractors are expected to attend the conference and ceremony.

3. I hope that you will again participate in next year's Award Program; information will be provided to you at a later date. Your support in this worthwhile effort is most appreciated.


GEORGE F. JELEN

"CORRESPONDENCE TRACKING"

TYPE: INFORMATION DOCUMENT NUMBER: 9121677
ORIGINATOR: 02 STATUS I DIRECTORATE STATUS

FROM: WEST, Togo D.: NORTHROP

TO: DR. D.A. BROMLEY

DATE OF
CORRESPONDENCE: 05/30/91

SUBJECT: REQUEST TO REVIEW THE MATERIALS ON THE B-2 BOMBER,
NOTING THAT THE HOUSE APPROVED A DEFENSE
AUTHORIZATION BILL FOR FY92 WHICH PROVIDES NO FUNDS
FOR PROCUREMENT OF THE B-2.

DIRECTORATE STAFF
ASSIGNED: ASSIGNED:

ACTION STAFF
REQUIRED: ACTION:

SENDER'S DUE DATE:
OSTP DUE DATE: STAFF DUE DATE
DATE COMPLETED: DATE COMPLETED/DEPT:

COPIES TO: D. Allan Bromley
Carl Bretscher
NATIONAL SECURITY

WHITE HOUSE TRACKING #: CONTACT PERSON:
PHONE: EXT:
REMARKS:

OSTP RECEIVED: 06/10/91 FILE: NATIONAL SECURITY-~~DEFENSE~~
DEPT RECEIVED:

NORTHROP

9/2/677
Togo D. West, Jr.
Senior Vice President
Government Relations

Northrop Corporation

Washington Office
1000 Wilson Boulevard, Suite 2300
Arlington, Virginia 22209
Telephone 703 525-6767

RECEIVED

91 JUN 10 AIO:

OFFICE OF THE
DIRECTOR

May 30, 1991

Dr. D. Allan Bromley
Assistant to the President for Science &
Technology
353 Old Executive Office Building
Washington, DC 20506

Dear Dr. Bromley:

As you certainly know, the House last week approved a defense authorization bill for FY92 which provides no funds for procurement of the B-2 bomber. This despite the facts that President Bush has called the B-2 "vital to our defense in the next century" and the Air Force considers the program its highest priority.

To provide you with up-to-date information on the program, I enclose the following:

"B-2 Stealth Bomber Fact Book";

a new brochure on the B-2;

a copy of a letter sent by President Bush to House leaders on May 20, 1991;

copies of letters by Secretary Cheney certifying satisfactory completion of Block 1 and Block 2 testing on the B-2;

a letter to the editor by Maj. Gen. Stephen B. Croker, which appeared in the April 12 issue of the Wall Street Journal;

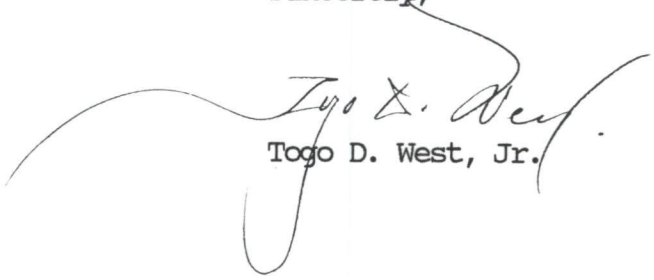
an op-ed piece by Cong. Bob McEwen, which appeared in the Washington Times;

"General Aspin's Pork Army," a Wall Street Journal editorial dated May 21; and

an Air Force Magazine editorial on how the media have reported on the B-2.

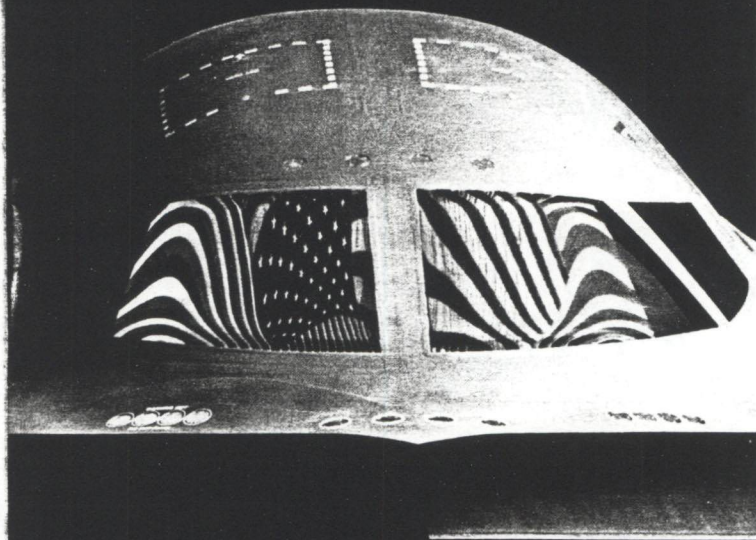
I hope you will take time to review these materials and inform yourself about the program. If you have any questions or would like additional information, please contact me.

Sincerely,


Togo D. West, Jr.

Enclosures

The B-2 . . .



THE WHITE HOUSE

WASHINGTON

May 20, 1991

Dear Congressman Dickinson:

The National Defense Authorization Act for Fiscal Year 1992 and 1993 (H.R. 2100) as reported by the House Armed Services Committee fails to meet the needs of the Nation's defense. If I am presented the bill reported by the Committee, I will veto it.

With the changes in the Soviet Union and Eastern Europe, and with the limitations on resources available for national defense, we plan substantial reductions in the coming years in the size of the U.S. armed forces. To provide forces capable of meeting future challenges within the fiscal limits that American taxpayers can afford, we must spend funds available for national defense with maximum efficiency. There is no room for pork-barrel spending or politics as usual in Congress.

The bill reported by the Committee terminated the B-2 Stealth bomber program that is vital to our defense in the next century. Also, despite the increasing need for effective defenses against missile attacks, the Committee bill slashes funding for the Strategic Defense Initiative, and especially the important Brilliant Pebbles program. While cutting funding for these and other crucial programs, the bill funds unneeded items such as excessive procurement of aircraft and other weapons systems. Finally, the bill prevents the reduction in the size of the Reserve and National Guard components of the armed forces needed for a carefully balanced and effective force structure.

The bipartisan leadership of the Congress and I have agreed to limits on the amounts which we will spend in the next few years on defense. We must spend these funds wisely if we are to provide the American people with the armed forces needed to defend the Nation and its interests around the globe. I urge the House of Representatives to produce a bill that reflects America's real defense needs, in lieu of the bill reported by the Committee on Armed Services.

Similar letters have been sent to the Speaker and Congressmen Michel and Aspin.

Sincerely,

A handwritten signature in dark ink, appearing to read "W. L. Dickinson". The signature is fluid and cursive, with the first name "William" and last name "Dickinson" clearly distinguishable.

The Honorable William L. Dickinson
Ranking Member
Committee on Armed Services
U.S. House of Representatives
Washington, D.C. 20515



THE SECRETARY OF DEFENSE
WASHINGTON, THE DISTRICT OF COLUMBIA

2 AUG 1990

Honorable Sam Nunn
Chairman, Committee on
Armed Services
United States Senate
Washington, DC 20510-1001

Dear Mr. Chairman:

Pursuant to Section 111 of the National Defense Authorization Act for Fiscal Years 1990 and 1991, Public Law 101-189 (1989), I certify that no major aerodynamic problem or flightworthiness problem has been identified during the Block 1 flight testing of the B-2 aircraft.

The Block 1 testing is complete. The Director of Operational Test and Evaluation has submitted a report to me containing the results of his review of the flight test data and an early operational assessment. His conclusions support my certification.

Overall, the B-2 has performed as well as or better than predicted. Flying qualities are meeting specification requirements for all conditions tested; takeoff performance is better than predicted; preliminary drag and fuel flow results are near predictions; the initial low observable flight test envelope is opened; and the initial air refueling envelope with the KC-10 is cleared. The primary objective of Block 1 testing to clear the B-2 flight envelope for initial low observable testing has been satisfactorily achieved.

Sincerely,

A handwritten signature in cursive script, reading "D. L. Chung".

cc: Honorable John Warner
Ranking Republican



THE SECRETARY OF DEFENSE
WASHINGTON, THE DISTRICT OF COLUMBIA



MAR 15 1991

Honorable Les Aspin
Chairman, Committee on Armed Services
House of Representatives
Washington, DC 20515

Dear Mr. Chairman:

Pursuant to Section 111(c)(2)(B) of the National Defense Authorization Act for Fiscal Years 1990 and 1991, Public Law 101-189 (1989), I hereby certify that the results of early Block 2 flight testing of the B-2 (including testing of low-observables and flying qualities and performance) are satisfactory; and no significant technical or operational problems have been identified during early Block 2 flight testing.

Initial Block 2 testing of the B-2 is complete. I have received both the report of the independent review conducted by the Low Observables Panel of the Defense Science Board, and the report submitted by the Director of Operational Test and Evaluation, as required by Sections 111(c)(2)(A) and 111(c)(3) respectively, of the National Defense Authorization Act referenced above.

This certification has also been sent to the Chairman of the Senate Committee on Armed Services and the Chairmen of the House and Senate Appropriations Committees.

Sincerely,

cc:
Honorable William L. Dickinson
Ranking Republican

Letters to the Editor

Our Military Future Needs the B-2

The central thrust of your Feb. 25 article "Success of High-Tech Weaponry in Gulf Buoy Backers of Northrop's B-2 Bomber" is accurate: We are encouraged by the performance of the F-117 and the implications of its success for our advocacy of the B-2. Unfortunately, while you presented many critics' arguments, you failed to provide the balanced counters to their false claims and distortions.

You note that critics charge the cost per B-2 is almost \$1 billion per plane—but don't explain the method by which this vastly inflated figure is calculated (dividing total program cost by total aircraft purchase). You later provide a totally different type of cost—"flyaway" cost for a F-117 (\$42 million). Providing these two dissimilar figures in the same article without an explanation is a classic "apples to oranges" comparison. When these two aircraft are compared in the same-year (1991) dollars, the flyaway costs are \$59 million for F-117 and \$437 million for B-2. As Secretary of the Air Force Donald Rice testified to the House Armed Services Committee, "If you look at the payload, you get more capability per dollars [with the B-2] than with the F-117." The cost ratio between the B-2 and F-117 is very comparable to the same-year dollar cost ratios between earlier bombers and fighters of the same generation.

"Cost" of any product—whether an automobile or an aircraft—is relative to the product's "value" to the consumer. While it is easy for critics to focus on the near-term cost impacts, the real "value" of the B-2 can be assessed only in terms of its contributions to our national-security objectives over the next 40 years. As the centerpiece of our strategic forces, the B-2 will provide unparalleled combat capability and flexibility for the entire spectrum of nuclear and conventional operations. The success of F-117s in Desert Storm has proved that stealth is a bargain because it enables us to operate with significantly fewer assets and places far fewer lives at risk. The B-2 will provide the stealth of the F-117 and the range and payload of the B-52, which will enable us to project power around the globe anytime, anywhere in support of U.S. objectives. These capabilities will become increasingly important as overall U.S. military forces become smaller, overseas bases are closed, and our B-52 bomber force approaches 40 years of service.

Over the period 1981 to 1989, the B-2 program stayed within its "cost-plus" contract budget. As we redesigned the wings to permit low-altitude terrain following flight and beefed up the structure to accommodate these stresses, our cost estimates grew 23%. Given that B-2 development required revolutionary advances in aircraft design and the invention of literally hundreds of new manufacturing processes and materials as we proceeded, a 23% cost growth over eight years is quite reasonable—in fact, remarkable. Cost growth since mid-1989 has resulted primarily from decisions beyond Air Force and contractor control that delayed full production and significantly reduced the total aircraft purchase and annual purchase rates.

You extol the success of cruise missiles in Desert Storm and ask why buy the B-2 "when other systems can do a similar job for a fraction of the cost?" You then ignore many operational limitations cruise missiles exhibit that limit their usefulness and flexibility. They are not reusable, not recallable, cannot react to en route defenses or "fog of war," are not easily mission planned and are not suitable for all targets. Fewer than 300 Navy Tomahawk cruise missiles were fired in Desert Storm, and almost all in the first days. At an approximate cost of \$1 million per copy, the total cost was about \$300 million to deliver less than 150 tons of ordnance. In contrast, during the first 35 days of the air war, our combat aircraft effectively delivered more than 70,000 tons of ordnance with devastating effect. (*That was only 1% of all the tonnage delivered during the Vietnam War.*) Some quick "back of the envelope" calculations should readily prove to anyone that \$1 million "silver bullets" are simply too expensive for massive conventional operations over extended periods in long-duration campaigns, regardless of their accuracy.

The B-2 represents an enormous technological achievement and provides revolutionary advantages that the U.S. should not abandon without a full understanding of the long-term consequences.

MAJ. GEN. STEPHEN B. CROKER

U.S. Air Force

Director of Strategic, SOF

and Airlift Programs

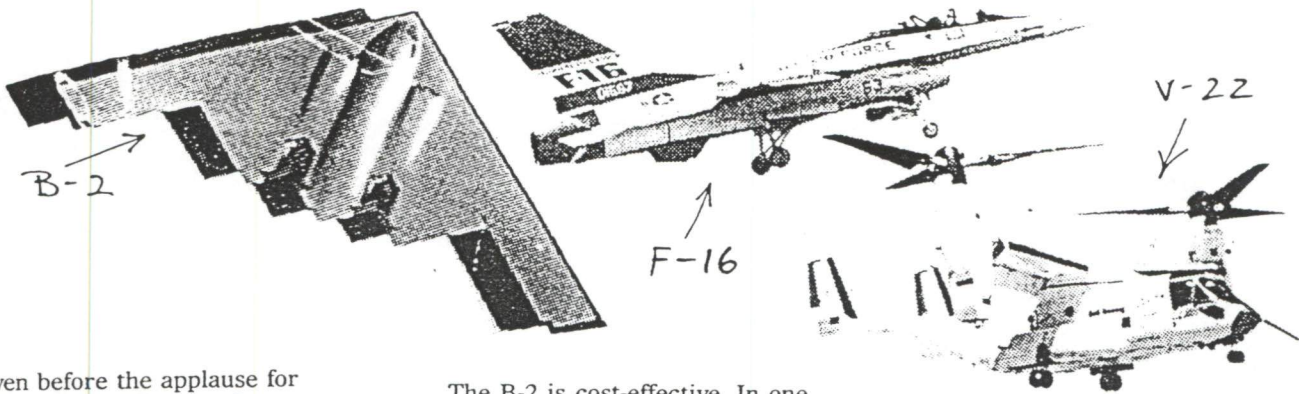
Assistant Secretary for Acquisition

Department of the Air Force

Washington

Today's decisions, tomorrow's defense

BOB MCEWEN



Even before the applause for Operation Desert Storm had died down, the first post-Gulf war defense vote took place in the House of Representatives. The safety and security of the American people lost.

In a near first-round knockout for the administration, the House Armed Services Committee adopted a defense plan with no money for our next-generation Stealth bombers.

The lack of B-2 funding is wrong for two reasons. First, it will cost the American taxpayer billions of dollars. Second and most important, it will jeopardize the lives of our soldiers and pilots who serve in the coming decades, as well as the citizens they have sworn to protect.

The most effective weapon used by the opponents of the B-2 is "sticker shock syndrome." Wielding inflated cost figures, they paint the B-2 as a cash cow that should be killed (or carved up, to be more accurate). Many have bought into this plan because defense dollars are scarce and pet weapons projects are vulnerable. The result: The net savings for taxpayers because of the B-2

funding cut equals a whopping zero dollars.

Instead, the money will be siphoned off to pet projects like the V-22 air transport (which the Pentagon doesn't want), more F-14 fighters (which the Navy doesn't want), more F-16 fighters (which the Air Force does not want), and more engines for the Air Force tanker fleet (which the Air Force already funds).

With more than 500 members of Congress, there must be a multitude of reasons thrown out by those who oppose the B-2. While everyone is entitled to his own opinion, everyone isn't entitled to his own facts. Here are a few facts I hope B-2 opponents will consider:

The B-2 is cost-effective. In one Desert Storm flight operation, 75 aircraft costing \$6.5 billion were unable to destroy an Iraqi nuclear facility. This mission was accomplished by a force of eight Stealth F-117 aircraft costing \$1.5 billion. Two B-2s costing \$1.3 billion could have done this mission with even bet-

ter Stealth secrecy and could have taken off from as far away as the United States! The incredible reach and power of the B-2 makes it as effective as 75 of our current aircraft at billions of dollars of savings.

Building more B-2s makes good financial sense. The opponents of B-2 grow dizzy when they see how much each B-2 costs. That's because they don't look beyond the numbers to see what's being bought. Yes, creating a fleet of B-2s will require a significant investment. But any bomber that is invisible to radar, can take off from the United States and reach any corner of the world, will cost a lot of money. Because we have already poured billions of dollars into the production and support facilities for the B-2 program, each additional plane will be less expensive than those already built. In fact, because we have committed \$38 billion

for the first 15 planes, we could accelerate the production schedule and buy the final 60 planes for \$28 billion more, and waiting five to 10 years will not make them cheaper.

The B-2's Stealth technology works. Stealth is battle-proven. Just ask our pilots returning from the Gulf. Forty-two Stealth F-117's flew only 2 percent of our total combat missions, but hit 40 percent of the most important and most heavily defended Iraqi targets. Because of Stealth technology, our Air Force won the war against Iraq's Soviet MIGs within hours. The B-2's Stealth features are even more advanced than the F-117's.

The B-2 is critical to the strategic interests of America. Before our liberation of Kuwait, we spent weeks transporting weapons for the air war and months transporting material for the ground war. The B-2 would change this. In addition to the quantum leap the B-2 makes in Stealth capability, the plane would assure America the ability to project military power anywhere in the world in a matter of hours. The B-2 has more than five times the range and can deliver up to 10 times the precision punch of the F-117. With that payload and range, we will still have an unmatched global military presence even though we will continue to scale back our armed forces and prune our network of bases.

The B-52 is nearing its 40th birthday. Technology of the 1940s, endlessly stripped and refitted, cannot serve America and freedom's interests into the next century. We need to commit to tomorrow's technology today. If we don't, we will risk inviting aggression and raise the cost of preserving the peace. We will also not be able to carry out military operations vital to our national interest.

Recently speaking to Congress, Gen. Norman Schwarzkopf thanked past presidents for seeking funding of the technology that "gave us the confidence necessary to attack into the teeth of the enemy with the sure knowledge that we would prevail."

The decisions made in the past decade gave us strength needed in Operation Desert Storm. Where the president stands in 2001 will depend on the decisions Congress makes this week.

REVIEW & OUTLOOK

General Aspin's Pork Army

The man who planned America's air campaign against Iraq, Lt. Gen. Charles Horner, says the war taught him two main lessons—the importance of stealth technology, and the need to defend against ballistic missiles, such as Scuds. So guess what the U.S. House of Representatives is trying to gut in this year's defense budget? Stealth and missile defenses.

We'd have thought the Gulf War also taught that the world remains a dangerous place, even with a declining Soviet threat; that high-tech weapons are an important American strategic advantage; that the Pentagon's war-fighting strategy has some basis in reality after all. But the House is acting as if nothing much happened in Iraq, as if Scuds never flew and all future threats have vanished. For all the rethinking in Congress, the Pentagon might as well have lost the war.

This is no mere caricature; the Members are only too happy to say it themselves. "The Persian Gulf War hasn't really entered into this year's debate over the fate of major weapons," says Ron Dellums, the Berkeley Democrat. Adds Republican William Dickinson of Alabama: "Desert Storm is behind us, and the defense drawdown train has left the station."

The four-star general driving this train is Les Aspin, chairman of the traveling circus known as the House Armed Services Committee. General Aspin knows that defense spending in the House is less about war than about ideology and pork-barrel politics. The chairman has one staff member, Larry Smith, devoted mainly to the task of "Member services." His job is to keep the chairman informed of the Members' wish lists, which Mr. Aspin then dutifully tries to meet to keep his troops happy. This year Mr. Smith has been working overtime.

Ron Dellums, for example, has long been on a crusade against the B-2 Stealth bomber, and General Aspin now agrees. He rallied his committee to slash B-2 spending by two-thirds to \$1.6 billion and a future total of only 15 bombers, though the Pentagon wants 75. Mr. Aspin apparently isn't impressed that the Stealth fighter, the F-117, flew just about every sensitive mission over Baghdad without a single loss.

The B-2 is more expensive than it should have been, but most of its re-

search costs are already paid for. It's a stealthy craft that can carry a huge payload as far as 10,000 miles on a single refueling—but projecting U.S. power is not a House priority.

Nor it would seem is anti-missile defense. General Aspin's committee slashed the Pentagon's SDI request to \$2.7 billion (from \$4.5 billion) and refused any money for space-based interceptors known as Brilliant Pebbles. General Aspin claims to still support "theater" defenses such as the Patriot, but as Scuds proliferate and grow more sophisticated, defenses must do the same. A defense based in space can protect against missiles launched from anywhere, while a "theater" defense is by definition confined to a specific location.

Stealing from SDI and the B-2 means General Aspin has more money to buy his committee's votes. Mississippi Democrat Sonny Montgomery grabbed more than \$1 billion for the reserves, including \$280 million for National Guard armories (in some 100 congressional districts) that the Pentagon doesn't want. The Pentagon has to deactivate four army divisions through 1993, but the reserves supposedly assigned to those divisions will live on. Behold the reserves' new Lost Brigades.

The Ohio and Michigan delegations won \$270 million for 60 more M-1 tanks, as if tank battles are the wave of the future. Pennsylvania Republican Curt Weldon happily sold his vote for more money for the V-22 Osprey, which the Pentagon has tried to kill for three straight years.

Some Members go especially cheap. Richard Ray, a Georgia Democrat, backed Mr. Aspin after he squeezed projects worth \$4.2 million for Robins Air Force Base in his district. Virginia Democrat Norman Sisisky went along with the chairman after Fort Lee, in his Virginia district, lined up for \$11.3 million for a finance office and training facility the Pentagon didn't want. "I could give you hundreds of these examples," says one Pentagon source.

Some log-rolling is inevitable, but a fast-declining defense budget has a smaller margin for waste. Defense Secretary Cheney's budget already proposes to shrink the military by 25% through 1995, to the lowest level as a share of the economy since 1939. Anything less and the U.S. might not be able to repeat Desert Storm, which apparently doesn't worry the pork-barrel generals of Congress.

By John T. Correll, Editor in Chief

The B-2 and Television

ACCORDING to opinion polls, a high percentage of Americans think the B-2 Stealth bomber should be canceled. This is understandably distressing to the US Air Force, which regards the B-2 as a critical requirement.

In a free society, public opinion has a powerful influence on public policy. That is fundamental to our process of government and politics, but the principle is subverted when the public does not have accurate information on the issues. It is important, therefore, to ask what evidence the public heard before reaching a verdict on the B-2.

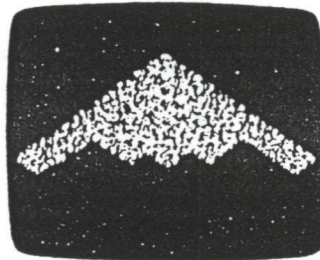
Part of the answer is provided by Stephen Aubin, an Olin research fellow at the Boston University Center for Defense Journalism. Analyzing B-2 coverage, day by day for more than a year, Mr. Aubin found that the three major television networks—the main source of news for most Americans—fed their viewers a distorted story.

ABC, CBS, and NBC concentrated, almost single-mindedly, on the cost of the B-2. They showed little interest in the aircraft's military mission, capabilities, or technology. Its role in arms control and strategic deterrence got very short shrift. The networks reported with relish on problems in the B-2 program but consistently ignored the successes.

To merit airtime, a story had to be visual and dramatic. For one eight-month stretch, between rollout and taxi tests, the B-2 practically disappeared from network newscasts. The reason, apparently, was that the producers had no interesting new pictures to show. When there were pictures, the newscasters overlaid them with pejorative adjectives like "exorbitant" and "ominous-looking." Mr. Aubin cites several instances in which television enhanced or cooked the facts, making the story more titillating.

The networks seldom passed up an opportunity to be snide. ABC's Diane Sawyer pitched her July 10, 1989, report this way: "What's long overdue, way over budget, and proved today it

can travel at least six miles on the ground?" She added that the B-2 "rolled up and down a runway in California today, the first time it's gone anywhere under its own power." Did the viewers understand that the news element in this cleverness was that the B-2 had done exactly what it was supposed to do in its taxi test?



The Stealth bomber may foil radar, but it's vulnerable to another electronic device: the network TV camera.

A week later, Fred Francis of NBC followed Ms. Sawyer's pattern as he reported the B-2's first flight: "The bat-winged bomber, the costliest weapon ever built, eighteen months overdue, and already being trashed by Congress, lifted gracefully into the California dawn." The networks felt compelled to point out that this first flight was not very fast and not very high and did not demonstrate the B-2's ability to evade radar. Did the viewers understand that the flight was not supposed to do any of those things, or, given such cues as "costliest," "overdue," and "trashed," did they reach some other conclusion?

In April 1989, CBS told the nation that the new Secretary of Defense, Dick Cheney, had reservations about

the B-2. A month later, Mr. Cheney gave the B-2 program high marks for quality control and expressed his support. CBS did not find that newsworthy.

Print media coverage of the B-2, which Mr. Aubin also studied, was more complete and better balanced. Newspapers, magazines, and newsletters had their share of negativism and bias, Mr. Aubin said, but the expanded context in print media "often gives the reader a fighting chance to form his own opinion."

It is no surprise that the most analytical coverage was in technical and trade publications, whose readers expect more than superficiality. Still, many reporters and columnists in general-interest publications seemed to understand that although the cost of the B-2 was an issue, it was not the only issue and perhaps not even the most important issue.

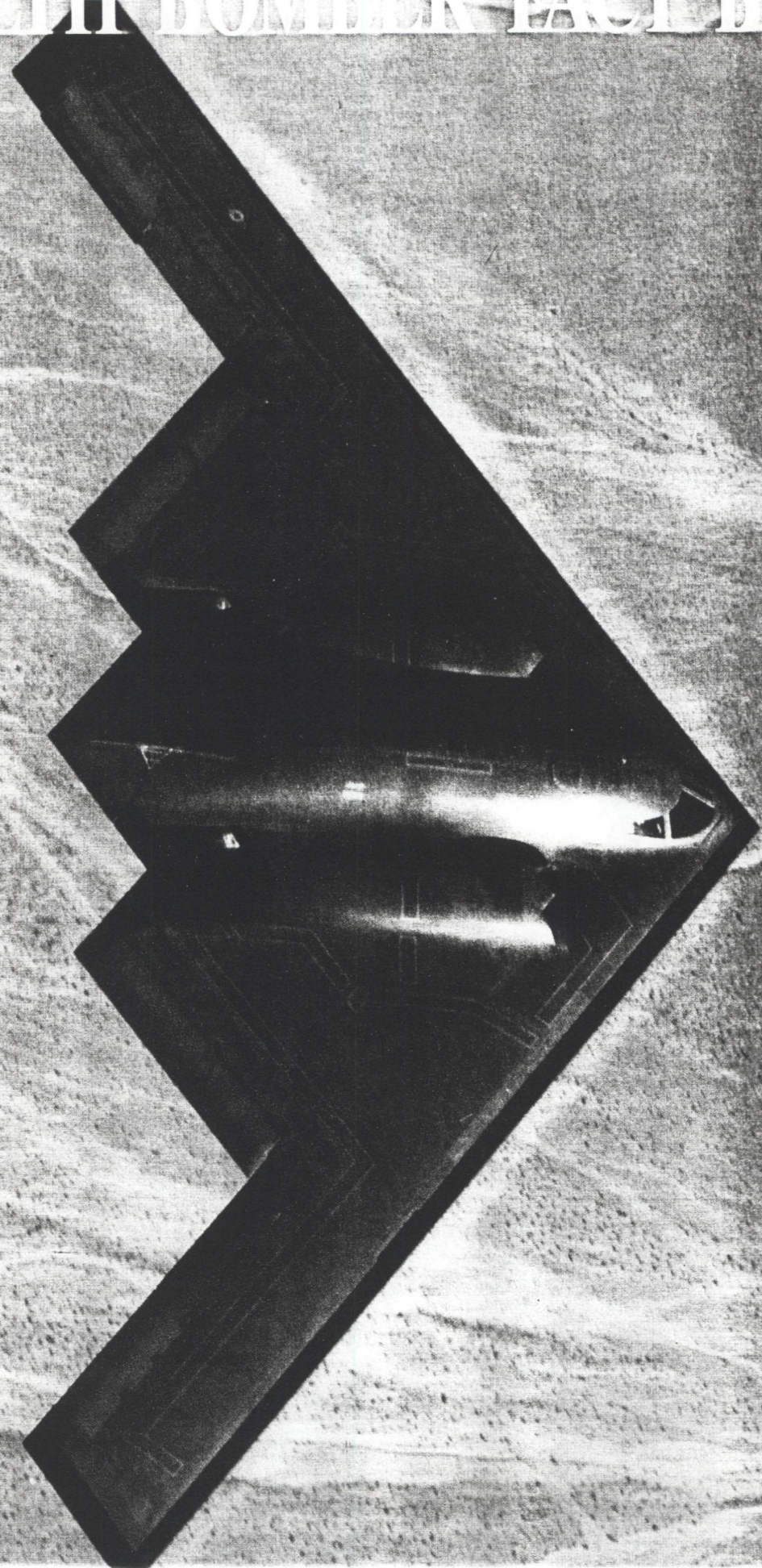
Mr. Aubin presents a fuller report of his findings in *The B-2 and Network News*, published in January by the Aerospace Education Foundation. Mr. Aubin is demonstrably not flack-ing for the B-2 or any other Pentagon program. In fact, he even points out a couple of negative angles the networks missed on the B-2.

Who knows what conclusions the vast viewing audience might have reached about the B-2, given a fuller set of facts and exposure to less simplistic considerations? Unfortunately, the networks have not given us a chance to find out.

The fate of the B-2 will probably be decided in Congress this year. The hand of those who oppose the program is undoubtedly strengthened by the B-2's bad image in the opinion polls. Let us hope that the final round of debate goes deeper than the fluff dispensed on the evening newscasts. Both the airplane and the public deserve better than they have gotten from network television.

It is ironic that the B-2, designed to defeat enemy radar, remains vulnerable to an electronic device of a different kind. It has no effective defenses against the domestic television camera.

B-2 STEALTH BOMBER FACT BOOK



1991

"CORRESPONDENCE TRACKING"

TYPE: INFORMATION

DOCUMENT NUMBER: 9121594

FROM: ATWOOD, Donald J.: DEPUTY SECRETARY OF DEFENSE

TO: Dr. D. Allan Bromley

DATE OF
CORRESPONDENCE: 05/30/91

SUBJECT: A RESPONSE TO DAB'S LETTER OF 04/18/91 REGARDING THE
SCIENTIFIC OPPORTUNITIES PRESENTED BY THE KUWAITI
OIL FIRES. DoD WILL PROVIDE ANY SUPPORT WHICH CAN BE
MADE AVAILABLE WITHOUT IMPAIRING MILITARY OR OTHER
HIGHER PRIORITY MISSIONS.

DIRECTORATE
ASSIGNED:

STAFF
ASSIGNED:

ACTION
REQUIRED:

STAFF
ACTION:

SENDER'S DUE DATE:

OSTP DUE DATE:

DATE COMPLETED:

DATE COMPLETED/DEPT:

COPIES TO: D. Allan Bromley
NATIONAL SECURITY
ENVIRONMENT
INTERNATIONAL/POLICY

WHITE HOUSE TRACKING #:

CONTACT PERSON:

REMARKS:

DATE RECEIVED: 05/30/91

FILE: NATIONAL SECURITY



THE DEPUTY SECRETARY OF DEFENSE

WASHINGTON, D.C. 20301

9121594
RECEIVED

30 MAY 1991
91 JUN 3 P 4: 24

OFFICE OF THE
DIRECTOR

Honorable D. Allan Bromley
Assistant to the President
for Science and Technology
The White House
Washington, D.C. 20506

allan
Dear Dr. Bromley:

In response to your letter of 18 April, I am pleased that the Department has been able to support the many efforts which have been initiated to capitalize on the scientific opportunities presented by the Kuwaiti oil fires. We will, of course, share any data which is collected through the Department of Defense portion of the research program. With respect to your request for further assistance, we will provide, under the provisions of The Economy Act, any support which can be made available without impairing military or other higher priority missions.

The Defense Nuclear Agency is serving as the DoD lead on this activity and has been working very closely with the National Science Foundation to ensure that we maximize the benefits of this endeavor to address our respective needs.

I am confident that this will be a mutually rewarding and beneficial program. Dr. George Ullrich, the DNA Deputy Director, will continue to work directly with the NSF and your staff to execute this effort.

Sincerely,

Donald J. Atwood

"CORRESPONDENCE TRACKING"

TYPE: INFORMATION

DOCUMENT NUMBER: 9121339

FROM: MAC LANE, Saunders: THE UNIVERSITY OF CHICAGO

TO: DR. BROMLEY

DATE OF
CORRESPONDENCE: 05/01/91

SUBJECT: "THE SECOND LABOR OF HERCULES, A ESSAY ON SOFTWARE
ENGINEERING AND THE STRATEGIC DEFENSE INITIATIVE,
PRELIMINARY DRAFT"

ASSIGNED TO:

ACTION REQUIRED:

SENDER'S DUE DATE:

OSTP DUE DATE:

DATE COMPLETED:

COPIES TO: D. Allan Bromley
NATIONAL SECURITY
Ken Yale
PHYSICAL SCIENCES

WHITE HOUSE TRACKING #:

CONTACT PERSON:

REMARKS: Enclosure to DAB.

DATE RECEIVED: 05/06/91

FILE: NATIONAL SECURITY-DEFENSE

9121339

THE UNIVERSITY OF CHICAGO

DEPARTMENT OF MATHEMATICS

5734 UNIVERSITY AVENUE

CHICAGO • ILLINOIS 60637

FAX: (312) 702-9787

BITNET: ucmath/zaphod@uchicago.bitnet

INTERNET: ucmath@zaphod.uchicago.edu.

RECEIVED
MAY 6 12:08
OFFICE OF THE
DIRECTOR

May 1, 1991

Dr. D. Allan Bromley
The White House
Washington, D.C. 20500

Dear Allan,

This note is to accompany the enclosed essay bearing on SDI.

The Second Labor of Hercules. An essay on software engineering and the Strategic Defense Initiative, Preliminary Draft by Prof. David B. Benson, Washington State University.

The essay (written 1986 not exactly new!) is an informative analysis of the (often discussed) difficulties of designing elaborate software. I am not an expert on this subject, but I have found this essay careful and informative. The author is well known to me. Some of his research in computer science has made use of various of my own ideas in category theory; here I can testify that he is a sound worker.

This is the essay which I mentioned to you when we talked at the Academy meeting.

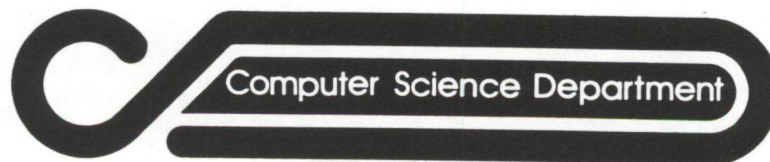
Cordially,


Saunders Mac Lane

SM/lw

The Second Labor of Hercules
An essay on software engineering
and the Strategic Defense Initiative
Preliminary Draft

David B. Benson
Professor of Computer Science



Washington State University
Pullman, Washington 99164-1210

"CORRESPONDENCE TRACKING"

TYPE: INFORMATION

DOCUMENT NUMBER: 9121294

FROM: STICKNEY, Wallace E.: FEDERAL EMERGENCY MANAGEMENT AGENCY

TO: DR. BROMLEY

DATE OF
CORRESPONDENCE: 04/29/91

SUBJECT: RE: THE RECENT FEMA AWARDS CEREMONY AT WHICH COLONEL
JOHN O'NEIL RECEIVED THE FEMA OUTSTANDING PUBLIC
SERVICES AWARD FOR 1991.

ASSIGNED TO:

ACTION REQUIRED:

SENDER'S DUE DATE:

OSTP DUE DATE:

DATE COMPLETED:

COPIES TO: D. Allan Bromley
NATIONAL SECURITY

WHITE HOUSE TRACKING #:

CONTACT PERSON:

REMARKS:

DATE RECEIVED: 05/02/91

FILE: NATIONAL SECURITY



9121294

Federal Emergency Management Agency

RECEIVED
Washington, D.C. 20472

91 MAY 2 A 9: 50

APR 29 1991

OFFICE OF THE
DIRECTOR

The Honorable D. Allan Bromley
Director
Office of Science and Technology Policy
Executive Office of the President
Washington, DC 20506

Dear Dr. Bromley:

We were sorry you could not attend the recent Federal Emergency Management Agency (FEMA) Awards Ceremony at which Col. John F. O'Neil of your staff received the FEMA Outstanding Public Service Award for 1991. Since I did not get to talk with you at the Ceremony I wanted you to know, personally, that the emergency preparedness community appreciates the outstanding leadership that Col. O'Neil provides. As Chairman of a task force that addresses training and exercise planning for one of FEMA's major program areas, he is able to focus the participants' efforts to ensure National and Regional Emergency Management Team readiness to respond to national security emergencies.

This is, of course, an extraordinary duty for Col. O'Neil, and it is through your support that he is there for us. Thank you for making him available.

I look forward to our continuing to work closely together in meeting the Federal emergency response needs of the Nation.

Sincerely,

1988

A handwritten signature in cursive script, reading "Wally Stickney", is written over the typed name.

Wallace E. Stickney
Director

"CORRESPONDENCE TRACKING"

TYPE: INFORMATION

DOCUMENT NUMBER: 9121399

FROM: GOLDSTEIN, Irving: COMSAT

TO: DR. BROMLEY

DATE OF
CORRESPONDENCE: 04/29/91

SUBJECT: THE COMSAT REPORT TO CONGRESS AS REQUIRED BY THE
COMMUNICATIONS SATELLITE ACT OF 1962.

ASSIGNED TO:

ACTION REQUIRED:

SENDER'S DUE DATE:

OSTP DUE DATE:

DATE COMPLETED:

COPIES TO: D. Allan Bromley
PHYSICAL SCIENCES
NATIONAL SECURITY
INDUSTRIAL

WHITE HOUSE TRACKING #:

CONTACT PERSON:

REMARKS: *Enclosure to DAB.*

DATE RECEIVED: 05/10/91

FILE: NATIONAL SECURITY-TELECOM

9121399

Irving Goldstein
Chairman
Chief Executive Officer



COMSAT

RECEIVED

01 MAY 1991 04:46

Communications
Satellite Corporation

950 L'Enfant Plaza, SW
Washington, DC 20024
Telephone 202-863-6433

April 29, 1991

OFFICE OF THE
DIRECTOR

Dear Mr. President and Members of Congress,

The Communications Satellite Act of 1962 requires that COMSAT submit a report to the President and the Congress annually. I am proud to submit a report for 1990 and in so doing would like to refresh your memory on the reason we were created by the 1962 Act. The reasons are as valid today as they were when the Act was passed.

The Act states, in part:

The Congress hereby declares that it is the policy of the United States to establish, in conjunction and in cooperation with other countries, as expeditiously as practicable a commercial communications satellite system, as part of an improved global communications network, which will be responsive to public needs and national objectives, which will serve the communication needs of the United States and other countries, and which will contribute to world peace and understanding.

The new and expanded telecommunication services are to be made available as promptly as possible and are to be extended to provide global coverage at the earliest practicable date. In effectuating this program, care and attention will be directed toward providing such services to economically less developed countries and areas as well as those more highly developed...

COMMUNICATIONS SATELLITE ACT
AUGUST 31, 1962

The vision of global communications via satellite foreseen in the 1962 Satellite Act is in brilliant focus today as the information age supports a global economy and world events are in broad view. This vision to link all countries around the world together with expanding highways of telecommunications technology is a household and office place reality today.

COMSAT is proud to be a part of this global success story of American diplomacy, leadership, technological know-how and sound business strategies. Today the INTELSAT system of advanced satellites and efficient earth stations stands as the major and most visible U.S. contribution to modernize telecommunications among industrialized and developing countries alike. All countries share the mutual benefits of a common global system that is today the major link bridging the developed and developing worlds together. COMSAT is unique as a United States corporation with a clear mandate in the 1962 Satellite Act to contribute to communications development, particularly for the less developed countries. The need to keep these countries as full partners in telecommunications is as important today as it was in 1962. Universal availability of telecommunications continues to be affordable under U.S. policies to foster global connectivity over the INTELSAT system and this continues to be accomplished on a commercially sound basis.

The telecommunications environment continues its rapid change as the wave of competition, liberalization, and privatization brings even a greater choice and variety of telecommunications services of high quality at lower prices. The wave of change that swept over this country in the 1970's and 1980's is now opening markets in Western Europe, changing basic structures in East Europe and shaping the economic activity of the Pacific rim countries. In our own hemisphere, the President's recently announced Enterprise for the Americas Initiative highlights the importance of telecommunications to facilitate trade and business investments within the region of the Americas.

The INTELSAT System has been a major catalyst for change with the flexibility to adjust to and accommodate different national policies and changing telecommunications structures. In the United States, all competing service providers and users authorized under U.S. policies have open and nondiscriminatory access to the INTELSAT System. As the U.S. Signatory, COMSAT remains dedicated to this principle.

This year's annual report reflects the many positive contributions to the social, cultural, and economic growth spurred by the availability of reliable telecommunications around the world. The soundness of the vision in the 1962 Satellite Act is clear today and will continue to serve well the future needs of a changing world.

Sincerely,

Irving Galdstein

"CORRESPONDENCE TRACKING"

TYPE: ACTION DOCUMENT NUMBER: 9121898
ORIGINATOR: 02 STATUS C DIRECTORATE STATUS

FROM: STETTES, Steven S.: NATIONAL GEOGRAPHIC SOCIETY

TO: DR. D.A. BROMLEY

DATE OF
CORRESPONDENCE: 04/16/91

SUBJECT: A COPY OF THE SIXTH EDITION, "NATIONAL GEOGRAPHIC
ATLAS OF THE WORLD" AND A REQUEST FOR
ASSISTANCE/ADVICE IN BRINGING TOGETHER PUBLIC &
PRIVITE INTERESTS TO PRODUCE SCIENTIFIC DATA FOR
BASIC RESEARCH OF THE KUWAIT OIL-WELL FIRES.

DIRECTORATE STAFF
ASSIGNED: D. Allan Bromley ASSIGNED:

ACTION STAFF
REQUIRED: AS NECESSARY ACTION:

SENDER'S DUE DATE:
OSTP DUE DATE: 04/30/91 STAFF DUE DATE
DATE COMPLETED: 04/18/91 DATE COMPLETED/DEPT:

COPIES TO:

WHITE HOUSE TRACKING #: CONTACT PERSON:
PHONE: EXT:
REMARKS:

OSTP RECEIVED: 04/17/91 FILE: NATIONAL SECURITY
DEPT RECEIVED:

THE WHITE HOUSE
WASHINGTON

April 18, 1991

Dear Mr. Stettes,

I am delighted to receive from you the Sixth Edition of the National Geographic Atlas of the World, particularly with its personal inscription from Mr. Grosvenor.

I am afraid that he and I started our telephone conversation with wildly wrong information at both ends and so our discussion was a little strange until we were able to sort things out.

I want to take this opportunity to congratulate all of you at the National Geographic Society for your participation in what will be an absolutely unique experiment taking advantage of the Kuwait oil fires to study, in a way never before possible, the injection of large amounts of carbon particulates into the atmosphere.

Your help has been of critical importance in putting together the international effort that is needed to obtain the maximum amount of information while this experimental situation exists, and I fully anticipate that your magazine will play a very major role in conveying that, and related information, to an interested public.

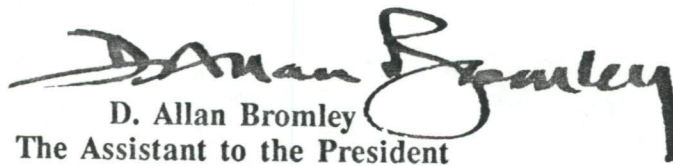
As one of those who grew up waiting avidly each month for the newest National Geographic as a vehicle to vicarious travel to the farthest reaches of the planet, I realize that I owe the Society over 50 years of heartfelt thanks.

Again, my special thanks for the Atlas of the World which I shall put to excellent use.

Please convey these thanks to Mr. Grosvenor.

With all best wishes,

Sincerely yours,


D. Allan Bromley
The Assistant to the President
for
Science and Technology

Mr. Steven S. Stettes
Assistant to the President
National Geographic Society
Washington, D.C. 20036

TELEPHONE
(202) 828-5689
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9121898
CABLE ADDRESS
NATGEOSOC, WASHINGTON

National Geographic Society

COMMITTEE FOR RESEARCH AND EXPLORATION
WASHINGTON, D. C. 20036

STEVEN S. STETTES
ASSISTANT SECRETARY

April 16, 1991

The Honorable D. Allan Bromley
Assistant to the President
for Science and Technology
Old Executive Office Building, Suite 358
17th Street & Pennsylvania Ave., N.W.
Washington, D.C. 20506

Dear Mr. Bromley:

On behalf of Mr. Gilbert M. Grosvenor, President and Chairman of the National Geographic Society, please accept the accompanying Sixth Edition National Geographic Atlas of the World. As indicated by Mr. Grosvenor's personal note inside the front cover, he hopes that the accuracy of the atlas will prove to be better than his initial information regarding the Office for Science and Technology.

Also included with this letter is background information on the Society's effort to raise support for the Kuwait Oil-Well Fire Atmospheric Assessment Project. Progress is continuing as the Society, in cooperation with the National Center for Atmospheric Research (NCAR), the University Corporation for Atmospheric Research (UCAR), and several universities seek to develop a two-phase scientific atmospheric assessment plan to collect and measure air pollutants generated by these fires. The project is being coordinated by the National Science Foundation.

Please note that our efforts are focused from a scientific research perspective. This is not a media or journalistic endeavor on the part of the Society. Our goal is to bring public and private interests together to produce valuable scientific data for basic research.

Any assistance or advice in this effort would be greatly appreciated. Mr. Grosvenor would welcome a telephone call [(202) 857-7788] should you have any questions, or to further discuss this project.

Sincerely,



Steven S. Stettes
Assistant to the President
Kuwait Oil-Well Fire
Atmospheric Assessment Project

KUWAIT OIL-WELL FIRE ATMOSPHERIC ASSESSMENT PROJECT

April 1, 1991

Introduction

The 500+ oil-well fires currently burning in Kuwait offer a unique opportunity to study the impact of massive fossil fuel fires on weather and climate systems in the Persian Gulf region. The magnitude of these fires is unprecedented, and indeed the impact may be global in scale.

The National Geographic Society, in cooperation with the National Center for Atmospheric Research (NCAR), the University Corporation for Atmospheric Research (UCAR), and several U.S. universities, is developing a two phase scientific atmospheric assessment plan to collect and measure air pollutants generated by these fires. These efforts, as well as those by other interested scientific organizations and Federal agencies are being coordinated by the National Science Foundation.

Objectives

The following are objectives of the overall atmospheric assessment plan:

- To identify and characterize the regional emission rates of smoke particles and trace gases;
- To measure radiative properties of the smoke particles, and the net radiative effects of the plumes, while focusing on how the radiation affects the altitudes of the plumes, and the stability of the atmosphere;
- To measure individual characteristics of the smoke particles and determine if the particles have a hygroscopic (moisture retention) component, (or if they acquire such a component through chemical transformations) that would accelerate their removal from the atmosphere;
- To search for direct evidence that smoke particles are scavenged in clouds, and to determine the effects of the smoke on the composition and radiative properties of clouds;

- To measure the chemical composition of the collective smoke plumes, and determine how the composition may change with time. Such measurements will aid in developing estimates of the atmospheric residence time of the smoke;
- To track, and map, the atmospheric extent of the distribution of pollutants from the oil-well fires;
- To study regional weather anomalies associated with these smoke emissions.

Plan Outline and Methodology

PHASE ONE

The primary tools to be utilized are research aircraft of the National Center for Atmospheric Research (Lockheed *Electra*) and the University of Washington (Convair C-131A).

The *Electra* aircraft is currently undergoing inspection and repairs by the Zantop Corporation in Macon, Georgia. It will soon return to Boulder, Colorado where it will be calibrated and extensively equipped with instrumentation to provide smoke aerosol characterization, to study aerosol/cloud interactions, to measure (by a combination of *in-situ* and remote sensing) the regional mass flux of aerosols and trace gases, to detail the chemistry of the smoke and its alterations with time, and to examine the dynamical interactions of solar heating on the smoke plume. With more than twice the range of the Convair, and a superior service ceiling, the *Electra* will devote extra effort to the long distance plume assessment.

The Convair C-131A, with a long history of studying large fires, is similarly equipped with special strengths for characterization of the optical properties of the smoke and the spectral albedo of the smoke plume. Grab samplers will be deployed to measure specialized emission factors by means of carbon balance methods.

A key element in effective use of the aircraft and in regional plume impact assessment will be the analysis of satellite imagery. Analysis of this imagery, together with plume trajectory modeling, will allow the aircraft to intercept plume fragments well downwind, and in regions of plume/cloud interaction.

PHASE TWO

Phase two will focus on longer term issues and will emphasize surface based monitoring. Additional atmospheric testing by aircraft will be continued as necessary. Surface sampling and analysis stations will focus on issues dealing with radiation balance, optical depth and precipitation chemistry, and will include at least one research grade meteorological radar to observe precipitation formation over heat sources, in the downwind plume zones, and in unaffected areas to seek to identify acute meteorological anomalies.

Some elements of phase two will be of sufficient long-term duration to assess the results of the decay of the sources as fires are extinguished. The surface albedo will be assessed in areas with both wet and dry deposition of soot, and compared to areas with no soot fallout.

Project Participants

The total number of project participants in the Persian Gulf region is estimated at 30, and will include scientific, operational and technical personnel. Supplemental and related studies may include additional individuals for numerical modeling efforts aimed at simulating the transport, chemical and nucleation properties of the smoke plume and it's attendant precipitation.

The following are organizations and agencies currently involved in this project:

- Desert Research Institute, University of Nevada
- Drexel University
- University of Hawaii
- National Center for Atmospheric Research (NCAR)
- National Geographic Society
- National Oceanic and Atmospheric Administration (NOAA)
- National Science Foundation (NSF)
- Rhode Island University
- University Corporation for Atmospheric Research (UCAR)
- University of Washington
- United States Geological Survey (USGS)

Efforts are underway to enlist assistance from the U.S. Department of Commerce, the Department of Defense (DOD)/Joint Chiefs of Staff, the Department of Energy (DOE), the Environmental Protection Agency (EPA), and the Department of State.

Anticipated Costs

In addition to political support from the U.S. government, a minimum of \$1.66 million must be raised to fund this project. The breakdown of necessary funding is as follows:

•National Center for Atmospheric Research*	\$ 836,000
•University of Washington	725,000
•University of Hawaii	60,000
•Desert Research Institute	40,000

TOTAL \$1,661,000

*(The NCAR budget includes participation by Drexel University and Rhode Island University)

Fuel costs alone are estimated at +/- \$200,000, and efforts are underway to seek contributions by the military of fuel for the project aircraft. In addition, it is hoped that the U.S. military in the region may be able to provide housing and food for the program participants, and security for project operations.

Cooperation is also being sought from other agencies or organizations that may have weather reconnaissance aircraft and/or weather radar already in the area.

Program Schedule

The phase one airborne atmospheric assessment component of the project is scheduled to depart the United States by May 1, 1991 for a field operation of approximately 30 days duration. The project design is for each aircraft to fly an estimated 100 hours of research missions based out of either Bahrain or Dhahran, Saudi Arabia.

The timing of this project during the month of May is critical for the following reasons:

- It is the earliest that the airborne teams can reasonably depart;

- It is the crucial meteorological transition to the dry season which will allow the observation of smoke plumes under both cloudy and cloud-free conditions;
- Climatological modeling of plume trajectories shows that during this time plumes will remain in airspace accessible to aircraft more than 80% of the time.

The phase two schedule remains to be outlined, and is subject to the outcome--and the success--of the highly critical first phase of this project.