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EXECUTIVE OFFICE OF THE PRESIDENT
OFFICE OF SCIENCE AND TECHNOLOGY POLICY
WASHINGTON, D.C. 20502

October 23, 1998

MEMORANDUM FOR KERRI-ANN JONES

FROM: STEVE RINALDI *SR*

SUBJECT: Committee on National Security Meeting – October 27

You are scheduled to co-chair the Committee on National Security (CNS) meeting with Dr. Jacques Gansler on October 27 at 10:00 a.m. in Room 3D1019 of the Pentagon. I have verified that Dr. Gansler will attend the meeting.

This package will help prepare you for the meeting. It consists of the following sections:

1. Tab A: Meeting announcement and agenda.
2. Tab B: Minutes of the June 29 CNS meeting.
3. Tab C: Briefing Charts, Critical Infrastructure Protection R&D IWG.
4. Tab D: Briefing Charts, Nonproliferation and Arms Control Technology Working Group (NPAC TWG).
5. Tab E: NPAC TWG Annual Report Executive Summary.
6. Tab F: FY2000 Interagency R&D Priorities memo, dated June 16, 1998, and talking points on the FY99 enacted budget.
7. Tab G: Talking points, Weapons of Mass Destruction R&D Subgroup

Should you need further information on any of the topics, I will be happy to provide it to you.

Attachments

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OFFICE OF THE DIRECTOR OF
DEFENSE RESEARCH AND ENGINEERING
3040 DEFENSE PENTAGON
WASHINGTON, D.C. 20301-3040

October 22, 1998

MEMORANDUM FOR MEMBERS OF THE NATIONAL SCIENCE AND TECHNOLOGY
COUNCIL COMMITTEE ON NATIONAL SECURITY

SUBJECT: Committee on National Security Meeting on October 27, 1998

The next meeting of the Committee on National Security (CNS) will be held as previously scheduled on Tuesday, October 27, 1998, from 10:00-11:30 AM in Room 3D1019, the Pentagon. The classification of the meeting will be Secret. We will coordinate with your office, if we do not have your clearance on file.

The draft agenda and read-ahead material are attached. The read-ahead material consists of the following:

- a. Minutes of the previous meeting held June 29, 1998.
- b. Briefing charts for Critical Infrastructure Protection.
- c. Briefing charts for Nonproliferation and Arms Control Working Group
- d. Nonproliferation and Arms Control Technology Working Group Annual Report
Executive Summary.
- e. FY 2000 Interagency Research and Development Priorities memo of June 16, 1998.
- f. Committee on National Security Membership List.

We look forward to your joining us on October 27, 1998. I can be reached at (703) 695-0005, e-mail SLOTERLE@ACQ.OSD.MIL, if you have any questions.

Lewis E. Slotter, II
Executive Secretary,
Committee on National Security

Attachments:
As stated.



**Agenda for the Meeting of the
NSTC COMMITTEE ON NATIONAL SECURITY
October 27, 1998
10:00 – 11:30 AM
Pentagon, Room 3D1019**

I. INTRODUCTION

II. STATUS OF CURRENT EFFORTS

- International Technology Transfer Issues & Policy- Update
- Critical Infrastructure Protection R&D- Agenda Overview
- Non-Proliferation & Arms Control- Annual Report Overview

III. OTHER BUSINESS

- FY00 R&D Budget Priorities
- Weapons of Mass Destruction Research & Development Subgroup

IV. CLOSING REMARKS

COMMITTEE FOR NATIONAL SECURITY MEMBERSHIP LIST

Dr. Jacques Gansler, Under Secretary of Defense Acquisition & Technology
Dr. Kerri-Ann Jones, Office of Science & Technology Policy
Mr. William Reinsch, Under Secretary Export Administration, Department of Commerce
Dr. Miley Gonzalez, Under Secretary for Research, Education & Economics Mission
Area, Department of Agriculture
Mr. Gary Bachula, Acting Under Secretary, Technology Administration, Department of
Commerce
Mrs. Joanne Isham, Acting Deputy Director Science & Technology, Central Intelligence
Agency
Dr. Gary Samore, Special Assistant to the President & Senior Director, Nonproliferation
& Export Controls, National Security Council
Mr. James F. Devine, Senior Advisor for Science Applications, US Geological Survey,
Department of Interior
Mr. Jorge Perez-Lopez, Director of Office of International Affairs, Department of Labor
Mr. Robert Knouss, Director, Office of Emergency Preparedness, Department of Health
& Human Services
RADM A. J. Kinghorn, Vice Commandant, US Coast Guard, Department of
Transportation
Mr. David Morrison, Program Associate Director for National Security and International
Affairs, Office of Management & Budget
Ambassador Ralph Earle, II, Deputy Director, Arms Control & Disarmament Agency
Mr. John Barker, Deputy Assistant Secretary for Export Controls, Department of State
Mr. Robert G. Bell, Special Assistant to the President & Senior Director, Defense Policy
& Arms Control, National Security Council
General John R. Dailey, Acting Deputy Administration, National Aeronautics & Space
Administration
Mr. Robert A. Eisenstein, Assistant Director for Mathematical & Physical Sciences,
National Science Foundation
Mr. Leon Fuerth, National Security Advisor to the Vice President, Office of the Vice
President
Ms. Rose Gottemoeller, Director, Office of Nonproliferation & National Security,
Department of Energy
Mr. Mark McClellan, Deputy Assistant Secretary for Economic Policy, United States
Treasury

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EXECUTIVE OFFICE OF THE PRESIDENT
NATIONAL SCIENCE AND TECHNOLOGY COUNCIL
WASHINGTON, D.C. 20502

NSTC COMMITTEE ON NATIONAL SECURITY
Minutes -- Meeting of June 29, 1998

The Committee on National Security (CNS) held its seventeenth meeting on June 29, 1998. The principals who attended are listed at Attachment 1. The primary purpose of the meeting was to receive status reports from the Critical Infrastructure Protection R&D Interagency Working Group, the International Technology Transfer Issues and Policy Interagency Working Group, and the Nonproliferation and Arms Control Technology Working Group. The meeting agenda is shown at Attachment 2.

I. INTRODUCTION

Dr. Kerri-Ann Jones opened the meeting and welcomed Dr. Hans Mark, the new Director, Defense Research and Engineering, who was sitting in for Dr. Jacques Gansler. Dr. Jones pointed out that the CNS has rejuvenated itself and now has a number of active working groups. This has resulted in a tremendous increase in the workload of affected staffs. She asked the members to consider the workload as additional activities are presented.

II. CURRENT EFFORTS

A. Critical Infrastructure Protection

Dr. Jones introduced the subject and pointed out that the Critical Infrastructure Protection R&D Interagency Working Group (CIP R&D IWG) was established last March in anticipation of the signing of Presidential Decision Directive (PDD) 63. She introduced Dr. Steven Rinaldi, the Office of Science and Technology Policy (OSTP) staff focal point for critical infrastructure protection, who presented a status report on the activities of the group.

Dr. Rinaldi began by reviewing the PDD R&D tasking. The group has been meeting biweekly since its establishment. The goals of the IWG are twofold: (1) develop and coordinate the federal government's critical infrastructure protection R&D agenda before the end of the year and (2) reach out to industry, academia, and international partners. A national R&D agenda and plan are due to the President by November 18, 1998. With regard to the group work plan, the IWG plans to develop a conceptual yet comprehensive agenda that is not constrained by funding by July 15. This plan will serve as the basis for identifying gaps and shortfalls. The draft R&D agenda and plan will be

ready for interagency review by September 18, 1998; the final agenda is due October 18 for NSC staffing before submittal to the President.

Dr. Ruth David asked how the IWG can determine R&D gaps without first having knowledge of ongoing R&D in the private sector and academia. Dr. Rinaldi acknowledged that this is a difficult problem. The President's Commission found it difficult to obtain this information from the private sector, and the IWG will probably face a similar problem with both industry and academia. The IWG will refine and improve the R&D agenda annually, bringing in new information from the private sector and academic community as it becomes available. Dr. Jones emphasized that this effort is a first cut but acknowledged that getting data from industry and academia will not be easy. She solicited ideas from the committee on means by which it could be accomplished. With respect to the telecommunications sector, Dr. Rinaldi noted that the National Security Telecommunications Advisory Committee (NSTAC) has invited the IWG to participate in its fall R&D exchange meeting. Dr. Jones added that the President's Committee of Advisors on Science and Technology (PCAST) has an ad hoc security group with members from private industry and academia, and this issue has been brought to its attention for assistance.

The IWG has completed an initial review of ongoing agency programs and budgets and is currently summarizing infrastructure vulnerabilities. It is drawing upon a number of existing analyses performed by other agencies. It will develop near- and long-term budgets, as well as a detailed FY2000 budget requested by the NSC. The internal review of the terms of reference for the group has been completed, and a copy can be provided to interested CNS principals. A question was raised concerning coordination with other groups (e.g., Department of Justice (DOJ) core agency group). Dr. Rinaldi pointed out that he is a member of the Technical Support Working Group (TSWG) subgroup on infrastructure protection, and the chair of that subgroup is a member of the IWG. An OSTP colleague of Dr. Rinaldi is actively participating in the DOJ study, and the two of them are examining the DOJ study results and conclusions to see how the pieces fit together.

The Critical Infrastructure Assurance Office (CIAO) is completing a roadmapping study on perceived technology gaps. Argonne National Laboratory coordinated the study which incorporated inputs from the government, private sector, academia, and national laboratories. The study, which is undergoing final review, will provide an initial R&D program plan for the IWG. It does not include a list of ongoing government R&D programs, which the IWG is currently developing.

In summary, the IWG activities are well underway. Dr. Rinaldi views this as a long-term effort, and the IWG has had preliminary discussions on its activities for next year. Developing a partnership with the private sector and academia will be a key to success. In response to a question from Dr. Jones, the principals agreed that the IWG should forwards its reports to the CNS before submitting them to the Critical Infrastructure Coordinating Group.

B. International Technology Transfer

Dr. Jones introduced Dr. Gerald Hane, the OSTP chair of the International Technology Transfer Issues and Policy Interagency Working Group (ITTIP IWG). She noted that the working group is examining two case studies. Dr. Hane began by presenting the Federal Laboratory International Technology Transfer Policies case study. This case study is examining best practices and is not focused on a particular Cooperative Research and Development Agreement (CRADA).

Dr. Hane pointed out that the central question in technology transfer policy is how to identify and decide on national security and economic security concerns. There are two categories of transfers: (1) technology partnerships, which are primarily domestic yet have international implications, and (2) formal intergovernmental activities. Executive Order (EO) 12591 (April 10, 1987) provides guidance on the first category. It calls for reciprocity in comparable partnerships in a country, assessments of national intellectual property protection in that country, and evaluations of the adequacy of export controls in that country. There are a modest number of foreign partners in CRADAs (DOE has 25, DoD 32, DOC 19, NASA 0, DOI/USGS 0) and other cooperative agreements (as in the case of NASA).

The IWG has developed several preliminary observations on domestic programs. Agencies appear to follow different approaches on domestic cooperation programs. EO 12591 provides important but general guidance. Decision making is decentralized and typically delegated to laboratories. Thorough reviews are conducted of relevance to agency missions. Some agencies use interagency reviews of agreements, especially on issues of reciprocity. Agency laboratories typically make export control determinations. Mr. William Reinsch pointed out that the laboratories do not have the authority to make those judgments; rather, it must be done by the Department of State (DOS) or the Department of Commerce (DOC) through their statutory processes.

The IWG identified several preliminary best practices in the domestic programs it reviewed, including use of checklists, reviews by internal committees to obtain a variety of perspectives, and interagency assessments of reciprocity. For example, the IWG found that U.S. Geological Survey (USGS), Department of Interior, followed a straightforward process based on a detailed checklist. The USGS solicits for CRADA proposals through announcements in the Federal Register, and an agency committee reviews all proposals. The IWG also noted that licenses and sublicenses typically are not tracked in agency review processes, and authority for a decentralized export control review process is unclear.

In its review of formal intergovernmental activities, the IWG found that in 1995 there were 651 bilateral and 116 multilateral agreements recorded in the State Department's Title V report on international cooperation in science and technology. Preliminary observations indicated that agencies are provided general authorities for international cooperation but that interagency and lead coordination rests with the State Department. There is no guidance comparable to EO 12591. International agreements are more complicated because they have strategic and diplomatic as well as technical goals. A key challenge is that reviews are frequently performed at the laboratory or project level, and export determinations are typically made at the laboratories. An example of a model approach is that employed by the U.S. Air Force. The service coordinates a summary statement of intent to negotiate an agreement that includes a DOC review. The DOC and DOS review the formal agreement after its negotiation with the foreign partner. DOD conducts legal and policy reviews. Parameters considered in the USAF approach include (1) the quid-pro-quo, (2) impact on the industrial base, (3) operational requirements, (4) availability of similar technology in the United States, (5) possibility of compromising the technology, (6) Military Critical Technology List and security review, and (7) National Disclosure Policy category. The best practices identified include the use of checklists and interagency review of both economic and security issues. However, licenses and sublicenses are not tracked, and there is no guidance to the laboratories on strategic priorities and parameters to be considered in the review.

The IWG work plan for the next few months includes (1) studying the feasibility of interagency review of reciprocity and economic concerns, (2) examining the feasibility of interagency review of export control issues addressing current practices and authority to make agreements, (3) exploring the desirability of using checklists to track key issues and as an administrative tool to monitor progress, and (4) meeting the requirements of the Tauscher Amendment, which calls for review of international participation in major CRADAs and issuance of appropriate guidance with a report back to Congress in a year. Mr. Reinsch requested that the CNS discuss the best ways to respond to the Tauscher Amendment if it passes. Dr. Jones agreed and indicated that any new procedures proposed by the IWG would be vetted with the principals.

The other case under consideration by the IWG involves commercial communication satellite export control. Because of difficulties encountered on this case study, the principals agreed to postpone it temporarily. The principal agencies involved (i.e., DOC, DOS, and DoD) should discuss among themselves how to proceed. Mr. Reinsch indicated that DOC was working on five other cases from the original list: (1) International Participation in SEMATCH: 300-mm Silicon Wafer Initiative, (2) Coproduction of M109 Howitzer, (3) Rocket Casing Manufacturing, (4) High Performance Computer Export Controls, and (5) Third Party Licensing. He anticipated that the studies would be completed in about four weeks and then distributed for review and comment. Dr. Jones indicated that the list of members of the IWG would be distributed to the CNS principals so they would know who to contact in an agency if questions arise during review of the case studies.

C. Nonproliferation and Arms Control

Dr. Jones introduced Mr. Mark Swiecicki, Arms Control and Disarmament Agency (ACDA), executive secretary of the Nonproliferation and Arms Control Technology Working Group (NPAC TWG), who presented the group's status report. He noted that the NPAC TWG reports to the National Science and Technology Council through the CNS and to the NSC deputies through the Defense Policy and Arms Control IWG, the Nonproliferation and Arms Control IWG, and the Intelligence IWG. The NPAC TWG has 13 focus groups. For most of the focus groups, R&D funding in areas tracked by the NPAC TWG was flat or increased slightly in the period FY96-98. Significant cuts occurred in three groups: Active Electro-Optics, Unattended Remote Sensors, and Underground Facilities Detection. The TWG coordinates R&D which totals approximately \$616 million in 282 programs based on the TWG's bottom-up analysis. The TWG process has been effective in increasing communication among diverse elements in the R&D community and identifying and addressing gaps and overlaps. However, it is ill suited to identify priorities and adjudicate differences. The TWG leadership believes that better dialog between users, developers, and policy makers would improve the R&D process.

There was considerable discussion on how the gaps identified by the TWG could be filled through the budget process, since the group does not have the authority to direct changes in agency R&D programs. It was recommended that the group take advantage of the Intelligence Program Review Group (IPRG) process and coordinate with the staff that is developing an R&D agenda for the intelligence community.

Mr. Swiecicki concluded by discussing four issues:

- The TWG has recommended that its members acquire a SIPRNET capability. This would facilitate the exchange of classified data up to the Secret level. The initial cost would be \$7,000 for computer and telephone hardware, with a recurring cost of \$21,000 per year for the telephone line.
- Unattended sensors is a continuing issue. Although there is considerable R&D underway in this area, it is not well coordinated (e.g., there are four separate users groups). There is a need for centralized coordination to eliminate duplication of effort and to develop a roadmap for future development. The TWG has recommended that the Defense Intelligence Agency's Central MASINT Office perform this function. Although that office is willing to undertake this function, it does not have sufficient personnel.
- DoD is at the forefront of developing nuclear, biological, and chemical (NBC) hazard prediction models, but its focus is on military requirements. The needs of first responders/emergency response personnel in terrorist situations have not

received much attention, although DOE is starting to examine the chemical and biological (CB) modeling problem.

- Technology transition is a continuing problem. Operators are generally not willing to commit funds for development; they want to acquire proven and mature systems. The developers have difficulty getting a product to a point where it can be passed to the users. The TWG Technology Needs Subcommittee is working on this problem.

Dr. Jones asked the CNS principals to check within their agencies to determine how the NPAC TWG report is being used and the extent of its distribution. It appears that the information is not being used effectively within agencies.

III. OTHER BUSINESS

A. Weapons of Mass Destruction R&D Update

PDD 62, *Combating Terrorism*, dated June 16, 1998, addresses weapons of mass destruction (WMD) preparedness and protection. R&D is a significant issue in the PDD. Rather than create a new structure to coordinate relevant R&D across agencies, it was decided to build on existing groups. The Weapons of Mass Destruction Preparedness, Consequence Management, and Protection group (WMDP) (chart at Attachment 3) has formed an R&D subgroup, which in turn has three teams. The Medical R&D Team, based on the Health and Human Services (HHS)-led team for an earlier NSC tasker, will address diagnosis, treatment, and prevention of illness resulting from the use of chemical or biological agents. The Nonmedical R&D Team is built on the TSWG, which is responsible now for developing technologies to respond to WMD terrorism, among other things. The Modeling and Simulation Team is a new group. OSTP is working with DOE, which chairs this team, to determine the appropriate team membership. The NPAC TWG should coordinate with this team.

Surveying the research community and developing a research agenda for the FY2000 budget process is an ambitious undertaking. The WMPD R&D subgroups will brief the CNS ensure that the principals are informed of all ongoing R&D activities.

B. FY2000 R&D Budget Priorities

The FY2000 Interagency Research and Development Priorities memorandum (Attachment 4) has been distributed to the heads of all of the departments and agencies. The memorandum provides general guidance on investment principles and performance measures, and it identifies crosscuts and areas of special emphasis. This year's memorandum is more specific than prior ones. The memorandum lists critical infrastructure protection as an area for special emphasis.

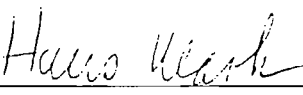
IV. ACTION ITEMS

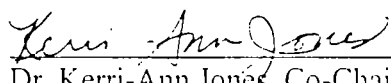
The following action items evolved from the meeting:

- The CIP R&D IWG will circulate its R&D agenda to the CNS principals.
- The Federal Laboratory Technology Transfer Case Study will continue.
- The Civil Communications Satellite Case Study will be deferred.
- If the Tauscher Amendment is enacted into law, the CNS will discuss how to best respond to the amendment's requirements.
- Drafts of the five case studies being developed by DOC will be distributed to the ITTIP IWG.
- A list of members of the ITTIP IWG will be distributed to the CNS principals.
- CNS principals should look at the utilization of the NPAC TWG in their organizations; this will be discussed at the next CNS meeting.
- The CNS will be briefed on the activities of the R&D subgroup established under PDD 62.

V. CLOSING REMARKS

Dr. Jones adjourned the meeting.

 10/19/98
Dr. Hans Mark, Acting Chair (date)

 10/19/98.
Dr. Kerri-Ann Jones, Co-Chair (date)

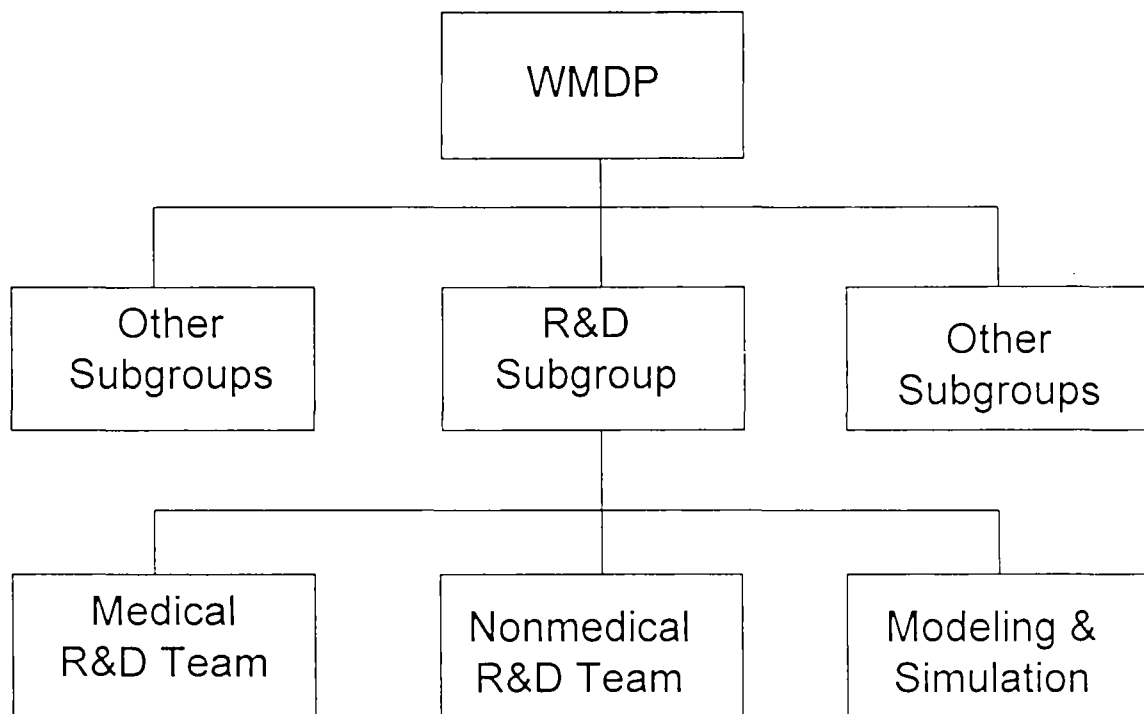
Attachments:

1. List of Principals attending the meeting
2. Meeting agenda
3. WMDP organization chart
4. FY2000 Interagency Research and Development Priorities memorandum

**Principals Attending Meeting of Committee on National Security
June 29, 1998**

Dr. Hans Mark, Acting Chair	Director, Defense Research and Engineering
Dr. Kerri-Ann Jones, Co-Chair	Associate Director, National Security and International Affairs, Office of Science & Technology Policy
Mr. William Reinsch	Under Secretary of Commerce for Export Administration
Mr. Gary Bachula	Acting Under Secretary of Commerce for Technology Administration
Dr. Ruth David	Deputy Director, Science and Technology, CIA
Ambassador Ralph Earle II	Deputy Director, Arms Control & Disarmament Agency
Mr. James Devine	Senior Advisor for Science Applications, U.S. Geological Survey, Department of the Interior
Dr. Miley Gonzalez	Under Secretary of Agriculture for Research, Education, and Economics

Attachment 1



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CRITICAL INFRASTRUCTURE PROTECTION: TOWARD A FEDERAL R&D AGENDA

Dr. Steven M. Rinaldi
Office of Science and Technology Policy
October 27, 1998



*Critical Infrastructure Protection R&D
Interagency Working Group*

CRITICAL INFRASTRUCTURE PROTECTION R&D IWG - OFF AND RUNNING

- Under NSTC authority, IWG first met in late March; has met almost weekly with 19 agencies actively participating
- PDD-63 on May 22 established Critical Infrastructure Coordinating Group (CICG), which agreed to utilize output of this IWG
- IWG organized into eight subgroups:
 - Banking and Finance
 - Information and Communications
 - Energy
 - Transportation
 - Vital Human Services
 - Interdependencies
 - Outreach
 - Budget



*Critical Infrastructure Protection R&D
Interagency Working Group*

CIP R&D IWG SUMMER ACTIVITIES

- **Establish the Baseline**
 - **OMB data call (December 1997): \$710 M in FY98, \$780 M in FY99**
 - **IWG data call (June): programmatic information and proposed new starts**
- **Review and Understand Vulnerabilities**
- **Determine Gaps and Shortfalls**
 - **What is the baseline?**
 - **What does a comprehensive, conceptual program look like?**
 - **The differences are the gaps and shortfalls**
- **Develop R&D priorities for each sector based on agency inputs**



*Critical Infrastructure Protection R&D
Interagency Working Group*

IWG FY2000 R&D NEW START OPTIONS HAVE SEVERAL “COMMON THREADS”

- **Need for vulnerability studies**
- **Emphasis on information assurance in all infrastructure sectors**
- **Emphasis on intrusion detection and monitoring (whether monitoring of electronic intrusions or monitoring for chem and bio agents)**
- **Focus on interdependencies: each subgroup noted little ongoing work or understanding of this issue and its need to be addressed in R&D new starts**



*Critical Infrastructure Protection R&D
Interagency Working Group*

IWG ANALYSIS: OPTIONS FOR FY2000

- IWG developed options for FY2000 CIP R&D new starts
 - Closely coordinated with OMB and overall budget process
 - Identified 71 programs in six broad infrastructure categories
- IWG analyzed five funding options (wedges) for FY2000:

<i>Wedge Level:</i>	<u>\$750M</u>	<u>\$500M</u>	<u>\$250M</u>	<u>\$125M</u>	<u>\$70M</u>
Banking and Finance	58	42	19	11	3
Information and Comm	409	286	138	63	39
Energy	153	85	44	25	14
Transportation	33	23	16	9	5
Vital Human Services	66	40	20	11	6
Interdependencies	31	24	13	6	3

- Comments:
 - \$750M and \$500M wedges would be difficult to manage; no ramp-up period; may incur personnel shortages
 - \$125M option may not allow USG to meet Presidential guidance
 - \$70M option is effectively status quo; does not adequately address identified gaps



*Critical Infrastructure Protection R&D
Interagency Working Group*

IWG ANALYSIS: OPTIONS FOR FY2000

- IWG recommends \$250 million funding for FY2000
 - Balances fiscal restraint with responsiveness to Presidential direction
 - Is same level of new effort recommended by President's Commission on Critical Infrastructure Protection; 33% increase over existing baseline

<i>Funding Profile:</i>	<u>FY2000</u>	<u>FY2001</u>	<u>FY2002</u>	<u>FY2003</u>	<u>FY2004</u>	<u>FY2005</u>
Banking and Finance	19	22	22	16	15	15
Information and Comm	138	178	191	192	192	192
Energy	44	53.5	58.5	62	63	63
Transportation	16	26	41	56	60	60
Vital Human Services	20	21	21	26	29	29
Interdependencies	13	15	15	23	23	23
TOTAL:	250M	315.5M	348.5M	375M	382M	382M



*Critical Infrastructure Protection R&D
Interagency Working Group*

AGENCY WEDGE ALLOCATIONS FOR FY2000

WEDGE LEVEL:	<u>\$750M</u>	<u>\$500M</u>	<u>\$250M</u>	<u>\$125M</u>	<u>\$70M</u>
Defense	237.6	147.6	63.6	27.7	16.4
Commerce	117.1	94.1	49.1	25.7	16.1
Energy	134.5	76.3	41.8	22.0	13.4
Transportation	22.0	15.0	8.5	6.5	3.5
EPA	17.0	10.5	10.5	5.8	3.8
FEMA	28.1	16.1	3.1	2.1	0.8
DOJ	34.6	29.6	13.6	6.8	4.3
NSF	94.0	65.5	29.5	9.0	4.0
DOI	15.0	11.2	9.2	6.5	3.6
HHS	7.0	3.0	2.0	1.0	0.0
DOA	1.0	0.0	0.0	0.0	0.0
NRC	0.1	0.1	0.1	0.1	0.1
NASA	5.0	3.0	3.0	1.0	1.0
Treasury	37.0	28.0	16.0	10.8	3.0



*Critical Infrastructure Protection R&D
Interagency Working Group*

THE NEXT MONTH

- **PDD-63 calls for a report to the President in November on plan for developing a CIP plan**
- **IWG R&D report for NSTC and CICG will have:**
 - **CIP R&D vision and objectives**
 - **Draft plan itself, in coordination with budget process**
 - **R&D options for FY2000**
 - **Interagency processes for budget, outreach, and technology monitoring**
 - **First draft completed by September 28, final by mid-late October**
- **But, rapid evolution of technology will require review of programs, threats, vulnerabilities, and agenda next year and beyond**



*Critical Infrastructure Protection R&D
Interagency Working Group*

FOLLOW-ON STEPS

- **Focus of IWG efforts from October - February**
 - Outreach to private sector, academia, international community
 - R&D conference next spring under consideration
- **Focus of IWG efforts from February - June**
 - FY2001 budget issues
 - Ongoing review of technology issues
- **PCAST has security panel, chaired by Norm Augustine, examining CIP R&D issues**
- **Coordinating R&D program of this magnitude, to include close partnership with the private sector, will require innovative management concepts and approaches**

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Nonproliferation and Arms Control Technology Working Group

4 Year Perspective Committee on National Security

Sallie Mullen - ACDA

27 October 1998



Organizing Principles

- Promote information sharing and cooperation
- Enhance effectiveness of overall “program”
- Eschew proliferation of working groups
- Develop informal budget crosscuts
- Advise agencies on R&D priorities
- Frame issues and differences for adjudication



Focus Group Changes

- Fissile Material Monitoring
 - ▶ Examined policy needs
 - ▶ Potential for coordination in 3 areas
- Ballistic Missile Sensors
 - ▶ Looking beyond treaties
 - ▶ Broadening range of observables



NPAC R&D Funding

- TWG coordinates ~\$600M (280 programs)

	1996	1997	1998	96-98
Active Electro-Optics	\$76M	\$55M	\$49M	-35%
BW Detection	80	90	90	+12%
CW Detection	67	80	80	+19%
Nuclear Detectors	12	7	9	-25%
Landmine Detection	*	129	175	+35%
Nuclear Test Monitoring	74	85	111	+50%
Proliferation Modeling	100	75	~50	-50%
Unattended Sensors	31	27	26	-16%
Underground Facilities	20	26	19	- 5%



Defining the Federal Investment

- 1998 roll-up = \$600 million
- Radius database indicates \$6.1 billion
- “Solving” the Radius problem deemed impracticable
- High confidence in TWG’s bottom-up reporting
- Trends more instructive than static numbers



State of Play in R&D Coordination

- Organizational traumas
- New mandates, competing priorities
- Changing constituencies
- Funding tenuous, no new money
- Imbalance of basic and applied R&D



NPAC TWG Recommendations

- Strengthen role of TNS
- Use reporting structure to expand “dialogue”
- Co-opt agency R&D principals
- Partner with other agencies (NIH, EPA,...)
- Increase accountability

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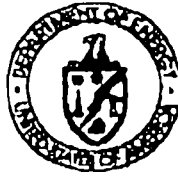
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Nonproliferation and Arms Control Technology Working Group Report, 1997-98 Executive Summary

Submitted to
**the National Security Council and
the Committee on National Security on
Coordination of Nonproliferation and Arms
Control Research and Development**

Submitted by
**The Co-Chairs of the
Nonproliferation and Arms Control
Technology Working Group**

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October 9, 1998

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Executive Summary (U)

The Nonproliferation and Arms Control Technology Working Group (NPAC TWG) was established in 1994 by Presidential Decision Directive 27 (PDD-27) to serve as the Executive Branch's mechanism for coordinating arms control and nonproliferation technology research and development (R&D). The President designated the Arms Control and Disarmament Agency (ACDA), the Office of the Secretary of Defense (OSD), and the Department of Energy (DOE) as co-chairs of the NPAC TWG. ACDA serves as executive secretary. The NPAC TWG is chartered to review NPAC-related R&D programs within and among US departments and agencies with a view to identifying gaps and resolving unnecessary overlaps in these programs. Since its inception, the NPAC TWG has brought together over 25 agencies and organizations on its formal membership roll. Also, numerous other organizations have been included in the proceedings of the NPAC TWG and its focus groups. (U)

This is the fourth annual NPAC TWG report to the National Science and Technology Council's (NSTC) Committee on National Security (CNS) and the National Security Council (NSC). The report summarizes the 1997-98 activities of the NPAC TWG. It also discusses the NPAC TWG's recommendations and plans for dealing with key R&D coordination issues identified over the four year course of NPAC TWG efforts. Together with PDD-27 and the NPAC TWG charter (See Appendix A), this report should be used as a reference and planning tool for departments and agencies that perform or require technology R&D serving NPAC purposes. (U)

This unclassified executive summary is intended for wide distribution, discussion, and implementation as appropriate throughout the R&D and policy communities. (U)

The Need for Coordination (U)

As articulated in the President's National Security Science and Technology Strategy (1995), the US must pursue a robust and focused science and technology strategy that applies technical knowledge to the development of effective arms restraints; that continually improves detection, monitoring and verification capabilities; and that emphasizes science and technology cooperation. The obligations and challenges facing the US Government (USG) in the nonproliferation and arms control fields continue to grow. The improved tools and technologies needed to meet these challenges in the future can only emerge from today's technology R&D programs. Despite the importance of these R&D challenges, the resources needed to meet them are severely limited. Moreover, funding is likely to remain tightly constrained for the foreseeable future. (U)

The critical tasks facing the USG are to foster better planning of technology R&D across the arms control and nonproliferation communities, and to enhance execution of R&D programs with an eye toward more efficient stewardship of the technical and financial resources available. Since there is no central management of technology R&D in the USG, that is, no government-wide "Department of Science and Technology", the R&D

process must be self-governing. The underlying philosophy of the NPAC TWG is to facilitate such a process. (U)

The NPAC TWG functions through the Technology Needs Subcommittee (TNS) that identifies and coordinates current and future NPAC technology needs, as well as through the following thirteen focus groups that are organized by technology, function, or arms control treaty area:

- Active Electro-Optics
- Ballistic Missile Sensors
- Biological Weapons Detection
- Chemical Weapons Detection
- Fieldable Nuclear Detectors
- Fissile Materials Monitoring
- Landmine Detection and Identification
- Nuclear Test Monitoring
- Proliferation Modeling
- R&D Database
- Spectral Sensing
- Unattended Remote Sensors
- Underground Facilities (U)

These groups draw on the regular and frequent participation of over one hundred government R&D program managers. (U)

After four years in operation, the NPAC TWG is acknowledged widely to have fostered substantial improvements in the coordination of federal R&D. The main challenge today is for the NPAC TWG to build on its track record and credibility and, without jeopardizing the cooperative spirit of this effective interagency process, aggressively execute the full scope of its charter. (U)

1997-98 NPAC TWG Activities (U)

Through its coordination efforts, the NPAC TWG strives to assure participating agencies, Congress, and ultimately the American public that federal technology R&D programs are meeting NPAC needs. The NPAC TWG also provides technology and budget crosscuts for policy and acquisition decision makers that help them make better resource allocation decisions. (U)

Since submitting its last report, the NPAC TWG has completed the following:

- Presented briefings for a variety of agencies, groups, and key individuals with an interest in NPAC matters, including the following:
 - The White House Office of Science and Technology Policy;
 - The NSTC's Committee on National Security;
 - The Office of Management and Budget;

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- The Counterterrorism ~~Technology Support~~ Working Group;
 - The National Security Council ~~Special Assistant~~ for Intelligence, and Nonproliferation and Export Control;
 - The Director of the Office of Research and Development, Central Intelligence Agency; and
 - Representatives of various Congressional staffs including the Senate and House Armed Services Committees;
- Conducted the Third Annual Symposium on Nonproliferation and Arms Control Research and Development on October 22-23, 1997, which consisted of reports of the focus groups to the NPAC TWG members and, for the first time, a second day for interactive technical breakout sessions. The Symposium was attended by approximately 300 R&D managers, contractors, other members of the NPAC R&D community, and some policy makers;
 - Expanded cooperation with the Counterproliferation Program Review Committee (CPRC), most notably through the joint establishment of working groups for hazard prediction models, unattended ground sensors and hyper/ultraspectral sensors for CW/BW detection;
 - Continued to ensure the effective coordination of 282 R&D programs and projects identified for arms control and nonproliferation that collectively account for over \$600 million of the annual federally funded NPAC technology R&D budget;
 - Further refined processes for identifying and validating NPAC technology needs that would benefit from appropriate R&D, identifying the technology drivers that most influence whether the US can achieve its NPAC technology R&D goals in the future, and providing a community-validated list of each of these needs and drivers;
 - Renamed the START Focus Group as the Ballistic Missile Sensors Focus Group and recast the charter of this group to address US readiness to deal with arms control and nonproliferation ballistic missile-related problems identified by the TNS;
 - Continued to update the classified and unclassified NPAC TWG web pages as mechanisms for electronic data exchange with the widest possible community interested in arms control and nonproliferation R&D issues, and to improve their usefulness using DoD's Technology Navigator; and
 - Expanded tasking of a Federally Funded Research and Development Center (FFRDC) to support the NPAC TWG by gathering and organizing relevant information, performing selected studies, and supporting several focus groups.
- (U)

Four Year Perspective on the NPAC TWG (U)

The successful pursuit of new and ongoing technology initiatives in arms control and nonproliferation requires vigorous and creative R&D programs that efficiently capitalize on the available resources through government-wide coordination and cooperation. The NPAC TWG is an appropriate vehicle for achieving this goal and, as noted earlier, ideally

would embody the self-governing process for improved collaborative program planning and execution. However, after four years of developing an effective coordinating process for federal NPAC technology programs within traditional acquisition structures, it is apparent that new approaches to debating and adjudicating recurring R&D program issues may be needed to fulfill the full scope of the NPAC TWG charter. (U)

The NPAC TWG focus groups, comprised in large measure of those who direct the research, are relied upon to make recommendations to resource managers on significant gaps and wasteful overlaps. For the most part, this process works well for issues and recommendations clearly related to the missions and priorities of the involved agencies. Without detracting from the notable successes of the NPAC TWG, the membership is beginning to recognize that within the NPAC TWG charter there are inherent limits to what can be achieved cooperatively among federal agencies, as each has distinct missions, time horizons, funding lines, and acquisition processes that often drive unique technology programs. (U)

BOUNDING THE PROBLEM (U)

While the NPAC TWG Charter is specific on the subject of developing recommendations, it is not specific on ways to operationalize them. It is in the nature of bureaucratic processes that one will not risk higher priority programs or expend scarce resources for the common good if there is no compelling mandate or obvious reward. Hence, if there is a recognized need in our national NPAC technology objectives that falls outside the mission of any single agency or does not rank successfully within agency budget processes, that need can be left unfulfilled. Under these conditions, even a well-coordinated consortium of agencies cannot mitigate a technology gap without independent authority or funding discretion that is non-prejudicial to their mission-specific programmatic funding. (U)

This problem bears directly on two important elements of the NPAC TWG charter. The first involves advising agencies on arms control and nonproliferation technology priorities. The second concerns framing interagency issues and differences for decisions by adjudicating bodies. (U)

The individual program managers and technologists forming the NPAC TWG cannot be expected to go outside their chains of command to garner support for their recommendations or to necessarily have the "macro" view of agencies' R&D priorities. Obviously, the NPAC TWG can not presume to prioritize agency R&D programs. At the same time, the program managers and technology developers cannot be expected to respond to perceived needs unless there is concurrent indication of policy support. (U)

Without creating new structures or threatening agency prerogatives, one approach to improving the NPAC TWG process should be to use this report to expand the dialog into the national security policy, technology developer, and user communities. (U)

OPPORTUNITIES FOR IMPROVEMENT (U)

Approaches to alleviating these problems would avoid redirecting funds and introducing new authority structures. With the view that the sources of these problems are as much sociological as they are structural, the NPAC TWG membership believes that more spirited participation by technology users and policy makers is needed to accomplish the following:

- Ensure a suitably broad dialog across government,
- Open the coordination process to more programs and organizations, and
- Ensure technological approaches to national security problems are responding to real policy and operational needs. (U)

Successfully addressing NPAC TWG recommendations will require a broader awareness and appreciation of issues in the following three areas: engaging a wider range of participants, examining a wider range of programs, and moving technologies from R&D to operational status. (U)

Engaging A Wider Range Of Participants (U)

The first dimension to improving coordination is finding better ways to engage policy makers, technology users, and technology developers in the continuing dialog on the relationship between technical needs and R&D programs. This dialog must include national policy directions and priorities. It also must be specific and continuous because the participants otherwise are responding to different pressures, requirements, and deadlines from one another and do not have a common forum in which to meet. The goals of this dialog are to accomplish the following (U):

- Overcome the historical tendency for the NPAC policy community to rely somewhat blithely on the R&D community to anticipate long-term operational NPAC needs. R&D program planning with insufficient policy guidance or involvement can lead to a higher degree of "technology push" than desirable. (U)
- Provide sufficient interaction between today's developers and the future users of key technologies at stages in the R&D planning process when the insights of the latter can influence the plans and decisions of the former. Understanding R&D product customers' expectations is crucial to delivering what is needed, especially where one department or agency may be developing products for another. (U)
- Provide the policy community with a clear understanding of the doable, the achievable, and the not-yet-possible. (U)

Examining A Wider Range Of Programs (U)

The second dimension is broadening the range of R&D programs considered by the NPAC TWG. The NPAC TWG focus groups examined 282 R&D programs that accounted for almost \$600 million (see Section 2). Both the number and dollar value of these programs have grown steadily over the past four years. This is a notable success from a program coordination viewpoint. (U)

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Many R&D programs are developed and justified in terms of a single agency or department mandate. Yet the results of R&D are often unpredictable. R&D programs often produce results more widely useful than, or significantly different from, what is expected. Moreover, NPAC programs typically are compartmented at all levels, so R&D results often are not widely shared, even among agencies with similar missions, and, in some instances, even within the same agencies. For these and other reasons, R&D potentially useful for NPAC purposes is not limited to programs or organizations with clear NPAC-related mandates. (U)

Table 1 illustrates this point. The table shows unclassified agency and department aggregate funding for R&D programs that focus on technologies potentially relevant to the NPAC community. This table suggests that it is essential for NPAC TWG member organizations to examine the R&D activities even of agencies or departments with missions wholly unrelated to nonproliferation and arms control, or within agencies which are reluctant to become associated with what they perceive to be "intelligence" programs. (U)

Table 1. **R&D BUDGET AUTHORITY WITH POSSIBLE ARMS CONTROL OR NONPROLIFERATION APPLICATIONS¹** (U)
(THOUSANDS OF \$US)

DEPARTMENT OR AGENCY ²	FISCAL YEAR 1997	PERCENTAGE OF TOTAL
COMMERCE	\$238,728	3.9%
DEFENSE	\$3,257,617	52.9%
ENERGY	\$735,023	11.9%
ENVIRONMENTAL PROTECTION AGENCY	\$508,482	8.25%
HEALTH AND HUMAN SERVICES	\$60,633	0.98%
JUSTICE	\$2,000	0.03%
NASA	\$586,600	9.5%
NATIONAL SCIENCE FOUNDATION	\$720,080	11.69%
TRANSPORTATION	\$41,397	0.67%
TREASURY	\$11,000	0.18%
TOTAL	\$6,161,560	100%

(U)

¹ Source: The Radius Database of Federal R&D Expenditures. Radius is a comprehensive database that tracks the funding invested annually by the US Government in R&D, from the top level of the federal agencies that fund R&D work to the thousands of sites where the work is performed. Radius was developed by RAND in cooperation with the NSF. (U)

The R&D Budget Authority represents the total R&D funding controlled by a specific organization. In a given department or agency, the entire amount is not devoted necessarily to R&D purposes. Classified budget totals do not appear in Radius. (U)

² Methods: Radius identified thousands of individual R&D programs that matched a set of the NPAC-related key words. The identified programs were reviewed by title and sponsoring agency to eliminate programs clearly irrelevant to NPAC purposes, while the remaining programs were included in the table as potential sources of R&D useful for NPAC purposes. (U)

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On the other hand, Table 1 seems to indicate a large gap exists between the programs captured by the NPAC TWG and the potentially relevant R&D conducted across government. Many R&D programs embedded in Table 1 remain wholly unexplored for their applicability to NPAC purposes. Unfortunately, it is not within the resources of the NPAC TWG to examine the thousands of potentially relevant R&D programs that comprise Table 1. (U)

Moving Technologies from R&D to Operational Status (U)

It is often difficult for technology developers to obtain the resources needed to take newly identified technologies to a level of maturity at which users can implement them readily. Users of NPAC technologies also face their own budget constraints and are often reluctant to invest scarce operational resources and risk manpower in anything but proven technologies. This problem is often compounded when a single agency can neither invest sufficiently in a technology that would benefit multiple agencies nor collaborate effectively with other agencies in such investments. This results in persistent shortfalls in cross-cutting and wide-ranging national needs. (U)

The developer-user "gap" is often evidenced by the following :

- The tendency of the resource allocation process to be loosely connected with, or even disconnected from, the requirements definition process in some agencies performing NPAC technology R&D;
- Weak incentives for long-range planning and requirements definition, resulting in a short-term focus on enhancements of proven technologies at the expense of long-term, perhaps higher risk R&D that could yield major gains, and
- Special purpose, single agency-specific programs of limited technical scope or narrow application. (U)

Consequently, opportunities for cross-fertilization of ideas and the development of multiple-use technologies available to all agencies and departments are frequently foregone. (U)

ELEMENTS OF AN ENHANCED NPAC TWG PROCESS (U)

The NPAC TWG charter is broad and ambitious. Experience over the past four years has led to a more refined view of the coordination needed for NPAC technology R&D programs. The problems discussed above can be made more tractable through expanded participation across government on multiple fronts - specifically the policy, R&D and operations elements of all organizations. The expanded dialog envisioned by the NPAC TWG has the following elements:

- Continuing, but improved, coordination among policy officials, NPAC technology users, and NPAC-related technology developers on the subject of technical capabilities needed in the future through more frequent, carefully focused discussion;

- Improved identification of interagency-coordinated national level priorities for NPAC technologies that could lay out a road map to the future capabilities that will be needed;
- Continued, but increased, collaboration between the CPRC and the NPAC TWG on issues of joint concern;
- Increased NPAC TWG dialog with the CNS and the National Security Council to engage the national level policy community more fully in the R&D process in a selective way, and to communicate national needs to agencies via CNS;
- Careful exploration of R&D programs sponsored by agencies that do not have NPAC-related mandates but may be producing technologies of possible use in achieving NPAC purposes; and
- Increased awareness within the policy community of the activities within the R&D community. (U)

Overall NPAC TWG Recommendations (U)

The NPAC TWG has accomplished much in its first four years, but the need to improve the coordination of NPAC-related R&D remains. Building upon its successes, the NPAC TWG will attempt to improve its ability to perform the necessary coordination by:

- Strengthening the role of the TNS by assigning it responsibility for identifying more completely the future needs for NPAC technologies; improving the linkage between the needs of the NPAC policy community and the technology development programs carried out within the R&D community; and documenting these links in a widely accessible form for use by the R&D community in planning and justifying its programs;
- Using the links between the NPAC TWG and the CNS as a means of improving information sharing concerning the needs of the policy community, the operational user community, and the R&D community;
- Engaging the R&D principals of the agencies comprising the NPAC TWG membership more extensively by framing issues that cannot resolved at the NPAC TWG level for action by a higher level adjudicating body; using their influence to obtain decisions from this body with respect to programs deemed under-funded or otherwise endangered; and
- Broadening links with R&D managers in Departments and Agencies not typically viewed as having NPAC mandates with a goal of determining whether R&D sponsored by these organizations has, or can have, NPAC applications. (U)

TECHNOLOGY NEEDS SUBCOMMITTEE RECOMMENDATIONS (U)

The Technology Needs Subcommittee (TNS) recommends that the TNS accomplish the following over the next year:

1. Work more closely with threat analysts working in the IC and elsewhere to identify key technology-based future threats as a means of identifying R&D that will support

- future arms limitation agreements and respond more effectively to future proliferation threats;
2. Work with the NPAC TWG focus groups to identify and develop more quantitative descriptions of the technology needs and drivers for technology developers to use in planning and carrying out their programs;
 3. Develop and implement a means for monitoring progress in the key technology areas identified in this report; and
 4. Improve communications with community resource, technology, and R&D managers to provide more effective guidance for R&D investments and programs that support NPAC missions. (U)

Several themes emerge from these recommendations. First, improvements should be made in establishing the link between technology needs on the one hand, and specific R&D recommendations on the other. Second, improved methods should be developed for identifying the appropriate recipients for the recommendations, for determining the disposition of these recommendations, for monitoring and tracking progress with respect to their implementation, for adjudicating conflicts among them, and for determining the benefits that result. Third, communication of all this information to NPAC community organizations and participants should be improved by identifying the cognizant parties, reviewing the charters of the interagency groups involved, developing Memoranda Of Understanding (MOUs) as needed, and proposing means to achieve joint goals. (U)

An alarming trend has become apparent in FY98: Resources are declining for basic research. As funds shrink, resource managers grow less tolerant of R&D investments that are not linked directly to an operational need. Thus funds needed for basic discovery, innovation in fundamental thinking, and new ideas are being allocated and managed in accordance with a constricted set of policy needs and demands. The consequences are loss of capability in research centers; loss of skills and decline in talent among individual researchers; a reduced reservoir of available technology; and a lack of capability for achieving technological solutions. (U)

KEY FOCUS GROUP RECOMMENDATIONS (U)

Section 2 of the classified report provides summaries of each focus group's annual report to the NPAC TWG, including findings and recommendations. Many of these recommendations are highly specific to a given focus group's area, and many cannot be included in this unclassified summary. The following unclassified recommendations are based on NPAC TWG findings that apply across agencies, technical disciplines, and functional areas. (U)

Some of these recommendations appeared in previous NPAC TWG Annual Reports. These recommendations appear again this year because the persistence of the problems they represent warrants broad exposure across the federal R&D and policy communities. Readers are urged to review all of these recommendations in light of their own organization's technology needs, R&D programs, and budget priorities. (U)

Active Electro-Optics (U)

The Active Electro-Optics (AEOFG) recommends that the AEOFG accomplish the following over the next year:

1. Continue development of a detailed signature database of proliferation-related materials, particularly biological agents and their precursors;
2. Continue to develop improved plume and effluent atmospheric distribution and dynamic flow models; and
3. Conduct real-world field training and exercises, on the ground and in the air, to validate technologies and techniques, and to improve understanding of the dynamics and evolution of proliferation-related materials in the atmosphere. (U)

Biological Weapons Detection (U)

The Biological Weapons Detection Focus Group (BWDFG) recommends that the BWDFG accomplish the following over the next year:

1. Continue cross-fertilization among national agencies that have different missions but share needs for many of the same technologies to accomplish these missions;
2. Increase emphasis on BW sample collection and processing R&D, with more attention to sample preparation;
3. Give additional emphasis to designing system elements that can be integrated into different collection systems, rather than being limited to single, standalone systems;
4. Increase R&D investigations into modeling and simulation related to the production and weaponization of BW agents; and
5. Conduct further research into small, highly reliable, lightweight power sources. (U)

Chemical Weapons Detection (U)

The Chemical Weapons Detection Focus Group (CWDFG) recommends that the CWDFG accomplish the following over the next year:

1. Increase R&D efforts in modeling and simulation of CW agent production and weaponization; and
2. Expand means for leveraging industry and academia R&D activities to keep abreast of research into relevant emerging technologies. (U)

Fieldable Nuclear Detectors (U)

The Fieldable Nuclear Detectors Focus Group (FNDFG) recommends that the FNDFG accomplish the following over the next year:

1. Explore the use of ultra-low-dose induced gamma-rays for rapid screening of luggage for explosives; *with sensitivity*
2. Evaluate the use of fieldable nuclear detector technology to locate and identify land mines, particularly those constructed using little or no metal; and
3. Develop the highly portable, inexpensive, sensitive, user-friendly gamma-ray spectrometers required by the US Customs Service to detect and distinguish benign sources of radiation from special nuclear material. (U)

Landmine Detection & Identification (U)

The Landmine Detection and Identification Focus Group (LDIFG) recommends that the LDIFG accomplish the following over the next year:

- The LDIFG should explore further opportunities for synergy with the NPAC TWG focus groups on Active Electro-Optics, Underground Facilities, Spectral Sensing, and Unattended Remote Sensors. (U)

Nuclear Test Monitoring (U)

The Nuclear Test Monitoring Focus Group (NTMFG) recommends that the NTMFG accomplish the following over the next year:

1. Theoretical studies are needed to estimate how efficiently explosive sources just above or below the water surface will couple energy into the SOFAR channel and to estimate signal characteristics;
2. Work is needed on infrasound sensor design and array geometries which minimize the effects of wind and other noise sources;
3. Research is needed in development of radioactive particulate and gas detection equipment that includes self calibration and automatic analysis of the samples taken;
4. Research is needed in all-condition exoatmospheric sensing and discrimination of naturally occurring low-level phenomena as well as ground truth sources for calibration of next generation satellite sensors; and
5. Research is needed to increase the capacity and efficacy of data processing techniques and data authentication features in sensors of all four types of IMS monitoring technologies. (U)

Proliferation Modeling (U)

The Proliferation Modeling Focus Group (PMFG) recommends that the PMFG accomplish the following over the next year:

1. Continue to support efforts to expand and improve INTELINK capabilities that have impact on NPAC issues, and R&D support for web-based dissemination of proliferation-related information, models, tools, and data bases;
2. Continue to support (and secure funds for) R&D for automated security tools that effectively limit system access to specific "communities of interest," and identify and overcome security (compartmentalization) barriers which hinder effective R&D collaboration on NBC-related issues;
3. Continue comparative testing of atmospheric dispersion models to ensure complex plume analysis capabilities are accurately applied to proliferation and arms control-related activities;
4. Reinstate the yearly Conference on ADP Tools for Nonproliferation Analysis as a means for estimating the magnitude of programs and resources associated with proliferation and arms control modeling; and
5. Monitor the health of important "one deep" R&D programs to ensure that no single agency can cancel a program which has broad applications across the community. (U)

R&D Database (U)

The Research and Development Database Focus Group (R&DDFG) recommends that the R&DDFG accomplish the following over the next year:

1. Make an unclassified version of the Technology Needs Subcommittee report available to industry and academia as a means to help to refine their technology submissions and inquiries; and
2. Encourage departments and agencies to procure access to SIPRNET to improve exchange of classified data and communications on NPAC R&D programs. (U)

Spectral Sensing (U)

The Spectral Sensing Focus Group (SSFG) recommends that the SSFG accomplish the following over the next year:

- Across the board, nonproliferation and arms control goals will be better served through research to build a strengthened exploitation capability by: developing improved spectral signatures databases; developing improved automated exploitation algorithms; strengthening the fusion of sensor data and proliferation process models; improving analyst training, expansion, and product development; and building a hardware infrastructure for data handling. (U)

Unattended Remote Sensors (U)

The Unattended Remote Sensors Focus Group (URSFG) recommends that the URSFG accomplish the following over the next year:

1. Establish a central executive function with sufficient resources to provide leadership and coordination of both requirements and sensor development in the unattended sensor community;
2. Conduct more real-world testing of sensor systems and more coordination of testing among sensor developers to demonstrate the operational possibilities of sensors;
3. Encourage the community of unattended sensor developers and users to work more closely with special communications systems providers to identify comprehensive requirements for communications with unattended remote sensors;
4. Foster collaboration between the NPAC TWG and the CMO to secure resources for the development of an unattended sensors technology road map; and
5. Develop programs focused on improved delivery systems for unattended sensors. (U)

Underground Facilities (U)

The Underground Facilities Focus Group (UGFFG) recommends that the UGFFG accomplish the following over the next year:

1. Integrate robotics, tags, and WMD sensors through ATD/ACTD processes;
2. Develop UGF process models to determine data requirements for all aspects of UGFs, from tip-off through characterization;
3. Develop methods, procedures and technologies to provide multi-sensor data integration, event-driven sensor cross-cueing, and semiautomated change detection;

4. Continue investigation of passive EM methods (e.g., power line, spurious emissions) collection systems;
5. Expand exploitation of seismic monitoring for construction status, geolocation, and spoil volume;
6. Expand research methods for collection and analysis of gaseous and other effluents from airborne and satellite systems; and
7. Establish an R&D reserve to take advantage of breakthroughs or new technology. (U)

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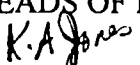
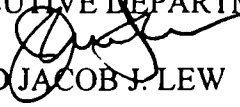
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THE WHITE HOUSE
WASHINGTON

June 16, 1998

MEMORANDUM FOR THE HEADS OF EXECUTIVE DEPARTMENTS AND AGENCIES

FROM:  KERRI-ANN JONES AND  JACOB J. LEW

SUBJECT: FY 2000 Interagency Research and Development Priorities

Through the National Science and Technology Council (NSTC), Federal agencies and departments have identified a set of research and development (R&D) areas that are important national efforts requiring coordinated investments across several agencies. As with all R&D investments, these interagency priority areas should reflect our objectives of maintaining excellence, maximizing effectiveness, and minimizing costs. This memorandum, rather than providing an exhaustive list of all Administration R&D priorities, focuses on those activities that require a significant level of interagency coordination.

Investment Principles

The Administration's approach to science and technology investments is guided by several fundamental principles. In general, Federal R&D investments should: a) Sustain and nurture America's world-leading science and technology enterprise, through pursuit of specific agency missions and through stewardship of critical research fields and scientific facilities; b) Strengthen science, math, and engineering education, ensure their broad availability, and contribute to preparing the next generation of scientists and engineers; c) Focus on activities that require a Federal presence to attain national goals; including national security, environmental quality, economic growth and prosperity, and human health and well being; and/or d) Promote international cooperation in science and technology.

More specifically, in making investment decisions on Federal R&D, the Administration will:

- Favor investments that focus on long-term, potentially high-payoff activities and outcomes that would not occur in the absence of a Federal presence, such as activities in the 21st Century Research Fund.
- Favor activities that employ competitive, peer-reviewed processes.

- Encourage collaborative arrangements with other agencies, industry, academia, the States, and appropriate overseas/foreign counterparts.
- Encourage agencies to fund program proposals within FY 2000 budget guidance, rather than requesting additional funding, in keeping with our continuing effort to maintain a balanced Federal budget. The Administration encourages agencies to fund new, high-priority activities by substituting them for lower-priority or recently-completed activities.

R&D Performance Measures

We encourage agencies to include the following R&D goals and measures in their agency performance plans. The Government Wide Performance Plan that accompanied the President's FY 1999 budget included similar measures for Function 250 activities.

- **Federally funded research will be of high quality**
 - We encourage each agency to establish a goal for the percent (by amount of funds) of its research project portfolio that will be allocated on the basis of a merit-based competitive process. (In the President's FY 1999 budget, the goal is 80 percent or greater for Function 250 activities.)
 - We encourage agencies to ensure that independent assessments of their research programs evaluate both the quality and the progress of the agencies' research toward stated goals. The goal will be to achieve a "satisfactory" rating from such assessments, consistent with the format provided in the Government Performance and Results Act. Existing advisory committees, groups within the National Academy of Sciences, or other outside groups could conduct the assessment.
- **Major scientific facilities will be built and operated efficiently**
 - As established by law in the Federal Acquisition Streamlining Act, agencies will keep the development and upgrade of facilities on schedule and within budget, not to exceed 110 percent of estimates. In operating R&D user facilities, agencies will establish a goal for unscheduled down time as a percent of total scheduled possible operating time. (In the President's FY 1999 budget, the goal is less than 10 percent unscheduled down time.)

Research and Development Budgets for Interagency Priorities

NSTC coordinates selected interagency science and technology investment priorities. Interagency priorities that require high-level attention in the President's budget submission to Congress are managed as interagency crosscuts. The NSTC has also identified a number of special emphasis areas that require budget oversight within the Executive branch but that do not require formal

budget crosscuts. These special emphasis areas do not constitute a comprehensive list of all NSTC priorities. The NSTC is actively involved in a number of interagency R&D issues that, unlike the issues outlined below, do not require near-term Administration policy or budget decisions, but are nevertheless important, ongoing activities.

NSTC Crosscuts

The FY 2000 budget will include four interagency R&D crosscuts. Agencies and departments should be prepared to demonstrate their commitment to these priorities, if relevant to their missions, as part of their budget discussions with, and FY 2000 budget requests to, the Office of Management and Budget (OMB), as well as in their responses to the Government Performance and Results Act (GPRA). OMB's Circular A-11, a revised version of which will be available in the early summer, outlines the definitions of these crosscuts and how agencies must submit data to OMB. The four cross-cutting R&D areas are:

1. Climate Change Technology Initiative
2. U.S. Global Change Research Program
3. Partnership for a New Generation of Vehicles
4. High Performance Computing and Communications (including Next Generation Internet)
 - The President has called for a significant funding increase in long-term information and communications R&D within agency budget allocations. Agency budget submissions should reflect the President's directive by including proposals for new and expanded activities within the High Performance Computing and Communications crosscut.

To promote more uniform management and accounting, each interagency program must include the following:

1. Concise program performance goals and measures, finalized in time to be sent to OMB as part of the FY 2000 Budget submission. Goals and measures should be quantitative if possible, but may be qualitative where appropriate.
2. A program implementation plan for the FY 2000 budget outlining specific agency activities and budgets, and the linkages between them. Agency activities contributing to the crosscut should be tied clearly to overall crosscut goals and performance measures. Agency budget information should include estimates for FY 1999-2004. Funding for the crosscut activities should be within OMB budget guidance. Activities whose funding cannot be accommodated with the budget guidance should be clearly delineated. Agencies should provide such information in a timely fashion if they plan to participate in the interagency program; late submittals may not be accepted. Implementation plans should be finalized no later than September, 1998.

3. Written assurance, incorporated in the crosscut implementation plan, by each participating agency that all agencies involved in the crosscut have reviewed each other's projects, and that these projects directly contribute to the goals and objectives of the crosscut and are well coordinated.
4. Budget hearing with OSTP and OMB staff in September, 1998.
5. Supplement to the President's budget, to be released to the public no later than end of March, 1999.

This schedule emphasizes the requirement for agencies to coordinate and share information on development of the FY 2000 budget as part of each interagency program.

We will work with you in the coming months through the NSTC to ensure that each interagency program achieves these results.

Areas of Special Emphasis

In addition to the crosscutting programs listed above, the NSTC is also coordinating activities in a variety of other fields. In the following areas of special emphasis, the NSTC will be working to understand and compare ongoing programs across agencies and to identify gaps and overlap in these programs. Departments and agencies participating in NSTC activities in these special emphasis areas will be asked to report on their participation in the NSTC working group during their budget hearings this fall. OMB and OSTP staff who have also participated in the working groups will attend these hearings and engage the presenters in a dialogue on how the department or agency is supporting the President's policies in these areas. In the coming months, the Administration may make significant policy and budget decisions in the following areas of special emphasis:

1. **Learning and Teaching:** Support research to better understand the learning process and to apply that understanding to the development and evaluation -- particularly through large scale, long-term, and experimental studies -- of educational systems, technologies, and other approaches aimed at improving educational and training outcomes. Upcoming FY 2000 budget decisions will be based on a coordinated interagency plan that addresses priorities identified by an NSTC Interagency Working Group on the Education Research Initiative. The plan should reflect recommendations contained in the report from the President's Committee of Advisors on Science and Technology on the *Use of Technology to Strengthen K-12 Education in the United States*.
2. **Critical Infrastructure Protection:** Promote and coordinate research to reduce vulnerabilities in our Nation's critical infrastructures; promote the research and development of technologies that will detect, contain, and mitigate attacks against or other failures in

these infrastructures. Upcoming decisions will focus on assessment of progress and responsiveness to a forthcoming Presidential Decision Directive, and on whether to transition this effort into a formal crosscut.

3. Aviation Safety and Security: Support research and development aimed at: (a) Reducing the aviation fatal accident rate by a factor of five within ten years; (b) Modernizing our aging air traffic control system using advanced information, communication, and navigation technologies; and (c) Enhancing the security of air travel. These activities are in response to the recommendations of the White House Commission on Aviation Safety and Security. Upcoming decisions include whether to adjust investments and responsibilities based on issues raised in the interagency coordination plan, and whether to transition this effort into a formal crosscut.

4. Emerging Infectious Diseases: Continue to implement the activities called for in the President's policy - Presidential Decision Directive NSTC-7. Upcoming decisions will focus on assessment of agency investments in priority activities and whether to develop this effort into a formal crosscut that captures the breadth of the policy for Emerging Infectious Diseases - technologies and methodologies for surveillance and response, research, and training.

5. Science for Sustainable Ecosystems: Develop the knowledge base, information infrastructure, and modeling framework to help resource managers predict/assess environmental and economic impacts of stress on vulnerable ecosystems, with particular focus on invasive species, water and air pollution, changes in weather and climate, and land and resource use. Upcoming FY 2000 budget decisions will be based on analysis of the existing research portfolio and coordinated interagency plans reflecting priorities recommended by the President's Committee of Advisors on Science and Technology and the National Research Council.

6. Plant Genome: Promote the coordinated development of plant genomic information, new technologies, and resources that will improve our understanding of plant biology and be applied to the enhancement of economically important plants. Upcoming FY 2000 budget decisions will be based on coordinated interagency plans that address the program priorities contained in the 1998 NSTC report *National Plant Genome Initiative*. In addition, agencies will be expected to provide plans on engaging the private sector and international partners.

7. Food Safety: Promote food safety research that provides a scientific foundation for sound food safety policy, innovations in food production to increase safety, consumer education to improve food safety practices, and global monitoring (surveillance) and response to outbreaks of food-borne illnesses. Upcoming FY 2000 budget decisions will be based on coordinated interagency plans that address the program priorities established by NSTC Interagency Working Group on Food Safety Research. Specifically, priorities

must reflect the President's Food Safety Initiative and be based on an assessment of the existing research portfolio.

POINTS TO BE MADE AT THE CNS MEETING
ON R&D BUDGETS

- Total federal R&D increased substantially in FY99; I am very pleased to date
- DOE received increases over FY98 funding levels in a number of its programs, although many were funded at less than the Administration's FY99 requests
- DOD basic research (6.1) was funded at the Administration's requested level, an increase of \$63 million (6%) over the FY98 enacted level. This reverses the trends we have seen in recent years
- DOD applied research (6.2) increased 5.8% over FY98 enacted levels
- DOD's Joint Infrastructure Protection effort did not receive any of its requested \$69.9 million for FY99.

Note: This was the only "new start" infrastructure protection R&D program in the FY99 budget

- I am interested in your perspectives, especially as we are now looking toward the FY2000 budget

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POINTS TO BE MADE AT THE CNS MEETING
ON THE WMDP R&D SUBGROUP

- As part of the FY2000 budget review, the NSC-chaired Weapons of Mass Destruction Preparedness Group has been working with agencies and OMB in the preparation and review of budgets for WMD Preparedness programs
- As part of this process, OSTP is chairing an R&D subgroup of the WMDP. We are looking at medical R&D, nonmedical R&D, and modeling and simulation, and we are concentrating on responses to bioterrorism.
- The R&D subgroup met most recently last Tuesday the 20th
- Right now we are looking mostly at budget issues; as we proceed we will also be looking at coordinated planning and execution of agency research programs, particularly among HHS, DoD, and DOE.