[redacted]

[redacted]

PRESENTATION ON THE NRP

TO THE

SCIENTIFIC ADVISORY BOARD

August 21, 1972

OUTLINE

I. Security Administration - Lt Col Hofmann and Col Cheatham

The attendees at this session will all possess at least a TALENT-KEYHOLE clearance. Prior to the presentation we will administer briefing and debriefing oaths to bring all attendees to a fully TALENT-KEYHOLE and [redacted] cleared status for this day, after which they revert to their former status. The area we will be using is secure.

II. Introduction - Dr. McLucas

This may serve as an overview of the briefings to follow, but you have also been invited to present any other comments you wish to the Summer Study Group--whether related to the covert NRO or the overt Air Force uses of space.

The major objectives of the NRP presentations are to:

A. Increase the perspective of the Study Group.

B. Show the interrelationships and interdependencies between the Air Force and the NRO--roles and missions and resources.

[redacted]

[redacted]

C. Describe the spectrum of intelligence collection capabilities from space.

D. Discuss the relationship of the NRP to the STS.

III. Perspective and Policy - Lt Col Hofmann

- Overview of presentations.
- National character of the NRP.
  - History
  - Organization and management in gross terms.
  - Requirements--how they are generated.
  - Reviewing agencies--the checks and balances.
- Policies.
  - Evolution of National Security Council Action 2454.
    - Reconnaissance activities.
    - Anti-satellite policies.
  - The "Fact Of" issue over the years.
  - The "Fact Of" and SALT; where we stand today.
- NRO-NASA relationships.
  - Related to earth viewing imaging sensors
  - Exchange of technology

[redacted] [redacted]

- NRO and the Air Force.
  - Reliance upon AFSC resources.
  - MAC for airlift and weather.
  - AFCS for communications.
- NRP financial program - trend chart.

IV. Collection Activities - Gen Bradburn

- Satellite Systems Elements.
- Photographic.
  - CORONA history - growth of capability - resolution, stereo, lifetime, coverage.
  - [redacted]
  - [redacted]
  - Photographic collection requirements chart.
  - Photo system chronology by system and capability.
  - Photo system activity--days in orbit and launches.
  - Defense Systems Application Program.
    - Typical 1/3 n.m. photo.
    - CORONA system effectiveness.
    - Readout sites.

[redacted]

- [redacted]
  - Future system mix (if we brief [redacted]
- SIGINT.
  - Chart showing spectrum of collection.
    - [redacted]
    - [redacted]
    - [redacted]
    - [redacted]
    - [redacted]
    - [redacted]

  - Demonstrate the Model

V. Tactical Activities - Gen Bradburn

- [redacted]
  - Problem.
  - Studies.
  - Recommended approach.

[redacted]

- Ocean Surveillance.
  - The future of the [redacted]

VI. [redacted]

- NRO studies.

[redacted] [redacted]

DEFENSE SYSTEMS APPLICATION PROGRAM

Photographic systems are dependent on clear weather for their success. In order to achieve efficient operation of these systems, we apply forecasts from the Air Weather Service. The Global Weather Central, a unit of Air Weather Service, located at Offutt Air Force Base, has a contingent of personnel and equipment dedicated to the NRO support.

Various studies and experience have proven that statistical application of forecasts will provide the most efficient weather support to photograph reconnaissance.

The two most important ingredients in providing accurate forecast are meteorological satellite data and a short forecasting period. A proper mix of these ingredients provides a sound basis for making accurate cloud cover forecasts and computing probabilistic forecasts for seeing the landscape from satellite altitude.

The Defense System Application Program, a military meteorological satellite system, provides high quality cloud photographs over the entire surface of the earth.

[redacted] [redacted]

SLIDE I. Here we see a picture of a DSAP satellite. This satellite is equipped with sensors which produce 1/3 of a mile resolution cloud photographs. The satellites are flown in a sun synchronous orbit at around 450 n.m. above the surface of the earth. Their design lifetime is about 1 year.

SLIDE II. This picture shows the typical quality of the 1/3 n.m. DSAP photographs. You will recognize the Vancouver/Seattle area. Rivers, mountains and valleys are readily apparent. However, the most important features are the small scale clouds which can be located on the picture. Snow also can be seen on the mountain tops. This particular sensor operates in the video portion of the electromagnetic spectrum and provides a swath width of 1600 n.m. It operates during daylight hours only. A total of 20 minutes per orbit is available for this type of data which is sufficient to cover the entire Sino-Soviet bloc. This restriction is due to storage capacity of the tape recorders aboard the spacecraft and will be improved in the future.

SLIDE III. This system also has a sensor which yields 2 n.m. resolution data in the visual spectrum during daylight and

[redacted] [redacted]

down to ½ moonlight at night, and infrared data taken both day and night. The infrared sensor operates in the region of 8 to 12 micorns and produces effective photographs between the ranges of 210-310 degrees Kelvin. You will recognize the West Coast of the U.S. and Baja, California.

SLIDE IV. This slide of the Red Sea region was taken by the infrared sensor at night. The color temperatures are reversed so that the cold-high clouds look whitest and the surface of the earth which is warm looks dark. This is an extremely effective system for locating cirrus clouds and determining the difference between snow and clouds.

We presently have two DSAP spacecraft in orbit. The morning DSAP (nodal time ascending-0800) was launched in February 1971. The noon-orbit spacecraft was launched in March of this year, replacing one which was showing signs of degradation.

SLIDE V. The NRO is not the only user of Meteorological Satellit Data. In fact, one spacecraft was launched specifically to support the SEA operations. A mobile van located at Tan Son Nhut AB, South Vietnam receives a direct mode transmission which

[redacted] [redacted]

provides cloud cover pictures over the entire operational area on a 1/3 n.m. basis. It also can receive the IR night-time pictures. A total of 8 mobile sites have been deployed to key locations throughout the world for support of tactical operations.

The Navy has conducted an 18-month test of a shipboard receiving terminal aboard the U.S.S. Constellation. This unit has proven to be extremely valuable to carrier operations during cruises in the Indian Ocean and the South China Sea. The Navy plans to equip all 12 attack carriers with these terminals. Although the U.S. Army receives a great deal of its operational meteorological support from the Air Weather Service and hence does obtain benefits from the DSAP system, it too is planning a special ground site to receive DSAP photographs to be used in future applications peculiar to ground force operational support.

Now back to the NRO support.

As I said there are two important ingredients that produce good results--since meteorological satellite data is very perishable we must apply it as rapidly as possible.

[redacted] [redacted]

This is done by a completely automated technique and the shortening of the timeline, i.e., time of the DSAP satellite over target. At present we are operating with a timeline of six to twelve hours; however, in the very near future when a new and faster computer is pressed into operation at Global Weather Central, this time will be shortened to about 4½ hours. This will provide even better cloud forecasts and improve our efficiency.

How are the DSAP data used in making the forecasts? As I'm sure you can guess it is an extremely complicated process, however, basically it is as follows:

DSAP data as well as surface and upper air observations are placed in a computer and an analysis is performed which provides a data base for time zero (the time of the observation). This analysis is then marched forward in time by the use of dynamic models to the time the reconnaissance satellite will be over the target. The final forecast is converted into probabilistic terms by considering the amount of cloud over the target--the motion of the clouds and the dynamic features such as fronts and low cells which my influence the accuracy

[redacted] [redacted]

of the forecast. How well it works can only be interpreted in terms of clear photographs returned by our reconnaissance systems.

SLIDE VI. This slide depicts a dot for very CORONA mission from 1961 through 1970. The horizontal line shown all the way across the chart near the 40 percent cloud-free region is the climatological expectancy. That is, if we were to operate our reconnaissance system without regard to weather forecasts we would expect to return about 40 percent cloud free in the winter and nearly 35 percent in the summer. The difference is due to the fact that more clouds are present over large land masses in the summer during our times of operation than in winter. As can be seen the percent cloud free return has shown a marked improvement through the years, starting at what might be expected with little or no capability to employ weather forecasts and progressing to a near 80 percent cloud free return with a sophisticated system that was highly capable of using forecasts of small scale cloud features to an advantage. The mission in May of 1969 was tasked to photograph [redacted] 1011 [redacted] regardless of expected

[redacted] [redacted]

weather over the target. The effect of disregarding the meteorological input is apparent. The items listed on the bottom of the graph depict when certain changes were made to incorporate more capability both in the CORONA system and weather forecasting.

For instance, the first DSAP scout was used in 1964--this was an improvement whereby the DSAP satellite flew in an orbit optimized for the CORONA mission forecasts.

Probability forecasts were employed beginning in 1965.

The Automated Weather Network was also placed in operation in 1965. This is a network designed to bring in surface weather observations from Europe and the Sino-Soviet areas at computer speeds.

Further studies and efficient application of weather forecasts will continue to provide the greatest cloud free return for our NRO photographic systems.

[redacted]

FACTS ON DSAP

First launch - August 1962

Total number spacecraft launched - 28

Next launch - September/October 1972

Additional capability for next improved spacecraft:

5-D is a new block of spacecraft, scheduled for mid-1974 launch. It will have 1/3 n.m. resolution both visual and IR--giving both day and night capability. It will have the vertical temperature sounder to provide temperature observation in the vertical to aid in the forecasting problem. Improved primary sensor with more reliability built in and brushless motors. Additional tape recorder to double the storage capability, from the present 20 minutes to 40 minutes.

Mobile Vans - Seven only are operational. However, Kadena is still providing some support to the SAC reconnaissance program.

SECRET

[redacted]

AIR FORCE PERSONNEL COSTS

SPECIAL PROGRAMS

	FULL TIME	PART TIME (.35)	TOTAL EQUIV MAN YRS	FACTOR ($)	COST
OFFICERS	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
AIRMEN		1011			
CIVILIANS					
TOTALS					

[redacted]

[redacted]

Program A
(SAFSP and SAMSO Support)

[redacted]

	Total	Part Time Total
Officers	[redacted]	
Enlisted		
Civilians		

Notes:
1. SAFSP figure includes central control group officers [redacted] and civilians [redacted]
2. SAMSO figure includes launch vehicle plus base support. Launch vehicle support is based on [redacted]
3. Procurement support is based on 85% of the AFPRO at LMSC.
4. All authorizations at the ADF, the Atlas System Division of the 6555th ATG, and the Thor and Titan Divisions of the 6595th ATG are included.
5. Allocation of [redacted]

[redacted]

[redacted]

Program B (CIA)

	NRO Staff	OSA	OEL	OSP	ORD (Optics)
Officers	[redacted]				
Enlisted					
Civilians					

	Total
Officers	[redacted]
Enlisted	
Civilians	

Notes: 1. OSA includes General Bevan's U-2 group plus contract support personnel.

2. OEL break-out: Air Systems Division [redacted]

[redacted]

[redacted]

[redacted]

Program C

	Total	Total Part Time
Officers	[redacted]	
Enlisted		
Civilians		

Notes: 1. [redacted]

2.

3.

1006

HANDLE VIA [redacted]

[redacted]

[redacted]

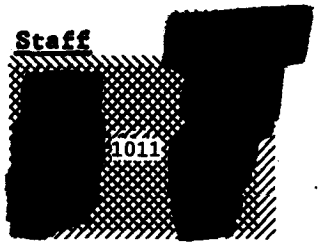
Program D

Staff

Officers

Enlisted

Civilians

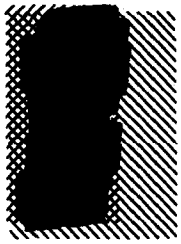


Total

Officers

Enlisted

Civilians



HANDLE VIA [redacted]
CONTROL SYSTEM ONLY

[redacted]

[redacted]

Air Force
NRO Staff

Officers
Enlisted
Civilians

[redacted]

Army and Navy Support

Army

	SAFSP	NRO Staff	Total
Officers	[redacted]	[redacted]	[redacted]
Enlisted			

Navy

	SAFSP	NRO Staff	CIA	Total
Officers	[redacted]	[redacted]	[redacted]	[redacted]
Enlisted		011		

[redacted]

HANDLE VIA [redacted]
CONTROL SYSTEMS ONLY

[redacted]

USAF SCIENTIFIC ADVISORY BOARD
AD HOC COMMITTEE ON THE AIR FORCE AND SPACE
(1972 SUMMER STUDY)
Woods Hole, Massachusetts
14 August - 1 September 1972

GENERAL INFORMATION

1. The following information is provided to assist you in planning your participation in the Scientific Advisory Board (SAB) Summer Study at Woods Hole, Massachusetts.

a. Meeting Site

The summer study will be conducted at the Quissett Campus (Fenno Estate) which is located on Oyster Pond Road in Woods Hole. A map showing the Cape Cod area and the location of the estate is attached.

b. Work Schedule

The summer study sessions will begin at 0830 and end by 1530 daily. Breakfast will be served for meeting attendees at 0730 each day at the meeting site.

c. Transportation

All attendees are requested to complete the attached travel questionnaire and return it to the SAB Secretariat as soon as possible. The SAB Secretariat should be advised by phone of changes in arrival time or mode of transportation.

(1) Personnel arriving by military air at Otis Air Force Base will be provided military transportation to the meeting site or quarters. Otis is located approximately 25 minutes from Woods Hole.

(2) Hyannis is the nearest commercial airport serving Woods Hole. Limited tranportation will be provided from the Hyannis Airport to Woods Hole on request.

(3) Limited transportation will be available from the motels to and from the meeting site daily; however, it is recommended that attendees provide their own transportation.

d. Housing

Woods Hole is a resort area. In order that you may be assured of getting suitable accommodations, you are encouraged to make your reservations as soon as possible.

(1) A limited number of austere BOQ-type quarters are available at the National Academy of Sciences facility at the Houston House ($10.00 per day) which is on Quissett Avenue and may be secured on a first-come basis by contacting Mr. Robert Armstrong (Area Code 617 548-3760).

(2) Attachment 2 is a listing of the motels located in the Woods Hole/Falmouth area. Arrangements should be made directly with the motel of your choice.

(3) DV accommodations for military personnel at Otis Air Force Base are limited. Reservations on a first-come basis may be made by calling the Otis Housing Office (Area Code 617 563-5531 or 5532).

e. Dress

Casual clothes are recommended for the meetings.

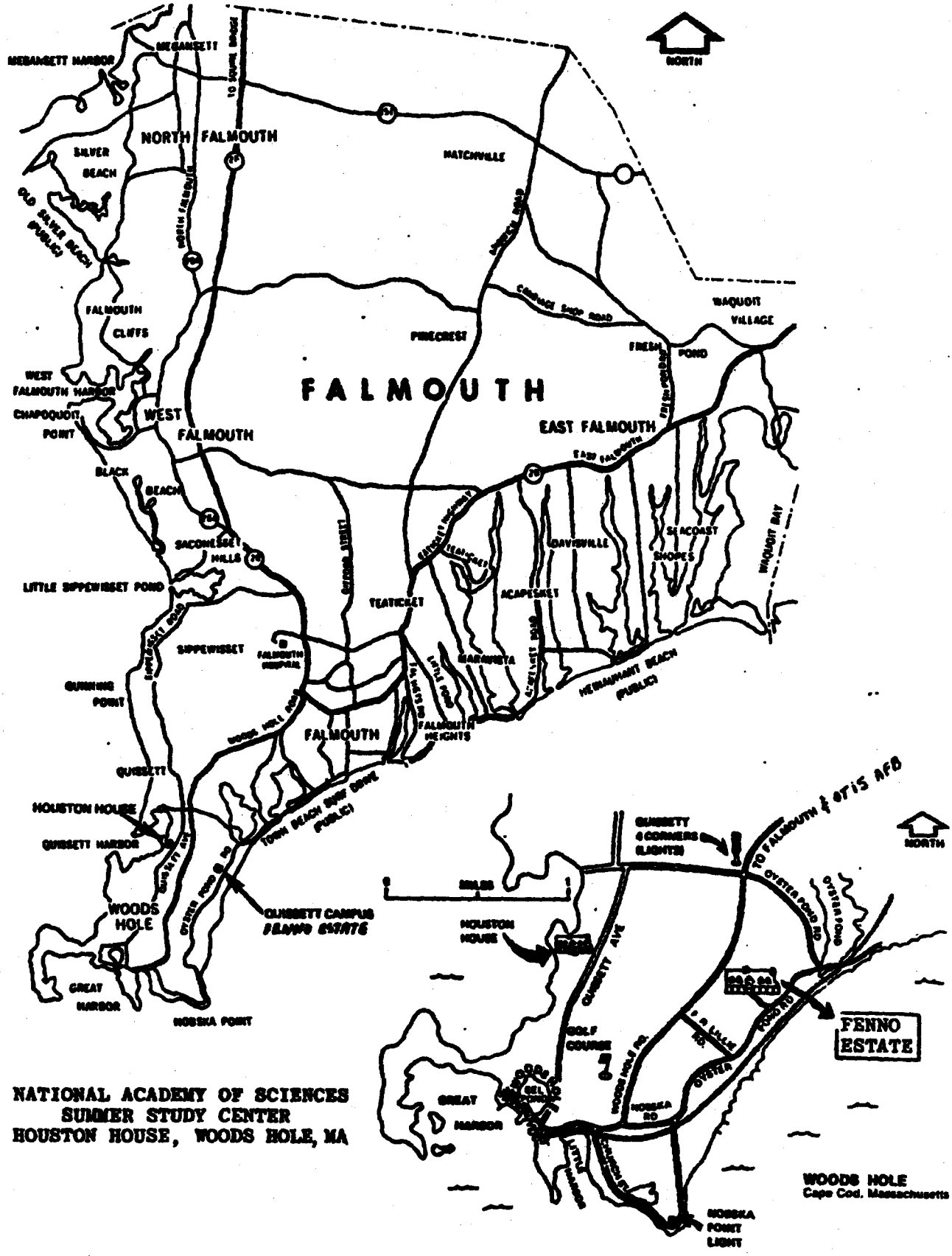
f. Meals

Breakfast and light lunches are served at both National Academy of Sciences facilities at normal prices. No evening meals are served.

2. The telephone number at the Quissett Campus, Woods Hole, is Area Code 617 548-3760.

3. If you have any questions, please call the Secretariat (Area Code 202 697-4811 or 4648).

2 Atch
1. Map
2. Motel listings



NATIONAL ACADEMY OF SCIENCES
SUMMER STUDY CENTER
HOUSTON HOUSE, WOODS HOLE, MA

USAF SCIENTIFIC ADVISORY BOARD
AD HOC COMMITTEE ON
THE AIR FORCE AND SPACE
(1972 SUMMER STUDY)

TENTATIVE MEMBERSHIP

Professor Courtland D. Perkins (Chairman)
Professor Seymour M. Bogdonoff
Dr. Philip M. Diamond
Dr. Gerald P. Dinneen
Dr. Donald A. Dooley
Mr. Robert R. Everett
Dr. Alexander H. Flax
Dr. Ivan A. Getting
Lieutenant General Otto J. Glasser
Professor Abraham Hertzberg
Dr. Robert G. Loewy
Professor John F. McCarthy, Jr.
Colonel Daniel W. Cheatham, Jr. (Secretary)

6 April 1972

1972 SAB SUMMER STUDY

"THE AIR FORCE AND SPACE"

OBJECTIVES:

a. Focus attention on Air Force space efforts now after primary attention to the aeronautical technologies for several years.

b. Assess the "balance" of Air Force space programs/efforts in comparison to those in other Air Force R&D areas.

c. Consider the impact of Army, Navy and other DOD programs/plans on Air Force efforts.

d. Clarify the Air Force position vis-a-vis the space shuttle and other NASA programs.

e. Assess the effectiveness, the utility and the survivability/vulnerability of Air Force and related space systems.

f. Review the priorities of present and planned Air Force space efforts.

g. Assess the balance of Air Force research and technology programs to support space objectives.

h. Consider new potentials for space applications.

i. Forecast requirements for post-1980 and hear using agency/command's view of present and new systems.

12 May 1972

USAF SCIENTIFIC ADVISORY BOARD
AD HOC COMMITTEE ON
THE AIR FORCE AND SPACE
(1972 SUMMER STUDY)
Woods Hole, Massachusetts
14 August - 1 September 1972

TENTATIVE AGENDA

DATE	SUBJECT	CHAIRMAN/ DEPUTY CHAIRMAN
14-15 Aug	Overview	Prof. C.D. Perkins
	A. Space Systems and Requirements	Dr. I.A. Getting
	B. DOD Space-related Programs	Dr. I.A. Getting
15 Aug (PM)	Foreign Space Programs	Prof. C.D. Perkins
16 Aug	Space Communications	Mr. R.R. Everett/ Dr. G.P. Dinneen
17 Aug	Strategic Surveillance	Dr. A.H. Flax/ Dr. G.P. Dinneen
18 Aug	Space Defense	Prof. J.F. McCarthy/ Mr. R.R. Everett Dr. G.P. Dinneen
21 Aug	Classified Programs	Prof. C.D. Perkins
22 Aug (AM)	Navigation	Dr. R.G. Loewy/ Dr. P.M. Diamond
22 Aug (PM) 23 Aug	Launch Vehicles	Dr. D.A. Dooley/ Dr. A.H. Flax
	A. Conventional/Standard, L/V	
	B. Space Transportation System	
	C. Transition Problems	
24-25 Aug	Advanced Technology and New Concepts	Prof. A. Hertzberg/ Prof. S.M. Bogdonoff
28 Aug - 1 Sep	Report Writing	

9 Aug 1972

SAB AD HOC COMMITTEE ON
THE AIR FORCE AND SPACE
(1972 SUMMER STUDY)

CLASSIFIED PROGRAMS
21 August 1972

ATTENDEES

Professor Seymour M. Bogdonoff	Head, Gas Dynamics Laboratory Princeton University
Colonel Daniel W. Cheatham, Jr.	Executive Secretary Scientific Advisory Board
Mr. Harry Davis	Deputy Under Secretary of the Air Force (Systems Review)
Mr. Philip M. Diamond	General Manager, Development Operations The Aerospace Corporation
Dr. Gerald P. Dinneen	Director, MIT Lincoln Laboratory
Dr. Donald A. Dooley	Vice President of Research and Development Systems Development Corporation
Brig Gen R. A. Duffy, USAF (Ret)	Vice President, Charles Stark Draper Laboratory
Colonel William W. Dunn	Deputy for Development Planning SAMSO
Dr. Manfred Eimer	Assistant Director, Intelligence (ODDR&E)
Mr. Robert R. Everett	President The MITRE Corporation
Mr. Daniel J. Fink	Vice President & General Manage Space Division General Electric Company

11 August 1972

Dr. Alexander H. Flax	President, Institute for Defense Analyses
Dr. Ivan A. Getting	President, The Aerospace Corporation
Honorable Grant L. Hansen	Assistant Secretary of the Air Force (R&D)
Professor Abraham Hertzberg	Director, Aerospace Research Laboratory University of Washington
Mr. Joe C. Jones	Deputy Assistant Secretary of the Air Force (R&D)
Dr. Robert G. Loewy	Dean, College of Engineering and Applied Science University of Rochester
Professor John F. McCarthy, Jr.	Massachusetts Institute of Technology
Honorable John L. McLucas	Under Secretary of the Air Force
Dr. F. Robert Naka	Deputy Under Secretary of the Air Force (Space Systems)
Mr. Patrick J. Parker	Director, Net Threat Assessment OASD (Intelligence)
Professor Courtland D. Perkins	Chairman, Department of Aerospace & Mechanical Sciences Princeton University
Mr. Franklin J. Ross	Deputy Assistant Secretary of the Air Force (R&D)
General John D. Ryan	Chief of Staff, USAF

Major John V. Schafer, Jr.	Assistant Executive Secretary Scientific Advisory Board
Mr. Gerard A. Sears	The RAND Corporation
General Jacob E. Smart, USAF (Ret)	Assistant Administrator for DOD and Interagency Affairs NASA
Mr. Arthur G. Wimer, Jr.	Scientific Advisor, Director of Laboratories

SAB AD HOC COMMITTEE ON
THE AIR FORCE AND SPACE
(1972 SUMMER STUDY)

"NAVIGATION"
22 August 1972

ATTENDEES

Mr. Robert F. Buntschuh	Manager, Navigation Systems Astro Electronics Division RCA
Honorable Robert H. Cannon or Dr. Donald E. Findley	Assistant Secretary for Systems Systems & Technology Department of Transportation
Mr. Harold A. Cheilek	Systems Evaluation Division Institute for Defense Analyses
Mr. Harry Davis	Deputy Under Secretary of the Air Force (Systems Review)
Colonel William W. Dunn	Deputy for Development Planning SAMSO
Mr. Jacques S. Gansler	Assistant Director, Weapons Systems Electronics ODDR&E
Mr. Edward Z. Gray	Grumman Corporation
Mr. David R. Israel	Director, Office of Systems Engineering Management Federal Aviation Administration
Mr. Joe C. Jones	Deputy Assistant Secretary of the Air Force (R&D)

11 August 1972

Mr. Charles C. Joyce, Jr.	Assistant Director, Office of Telecommunications Policy Executive Office of the President
Dr. Richard B. Kershner	Assistant Director, Applied Physics Laboratory The Johns Hopkins University
Mr. Walter C. Melton	Group Director, Space Systems Group Directorate The Aerospace Corporation
Honorable John L. McLucas	Under Secretary of the Air Force
Dr. F. Robert Naka	Deputy Under Secretary of the Air Force (Space Systems)
Mr. David D. Otten	Manager, Systems Products Group Xerox Corporation
Colonel Jack L. Price	SAMSO/AFSC
Mr. Thomas Rogers	Vice President, Urban Affairs The MITRE Corporation
Mr. Franklin J. Ross	Deputy Assistant Secretary of the Air Force (R&D)
Mr. Gerard A. Sears	The RAND Corporation
General Jacob E. Smart, USAF (Ret)	Assistant Administrator for DOD and Interagency Affairs NASA

SAB AD HOC COMMITTEE ON
THE AIR FORCE AND SPACE
(1972 SUMMER STUDY)

"LAUNCH VEHICLES"
22 August 1972 (PM)
23 August 1972

ATTENDEES

Professor Holt Ashley	Stanford University
Mr. Howard P. Barfield	Acting Director, Space Technology, ODDR&E
Lt Col Lamar D. Bowles	Chief, Air Force STS Group NASA Manned Spacecraft Center
Col Edwin A. Coy	Deputy for Launch Vehicles SAMSO
Mr. Philip E. Culbertson	Director of Advanced Missions HQ NASA
Col Howard S. Davis	Director, Space Transportation System Planning SAMSO
Mr. Harry Davis	Deputy Under Secretary of the Air Force (Systems Review)
Col William W. Dunn	Deputy for Development Planning SAMSO
Col Ralph J. Ford	Assistant Deputy Chief of Staff/Development Plans, AFSC
Honorable Grant L. Hansen	Assistant Secretary of the Air Force (R&D)

11 August 1972

Mr. Joe C. Jones	Deputy Assistant Secretary of the Air Force (R&D)
Mr. Byron P. Leonard	The Aerospace Corporation
Mr. Robert C. Littlefield	Assistant to the Associate Administrator for Manned Space Flight NASA
Mr. Dale D. Myers	Associate Administrator for Manned Space Flight NASA
Honorable John L. McLucas	Under Secretary of the Air Force
Dr. F. Robert Naka	Deputy Under Secretary of the Air Force (Space Systems)
Lysle H. Peterson, M.D.	Director, Bockus Research Institute Univ of Pennsylvania
Mr. G. Merritt Preston	Director of Center Planning and Future Programs NASA
Mr. Ivan Rattinger	Assistant for Space to the Executive Secretary National Aeronautics and Space Council
Mr. Franklin J. Ross	Deputy Assistant Secretary of the Air Force (R&D)
Col J. A. Saavedra	Chief, Policy & Plans Group Directorate of Space DCS/R&D
Mr. Gerard A. Sears	The RAND Corporation

Mr. Samuel M. Tennant	Associate General Manager of the Systems Planning Division, Systems Engineering Operations The Aerospace Corporation
Dr. Wernher von Braun	Vice President, Engineering and Development Fairchild Industries, Inc.
Mr. Walter C. Williams	Vice President & General Manager of the Vehicles Systems Division, Systems Engineering Operations The Aerospace Corporation

SAB AD HOC COMMITTEE ON
THE AIR FORCE AND SPACE
(1972 SUMMER STUDY)

"ADVANCED TECHNOLOGY AND NEW CONCEPTS"
24-25 August 1972

PROPOSED AGENDA

Direct Laser Propulsion -Earth Based Lasers for Boost into Orbit	Dr. Kantrowitz AVCO
Laser Generated Thermonuclear Explosive Propulsion System	Dr. Boyer LASL Dr. Kidder LLL
Laser Applications in Space	Dr. Hundley RDA Mr. Hunter Lockheed
Modifications of the Geosphere	Aerospace Corporation
New Potential Applications in Space	Mr. Davis SAF/US
Novel Chemical Fuels	NASA
Laser Power Transmission	NASA/Aerospace Corporation
New Nuclear Power Generation Concepts for Space - Power Generation and Propulsion	NASA
Information Handling - Artificial Intelligence	Dr. Roberts DARPA Professor McCarthy Stanford University

26 July 1972

SAB AD HOC COMMITTEE ON
THE AIR FORCE AND SPACE
(1972 SUMMER STUDY)

"ADVANCED TECHNOLOGY AND NEW CONCEPTS
24-25 August 1972

ATTENDEES

Professor Holt Ashley	Stanford University
Mr. William F. Bakemeyer	Station Manager Hughes Aircraft Co
Mr. M. W. J. Bell	Manager, Space Studies Space Shuttle Program, Space Division North American Rockwell Corp
Dr. Keith Boyer	L-Division Leader Los Alamos Scientific Lab
Mr. Harry Davis	Deputy Under Secretary of the Air Force (Systems Review)
Col William W. Dunn	Deputy for Development Planning SAMSO
Mr. David S. Gabriel	Manager, Space Nuclear Systems Office NASA
Honorable Grant L. Hansen	Assistant Secretary of the Air Force (R&D)
Dr. Richard O. Hundley	R&D Associates
Mr. Maxwell W. Hunter	Assistant to the Vice Presiden and General Manager, Space Systems Division Lockheed Missiles & Space Co.,

11 August 1972

Mr. Roy P. Jackson	Associate Administrator for Office of Aeronautics and Space Technology, NASA
Professor Ali Javan	Professor of Physics MIT
Mr. Joe C. Jones	Deputy Assistant Secretary of the Air Force (R&D)
Dr. Arthur Kantrowitz	Director, AVCO Everett Research Laboratory
Dr. William L. Lehmann	Deputy Assistant Secretary of the Air Force (R&D)
Professor John McCarthy	Computer Science Dept Stanford University
Honorable John L. McLucas	Under Secretary of the Air Force
Dr. George P. Millburn	General Manager - Technical Div The Aerospace Corp
Dr. F. Robert Naka	Deputy Secretary of the Air Force (Space Systems)
Dr. Lawrence G. Roberts	Director for DARPA/Information Processing Techniques
Mr. Franklin J. Ross	Deputy Assistant Secretary of the Air Force (R&D)
Mr. Frank E. Rom	Chief, Power Application and Systems Analysis Branch NASA Lewis Research Center
Honorable Robert C. Seamans, Jr.	Secretary of the Air Force
Mr. Gerard A. Sears	The RAND Corporation

Dr. Edward Teller	Lawrence Livermore Lab
Dr. Wernher von Braun	Vice President, Engineering and Development Fairchild Industries, Inc.
Mr. Arthur G. Wimer, Jr.	Science Advisor, Director of Laboratories, AFSC