

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

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FOIA MARKER

**This is not a textual record. This is used as an
administrative marker by the George Bush Presidential
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Record Group/Collection: George H.W. Bush Presidential Records
Collection/Office of Origin: Science and Technology Policy, Office of (OSTP)
Series: Bromley, D. Allan, Files
Subseries: Correspondence Files

OA/ID Number: 62010
Folder ID Number: 62010-007

Folder Title:
Invitations: General (4) [7 of 12] [1991]

Stack:

Row:

Section:

Shelf:

Position:

0

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"INVITATION FOR DR. BROMLEY"

TYPE: INVITATION

DOCUMENT NUMBER: 9120753

SPEECH: YES NO

FROM: UNIVERSITIES RESEARCH ASSOCIATION, INC.

DATE OF EVENT: 04/24/91

LOCATION OF EVENT: RAYBURN HOUSE OFFICE BLDG, THIRD FLOOR, ROOM 2318

TIME OF EVENT: 05:30PM

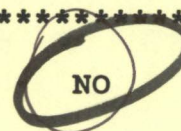
SUBJECT: FERMI NATIONAL ACCELERATOR LABORATORY &
SUPERCONDUCTING SUPER COLLIDER LABORATORY REQUEST
THE PLEASURE OF YOUR COMPANY FOR COCKTAILS & BUFFET.

RSVP:

CONTACT PERSON:

CONTACT NUMBER: 202/293-1382

INVITATION ACCEPTED?



COPIES TO: Perry Lindstrom

REMARKS: 3/18/91 Regretted to Gloria!
nr

DATE OF LETTER:

DATE RECEIVED: 03/15/91

FILE: P- INVITATION

An Invitation . . .

Universities Research Association, Inc.

Operator of

Fermi National Accelerator Laboratory

and

Superconducting Super Collider Laboratory

requests the pleasure of your company

for Cocktails and Buffet

on Wednesday, April 24, 1991

Rayburn House Office Building

Third Floor - Room 2318

South Capitol Street at Independence Avenue

Washington, D. C.

R. S. V.P.

(202) 293-1982

Informal

5:30 to 7:30 p.m.

UNIVERSITIES RESEARCH ASSOCIATION, INC

MEMBER INSTITUTIONS

University of Alabama
 Arizona State University
 University of Arizona
 Boston University
 Brown University
 University of California
 at Berkeley
 University of California at Irvine
 University of California
 at Los Angeles
 University of California
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 University of Oklahoma
 University of Oregon
 University of Pennsylvania
 Pennsylvania State University
 University of Pittsburgh
 Prairie View A&M University*
 Princeton University
 Purdue University
 Rice University
 University of Rochester
 Rockefeller University
 Rutgers, The State University
 of New Jersey
 San Francisco State University*
 University of South Carolina
 Stanford University
 Syracuse University
 University of Tennessee
 at Knoxville
 University of Texas at Arlington
 University of Texas at Austin
 University of Texas at Dallas
 Texas A&M University
 Texas Tech University
 University of Toronto
 Tufts University
 Tulane University
 University of Utah
 Vanderbilt University
 University of Virginia
 Virginia Polytechnic Institute
 and State University
 Washington University
 University of Washington
 College of William and Mary
 University of Wisconsin
 at Madison
 Yale University

* Indicates Associate Member

"INVITATION FOR DR. BROMLEY"

TYPE: INVITATION

DOCUMENT NUMBER: 9120754

SPEECH: YES NO

FROM: USO WORLD HEADQUARTERS

DATE OF EVENT: 04/05/91

LOCATION OF EVENT: UNIVERSAL STUDIOS AMPHITHEATRE, UNIVERSAL CITY, CA

TIME OF EVENT: 06:30PM

SUBJECT: THE USO 50th ANNIVERSARY SALUTE HONORING BOB HOPE
AND CORPORATE FOUNDERS.

RSVP:

CONTACT PERSON: KELLY WARD

CONTACT NUMBER: 202/879-4702

INVITATION ACCEPTED?

~~YES~~ NO

COPIES TO:

REMARKS:

DATE OF LETTER:

DATE RECEIVED: 03/15/91

FILE: *P* INVITATION

YOUR PASSPORT TO



USO World Headquarters

601 Indiana Avenue, NW
Washington, DC 20004
(202) 879-4702 • Fax: (202) 638-4716

The USO 50th Anniversary Salute Headquarters

12100 Wilshire Blvd. • Suite 1020
Los Angeles, CA 90025
(213) 207-9700 • Fax: (213) 207-2246

**JOIN US IN
HONORING 50 YEARS OF SERVICE**



The pleasure of your company
is requested at the

USO 50TH ANNIVERSARY SALUTE

Honoring
Bob Hope
and
Corporate Founders

Wednesday, April 10, 1991

Universal Studios Amphitheatre
Universal City, California

Black Tie

Favour of a reply is requested

Due to security, exact time will be forwarded
upon purchase of ticket. Estimated time: 6:30 PM

The President of the United States
George Bush
USO Honorary Chairman

Bob Hope
USO Ambassador of Good Will

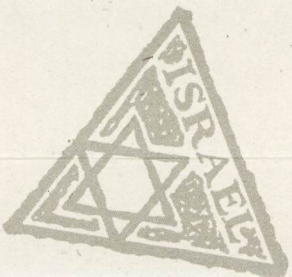
Admiral William J. Crowe, Jr., USN (Ret.)
Former Chairman, Joint Chiefs of Staff
and

Heinz C. Prechter
Chairman, ASC Inc.
Co-Chairmen, USO 50th Anniversary

Alex G. Spanos
Chairman, A.G. Spanos Construction, Inc.
USO Salute Dinner Chairman

General Bernard W. Rogers, USA. (Ret.)
Chairman, USO World Board of Governors

Honorable Chapman B. Cox
President, World USO



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Alfred W. Swan, Jr.
Melvin M. Swig
William G. Tobin
Max E. Toy
Alex Trebek
James E. Turner, Jr.
Rudolph A. Vignone
Ray Volpe
Hon. Harry N. Walters
Morris Wax
James F. Williams
Robert T. Williamson
James Wood
James F. Young
Johnny Yune

USO SALUTE LEADERSHIP COMMITTEE

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Chicago, Illinois

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President
Ann Ascher, Inc.

Mr. Edmond Baysari
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President
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Mr. Steven W. Lew
President/COO
Universal Studios Hollywood

Mr. John D. Nordstrom
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Mr. Tom Werner
Executive Producer
The Carsey-Werner Co.

DATE CHANGE

Due to the attendance of
the President of the United States
George Bush

The date of the USO 50th Anniversary Salute

has been changed to

Friday, April 5, 1991



For further information please contact:

Kelly Ward • USO World Headquarters
601 Indiana Avenue, N.W.
Washington, D.C. 20004 • (202) 879-4702

or

Robin Cherry • Salute Headquarters
12100 Wilshire Blvd. • Suite 1020
Los Angeles, CA 90025 • (213) 207-9700

USO thanks the following
Honorary Committee members and Salute participants:
(as of March 5, 1991)

Honorable Richard B. Cheney
Secretary of Defense

Honorable Robert A. Mosbacher
Secretary of Commerce

Honorable Pete Wilson
Governor, State of California

Honorable Tom Bradley
Mayor, City of Los Angeles

USO welcomes the newest members of the
USO 50th Anniversary Salute Leadership Committee:

Mr. Howard P. Marguleas
Chairman and Chief Executive Officer
Sun World, Inc.

Mr. David H. Murdock
Chairman and Chief Executive Officer
Castle & Cooke, Inc.

Mr. John Rangos, Sr.
President and Chief Executive Officer
Chambers Development Company, Inc.

Mr. Alexander W. Rangos
Executive Vice President
Chambers Development Company, Inc.

"INVITATION FOR DR. BROMLEY"

TYPE: INVITATION

DOCUMENT NUMBER: 9120755

SPEECH: YES NO

FROM: TRULY, Richard H.: NASA

DATE OF EVENT: 04/04/91

LOCATION OF EVENT: JOHN F. KENNEDY SPACE CENTER, FLORIDA

TIME OF EVENT: 09:20AM

SUBJECT: THE LAUNCH OF THE GAMMA-RAY OBSERVATORY ABOARD THE
SPACE SHUTTLE ATLANTIS.

RSVP:

CONTACT PERSON:

CONTACT NUMBER:

INVITATION ACCEPTED?

~~YES~~

NO

COPIES TO:

REMARKS:

DATE OF LETTER:

DATE RECEIVED: 03/15/91

FILE: P- INVITATION

Richard H. Truly
Administrator
National Aeronautics and Space
Administration

Cordially Invites you
to the

Launch of the Gamma-Ray Observatory
aboard the Space Shuttle Atlantis
John F. Kennedy Space Center,
Florida

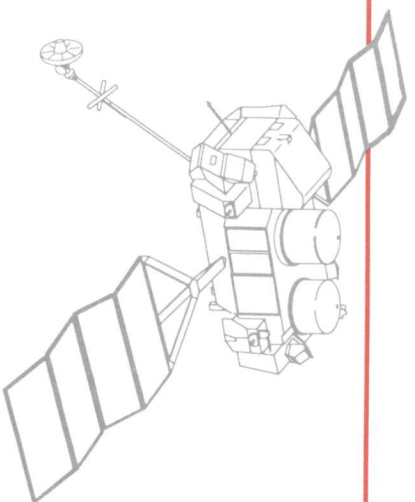
“...the heavens still are to our imaginations
what the western horizon once was.”

—Robert A. Brown

RSVP
Reply Card Enclosed



National Aeronautics and
Space Administration



STS-37
Gamma-Ray
Observatory

Administrator
National Aeronautics and
Space Administration
A/NASA Headquarters
Washington, DC 20546

Official Business
Penalty for Private Use, \$300

Postage and Fees Paid
National Aeronautics and
Space Administration
NASA-451



Mr Allan Bromley
Sci Adv to the President
Dir Ofc Sci & Tech Policy
New EOB
Washington, DC 20506-

358/0900B

NASA

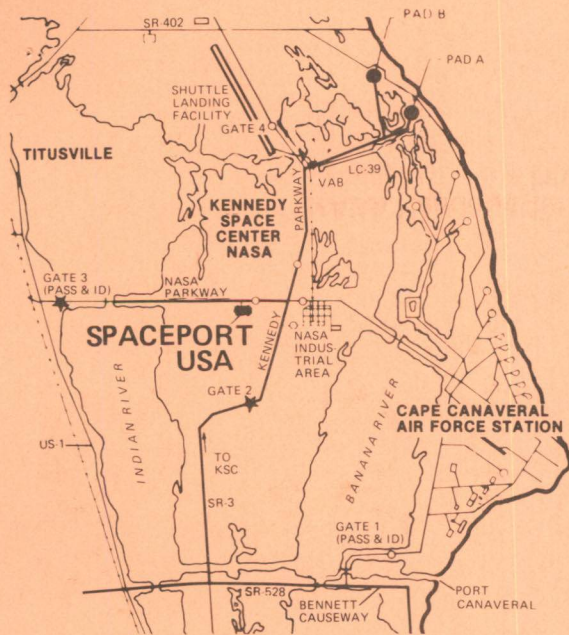


9120755

RECEIVED

21 MAR 15 10:00

OFFICE OF THE
DIRECTOR



Display in windshield with this side showing in vehicle.

This permit authorizes the bearer to enter Kennedy Space Center, FL **ONLY** by gate No. 2 (State Road No. 3, Merritt Island entrance) and by gate No. 3 (U. S. No. 1 and NASA causeway entrance) for access to Spaceport USA.

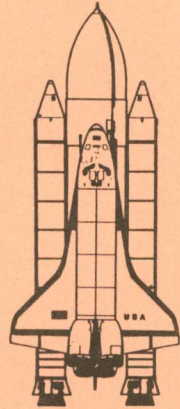
NOTICE

- NO PETS ● NO ALCOHOL OR OTHER INTOXICANTS
 - NO SELLING OR SOLICITING ● NO FIREARMS
 - NO SWIMMING, WADING, OR FISHING
 - NO FEEDING WILDLIFE
- will be allowed on Kennedy Space Center or Cape Canaveral Air Force Station.

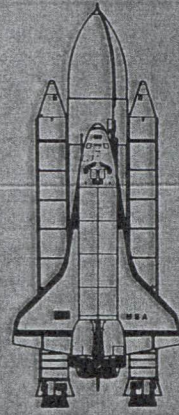
WARNING

U.S. Government property, issued for official use until completion of operation. Use or possession by an unauthorized person, counterfeiting or alteration is a violation of section 499, Title 18, U.S. Code and will make the offender liable to penalty. This permit may be kept as a souvenir.

Forrest S. McCartney
 Forrest S. McCartney, Director



NASA Kennedy Space Center's
Spaceport USA



NASA Kennedy Space Center's
Spaceport USA

Bush Library Photocopy

TRW Space Systems built the spacecraft and provided overall systems and mission integration.

Additional Payloads

The **Ascent Particle Monitor** (APM) measures particle contamination in the cargo bay during the immediate prelaunch period and during ascent.

Middeck Payloads

During overflights of Maui Island in Hawaii, the Orbiter and crew will be used to obtain data for the **Air Force Maui Optical System** (AMOS) to calibrate its ground-based infrared and optical sensors and to observe plumes under a variety of conditions.

The **Bioserve-Instrumentation Technology Associates Materials Dispersion Apparatus** (BIMDA) is designed to evaluate current processes for growing large high-quality protein crystals from macromolecules in microgravity.

The **Protein Crystal Growth** (PCG-III) experiments supply information on the scientific methods and commercial potential for growing high-quality protein crystals in a controlled microgravity environment.

The **Radiation Monitoring Experiment** (RME-III) will record both the rate and total dosage received on the Orbiter of all types of ionizing radiation (gamma ray, neutron, and proton radiation).

The **Shuttle Amateur Radio Experiment** (SAREX-II) conducts shortwave radio transmissions between ground and shuttle-based amateur radio operators.

On this flight, The **Space Station Heatpipe Advanced Radiator Element** (SHARE II) will be tested to verify new designs.

Additional Activity

The primary objective of the **Mid-Range Stationkeeping** test is to determine how accurately the Orbiter can intercept a point and maintain its position using radar and onboard relative navigation.



Space Shuttle Mission STS-37 Prelaunch Profile

Orbiter: OV-104 (Atlantis)
Altitude: 450 kilometers circular (243 nautical miles)
Inclination: 28.5 degrees
Mission Duration: 5 days

Crew

Col. Steven Nagel, Commander
Lt. Col. Kenneth Cameron, Pilot
Dr. Linda Godwin, Mission Specialist
Lt. Col. Jerry Ross, Mission Specialist
Dr. Jay Apt, Mission Specialist

Payloads

The Gamma Ray Observatory
Ascent Particle Monitor

Middeck Payloads

Air Force Maui Optical System (AMOS)
Bioserve-ITA Materials Dispersion Apparatus (BIMDA)
Protein Crystal Growth (PCG-III)
Radiation Monitoring Experiment (RME III)
Shuttle Amateur Radio Experiment (SAREX)
Space Station Heatpipe Advanced Radiator Element (SHARE II)

Flight Experiment

The **EVA Development Flight Experiment** will be testing new crew and equipment restraints, measuring and recording crew performance with loads under a variety of conditions, and testing how the Remote Manipulator System performs with the astronauts in different positions.

The Gamma Ray Observatory

The primary objective of the STS-37 flight is the deployment of the Gamma Ray Observatory. Deployed in space beyond Earth's obscuring atmosphere, the Gamma Ray Observatory will detect and measure gamma rays over the entire celestial sphere with a sensitivity an order of magnitude better than has ever been done before. The Observatory is the second of NASA's Four Great Observatories; the Hubble Space Telescope was launched in April 1990.

Gamma-ray astronomy is a means of viewing some of the most energetic and chaotic objects in the Universe. Celestial gamma rays provide a glimpse of the birth of elements and the deaths of stars, mysterious quasars and pulsars, and the space-time precipice of a black hole.

Deployment and Activation

Atlantis will transport the Gamma Ray Observatory to a circular orbit at an altitude of about 450 km (243 nm.) and at an inclination of 28.5 degrees to the Equator. Following orbital insertion, Atlantis' crew will check out the Remote Manipulator System (RMS) and the Extra-Vehicular Mobility Unit (EMU) in preparation for the Observatory's deployment during orbit 34 on flight day 3. The Shuttle's robot arm will remove the Observatory from the payload bay and hold it while the satellite deploys its solar arrays and communications antenna. After pre-release checks are complete, the Observatory will be set free in space. Three Orbiter engine burns are planned for a slow separation. The Space Shuttle returns to Earth on flight day 6. On Day 10, the Gamma Ray Observatory science instrument activation will begin.

During the first 15 months, the Gamma Ray Observatory will survey the entire sky through a series of 2-week observation periods. After the all-sky survey is completed, data obtained will be used in planning subsequent pointed observations to maximize scientific return.

Spacecraft

The Gamma Ray Observatory will be the heaviest science payload deployed by the Space Shuttle in low Earth orbit. The Gamma Ray Observatory weighs over 17 tons and fills half of the shuttle bay. The four instruments together weigh 6 tons, each one as much as a compact

car. The Gamma Ray Observatory is a three-axis stabilized spacecraft design so that its gamma-ray detectors can be pointed in a fixed direction for observational periods of 14 days each.

The Gamma Ray Observatory's Instruments

The Gamma Ray Observatory instruments are much larger, more massive, and much more sensitive than any gamma-ray instruments ever flown in space. Size is crucial for gamma-ray astronomy—large instruments are needed to detect a significant number of photons in a reasonable amount of time because the number of gamma rays from celestial sources is small. A massive detector is required because gamma rays are highly penetrating and can be detected only when they interact with matter.

The Gamma Ray Observatory instruments were developed by the following institutions:

Burst and Transient Source Experiment (BATSE): NASA/Marshall Space Flight Center; University of Alabama, Huntsville; University of California, San Diego; NASA/Goddard Space Flight Center.

Oriented Scintillation Spectrometer Experiment (OSSE): United States Naval Research Laboratory, Northwestern University, Clemson University, Royal Aircraft Establishment (Great Britain).

Imaging Compton Telescope (COMPTEL): Max Planck Institute (Federal Republic of Germany), European Space and Technology Center (ESTEC), University of New Hampshire, Space Research Laboratory, Leiden (The Netherlands).

Energetic Gamma-Ray Experiment Telescope (EGRET): NASA/Goddard Space Flight Center, Stanford University, Max Planck Institute (Federal Republic of Germany), Grumman Aerospace.

Gamma Ray Observatory Development and Operation

The Goddard Space Flight Center is responsible for the development of the Gamma Ray Observatory, its scientific instruments, and command and data handling system. The Observatory's operations will be conducted from Goddard's Payload Operations Control Center.

STS-37

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Guest Information

Included with this invitation are (1) an Important Notice Card; (2) a Mission Profile; (3) a Vehicle Pass, which enables you to enter the Kennedy Space Center (KSC) on launch day; and (4) a RSVP Card, which we encourage you to complete and return as soon as possible if you plan to attend. A map of the local area directing you to Spaceport USA is printed on the back of the invitation.

Guest Center

A Guest Center at Spaceport USA, Kennedy Space Center, Florida, will open in Room 2001 one or two days prior to the scheduled launch of the Space Shuttle. The telephone number is (407) 867-2144.

Hours of Operation

Two days before launch 12 noon to 4:00 p.m. One day before launch 9:00 a.m. to 4:00 p.m. (The time of launch may result in a change in the above listed hours of operation.)

Launch Day—Four hours before liftoff and until all buses return from the launch viewing site.

Tours and Briefings

Each guest may take a tour of the Kennedy Space Center and receive a Space Shuttle briefing the day before launch. Guests must register for tours and briefings in Room 2001, Spaceport USA. Briefings will be held in the Galaxy Theater at Spaceport USA (KSC), and the tour will originate from the parking area adjacent to the Rocket Garden.

Launch Day

Buses will begin departing from Spaceport USA for the launch viewing site at two hours before launch, with the last bus leaving one hour before launch.

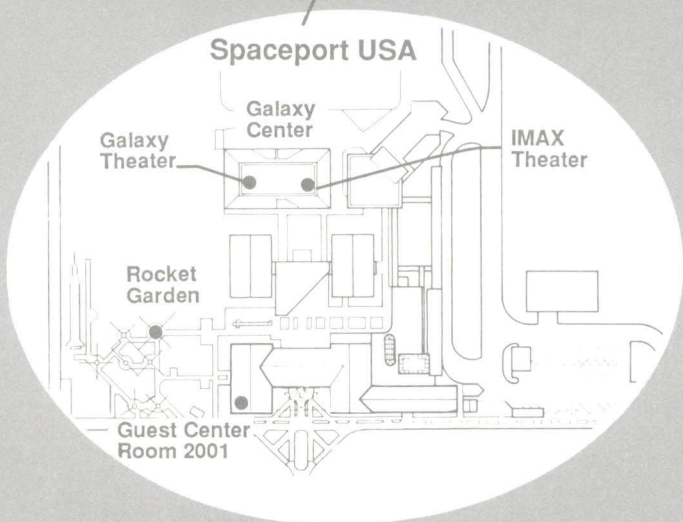
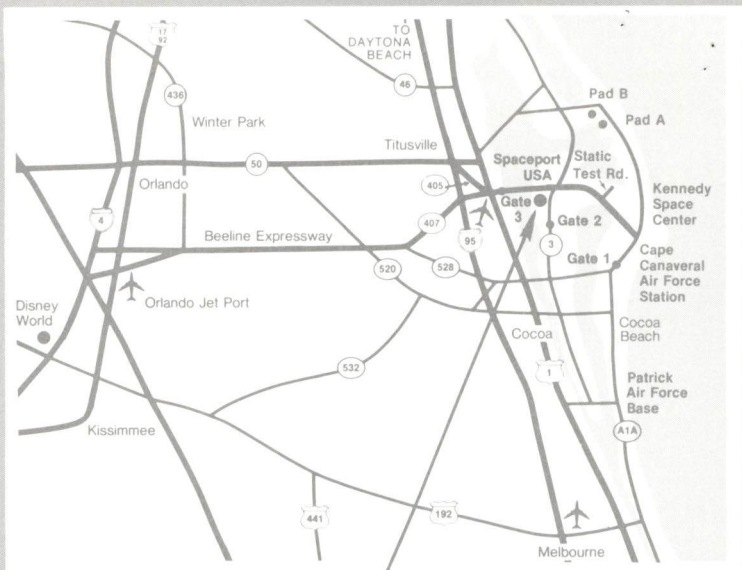
Access to Kennedy Space Center

The outside gates will be closed on launch day until four hours before launch. You must show the vehicle pass provided with this invitation at perimeter gates No. 2 or No. 3, identified on the map, to reach Spaceport USA.

Accommodations/ Transportation

Guests are responsible for their own lodging and transportation.

In the event of a postponement, this invitation is valid for the next scheduled attempt of this same mission.





Important Notice

The Gamma Ray Observatory is scheduled to be launched aboard the Space Shuttle orbiter Atlantis (STS-37) no earlier than Thursday, April 4, 1991, from the John F. Kennedy Space Center, Florida.

The launch window opens at 9:20 a.m. EST and extends for a four hour period.

The five-day mission will end with a landing scheduled for 9:30 a.m. EST Tuesday, April 9, at Edwards Air Force Base, California.

Guests should be aware that contingencies could arise changing launch and landing dates, times, number of orbits and the landing site. Those planning to attend are urged to monitor the news daily for the final launch and landing dates which will be announced on NASA's 24-hour nationwide information service. Numbers are listed at the right:

NASA Headquarters,
Washington D.C. (202) 755-8363

Kennedy Space Center,
Florida (407) 867-2314

Marshall Space Flight Center,
Alabama (205) 544-2222

Goddard Space Flight Center,
Maryland (301) 286-6397

Johnson Space Center,
Texas (713) 483-2477

Ames-Dryden Flight Research,
Facility, California (805) 258-3520

"INVITATION FOR DR. BROMLEY"

TYPE: INVITATION

DOCUMENT NUMBER: 9120737

SPEECH: YES NO

FROM: O'STEEN, W. Keith and Donald J. Marsh: WAKE FOREST
UNIVERSITY

DATE OF EVENT: 12/06/91

LOCATION OF EVENT: THE RED LION'S LA POSADA RESORT IN SCOTTSDALE, AZ

TIME OF EVENT:

SUBJECT: A SYMPOSIUM ON THE BROAD ASPECTS OF FEDERAL FUNDING
OF BIOMEDICAL RESEARCH DURING THE ANNUAL MEETING OF
THE ASSOCIATION OF ANATOMY CHAIRMEN AND THE
ASSOCIATION OF CHAIRMEN OF DEPARTMENTS OF
PHYSIOLOGY.

RSVP:

CONTACT PERSON:

CONTACT NUMBER:

INVITATION ACCEPTED?

YES

NO

COPIES TO: Life Sciences

REMARKS:

DATE OF LETTER: 02/19/91

DATE RECEIVED: 03/13/91

FILE: P- INVITATION

THE WHITE HOUSE
WASHINGTON

April 8, 1991

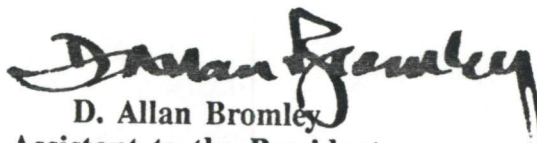
Dear Professor O'Steen:

Thank you for your letters of February 19 and March 15, 1991, inviting me to participate in your symposium at your annual meeting scheduled for December 6, 1991 in Scottsdale, Arizona.

Because of the widespread concern about funding biomedical research, this will be a meeting that I would have wanted to attend. However, this time period is, unfortunately, in the middle of the budget season, so I must regretfully decline.

Thank you for thinking of me and let me offer my best wishes for a successful meeting.

Sincerely yours,



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

Professor W. Keith O'Steen
Professor and Chairman
Department of Neurobiology and Anatomy
Wake Forest University
300 South Hawthorne Road
Winston-Salem, North Carolina 27103

NATIONAL ACADEMY OF SCIENCES
OFFICE OF THE PRESIDENT

March 11, 1991

The attached invitation
was sent to Dr. Press'
office inadvertently.

Document Originally
Attached to
Following Page

The Bowman Gray
School of Medicine

Department of Neurobiology and Anatomy
Programs in Neuroscience and Cell Biology
(919) 748-4368

D. Allan Bromley, Ph.D., Dr. nat. phil.
Presidential Science Adviser
The White House
Pennsylvania Avenue
Washington, DC 20500

Dear Dr. Bromley:

The Association of Anatomy Chairmen and the Association of Chairmen of Departments of Physiology invite you to participate in a symposium at our annual meeting at the Red Lion's La Posada Resort in Scottsdale, Arizona, on December 6, 1991. The symposium is to address the broad aspects of federal funding of biomedical research.

Our organizations collectively are composed of the chairpersons of over 280 departments of physiology and anatomy, including neurobiology, cell biology, and molecular biology, in medical, dental, and other schools and universities throughout North America. The departments are composed of 8-10,000 academic professors and scientists.

We are organizing this symposium because of concerns shared with our colleagues throughout American science about the future of scientific research. We acknowledge the recent recognition given to this problem by the President in his address to the American Association for the Advancement of Science and in his proposals for the 1992 budget. We think it is important, however, for professional organizations such as ours to engage public officials such as yourself in a dialogue. We should certainly benefit from learning of your views about the federal government's role in biomedical research, and we think that it would be useful to share our perceptions about long range developments perceived to be underway and about the role of the government in shaping these changes.

We hope that you will be able to participate, and we look forward to hearing from you soon.



W. Keith O'Steen, Ph.D.
Professor and Chairman
Department of Neurobiology
and Anatomy
Bowman Gray School of Medicine
President, Association of
Anatomy Chairmen

Sincerely yours,



Donald J. Marsh, M.D.
Professor and Chairman
Department of Physiology and Biophysics
University of Southern California School
of Medicine
President, Association of Chairmen of
Departments of Physiology

"INVITATION FOR DR. BROMLEY"

TYPE: INVITATION

DOCUMENT NUMBER: 9120919

SPEECH: YES NO

FROM: O'STEEN, W. Keith: WAKE FOREST UNIVERSITY

DATE OF EVENT: 12/06/91

LOCATION OF EVENT: RED LION'S LA POSADA RESORT, SCOTTSDALE, AZ

TIME OF EVENT:

SUBJECT: INVITATION TO PARTICIPATE IN A SYMPOSIUM AT THE
ANNUAL MEETING OF THE ASSOCIATION OF ANATOMY
CHAIRMEN & THE ASSOCIATION OF CHAIRMEN OF
DEPARTMENTS OF PHYSIOLOGY WITH A NOTE OF APOLOGY.

RSVP:

CONTACT PERSON:

CONTACT NUMBER:

INVITATION ACCEPTED?

~~YES~~

NO

COPIES TO: Life Sciences

REMARKS: The invitation was received 03/13/91, document #9120737.

DATE OF LETTER: 03/15/91

DATE RECEIVED: 03/27/91

FILE: INVITATION

THE WHITE HOUSE
WASHINGTON

April 8, 1991

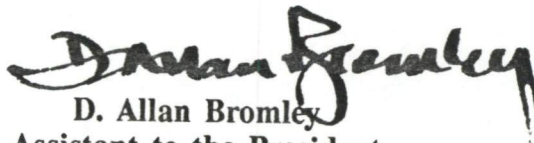
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Sincerely yours,

A handwritten signature in dark ink, appearing to read "D. Allan Bromley". The signature is fluid and cursive, with the first name "D. Allan" and last name "Bromley" clearly distinguishable.

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

Professor W. Keith O'Steen
Professor and Chairman
Department of Neurobiology and Anatomy
Wake Forest University
300 South Hawthorne Road
Winston-Salem, North Carolina 27103

9120919

WAKE FOREST
UNIVERSITY

The Bowman Gray
School of Medicine

RECEIVED

91 MAR 27 P 5: 02

Department of Neurobiology and Anatomy
Programs in Neuroscience and Cell Biology
(919) 748-4368

OFFICE OF THE
DIRECTOR

March 15, 1991

Dr. Allan Bromley
Assistant to the President
for Science and Technology
Director, Office of Science
and Technology Policy
Room 360 OEOB
Washington, DC 10506

Dear Doctor Bromley:

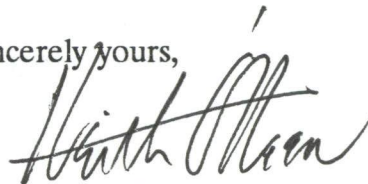
It has come to my attention that the letter of invitation to you to participate in our meeting (see attached) was sent inadvertently to the wrong address.

I want to apologize for this mistake due to long distance planning between here and California.

Please let this note signify our continued desire to have you join us for our program and the pleasure that your acceptance will give us.

Best wishes,

Sincerely yours,



W. Keith O'Steen, Ph.D.
Professor and Chairman
Department of Neurobiology
and Anatomy

WKO/jb

The Bowman Gray
School of Medicine

February 19, 1991

Department of Neurobiology and Anatomy
Programs in Neuroscience and Cell Biology
(919) 748-4368

D. Allan Bromley, Ph.D., Dr. nat. phil.
Assistant to the President
for Science and Technology
Director, Office of Science and Technology Policy
Room 360 OEOP
Washington, DC 10506

Dear Dr. Bromley:

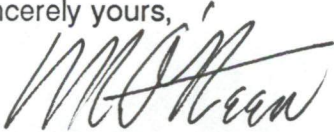
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We hope that you will be able to participate, and we look forward to hearing from you soon.

Sincerely yours,



W. Keith O'Steen, Ph.D.
Professor and Chairman
Department of Neurobiology
and Anatomy
Bowman Gray School of Medicine
President, Association of
Anatomy Chairmen

Donald J. Marsh, M.D.
Professor and Chairman
Department of Physiology and Biophysics
University of Southern California School
of Medicine
President, Association of Chairmen of
Departments of Physiology

"INVITATION FOR DR. BROMLEY"

TYPE: INVITATION

DOCUMENT NUMBER: 9120739

SPEECH: YES NO

FROM: AMERICAN ASSOCIATION OF ENGINEERING SOCIETIES

DATE OF EVENT: 04/04/91

LOCATION OF EVENT: THE DOLLY MADISON ROOM, THE MADISON HOTEL, D.C.

TIME OF EVENT: 12:30PM

SUBJECT: TWELTH ANNUAL AWARDS CEREMONY & LUNCHEON

RSVP: 03/29/91

CONTACT PERSON:

CONTACT NUMBER:

INVITATION ACCEPTED?

YES

NO

COPIES TO: Dr. Wong

REMARKS:

DATE OF LETTER:

DATE RECEIVED: 03/13/91

FILE: P- INVITATION



The American Association of Engineering Societies

requests the pleasure of your company at the

*Twelfth Annual Awards Ceremony
& Luncheon*

*Thursday, April fourth, 1991
at twelve-thirty o'clock*

*The Dolley Madison Room
The Madison Hotel
15th & M Streets, N.W.
Washington, D.C.*

Champagne Reception 12:00 noon

Award Honorees

Mr. Norman R. Augustine

Chairman and CEO

Martin Marietta Corporation

National Engineering Award

The Honorable James D. Watkins

Secretary

U.S. Department of Energy

Chairman's Award

Mr. M. Kent Loftin

Director, Kissimmee River Restoration

South Florida Water Management District

Joan Hodges Queneau Award



*Hon. D. Allan Bromley
Science Advisor to the President
and Director
Office of Science & Technology Policy
Old Executive Office Building
Room 360
Washington, DC 20506*

9/20739
American Association of Engineering Societies

1111 Nineteenth Street, N.W., Suite 608

Washington, D.C. 20036-3690

RECEIVED

91 MAR 13 P 3:39

OFFICE OF THE
DIRECTOR



"INVITATION FOR DR. BROMLEY"

TYPE: INVITATION

DOCUMENT NUMBER: 9120734

SPEECH: YES NO

FROM: NATIONAL OCEAN INDUSTRIES ASSOCIATION

DATE OF EVENT: 04/09/91

LOCATION OF EVENT: THE COLUMBUS CLUB AT UNION STATION

TIME OF EVENT: 06:00PM

SUBJECT: A RECEPTION ON THE OCCASION OF THEIR NINETEENTH
ANNUAL MEETING.

RSVP:

CONTACT PERSON:

CONTACT NUMBER: 202/785-5116

INVITATION ACCEPTED?

YES

☒ NO

3/15/91 Regretted to Karen. m

COPIES TO: Nancy Maynard

REMARKS:

DATE OF LETTER:

DATE RECEIVED: 03/13/91

FILE: *P-* INVITATION

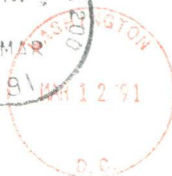


National Ocean Industries Association

Cordially invites you to a reception
on the occasion of our
Nineteenth Annual Meeting

Tuesday, April 9, 1991
6:00 p.m. to 8:00 p.m.
The Columbus Club at Union Station

R.S.V.P. (202) 785-5116
Not Transferable



D. Allan Bromley
Sci. Adv. to Pres and Dir.
The White House
of Sci. and Tech. Policy

Washington, D.C. 20500

1050 Seventeenth Street, N.W., Suite 700
Washington, D.C. 20036

9/20/34
RECEIVED

91 MAR 13 AIO: 05

OFFICE OF THE
DIRECTOR

SA

"INVITATION FOR DR. BROMLEY"

TYPE: INVITATION-DISCUSSION

DOCUMENT NUMBER: 9120719

SPEECH: YES NO

FROM: TEASLEY, Kevin: REASON FOUNDATION

DATE OF EVENT: 03/27/91

LOCATION OF EVENT: THE RITZ-CARLTON HOTEL, WASHINGTON, D.C.

TIME OF EVENT: 08:00AM

SUBJECT: THE FUTURE OF AMERICA'S POSITION IN SPACE TRADE: A
REASON FOUNDATION ROUNDTABLE DISCUSSION.

RSVP: 03/22/91

CONTACT PERSON: KEVIN TEASLEY

CONTACT NUMBER: 213/392-0443

INVITATION ACCEPTED?

~~YES~~

NO

COPIES TO: Dr. Wong
Dr. Phillips

REMARKS:

*3/15/91 Requested to Mary.
mr*

DATE OF LETTER: 03/08/91

DATE RECEIVED: 03/12/91

FILE: P- INVITATION

RECEIVED

91 MAR 12 A 9:45

OFFICE OF THE
DIRECTOR



Reason
Foundation

March 8, 1991

D. Allan Bromley
Assistant to the President
Office of Science & Technology
The White House
Washington, DC 20500

Dear Dr. Bromley:

The Reason Foundation is hosting a closed-door, roundtable discussion for a select audience of industry, Administration and Congressional representatives in Washington, D.C. on March 27th to discuss the future of America in space trade. Specifically, we plan to focus on the launch vehicle and satellite industry.

This meeting is a follow-on to the Reason Foundation's recently published study, Creating Competitive Space Trade: A Common Market for Space Enterprise, by James Bennett, corporate vice president of American Rocket Company. Mark Albrecht of the National Space Council said the report, "is one of the best analyses of the competitive factors shaping the international marketplace for space goods and services." A copy of the study is enclosed.

I would like to invite you to participate in this event. Following the presentations by the various parties, there will be an open discussion session to address issues raised during the morning session.

Space is limited so this event is limited to principals plus one only. Please RSVP by March 22 to my office, (213) 392-0443. Thank you for your time. I look forward to meeting you.

Sincerely,

Kevin D. Teasley
Public Affairs Director

2716 Ocean Park Blvd., Suite 1062, Santa Monica, California 90405 (213) 392-0443

Trustees

Bernard Baltic, *Baltic-Gustafson Assoc.* • Frank Bond, *U.S. Health, Inc.* • Joseph Coberly, *J.E. Coberly, Inc.* • Joseph H. Coulombe, *Consultant*
Morton B. Jackson, *Baker & McKenzie* • Norman Karlin, *Southwestern University* • David Keyston, *Pebble Beach, CA*
Manuel S. Klausner, *Kindel & Anderson* • David H. Koch, *Koch Industries* • Robert W. Poole, Jr., *Reason Foundation* • Robert W. Smiley, Jr., *Benefit Capital, Inc.*



The Future of America's Position in Space Trade:
A Reason Foundation Roundtable Discussion

March 27, 1991
The Ritz-Carlton Hotel
2100 Mass. Ave., NW
Washington, DC

- 8:00 a.m.: Welcoming Remarks and Introduction
Kevin D. Teasley, Public Affairs Director
Reason Foundation
- 8:10 a.m.: Creating Competitive Space Trade: A Long-Term Perspective
James Bennett, Corporate Vice President
American Rocket Company
- 8:45 a.m.: Lessons Learned from the European Economic Community
TBA
- 9:15 a.m.: BREAK
- 9:30 a.m.: Commentary
Moderator
Claud Gingrich, L.A. Motley and Company
- Administration Perspective
Courtney Stadd, Senior Director, National Space Council
- U.S. Launch Services Perspective
Dr. Alan Lovelace, General Dynamics
- European Launch Services Perspective
Doug Heydon, Ariannospace
- U.S. Satellite Industry Perspective
Dr. John E. Koehler, Hughes Aircraft Co.
- 10:30 a.m.: Open Discussion
- 11:30 a.m.: Close

Please plan to join us at this event for an informative discussion by representatives from industry, the Administration, Congress, and others on the subject of where the United States will be in 10-20 years with respect to trade issues regarding the space launch and satellite industry. What policies should be implemented to get us from point A to point B? This will be a closed-door discussion. No media. Due to space limitations, this event is for principals plus one only. RSVP by March 22, 1991 to Kevin Teasley, (213) 392-0443.

2716 Ocean Park Blvd., Suite 1062, Santa Monica, California 90405 (213) 392-0443

Trustees

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Manuel S. Klausner, *Kindel & Anderson* • David H. Koch, *Koch Industries* • Robert W. Poole, Jr., *Reason Foundation* • Robert W. Smiley, Jr., *Benefit Capital, Inc.*



Reason Foundation

POLICY
STUDY

No. 123

Reason Foundation, 2716 Ocean Park Blvd, Suite 1062, Santa Monica, CA 90405 213/392-0443

August 1990

CREATING COMPETITIVE SPACE TRADE: A Common Market for Space Enterprise

By James Bennett

Executive Summary

If the United States is to profit from the rapid commercialization of space, it will have to take the lead in developing a free-trade structure among the industrialized democracies. Current space trade policy remains an uncoordinated assortment of agreements made at the political-diplomatic levels, reinforcing the government's traditional dominance in the industry.

This frequently changing, politicized environment has inhibited investment in U.S. space ventures for the past decade. A coherent strategy fostering free-trade and private enterprise will bring an end to expensive public subsidies and political uncertainties while providing new opportunities for entrepreneurial activity.

To move aggressively toward a free-market in space, the United States must first pursue a multilateral agreement that would: (1) move to minimize government subsidies in space goods and services; (2) make the use of launch services of nonmarket economies such as the Soviet Union and the People's Republic of China dependent upon their willingness to restructure their economics; and (3) negotiate for the establishment of a Space Trade Community committed to free-trade among its participant nations.

The Space Trade Community would be a long-term mechanism for developing private enterprise in space. It would eliminate the need for complex, piecemeal government trade action, replacing it with a mechanism for open flow of capital, technology and people. At first, it would include those nations already committed to market principles--the United States, Japan, the European Community, and possibly Canada and Australia--but would seek to integrate all other interested nations.

The United States, given its still-unique position as a world leader, must move quickly to provide the practical framework for this vision, for rapid internationalization of space under the current system will inevitably shift influence to such nonmarket participants as the Soviet Union and China. A Space Trade Community, on the other hand, would encourage free-market integration of those nations.

I. Introduction

Outer space, once thought of as an exclusively governmental domain where activities were undertaken for military, prestige, or technology-leadership reasons, has today become a significant commercial arena. In recent years, this arena has emerged increasingly as a competitive, single, world-market environment in which U.S. interests have become highly vulnerable to foreign state-supported entries. Foreign, subsidized competition, "dumping" strategies, the entry of Soviet and Chinese space services, and related issues were minor concerns only five years ago. Today these concerns top the agenda of the commercial launch industry. The intertwined issues of technology transfer and rocket technology proliferation have also risen to prominence, particularly in light of the introduction of advanced rocket technology to unstable regions such as the Middle East and Southwest Asia.

Although the space market is a world market, it is not and has never been a free market. Today a web of multilateral and bilateral arrangements and frequent direct diplomatic intervention control international space trade. The United States, Europe, Japan, the Soviet Union, and China all frequently raise space trade issues to political-diplomatic levels. Technology transfer, a strong concern in its own rights, has become intertwined with trade issues. For the past decade, this frequently changing, politicized environment has created uncertainty that overhangs investment in U.S. space ventures and seriously impacts American commercial interests.

The United States has addressed these problems to date through bilateral consultations, Section 301 and "Super-301" actions undertaken by the U.S. Trade Representative's Office, export permit deliberations by the Departments of State and Commerce, legislation, CoCom discussions, Department of Defense classification decisions, and the Missile Technology Control Regime. Yet these processes have yielded slow, grudging, and questionable gains, in the face of the rapid pace of developments in the market, the emergence of new markets and technologies, and the entry of more and more nations into the field of players. Furthermore, the relatively uncoordinated nature of the mechanisms used threatens the ability of the government to make or enforce consistent decisions: technology transfer processes such as export permit reviews are used to make decisions driven by strategic-industry or trade-dispute concerns, while bona fide technology transfer concerns are undermined by trade considerations.

The increasing internationalization of the market, particularly given the entry of the Soviets and Chinese, dictates that the current situation of U.S. industry will not remain tenable for any length of time. The increasing internationalization of the market is moving the United States to choose between three alternatives: 1) continuing the status quo, thereby abandoning a significant presence in space commerce; 2) adopting an "industrial-policy"

approach with strong government support; or 3) adopting a comprehensive free-market, free-trade path, entailing a comprehensive strategy aimed at restructuring the space services into an open, internationalized market.

The culture and legal-political structure of the United States place this country's enterprises at a disadvantage in competing in the current politicized environment. The inability of the Space Shuttle program to deliver frequent, low-cost space flight exemplifies the difficulty of making an "industrial-policy" approach work in the United States. Current fiscal constraints on U.S. action further limit the likelihood that a U.S. industrial policy strategy will succeed.

To pursue the free-trade path requires more than a "do-nothing" approach, since existing space trade takes place in a highly politicized and subsidized environment. If the U.S. government will not match foreign subsidies and support, it must at least move toward the creation of international "rules of the road" and institutional structures that will move toward reduction of subsidies and structural barriers in space trade on a multilateral basis. The United States still holds powerful bargaining chips that can be used as leverage to achieve a comprehensive, long-term solution for the mutual benefit of all space-trading parties.

Given the choice of the free-trade path, this paper argues for the adoption of a bold initiative by the U.S. government to capitalize on the still-powerful bargaining chips held by the US, and use our leverage to achieve a comprehensive, long-term solution for the common benefit of all parties.

This paper proposes the creation of an initiative in space trade to pursue a near-term multilateral agreement among the major market-economy nations committing them to:

- * move to minimize subsidy in space goods and services;
- * adopt a common position barring in the short term launch of their satellites on nonmarket-economy launch vehicles; and
- * negotiate for the establishment of a Space Trade Community, a voluntary, multilateral, special-purpose trade community based on the principles of competition on equal basis, restructuring of industry to eliminate subsidies, open flow of capital, technology, and people within the community, and common standards on technology transfer and end-use controls for exports beyond Community boundaries.

It is now conceivable that not only a common position on near-term issues, but even such a permanent, limited-scope trade community for commercial cooperation in space could be established. This option is the best, most long-lasting approach to resolving space trade issues.

The threat of heavily subsidized competition from the nonmarket economies has opened the European Community and other market partners to the possibility of such sweeping cooperation for the first time. If we do not seize this window of opportunity, these partners will be under great pressures to cut individual deals with nonmarket nations, resulting in a politically supported cartel with the U.S. at the greatest disadvantage. If the U.S. does not seize this window of opportunity to abolish politicized cartelization, we will see cartelization entrenched.

A Space Trade Community offers the best, most permanent approach to resolving space trade issues. The community would be a voluntary, multilateral, special-purpose trade community based on principles of competition on an equal basis. It would create incentives for space trading nations to restructure their industry to eliminate subsidies; provide for the open flow of capital, technology, and people within the community; and set common standards on technology transfer and end-use controls for exports beyond the community's boundaries.

The community would function much in the way the European Community has served to promote free trade among European nations in many of their economic activities. It would not serve as a cartel arrangement involved in price-fixing or restricting space service output by participating nations. Indeed, its fundamental function would be to move nations away from the current "managed trade" philosophy that has thus far dominated space trade policy.

Early adherents to the community would likely include the United States, European Community nations, Japan, and possibly Canada and Australia. Eventual adherence by the Soviet Union and the China, once unthinkable, is now possible to envision given continued reforms in those nations. Initially, continued reform would be encouraged by offering limited, gradually increasing access to community markets as those nations develop convertible currencies, price structures based on full-cost accounting, and so on.

In summary, the United States should:

- * undertake a Space Trade Initiative to offer our trading partners a near-term agreement to create a common position on nonmarket-nation space services, and engage in a process of internal subsidy reduction;
- * offer participation in a Space Trade Community as a means of achieving long-term, consistent restructuring of the international industry;
- * structure approaches for Soviet and Chinese inclusion in this community dependent upon their fulfilling commitments to effect economic restructuring, convertibility of currency, mobility of labor, and elimination of subsidy; and
- * refrain, along with its partners, from agreeing to incentives or concessions on an ad hoc or piecemeal basis until a general solution can be achieved.

In the short term, this would require that the United States:

- * refrain from giving the Soviet Union partial or full access to our markets as a diplomatic bargaining chip, including, in particular, a decision not to permit the Cape York project to proceed to operational status until the Soviets agree to structural changes leading to competition on an open, unsubsidized basis;
- * demand strict adherence to the implementation terms of the U.S.-China space trade agreement;
- * continue effective representation with Japan and the European nations in current talks on satellite and launch vehicle issues.

The U.S. has critical interests in space trade and control of weapons proliferation. Yet its position is deteriorating in both areas. As other countries continue to advance in space technology, the U.S. negotiating position becomes progressively weaker. The United States must choose between emulating the industrial-policy approaches of foreign competitors, or using its bargaining power to establish a structure to encourage change toward an open, unsubsidized, competitive, and internationalized market in which U.S. companies would play on a more level field. An immediate Space Trade Initiative is the most effective short-term step available. Moving towards creation of a permanent Community for Space Trade is the most comprehensive and long-lasting framework for guaranteeing such a result.

The challenges of this era are no smaller than those of the Cold War. That generation created NATO, the Marshall Plan, the European Community, and other great initiatives. Today we must rise to the challenge of creating a new set of international institutions to replace those of the Cold War. This cannot be done entirely with small measures.

The vision of a Space Trade Community offers a number of advantages at this point in history. As the threat of imminent Soviet invasion recedes from Western Europe, much of the historical impetus that has driven trans-Atlantic cooperation is disappearing. Ties among the major market-economy nations of Asia and the West must be renewed on a basis of peaceful achievement as well as defense. A Space Trade Community provides an early, attainable, and visible beginning for forging such ties, in an arena that is inherently in the public eye. In addition, engagement in such an international process offers U.S. firms a badly needed assurance of policy continuity--an assurance that the needed legal and political environment will not be changed suddenly, or to accommodate to other perceived reasons of state as they arise.

The International Space Station Freedom project, which requires substantial budget commitments on the part of the United States, has enjoyed continuity in large part because those commitments are international as well as national. The Community concept, which

does not require large outlays from any government involved, would enjoy even greater continuity of commitment. Finally, if the United States were to display leadership on this issue it would place the onus of noncooperation on the rest of the world. If others reject this offer, the United States is in a stronger position to demand substantive response in bilateral and multilateral processes.

II. The Space Trade Situation Today

Policy makers and space policy analysts are only beginning to address the emergence of space trade as an issue. The Office of the U.S. Trade Representative still has no center of expertise on space trade issues. Space trade and related issues have now been placed on the trade policy agendas of the United States, Europe, and Japan, and these issues have begun to affect the diplomatic concerns of the Soviet Union and China. In addition, space trade policy affects other nations in their role as customers of space services. For example, Australia and Indonesia have put space trade issues on the agenda in their relations with the United States on recent occasions.

Space trade issues also affect U.S. domestic policy. U.S. companies encouraged to enter the launch-services market by domestic policy justifiably complain of inconsistent U.S. actions in the trade policy arena. The growing importance and complexity of this arena now calls for a comprehensive, long-range policy approach to replace the haphazard drift that has characterized U.S. trade policy to date.

The emphasis on national prestige and technology leadership in space activities in the United States and other nations has shaped the structure of the industry in each nation (with the European Community here viewed as a single nation) along national lines. In large part, the international ties, connections, and cross linkages that characterize most normal industrial and trade efforts in the world market economy are minimal.

With only minor exceptions, the main corporate players in the United States, the European Community, and Japan are domestic corporations, domestically owned, contracting with other domestic corporations. In Europe and Japan, the major corporations are in many ways conscious agents of government policy. Each space industry is heavily supported by its national government, through subsidy, government contracts, or both. Each sells products originally developed with government funding, or heavily subsidized. Each government gives heavy preference, if not exclusive access, to the domestic provider in buying space goods and services. In addition, the European Community and Japan continue to subsidize substantially many of their commercial space entities.

Soviet and Chinese entry into the space commerce arena has further complicated the situation. In both cases, state-owned entities operating in nonmarket economies, driven by strong needs

for hard currency, and, in the case of the Soviet Union, by a domestic political need to justify economically the expenditures on the space program, offer a wide variety of space goods and services to international customers at prices often well below current market rates. This is made possible by the fact the none of the goods or services used in providing the launches are charged their true cost by the Soviet or Chinese economies and are often not costed at all. For example, both the Soviet and Chinese launch operations are run by their militaries and are not charged to the marketing entities.(1) Not only pricing, but market practices and diplomatic support by their government, create a set of concerns over the aggressive entry of these nations.

This has raised objections from U.S. and European Community space commerce entities on several grounds. First, they object that the pricing of services offered by governments with nonmarket economies is predatory and constitutes an unfair trade practice. Second, they argue that **technology transfer** through the export of satellites and other space-related technologies to the Soviet Union or China for launch preparation and other uses poses military risks. Third, they note that allowing space business to be drained off to these countries raises **industrial strategic considerations**, weakening strategically the United States and the European Community. Draining off customers for launch and other space industries of the market nations could destroy their industries and leave them dependent on the capabilities of the Soviet Union or China. Yet these services could become undependable in times of crisis or confrontation.

Giving some credence to these concerns, particularly the last, is the situation in China following the Tienanmen Square massacre of May 1989. The United States had negotiated an agreement permitting a limited number of launches of U.S.-technology satellites under specified conditions.(2) Following the massacre, the United States and European Community imposed temporary bans on satellite launches from China for political, strategic, and ethical reasons. Since then, the United States has permitted launches of U.S.-built satellites to continue, with the first such launch taking place in April 1990. The first review of that agreement began in July 1990. The continuing turbulence of transition indicates that U.S.-Chinese and U.S.-Soviet relations will remain uncertain for some time to come, and trade relations with these nations will remain subject to abrupt changes and reversals.

In this environment, all current and potential spacefaring nations have a stake in resolving the growing problems of trade and technology transfers. Continued erection of closed trading and technology blocks driven by neomercantilist, protectionist concerns threatens to create a series of subsidized, protected, and ultimately, technologically stagnant national industries, closing off areas of market cooperation and retarding the progress of space development. At the same time, would-be acquirers of launch technology are able to play off current technology holders against one another to gain access to launch technology without guarantees against use of the technology for delivery of weapons of mass destruction.

Any general solution must take into account the real and perceived interests of the principal parties and offer a solution acceptable to all. No nation has the military, economic, or diplomatic leverage to impose a solution unacceptable to other parties. Nor are space issues paramount to any one nation. These issues must be resolved within the framework of the broader interests of each nation and the international community in general (see Appendix 1 for a detailed discussion of the various interests that have a stake in space trade policy.)

III. Available U.S. Policy Tools

The U.S. government will no doubt continue to pursue its perceived interests in maintaining space capabilities for defense, prestige, technology leadership, and economic vitality. Moreover, foreign practices, including European and Japanese infrastructure subsidies, and Soviet and Chinese nonmarket pricing, will likely jeopardize the ability of the U.S. space-service providers to compete and raise capital.(3) In addition, military concerns related to Soviet or Chinese access to Western military-related high technology are still valid and will be until events in those countries resolves themselves in a favorable direction. Finally, long-term concerns regarding access by Third World nations to launcher technology will remain valid. Given these concerns, U.S. policymakers have several options under existing law and policy. These include:

Trade sanctions. The President may, under existing legislation, impose sanctions up to and including the barring of foreign providers from the U.S. market if the Trade Representative finds that "unfair trade practices" are carried out by those providers, trade agreements have been violated, or unfair governmental acts have been committed, and it is in the interest of the United States to do so. In the first such space-related case, brought by the U.S. company TransSpace Carriers, Inc. against ESA and Arianespace, the ESA and President's finding was ambiguous on the question of whether Arianespace's practices were unfair. However, the President decided that it was not in the interests of the United States to impose sanctions,(4) in view of then-current U.S. practices in connection with the shuttle.

Such actions could protect against various objectionable actions. However, they have a number of drawbacks. The most serious is that they tend to invite retaliation in related and unrelated markets. Trade wars triggered in such fashion tend to reinforce the pattern of independent, nationally oriented industries competing against each other in politicized environments, each backed by the respective governments.

This pattern is unhealthy for several reasons. Each national industry can use the rivalry to extract subsidies from its own governments more readily, locking in a cycle of self-interest justifying raids on the public treasury. This tends to perpetuate

the operation of obsolete, inefficient technologies and organizations and closes the door in each nation to innovation and entrepreneurship.

Managed Trade Agreements. Such agreements, usually reached as a result of bilateral negotiation, constitute a commitment by the respective governments to limit the number of items sold by the entities under their control to a fixed amount, and/or to fix the price at which one or more parties may sell those items. Such agreements usually cover a fixed time period. U.S.-Japanese agreements on limitation of auto imports, despite being called "voluntary" quotas, are a well-known example of a managed trade agreement.

The U.S.-China trade agreement permitting the sale of Chinese launch service for American-made satellites is a classic managed-trade agreement. It limits to nine the number of communications satellite launches the Chinese can sell in the six years following the agreement (1989) and fixes a floor on the price of launches as well. This agreement demonstrates the drawbacks of that approach: it wastes the immediate leverage we enjoy by failing to create incentives for the nonmarket provider to move in the direction of market practices, while permitting it to enter the marketplace and establish itself with the customer community. Setting a price floor permits the nonmarket provider to maximize the hard-currency income per operation and deprives customers of the benefit of low-price launching.

Since the signing of the agreement, experience has shown practical difficulties in implementation as well. The ability of the United States to deal in good faith with our European partners has been impaired, as this author predicted at the time the agreement was made.(5) The Chinese have engaged in aggressive marketing of launches beyond the agreed-upon limits. The U.S. and European launch companies have complained of numerous violations of the agreement, while the Chinese have complained about the restraints they agreed to and have begun lobbying for unrestricted entry.(6)

Countersubsidies. Another option, similar in nature and intent to trade sanctions, is the creation of equivalent subsidies in space transportation services to support domestic launch providers. An available and familiar mechanism for doing so is the granting of trade credits through the Export-Import Bank for foreign customers who buy launch services from U.S. providers. This has the advantage of improving the likelihood of U.S. sales to foreign providers without setting up direct policy confrontations with foreign providers. It follows similar practices by foreign suppliers.

The disadvantages are numerous, however. The most immediate disadvantage is its drain on U.S. government funds in an era of strong budgetary limitations. Indeed, the funding of such a subsidy program would be difficult to achieve politically. Furthermore, such a program, once begun, would offer no strong

incentives for the U.S. industry to increase its long-term competitiveness. It would weaken the U.S. case for eliminating similar subsidies abroad, unless the subsidies were explicitly announced as temporary and linked to the fate of overseas subsidies.

Ironically, the United States government threw the first stone in the matter of space launch subsidies. The Space Shuttle pricing formula amounted to a substantial subsidy on launches provided to international commercial customers by the U.S. government. Ariane pricing was explicitly formulated to respond to those price levels. When the United States was no longer able to offer the Shuttle to the world market, Arianespace pricing then used U.S. expendable launch vehicle (ELV) prices as its point of reference for pricing. Therefore, it was able to increase its price somewhat to take advantage of the higher world market price.

Technology Transfer Actions. Because of the military connotations of much space technology, technology transfer concerns, actions, and mechanisms have been inextricably linked with the development of the space trade issue. Since most satellites developed in the market-economy nations incorporate U.S. components and technologies, the United States has been able to effectively block launch of most such satellites on Soviet or Chinese launchers. U.S. government decisions in such cases have been articulated through technology-transfer mechanisms even when the decisions have been made on broad strategic or trade-issue grounds.

A number of mechanisms are available to articulate various technology-transfer concerns, both national and multilateral. They include:

U.S. State Department. The State Department administers export permits for items on the Munitions List, a list including almost any technology related to space launch or space operations not generally available on the world market. This control extends not only to actual hardware, but also to plans, drawings, technical papers and memoranda, and even verbal dissemination of information. The criteria for decisions are quite broad. This procedure was used as the control mechanism for recent actions regarding launch of U.S.-manufactured satellites on Soviet and Chinese launchers.

U.S. Commerce Department. Items and technologies not on the Munitions List, but still of some concern, are regulated for export to the Soviet Union, China, and some other countries by the Commerce Department. A 1988 decision by that department to permit, following Department of Defense review, the flight of a small, low-tech U.S. research payload on the Soviet Mir space station, a capability not available from any other source, triggered substantial grandstanding by certain legislators. The Commerce export control system was substantially liberalized in June 1990 in response to the increasing democratization in Eastern Europe and changes in the Soviet Union.

CoCom. The Coordinating Committee on Multilateral Export Controls (CoCom) is an organization made up of all NATO nations except Iceland, plus Japan and Australia. This organization approves exports of certain military-sensitive technologies to the Soviet Union, other Warsaw Pact nations, and the China. It is an attempt to negotiate a common technology-transfer consensus among the principal exporting nations to avoid one nation breaking ranks for commercial advantage. All critical space technologies are reviewed by CoCom.

CoCom fairly successfully maintained a consensus policy in the past, although France and other European states have taken a softer stance on export to the Soviet Union, while the United States has wanted to approve exports to China that it would not grant to the Soviet Union, a distinction Europeans tend to reject. The collapse of Communist rule in Eastern Europe, and particularly the coming reunification of Germany, have prompted an urgent reevaluation of CoCom policies and assumptions. Several European members now wish to loosen restrictions on export to both the Soviet Union and China, while the United States favors loosening restrictions only on Eastern European trade. The current situation indicates that a trade strategy involving CoCom decisions could not be counted on unless and until the situation restabilizes itself. On the other hand, the reexamination of CoCom may provide an opportunity to consider new multilateral solutions.

MTCR. In 1987, the "Group of Seven" nations (United States, Canada, France, West Germany, Italy, and Japan) announced the adoption of the Missile Technology Control Regime. This is a coordinated set of policies designed to restrict the export of space-launch and missile technology to nations considered likely to use it for the introduction of ballistic missile weapons to new regions, or to broker the sale of such technology. This regime has had mixed success to date, as there have been suspicions of actions, primarily on the part of European nations, which have resulted in the transfer of missile technology to Latin America and the Middle East. One major problem is that the Regime is nothing more than a coordinated set of policies in each nation. There is no way to enforce the uniform rules for technology transfer on a nation that stretches or violates the agreements. A recent study by the General Accounting Office has concluded that the MTCR has had limited effectiveness since its inception, specifically because of its lack of enforcement mechanisms.(7)

The MTCR has had only a minor effect on space trade to date but has the potential to affect it in the future. An application by Space Vector Corp., a small U.S. space technology company, to the State Department for permission to aid Argentina in orbital launch technology was denied subsequent to the negotiation of the regime, although prior to its announcement. Subsequently, the Argentines were able to obtain much of the same technology from European sources despite the existence of the MTCR. Other such deals have been inhibited by the existence of that regime. Like CoCom, dissatisfaction with the performance of the MTCR to date may create

a willingness to consider a more general solution to the problems it is intended to address, which will in all probability increase as concerns rather than diminish.

Department of Defense Security Clearances. Although not considered a classic technology transfer mechanism, the DOD security classification system effectively controls a large part of the U.S. space infrastructure, including companies, people, and information. The need for special screening and measures makes international financial participation in U.S. space ventures difficult, leading in turn to reduced options for capitalization of U.S. space ventures. The U.S. company E' Prime Aerospace Corp., a start-up space transportation venture, lined up Australian and Canadian investment in 1987 but was forced to relinquish it in order to guarantee continued access to U.S. government launch sites, due to security clearance requirements.

One of the principal frustrations of the space trade question in the past few years has come from the attempt to deal with trade questions through technology transfer mechanisms, to the detriment of both issues. The U.S.-Chinese agreement on geosynchronous launch services has provided a particularly egregious example. Although the principal issue at hand is Chinese dumping of underpriced launch services, the formal mechanism used to address the problem from the American side has been the Munitions Control regime administered by the Department of State.

Denial of an export license for sending a satellite with U.S.-made components into China is the only extant mechanism for dealing with violations of the U.S.-China agreement. However, the current position of the State Department is that there is no justification for denial of the export license unless there is a violation specifically of the technology-transfer portions of the agreement, even if the trade-related aspects of the agreement are found to be in violation. U.S. launch companies have been highly frustrated with this position, as they believe it is one more example of the policy inconsistency of the U.S. government in the space area. One of the most useful outcomes of the movement towards a Space Trade Community would be the creation of a new, explicit control mechanism to enforce antisubsidy provisions.

IV. Moving Toward an International Free Market: A Long-Term Solution

From an American viewpoint, the current pattern of space trade relations is undesirable. The United States has not played the game as well as Europe, Japan, or other overseas players. Government-planned and subsidized technical and commercial efforts require long-term commitment to funding and policy, lasting beyond the lifetime of a single political administration. Such commitment requires a widespread consensus that such efforts are in the national interest. In addition, it requires acceptance of a bureaucratic and industrial elite who are given full and unimpeded access to governmental and private resources, shielded from dissent.(8)

Nations successful at such efforts tend to possess, among other characteristics, institutions such as a high-level, nonpolitical civil service, a general social consensus to accept government decisions, including cultural bias against litigation or lobbying against a program once it has been adopted, and an acceptance of cartels and trusts parcelling out shares of business, enforced when needed by government action. Such nations also commonly put the full power of their government behind marketing efforts and mix bribes both direct and indirect, threats of retaliation, diplomatic pressure, and any set of measures needed to make the sale.

The United States not only takes a hands-off position most of the time, but in some instances actively encourages competing foreign players when support of their governments is considered in the interests of the U.S. Government. For example, the Soviet desk in the U.S. State Department actively favors the entry of Soviet launch providers, as this is one of the few hard-currency items the Soviets can sell. Also, the enforcement of measures such as the Foreign Corrupt Practices Act tend to place U.S. companies at a disadvantage vis-a-vis foreign competitors, who are constrained only by the law of the customer country. This is not an argument for permitting U.S. companies to engage in corrupt practices, but an observation that here, as in many other areas, U.S. and foreign companies are not required to play by common rules of the road.

The history of the Space Shuttle illustrates the United States' weakness in playing industrial-policy style, state-supported, international economic games. Almost all of the classic errors of industrial policy were demonstrated: the investment of heavy governmental resources in a single option and the vulnerability to parochial political interests; internal bureaucratic pressures in selecting that option; the subsequent failure of that option to perform to expectation; the subsequent inability of the government to sustain a consistent course of action; and slowness of response in recognizing and correcting the consequences of that action.

It is important to understand that the failure of the Space Shuttle program to achieve its economic goals is not a failing entirely, or even primarily, of NASA. The precise causes are still being debated, and many observers place heavy blame on White House and/or congressional interference and irresolution for the outcome. In a prior work, this author concluded that the blame lies primarily in the incentive structure of the political system that produced the decisions, a common failing of governmental enterprise.(9) For the purposes of this discussion, however, it is sufficient to note that none of the problems with the American governmental system for financing, developing, and operating large space projects have been resolved since the economic failure of the Space Shuttle program was disclosed. Indeed, the continuing problems with the Space Shuttle, the recently-disclosed problems with the Hubble Space Telescope, and growing concerns over the Space Station Freedom project demonstrate that these problems are still endemic.

Any policy option that reinforces the tendency to divide the market and the players into nationally defined trade blocs, whether to provide service, buy service, or both, tends also to keep U.S. players locked into a game in which the other players have a permanent, long-term advantage. Unless the United States underwent drastic and permanent political, legal, and cultural changes, it is doubtful that Americans would tolerate the sort of government and industrial system other nations now use to compete successfully in the state-backed trade game. This pattern, a type of neomercantilism, is characteristic of European political systems, particularly France and Germany, and Japan, as well as many of the minor players, and nonmarket economies have structured their entire societies around central planning and elite control.

The United States is far better off using its considerable trade, diplomatic, and political leverage to change the rules of the game to the sort of contests in which it has historically been successful. What are the characteristics of such a system? Such a system would put the premium on innovation, entrepreneurship, and rapid technological change. It would encourage the investment of domestic capital by meeting concerns about subsidized competition and guaranteeing access to wider markets, and give Americans in the space arena full access to international capital markets, which current foreign-investment restrictions now limit. It would encourage the formation of multiple international joint ventures and consortia. Instead of a Fortress America competing with Fortress Europa and Fortress Nippon, U.S. policy should work toward establishing a free-trade community in space commerce (as well as other trade fields) encompassing as many market economies as possible.

In technology transfer, we must recognize that these technologies will be disseminated sooner or later. The interests of Americans, Europeans, Japanese, and even Soviets and Chinese are best served if this access occurs in a controlled fashion, with reasonable end-use controls. A deal whereby states wishing to acquire such technology are given access in return for effective inspection and controls may be the best long-term solution. Therefore, such a community would have as wide a membership as possible, given the genuine concerns regarding weapons proliferation raised by space-launch technology.

V. Options for U.S. Competitiveness

Option One: Do Nothing.

Historically, the United States government has tended to take fewer actions in support of its industries than many other governments. Nevertheless, American industry has prospered and, even today, the United States enjoys a strong industrial sector, high wages, and high productivity per worker, despite recent gains by other nations. Free-market analysis also shows that trade actions against lower-cost foreign suppliers are usually self-defeating. This line of argument holds that if the Soviet and

Chinese leaders wish to subsidize Americans putting payloads into space, so be it: Americans should take advantage of the cheap launches, and either pursue other market advantages in space launch, such as reliability and familiarity to customers, pursue advanced technology capable of dropping the true price of launches below the subsidized prices offered by the competition, or disinvest in the space-launch sector.

There are several objections to this strategy. One is that the United States needs to preserve a domestic capability for launch of both critical government payloads and to preserve options for U.S. citizens who may be placed at a disadvantage by reliance on foreign launchers. A good example of the latter consideration is provided by the history of the Eutelsat project in the early 1970s in which a European consortium desiring to launch a series of satellites was threatened with denial of launch capability by the United States because the project was seen as threatening U.S. commercial interests. In a world divided into a number of competing, sovereign states, failure of the U.S. government to take note of and react to foreign interventions may place U.S. citizens in the position of being denied more and more opportunities. This, in turn, breeds pressure for worse interventions at home. As The Economist observed,

Unilateral free trade is good policy. However, when politicians say they favor free trade, they nearly always mean free-trade-for-everybody, or count us out. They are partly right. The greatest gains would be had if there were no barriers to trade anywhere....Hence the absurdity of threatening retaliation against trade barriers. Yet the absurdity is indeed necessary. Within countries, trade makes winners and losers. Often, the losers have political clout. Governments find it easier to stifle demands for protection if they can point to similar "sacrifices" abroad, and to new foreign markets. Multilateral free trade can thus turn mercantilist prejudice to a useful end.(10)

The most likely result of a status-quo posture by the U.S. government is a period of aggressive low-price marketing by the Soviets and Chinese, with the Europeans and Japanese lowering price as much as they can afford. In this environment, the U.S. commercial launch companies are likely to disinvest, returning the operation of U.S. launch vehicles to pure government contracting for essential launches, thus raising costs to taxpayers and stifling innovation. More importantly, projects for developing a new generation of U.S. launch technology are likely to face even greater barriers to investment, either in terms of internal investment by existing launch companies or outside investment in new start-up ventures, as investors anticipate being undercut by nonmarket players no matter how low newer technology can reduce true costs.

Option Two: Creation of a U.S. industry-government structure equivalent to European and Japanese institutions.

This is an elaboration of the countersubsidy strategy, constituting a formal industrial policy approach to space commerce. It would involve setting up a formal equivalent of European and Japanese institutions; mandating NASA to develop a next-generation commercial launch vehicle; setting up a government-dictated consortium of U.S. corporations to operate such a vehicle, or perhaps forming a new company to operate it, equivalent to Arianespace and extending needed antitrust exemptions to it; turning over the vehicle to that designated "chosen instrument" entity; and changing U.S. policy and practices to permit the U.S. government to aggressively aid in its marketing, including the creation of sizable export subsidies for that vehicle.

There are several objections to this strategy. To begin with, it is not clear that the U.S. government could develop a competitive next-generation launcher if it were mandated to do so. As discussed previously, the Shuttle program was supposed to produce a next-generation launcher capable of dramatically lowering launch costs, yet it failed to do so. There is no indication that the problems that undermined that program's objectives have been remedied. By placing our eggs in the Shuttle basket, the United States precluded progress on other technical and programmatic alternatives for a decade and a half, to the detriment of the overall competitiveness of the U.S. launch industry.

Secondly, it is not clear that the U.S. government could or would generate the funding needed to run this program, particularly given the cost levels a government-run program is likely to require. One problem with the Shuttle program was the change in funding levels, due to shifting government priorities, and consequent changes in the vehicle concept. In present times, characterized by severe budget pressures, it is less likely that an adequate and consistent level of funding over a multiyear period can be assured for such a program.

Finally, taking this set of measures would lock the U.S. industry structure into a European or Japanese structure, without the needed legislative and administrative continuity, or social-political consensus typical of those societies. This would preclude the evolution of independent lines of approach and make the capitalization of alternate ventures extremely difficult.

Over the last few years, the more innovative approaches in space transportation have come from entrepreneurial sources outside the traditional contractor community. Adoption of a U.S. "chosen-instrument" strategy would tend to preclude the incorporation of innovative strategies from entrepreneurial sources, which has been the principal avenue of long-term competitiveness for U.S. industry as a whole. The need for continued innovation from the entrepreneurial sector is perhaps even more compelling than is shown by a simple economic analysis, because U.S. corporations,

more than their overseas counterparts, depend heavily on acquisition of new technologies and business areas from the entrepreneurial sector, through licensing or outright acquisition.

Option Three: Negotiate a bundle of international agreements for trade and technology transfer.

Such a world might be guaranteed by a series of multilateral agreements establishing principles for international space trade and establishing a consultation and adjudication mechanism for resolving disputes. Technology transfer concerns might be resolved by reformulating CoCom and strengthening the Missile Technology Control Regime. The U.S. government could help move its trading partners toward a more open system by a combination of leadership and incentives, particularly the powerful incentive of access to U.S. markets and technologies. The U.S. government could conceivably use its leadership and incentives to create an agreement to give the nonmarket economies gradual access to U.S. markets in return for implementation of reforms leading to identification and elimination of subsidies.

However, the achievement of such a wide array of reforms would require substantial dedication on the part of the administration and would run the risk of one set of measures being undone while the others are in the process of being established. Additionally, many nations might be more eager to accede to one set of measures than another, with the likely result that there will continue to be several overlapping groups of nations, each establishing a somewhat different set of measures affecting international trade.

Therefore, I propose a more radical measure, that, if implemented, would establish a long-term framework for space activity that encourages a win-win pattern of cooperation for both Americans and their trading partners, while dismantling the win-lose game set up by the current state-dominated, neomercantilist system.

Option Four: Establish a common market for space

The most successful model for institutionalizing the dismantling of internal commercial barriers and creating a free flow of capital, technology, and people is the European Community. Although this model has its flaws, mostly in the pork-barrel politics of the common European institutions, the protectionist flavor of the Common Agricultural Policy, and the principle of "just return," or formalized porkbarreling, in the European Space Agency, the achievements of the Treaty of Rome in demolishing barriers and establishing free trade have been nothing short of astounding.

The recent U.S.-Canada Free Trade Agreement has similarly begun a process of dismantling structural barriers within North America. It is now politically conceivable that a permanent, limited-scope trade community for commercial cooperation in space could be

established. Such a free-trade community may well be the best, most permanent approach to resolving the space trade issue. An approach for such a Community is described in outline form in Appendix Two, A Community for Space Trade.

Characteristics of the Desirable Option. To assess whether the trade community option is indeed the most desirable solution, one must ask: What objectives ought the U.S. government pursue while addressing space trade questions? A long-term solution for the United States and its trading partners ought to establish a set of principles for mutually acceptable trading practices; create an adjudication mechanism for resolving trade disputes; free up the flow of capital, technology, and human resources in space commercial projects among partners; provide adequate guards against technology transfer leading to weapons proliferation; and encourage the integration of current nonmarket space powers into a market-based trading system as eventual full partners. This solution would establish a dynamic toward dismantling the current state-dominated, national-entity competition in space, replacing it with a multiplicity of international, company-to-company ventures drawing on all market-trading nations. For these reasons, this paper argues for the option of the Space Trade Community as the most desirable and feasible of the long-term options.

VI. Space Trade Community or Series of Multilateral Agreements?

Given agreement on the objective of restructuring the international space commercial market to permit U.S. participation on equitable terms, further analysis must address a key issue: Is it more realistic and effective to seek formation of a Space Trade Community as a permanent structure succeeding and incorporating current multilateral agreements? Or would it be more realistic and effective to continue seeking less ambitious improvements in existing multilateral agreements? This decision turns on which approach can most effectively 1) motivate potential partners to reach agreement; 2) achieve effective implementation of agreements once arrived at; and 3) remain sufficiently flexible to retain the ongoing participation of the member-nations, minimize the infringement of short-term political considerations, and adjust to changing circumstances?

Achieving agreement. The potential participants of this community (primarily the United States, the European Community nations, and European Space Agency states, Japan, Canada, Australia, and eventually the Soviet Union and China) would likely join for a variety of reasons, none of them common to any one country or set of countries.

Technology transfer concerns, both regarding the Soviet Union, unstable terrorist regimes, and countries with inadequate end use controls remain high on the U.S. agenda, with the viability of the U.S. space industry in the face of foreign competition a growing concern. European Community nations and Japan have strong interests in strengthening access to the lucrative U.S. market for space

products and services, and access to U.S. technologies and capabilities. Canada values its participation in joint projects such as the Space Station. Australia wishes to develop an international spaceport. The Soviet Union and China need hard currency, and space services are one of the few things they have to offer for it.

A number of bilateral and multilateral processes currently address these varied concerns and interests. A coherent regime might be worked out through coordinated negotiations in each field. However, it is more likely that the sum of interests in each area would create pressures for a stand-alone settlement in that area, while minimizing the bargaining power the United States holds when the fields are considered as a whole.

Free-trade and antisubsidy agreements may be easier to achieve on a bilateral or multilateral basis when based on industries producing relatively standardized commodities, such as wheat or textiles. Space goods and services are complex, and many items are unique. Deep governmental involvement taking different forms in each nation makes simple fair-pricing or antisubsidy agreements difficult to achieve, monitor, and enforce. Structural reform to a set of common standards for pricing and permissible government aid may be the only effective way to achieve a genuinely open trade environment viable over the long term.

The role of the General Agreement on Tariffs and Trade (GATT) in space trade should be considered. The GATT, a United Nations-sponsored process involving most of the market-economy nations, aims to eliminate both tariff and nontariff barriers to trade. As such, the process has achieved much good. However, it has had limited use in space trade questions, due to the unique history of that field. Since space technology has grown up as a twin to advanced military technologies, its use has been highly politicized. Direct and indirect control through a variety of mechanisms has been the rule rather than the exception. The GATT was never intended to deal with technology transfer or security clearance issues. Consequently, while it has been useful for commodities such as shoes or textiles, its processes are frustrated when such issues intrude into the domain of trade.

In addition, the goal of the GATT process has generally been the achievement of "most-favored nation" agreements among trading countries. These guarantee that tariff and quota treatments of one nation are equal to those others receive. These are of limited use when applied to nations which treat all outside providers of space goods and services equally: by excluding them. By supplementing the GATT process with approaches such as the Space Trade Community, the larger struggle for worldwide free trade, of which GATT is a part, is enhanced by demonstrating that the pressure for establishment of free trade will ultimately reach even into areas previously excluded. This will reduce the temptation of nationalist politicians to exclude new areas as they arise.

This is not to say that the GATT can have no role in the establishment or functioning of the Space Trade Community. The Community could be viewed as a "sector-specific agreement," linked to the GATT process, as civil aircraft trade agreements are categorized today. It may be useful to give GATT precedents on dispute settlement and subsidies standing in the Community adjudication process. This could help facilitate an earlier acceptance of the Community concept, as it would give some familiarity to the environment and make acceptance of the Community process less of a leap into the unknown for its potential members. (11)

The Leadership Factor. Rapid changes in the current world political situation have called into question many long-standing organizations and arrangements. Some of these, such as CoCom, are directly within the scope of the issues addressed here. The United States has done little since the acceleration of these changes to offer new visions to the community that still looks to it for leadership.

The historical record favors U.S. government pursuit of an integrated, overarching strategy in trade issues. Just as the U.S. governmental, social, and economic structure places it at a disadvantage in a competition between industrial-policy states, the United States is also at a disadvantage in issue-by-issue bilateral trade negotiations.

The United States does not maintain the continuity of negotiating personnel in such negotiations that our other trading partners do, nor does it maintain continuity of policy between administrations, especially those of different parties. In the U.S.-European Airbus trade negotiations, for example, the French maintained the same team throughout the more than six years of negotiations, despite the change from a conservative to a socialist administration, while the United States experienced complete turnover at least every two years, even within the same conservative administration. Yet when the United States sought a long-range, generic, structured solution, such as the U.S.-Canada Free Trade Agreement, it was able to muster the support, attention, and continuity of effort needed to achieve its goals. The United States has always done better at envisioning and achieving such large-scale solutions than it has at the day-in, day-out trench warfare of individual bilateral negotiations.

The vision of a Space Trade Community is new and bold. Like NATO and the Marshall Plan, it shows that the United States is willing to make commitments if its partners are willing to match them. U.S. leadership on this issue furthermore places the onus of noncooperation on the rest of the world. If others reject this offer, the United States is in a stronger position to demand substantive response in bilateral and multilateral processes. The Community proposal raises the level of visibility and attention of these issues and separates them from the vast and mostly neglected field of trade negotiations.

Effective Implementation. Bilateral and multilateral agreements can provide for periodic consultations; however, action to enforce compliance tends to be rare. Each issue, no matter how minor, is raised to the diplomatic level. Each charge of noncompliance must be contested, while unconnected developments in other areas of the relationship affect the outcome significantly.

In contrast, the Community structure provides for independent, ongoing, and automatic adjudication of disputes, and decisions are made with reference to the principles and provisions of the Charter rather than being totally politicized. Many implementation actions will require structural changes that embedded, local-interest politics in each nation have made unthinkable in the context of national politics. In the community structure, the pressure of these lobbying groups is diluted, while the growing number of companies with successful international joint ventures build momentum in favor of adhering to Community processes. The success of the early actions can create international ties that then build the support for further integration, creating a self-reinforcing process.

The surest method of creating a counterbalance to entrenched local interests is to create economic interests that benefit people in each of the countries involved, which will grow as barriers are removed. When in each country there are local interests benefiting from open, internationalized trade, they will create their own lobbies to further remove barriers. It is this process on which the Community must rely.

Some people in each country considering affiliation in such a trade community may have concerns that membership may lead to loss of sovereignty. Such fears would be misplaced. Those concerned over loss of sovereignty to international constraints should look rather at the web of technology-transfer and control agreements now in place, which tend to control international space trade (any many other aspects of international business) by a series of ad hoc decisions with widespread unintended consequences.

The Coordinating Committee for Multilateral Export Controls (CoCom) and the Missile Technology Control Regime have substantial control over the conduct of space business on the international scale. The U.N.'s International Telecommunications Union and its World Administrative Radio Conferences can determine the fate of U.S. telecommunications enterprises. Obscure United Nations policies drive national governmental decisions. Placing key decisions in the context of a visible Community regime returns sovereignty to citizens who wish to conduct space-related enterprises, who today are controlled by decisions made by faceless bureaucrats on a variety of rationales, many of which have widespread consequences. Examples include regulations on remote sensing of the Earth, which potentially limit the right of news organizations to gather news from publicly available sources,(12) or technology transfer rules which create precedents cutting deeply into First Amendment rights.(13)

Flexibility can be built into the Community process more easily than into a set of bilateral agreements. The failure to link the various subject areas leads to a gradual separation of the set of players in each area, as some nations seek to join a liberalized trade area but wish to remain outside of a technology transfer agreement, or vice versa. The situation in both China and the Soviet Union remains fluid and unpredictable. The market-economy nations may soon have to respond to either further radical liberalization in either or both of these states, or a crackdown and return to confrontation. A clear-cut set of Community standards for participation or nonparticipation creates a more enforceable set of guidelines for response than if the various nations must face these issues each by themselves.

At the end of the Second World War, the former adversary nations of Western Europe were each maintaining coal and steel industries on a national basis. These industries were considered core strategic assets both in the economic and military sense. Yet the ability of even the larger states to maintain self-sufficient industries on a national basis was called into question. The two principal adversaries, France and Germany, took the bold and unprecedented step of calling for a European Coal and Steel Community to link these industries together into a common market area for the benefit of all. This led to prosperity for all concerned, and ultimately the success of the model inspired its extension into other areas.

Today, the major trading blocs of the market-economy world are locked into a national rivalry and trade confrontation in the strategically sensitive area of space trade. The price tag of the subsidies and national technological commitments are rising fast in a world of new budgetary constraints and taxpayer rebellion. At the same time national capital pools are straining to fund space projects, and space enterprises are failing to take off for lack of available capital. Space commerce may be the first area to outgrow the limits of the national, or even continental, arena. The Space Trade Community offers a parallel opportunity to expand our capacity for enterprise beyond the limits that are today cramping it.

Special-purpose trade communities are not unique. The aforementioned European Coal and Steel Community is perhaps the most well-known example of such a community. However, any such community faces the problem of how to bound or delineate the industries to be covered by the agreement. One fundamental question is whether to define such communities by inclusion or exclusion. In the context of space activities, an inclusive regime might define any industry using a "space segment" as subject to the provision of the treaty. Thus, a communications system using a space transponder to relay messages would be under the provisions.

However, by using an inclusive rule, one company providing a service using a space system would be under community rules, while a company providing an identical service using ground lines would not, placing one or the other mode at a disadvantage. Something like this occurs today in international communications, where trans-Atlantic communication via satellite is subject to Intelsat-imposed pricing structures supporting cross-subsidies, while undersea cable traffic is not, creating an artificial price difference.

The "exclusive" approach includes only the industries specifically defined. This raises the possibility of some space industries remaining outside the community, which might require businesses operating services in both included and excluded areas operating some segments of their business under one jurisdiction, others under another, and uncertainty over where operations common to both segments lie.

To avoid such problems, a modified version of the exclusive regime is recommended. Unquestionably space-related activities, such as provision of space launch services, operation of spacecraft on orbit, and manufacture of spacecraft and space launch vehicles, are included. Provision of services from space, such as sale or lease of communications relay, position finding, or orbital imagery services are also included. Provision of terrestrial services incorporating a space segment are not intended to be included, unless the community adjudicator finds that a pattern of subsidy or unfair action involving such industries is being used to circumvent provisions of the Community agreement. For example, if a nation provides raw imagery from space at an unsubsidized price, but subsidizes the provision of improved imagery from its sources, then the value added data enhancement company may be brought under the community agreements.

Other spillover problem areas may require some industrial restructuring to achieve market pricing and open competition. However, these reforms lead in the direction that economic reformers in all advanced countries have been advocating for the past two decades. The required reforms may aid processes now underway, such as implementation of the Packard reforms in the U.S. defense industry, and the Office of Management and Budget's efforts to eliminate industrial subsidization; the continuing process of European integration and implementation of the Treaty of Rome; Japanese moves toward privatization such as those that privatized the telephone and railway systems; and the moves in the Soviet Union and China to make individual industrial units profitable and accountable.

Practicability of Options. Even the establishment of a series of new, multilateral agreements covering space trade rules of the road and technology transfer would constitute a major diplomatic initiative, and comes at a time when the United States is involved in a major reevaluation and renegotiation of many of the international institutions and arrangements that have described and

circumscribed our foreign policy options for the past forty-five years. What are the chances of creating a new international organization of a novel type, without any precise analogues, touching on a number of sensitive areas?

The chances of establishing a Space Trade Community may be better than those of any other comprehensive solution, if the U.S. government makes appropriate use of its present bargaining strengths. The Community solution may enable more of the involved parties to achieve more of their identified critical interests than any other, provided that they accede to the Community. The United States would benefit by the establishment of a long-term structure giving better protection against unfair trade practices, dismemberment of many of the objectionable practices of foreign providers, and powerful incentives to strengthen the technology transfer system against weapons proliferation to potential unstable or aggressive states.

The European Community and Japan get improved access to U.S. markets, as well as to each other's markets, and to advanced technologies. All three get protection against aggressive dumping from nonmarket economies. The Soviet Union and China get eventual entry into the world market, provided their already-announced reforms continue in the direction they have been heading, and some near-term benefits as well.

Emerging space powers also get entry into the markets of the larger nations and better access to technology, although at the expense of some potential export markets. Had a Space Trade Community already existed, Israel, for instance, would have achieved orbital capabilities sooner, but would not have been able to cooperate with South Africa, nor would Argentina, had it joined, been able to aid Iraq with its ballistic missile program.

Space customer nations would benefit substantially. The creation of a free flow of business relations within community boundaries would increase their options for satellites and launchers. Space infrastructure providers would benefit as well, as the resulting multinational space corporations would be more likely to choose a third-country solution for launch sites and other services.

In addition, a Space Trade Community could help address the growing set of problems concerning the environment, health and safety, and orbital debris by introducing a uniform sets of rules. Individual states have shown a reluctance to move ahead on orbital debris control measures out of concern that such regulations may impede their space operations relative to those states that refrain from restrictions. By moving at a uniform pace, this objection is removed in a space trade community structure. In fact, the first meaningful step taken to limit orbital debris formation, the agreement to vent gasses from upper stages to prevent their explosion and fragmentation in orbit, was taken by international consensus of the major spacefaring powers. Working to establish such common standards may be one of the first tasks for the Community to undertake.

A productive way to proceed may be to establish the umbrella concept of a Space Trade Community, and establish several working groups for each of the areas of cooperation. The environmental, orbital-debris, and liability groups may arrive at consensus well before groups working on knottier problems such as subsidy. Subsidiary agreements on areas where consensus is achieved could then be implemented before overall agreement. A similar effect was achieved in the process of European integration as agreements in areas such as atomic energy and space cooperation were institutionalized long before major economic integration was achieved.

Though the Space Trade Community would offer substantial benefits to various entities, opposition can be expected as well. Many national space agencies would be concerned about the loss of support as some programs could be deemed to be "disallowed subsidy programs" and therefore be changed in scope. Some national policy planners would fear the constraint of a set of permanent agreements. Defense planners might be concerned about space capabilities becoming enmeshed in an international web of providers. Some companies would see themselves as short-term economic losers as the community agreements would likely change some existing programs.

Finally, there are valid concerns about such a community from those concerned about freedom and openness. The European Community process has accomplished many good objectives, particularly by breaking down trade barriers and forcing the restructuring of industries along less-politicized lines; however, it has also perpetuated subsidy patterns through programs such as the Common Agricultural Policy, and created a new, and often stifling, layer of bureaucracy.

A Space Trade Community would not be immune to pressures for bureaucratization and excessive regulation. It would be ironic to move toward the creation of such a community to escape pressures for European-style, subsidized-industry patterns and end up having European-style regulation imposed through that community.

This can best be avoided by chartering the organization to perform only those functions specifically delegated to it; always to maintain the option of acting solely along national lines, and, most importantly, to avoid creation of Community programs that involve allocation of financial resources through political decisions. Also important is to deny any role in rationing markets, fixing price levels, or otherwise acting as a cartel. The intent is not to create a "Space OPEC." Approaches such as that of the U.N. Moon Treaty, which create an international economic taxing and licensing structure should be specifically prohibited in the organization's charter.

In short, the proposed Trade Community is not a restrictive trade cartel, nor is it likely to become one. In fact, the Space Trade Community is the antithesis of a cartel and would serve as an

antidote to the current trend toward managed trade agreements, the ultimate end of which is a cartel. A cartel is an agreement between supplier parties to allocate market share, usually at agree-upon price levels. The Organization of Petroleum Exporting Countries (OPEC) is a classic example of a cartel.

A Space Trade Community, by contrast, pulls together a group of trading partners who have agreed to allow the market to allocate the shares and prices of all transactions within the community and who, in addition, have agreed to adopt a uniform set of guidelines regarding which governmental actions are considered permissible and which constitute unfair practices. A common set of accounting guidelines are adopted to permit valid comparisons among the political-economic structures of the various nations. (For example, the accounting principles used by the French government to discriminate between "direct-" and "indirect-cost" items on expenditures made at Kourou and charged to Arianespace, and those used by the U.S. Air Force for charges to U.S. launch companies for use of the Vandenberg or Canaveral spaceports, should be the same.)

Furthermore, a Space Trade Community would have consultative and adjudicative, bodies that would become independent in a day-to-day sense of the national governments comprising the community, although the nations have ultimate control, through withdrawal. This would be a significant improvement over the status quo as it would increase the Community's ability to identify and dismantle practices and institutions that constitute subsidies and barriers to an open market. The many steps taken by the European Community to alter European practices have not only opened up the European market internally, but also have substantially aided the causes of privatization and deregulation within each member state. In many cases, the multinational institution was able to proceed with reforms that local interest groups had effectively blocked when attempted at the national level.

The European Community is usually upheld as an example of a trade community, and a highly successful one at that. In fact, the EC has acted partly as a free trade community and partly as a cartel, especially in the area of agriculture. This flaw came about because of the enormous vested interests of the agricultural lobbies in Europe and because of the fear of the social disruptions that free trade in agriculture might bring. A Space Trade Community would not be subject to nearly as much pressure in this direction.

Current trends in space trade policy have gone in the direction of market-share allocation. The U.S.-China agreement on launch services is a case in point. Many industry members have advocated further cartelization. This trend would be unproductive and ultimately futile. Movement in the direction of a trade community would provide a useful antidote to current trends.

What about the Soviets and Chinese? The situation of the Soviets and Chinese requires some special approaches under this scenario. Clearly, neither power is eligible for membership now. Their domestic economies would require substantial changes to enter even Phase One of the Community process. Just as clearly each nation has set changes in motion that could render them eligible at some time in the future, if they stay on course. It is in our interest to encourage them to stay on course.

Therefore, a set of interim measures are called for to deal with this situation. The Community should create an interim status for which the Soviet Union and China could apply, which would provide for limited access to the community market for a stated time period, and admission of representatives with observer status to the Community's organizations. An exception would be made for the organizations dealing with security and technology transfer. The Soviets would not be granted immediate access to major short-term markets such as communications-satellite launching. However, free access would be encouraged for those markets where the Soviets currently have unique capabilities, particularly in manned flight and space station services. The Soviets have now sold some six passenger flights at \$10 to \$12 million apiece. There is no provider for space passenger service in market-economy nations today, although some entrepreneurs have promoted plans for offering such service.

Permitting Soviet access to this market at low rates for a specified period would increase access to space, help demonstrate the presence of a market for passenger flights, and give the Soviets a short-term market for hard currency. As a step toward facilitating this market, and to demonstrate its bona fide encouragement to the Soviets, the United States and the Soviet Union should negotiate and ratify an international liability agreement for manned space flight to remove the uncertainties of the liability regime from such traffic. Another such market may be commercial observation imagery from radar satellites, a useful capability the Soviets are about to provide that has no commercial source in market-economy nations.

The Chinese situation creates a more difficult question. There is no major unique service the Chinese are capable of offering for hard currency. In addition, there is a battered, but still extant, trade agreement in place between the United States and China. Therefore, the least unpalatable solution may be to continue the Chinese agreement in force, perhaps renegotiating it for stronger enforcement of its provisions. However, it should be made clear that there will be no renewal of the agreement unless China begins to come within the multilateral process of the Community.

The question arises, specifically, what terms are adequate for Soviet or Chinese accession to such a Space Trade Community?

The following describes criteria that might reasonably be set for this accession, referring to the three-phase implementation scheme given in Appendix Two.

Phase One:

- 1) Full convertibility of local currency;
- 2) Full compliance with Space Trade Community (STC) end-use controls, including free access to the Community inspectorate;
- 3) Agreement to the Space Trade Community adjudication mechanism, permitting sufficient access to information to allow adjudication;
- 4) "Unbundling" internal industrial arrangement sufficiently to understand pricing mechanisms, cross-subsidies, and so on.

Example: launch-vehicle component supply contracts to integrators must be priced according to Space Trade Community accounting standards--conforming to cost-of-money charging standards, depreciation schedules, insurance-equivalent charges for self-insurance, and so on. A "social subsidy" charge should be created and assigned to labor costs to account for the large fraction of labor costs met through subsidized provision of housing, food, medical care, and so on.

- 5) All internal transactions must be charged according to Space Trade Community standards to identify subsidy practices and eliminate them where the Community agreements forbid them.

Example: Launch-vehicle operations are performed for Glavcosmos by the Soviet Strategic Missile Service, and for Great Wall industry Corp. by the People's Liberation Army. These services go well beyond the range of services performed (and charged Direct Cost Reimbursement--DCR) by the U.S. Air Force for U.S. commercial launchers. They are currently entirely unreimbursed. Under this scenario, Glavcosmos would be required to sign a Range Use Agreement with the Soviet Ministry of Defense for permitted services (equivalent to those performed for Western launch companies) charged on a DCR basis according to Community standards. For those services in the category of "not permissible at DCR" (example: standard payload integration services such as those provided by Astrotech in the United States), Glavcosmos would have to pay indirect costs as well (as calculated by a standard STC formula.)

- 6) International pricing based on prices excluding disallowed subsidies;
- 7) Effective access to domestic markets for foreign providers. This includes the right of Space Trade Community-national businesses to travel to, operate in, communicate to, from, and within the country, and to repatriate profits in hard currency;
- 8) Instituting and effectively enforcing environmental, health, and safety standards to minimum Space Trade Community requirements;
- 9) Adherence to the Space Trade Community standards for environmental and operation liability, including effective access to courts by local and foreign nationals for liability legislation.

Phase Two compliance includes:

- 1) Right of domestic nationals to form Space Trade Community chartered companies and work for Community-chartered companies, whether domestic or other-Community based, at both in-country and foreign locations;
- 2) Access of Space Trade Community-chartered companies and other domestic companies with disputes in the Community jurisdictional realm to the Community civil adjudication system at their option; compliance with the Community court decision, including use of local law enforcement to implement, when needed; relinquishing double jeopardy for items adjudicated within the Community's system.

Example: The two Soviet nuclear-powered satellites that crashed in Canada caused substantial liability. The victims had their claims pursued by the Canadian government against the Soviet government with limited and long-delayed success. (14) If Canada and the Soviet Union had been STC members, the individuals, as well as governmental bodies, could have proceeded directly against the Soviet government in Community civil juridical bodies, and collection would have been automatic. Refusal of the Soviet government to pay a claim would be grounds for suspension of Soviet participation.

In general, enforcement considerations would pose some challenges. The Community would have no enforcement arm, although it may have a small inspectorate to monitor compliance, particularly in technology end-use control. It will depend on compliance by national government bureaucracies for the most part, and the only final penalty it can enforce is expulsion, which is too large a cannon to employ on the many mosquitoes of small violations it may encounter.

Compliance, in the long run, must depend on the continuing perception that membership is in the common interest of all. The Community may come to provide a visible and positive symbol of cooperation among nations that need the goodwill and open markets of one another. Certainly, if successful, the Community will soon foster the links and interconnections of joint ventures, consortia, and international companies which, once woven, become difficult to unravel. The lesser penalties of suspension of membership for a noncomplying state, or suspension of cooperation in particular areas, such as further sharing of technology, may also prove effective. In drafting the community agreement, particular attention must be given to options for enforcement such as permitting targeted trade restrictions against offenders to provide a series of enforcement actions scaled to the magnitude of the offense.

In the second phase of Community development, the possibility of enforcement through fines and civil actions levied directly through the Community on violators becomes available. This allows a much more fine-grained approach to enforcement of Community decisions, and therefore permits the further removal of day-to-day Community activities from elevation to politicized international incidents.

The creation of the Community would, in general, be a win-win situation. Creating larger, open markets, and permitting the free interplay of more and more economic actors has always tended towards increasing general prosperity. This will only be more true in space projects, which give the scope for widespread joint action of many large economies. Raising the call to form such a community is an action well within the scope of the current administration's policy direction. It moves the world in the direction of free trade and creates incentives to reform currently highly subsidized industries. It reduces pressures for budget expenditures to countersubsidize or match foreign investments, and by making international cooperation more available, promises to reduce the dollar cost of the Space Exploration Initiative.

VII. Would U.S. Space Industries Be Competitive in a Space Trade Community?

Aiding the competitiveness and success of U.S. space industries is a major motivation for the government to move toward creation of a Space Trade Community. Would such a step, even if successful, would render U.S. industry more competitive? The U.S. space industry has more problems than those of trade, and its long-run success depends on whether the government can clarify other policy areas, and in the final analysis, on whether U.S. companies, large and small, can demonstrate the aggressive and insightful leadership needed for any industry to prevail in a competitive arena.

The question is not whether such measures can guarantee the success of the U.S. industry. There are no such guarantees in the real world. The question is whether the advantages gained by such a solution offset the losses; whether the net advantages justify the energy required to achieve this solution; and whether this course is more advantageous than any other likely course. Seen in this light, the Community solution offers a number of real benefits to U.S. industry, which offer a very strong opportunity for success. Such benefits include:

1) Policy stability. The achievement of a Space Trade Community treaty would give U.S. firms an assurance of stability in the space trade policy environment, and therefore an ability to plan and commit capital, which has eluded them since the inception of space commercialization. The limits of foreign subsidy would be known and calculable, and entry of Soviet and Chinese players would be on known and predictable terms, not likely to be upset by unilateral action of the executive for foreign-policy concerns. As noted previously, U.S. commercial space firms have suffered from uncertainties and reversals in national policy numerous times over

the past fifteen years. Engagement in an international process with our major trading partners would add greatly to the stability of the policy environment in which they must operate.

2) Greater assurance of enforcement of agreements. Currently, any trade agreements arrived at on behalf of U.S. industry rely on the goodwill of the partner nation for execution, and depend on the U.S. government for rectification in the event they are violated downstream. Agreements become hostage to extraneous diplomatic considerations, and the danger that a quid pro quo becomes unenforceable after a U.S. concession is always present. As discussed previously, this danger is illustrated by the current course of the U.S.-China space trade agreement. By removing enforcement of trade agreements from the bilateral arena and creating an ongoing enforcement mechanism removed at least one step from existing intergovernmental relationships, commercial parties have a better guarantee of enforcement of fair terms.

By creating a standing for companies directly in Community bodies, the danger that the national government may refuse to move on account of political considerations is minimized. A case in point is the TransSpace Carriers, Inc. petition against ESA and Arianespace. The decision was not so much that U.S. industry was not harmed, but that it was not in the interest of the U.S. government to pursue the case, in large part because the case highlighted the extent to which the U.S. government was dumping Shuttle launch services on the international market. Under a Trade Community agreement, TransSpace Carriers, Inc., would have been able to pursue its case directly before a Community body, whether the U.S. government chose to support it or not.

3) Period of adjustment. The terms of the agreement would create a known minimum period of adjustment before Soviet and Chinese players would enter the market. Any other major changes in the market situation would also be subject to such a period of adjustment. The major U.S. launch firms are already aware of the need to upgrade their fleet to take advantage of technological progress. The present fleet will eventually be undercut by new-technology launchers whether or not their competitors were unfairly subsidized. A period of adjustment in a stable political environment to prepare for the next generation of competition, combined with intelligent domestic policy measures discussed below, may mean the difference between survival and extinction for the U.S. launch industry. This agreement gives them that policy environment, and in a more stable fashion than otherwise obtainable.

4) Wider market. The current division of the market into national blocks tends to limit the available market share for any given space activity, particularly in the developing areas such as microgravity-materials research or remote sensing of the Earth. By widening the potential market areas, ventures may be started sooner than otherwise possible.

5) Better basis for cooperation with foreign partners. Many areas for business would benefit from international partnerships. Indeed, the natural pattern of evolution in international business is toward a group of international corporations or consortia, competing worldwide. This pattern has been retarded in space commerce, due to the high degree of national funding and control, and the consequent unreliability of agreements made between commercial partners in different nations. By removing many of the possibilities for reversal of policy at the national level, consortia may be formed more easily and with greater certainty of fulfillment of initial commitments. The numerous reversals of U.S. policy may put U.S. firms in the situation of discounting the value of their participation without a structural guarantee of long-term stability of the policy environment.

Other steps the United States can take to assure U.S. competitiveness

The creation of the Community is not the only measure the U.S. government can take to assure the competitiveness of its space industries. As this paper primarily treats trade issues, the focus does not allow a detailed discussion of such measures. However, it should be stressed that the principal measures discussed for support of the industry would not be excluded. Such measures include procurement reform to make effective use of the U.S. government market to support U.S. enterprise, improved terms of access to U.S. launch ranges and infrastructure, and support of technology research and development in critical areas to aid U.S. firms in preparing competitive new generations of technology. In fact, such actions may actually be encouraged. For instance, the declaration of a common understanding of what is and is not a permissible subsidy may facilitate the writing of a new and better range-use agreement for U.S. launch firms. The permissible levels of government support for research and development likely to be agreed upon should not prevent the types of technology programs now being discussed by industry.

Another measure often discussed in industry circles is the formation of a consortium or joint venture of all the existing major U.S. launch firms, to operate either the current fleet of launchers, or a newer launcher to be developed by the government. Although some versions of the latter scheme, involving dependence on the government to design and fund a next-generation competitive launcher, get into dubious industrial-policy assumptions, there is nothing wrong with the concept of a consortium of companies to pool their resources in international competition. In fact, such an approach is a natural free-market solution to the problems of capital formation faced by private space developers. One measure to encourage such a consortium would be a specific exemption from antitrust liability for companies participating in a consortium.

The possibility of forming one or more consortia between some U.S. firms and some overseas firms should also be considered. Such international joint ventures have been fruitful in aviation:

General Electric and the French firm SNECMA run a highly successful venture in manufacturing aircraft engines, while Boeing has accepted cooperation with Japanese firms on its next generation of transport aircraft. A Space Trade Community would make similar cooperation in space ventures more likely.

Steps toward the Creation of a Space Trade Community

The immediate step must be the issuance of a call for a Space Trade Community by the President. The National Space Council should begin to examine the mechanisms for implementing this call. Consultations with the European nations on space trade rules of the road are scheduled to begin soon. They should be used to conduct consultations on the adoption of the Trade Community idea. This should be followed by a round of consultations with the Europeans, and our other trading partners, to achieve a near-term agreement including a commitment to create the Community, an alignment of policy on near-term entry of nonmarket nations, and a schedule to begin negotiations on establishing the Community.

Negotiations should be aimed at producing a draft treaty committing the partners to the Community process. Working groups should be established in each of the areas to be affected by the Community. Areas where consensus can be achieved should be implemented under the Community umbrella as agreement is achieved. Major Community institutions should be established, at least in skeleton form, to oversee implementation of the initial areas of agreement. Some elements of the Community regime would be useful with even a small number of members. An example would be the freer flow of capital and technology between members.

The formation of the Community would affect other agreements and organizations. In some cases, such as the Missile Technology Control Regime, the Community will absorb the organization, once all MTCR members join. Others, such as CoCom, would work out a new relationship. The Community's technology-transfer related organizations might have a special status within CoCom, for example.

Who Might Join?

The United States, the major European space players, including EC members such as France, Germany, and Italy, and non-EC nations, such as Sweden and Switzerland; Japan; Canada; and Australia might all be likely early candidates, for various reasons. Several of the major emerging space powers such as Brazil, Argentina, and Israel may adhere if the major nations participate. Some Eastern European nations, which now have space-related industries supplying the Soviet space program, may find early membership an attractive option, as a relatively low-cost means of strengthening their ties to the world economy. China and the Soviet Union are both special cases and would require long-term, uniquely tailored and structured approaches to full membership, but in the long run, they have incentives to participate as well. At a certain point, the

Community achieves a certain critical mass, and countries remaining outside its structure begin to be at a severe disadvantage in markets and technology.

VII. Recommendations and Conclusion

The United States should: 1) seek to change the structure of the international space commercial industry in the direction of greater internationalization and reduction of subsidies and government support across the board; 2) pursue a negotiating strategy of linking trade and technology transfer negotiations; 3) offer creation and participation in a Space Trade Community as a means for achieving long-term, consistent restructuring of the international industry; 4) offer access to U.S. markets and technology; 5) structure approaches for eventual Soviet and Chinese inclusion in this community dependent on their agreeing to economic restructuring, convertibility of currency, mobility of labor, and elimination of subsidies; 6) and refrain from agreeing to incentives or concessions on an ad hoc or piecemeal basis until a general solution can be achieved.

In the short term, this includes refraining from giving the Soviet Union partial or full access to U.S. markets as a diplomatic bargaining chip; demanding strict adherence to the implementation terms of the U.S.-China space trade agreement; and continued pressure on Japan and the European nations in current talks on satellite and launch vehicle issues.

The United States holds a number of bargaining chips in space negotiations. It has critical interests in space trade and control of weapons proliferation, in both of which fields its position is deteriorating. As other countries continue to advance in space technology, the U.S. negotiating position becomes progressively weaker. The United States has the choice of emulating the industrial-policy approaches of foreign competitors, thereby locking in the neomercantilist approach as an international standard, or using its bargaining power to establish a structure for moving the market economy nations toward an open, unsubsidized, competitive, and internationalized market in which U.S. companies are playing on a more level field. Creation of a permanent Community for space trade is the most comprehensive and long-lasting framework for such a result.

By creating an automatic process for resolution of trade disputes, the potentially explosive decisions coming up regarding Soviet, Chinese, European, and Japanese space trade are defused. The creation of such a Community can provide a powerful example of how in the post-Cold War world the United States can facilitate cooperation in an exciting adventure. The challenges of this era are no smaller than the challenges of the era that saw the formation of NATO, the Marshall Plan, the European Community, and the other institutions that were born of and characterized the Cold War. In this new era of peace, we must respond with creative approaches for the happier tasks of a free, creative, and expanding humanity. Let us not lack for vision now.

Appendix One

The Principal Parties and Their Interests

The United States. U.S. players include several U.S. government agencies, particularly the Air Force and NASA; launch vehicle manufacturers and operators; and satellite manufacturers, who are increasingly becoming launch service customers.

The U.S. government has an interest in preserving as robust a commercial sector as possible in each technology area in order to maximize commercial support for those industries that would otherwise have to be supported entirely at taxpayers' expense for military and strategic reasons. The decline of the U.S. shipbuilding and shipping industries provides an analogy. Just as the U.S. shipbuilding and shipping industries can no longer remain competitive in cost, and all U.S.-flag maritime operations are burdened by resulting costs and inefficiencies, so will increasing uncompetitiveness in space launch and operations eventually burden even the most critical U.S. space operations with higher and higher costs, until the United States becomes reluctant to undertake space enterprises while other nations go forward.

Strategic space industries include launch vehicle manufacture and operation, communication satellite manufacture and operation, and observations satellite manufacture and operation. In addition, space-related industries contribute substantially to employment, and the space industry is one of the few remaining industrial sectors with a positive trade balance.

U.S. players--both established corporations and entrepreneurial new starts--are active in all fields of commercial space manufacture and service. U.S. space transportation providers have investment and revenues at stake in the ability to sell internationally. Major corporations are influential politically, and the entrepreneurs have substantial influence on policy, partly for symbolic reasons. The interests of these companies lie in full and wide access to markets, while eliminating foreign subsidy as much as possible.

Other U.S. corporations have interests as consumers of space goods and services. In general, their interest lies in obtaining the widest variety of space goods and services at the best possible price. Some corporations have a dual role, such as satellite manufacturers. As many buyers of satellites now specify delivery of the satellite in orbit, the manufacturer must buy the cheapest possible launch in order to be competitive. Although launch price is sometimes a fairly small percentage of the overall package price, the deep discounts offered by the Soviet Union and China in recent cases (from \$10 to \$20 million under Western launchers' prices) have made a substantial difference in the overall competitive price. If foreign satellite manufacturers can use cheap, subsidized launches, then U.S. manufacturers must do likewise to match overall price.

The European Nations. Europe's interests in space are articulated through a set of multilateral cooperative institutions, primarily the European Space Agency (ESA), but also including organizations such as Eutelsat, a satellite broadcasting consortium. The adherents to these multilateral organizations are not identical with the members of the European Community. Sweden, not an EC member, is a significant participant in the European Space Agency. However, these organizations are a strong part of the broader movement toward European unity and serve as a highly visible symbolic and practical expression of the individual member nations' commitment to that unity. For nations such as Sweden, ESA membership plays an important role in demonstrating that it, too, is committed to European cooperation and helps ease the path to EC membership in the event it becomes desirable. Austria's ESA membership helped play just such a role.

For Europeans, the primary goals of their space program are technology leadership, jobs, and economic competitiveness, in that order. These priorities were demonstrated after the Challenger accident forced the U.S. government to withdraw the Shuttle from the international commercial launch market in 1986. At that time, the manufacturers of the U.S. expendable launch vehicles had not decisively committed to offering their vehicles on the world market. The European Ariane launcher was the only vehicle ready, available, and considered reliable. The operating entity, Arianespace, increased production to the maximum that existing facilities permitted. Despite having an effective lock on the market, however, the Europeans declined to undertake the investment needed to substantially increase the Ariane production rate. The fundamental logic behind this decision was that Arianespace is arguably profitable, or at least not a great money-loser, when it is selling a launcher developed by the European Space Agency at no cost to the company. However, if it were to have to pay off any significant capital costs, it would show losses.

The European Community states committed themselves to the Ariane program because they found through experience that the U.S. government historically used its control of access to space to influence European policy. (1a) This experience generated a commitment on the part of the major European nations to maintain for themselves a permanent independent access to space. They did not originally expect Ariane to be cost-competitive with the space shuttle. The fact that the system could be commercially competitive with American launchers was a pleasant surprise discovered after the commitment had been made.

The Ariane will be supported so long as the European governments believe that this independent capacity is needed. Europe's goal for the near future is to get a reasonable market share for the Ariane, currently estimated at 50 percent of competed geosynchronous orbital launches. This goal was chosen to spread the cost of maintaining the system as widely as possible, and to pay for the support of a high-technology industrial base in aerospace,

including maintenance of existing employment levels. Europe's long-term goal is to continue to be competitive and reasonably current in aerospace technology and to participate on favorable terms in any new space endeavors.

Japan. Japanese interests include the government (the trade ministry, and the two civilian space agencies--the National Aerospace Development Agency, or NASDA, which is technology-oriented, and the Institute for Space and Astronautical Sciences, which is more science-oriented); the contractors to those agencies, producing launch vehicles and space hardware; and satellite manufacturers, who now sell primarily to Japanese government and commercial customers.

The Japanese interests to date have been harmonious in relation to each other, and the companies have followed the lead of the government on policy. Japanese space activity has fit the mold of "Japan, Inc." perhaps more closely than other fields, due to the strong government role as customer as well as coordinator. A consensus of Japanese government and industry appears to have agreed that space is a critical field for Japan's ambitions to first-class status in commerce, science, and technology. As a result, Japanese space expenditures, private and governmental, have been accelerating rapidly over the past few years. U.S. accusations of Japanese protectionism and closing of markets have included satellite technology. In fact, satellites are a critical area in the "Super 301" trade action now in process by the U.S. Trade Representative's office. (This is a process by which the U.S. government determines that a nation has been closing markets, or subsidizing exports. Such a determination permits the U.S. government to impose sanctions on that nation's trade with the United States.) Although a preliminary agreement seems to have been reached on satellites in these discussions, this field is likely to remain contentious for the foreseeable future.

The Japanese space agency is developing a large launch vehicle based on indigenous technology, known as the H-2. This vehicle will be technologically as sophisticated as any other expendable vehicle now in service. When in service--in 1992 or 1993--it will be competitive with existing launch vehicles if it does not have to recover development costs. A consortium of 77 Japanese firms, including aerospace contractors, banks, and insurance companies have formed a company, Rocket Systems, Inc. to market this vehicle internationally, similar to the Arianespace consortium. The company will order the H-2 vehicle in bulk in order to reduce per-item costs, knowing that the Japanese government will provide a firm basis for sales. Japan will enter the world launch market in order to develop its launch industry and pave the way for a permanent Japanese commercial presence in space. Given Japan's record in technology development and marketing, it is reasonable to expect future Japanese vehicles to begin cutting the cost and improving the quality of launch services, once they have paved their entry into the market with the H-2.

The Soviet Union. The Soviet government is the first entity to have launched a satellite into space, and the first to have launched humans. It still launches a larger number of satellites each year than all other nations combined. The primary driver for the Soviet government in space is military need, as with the U.S. government. The Soviets depend heavily on space for military reconnaissance and communications capabilities, perhaps increasingly following their withdrawal from Eastern Europe. Secondly, their space program has served as a source of prestige externally, and internally as a validation of the Soviet system. This function has faded somewhat as an unintended result of glasnost. With increasing general awareness of Soviet backwardness in most areas of technology and industry, Soviet space accomplishments stand out as an exception rather than as an indicator of the level of Soviet achievements.

The space industrial bureaucracy retains considerable power and influence in the Soviet political system, and its interests will influence the conduct of international relations. The recent changes in the Soviet system, particularly the growing independence of the Soviet parliament, have put pressure on the Soviet space bureaucracy to justify the considerable resources poured into their programs. As a response, the space bureaucracy has begun a public relations campaign reminiscent of NASA, pointing to the employment benefits, the technological spinoffs, the benefit to understanding of the environment, and so forth. As NASA began to promote commercial applications of space from the start of the '80s, so have the Soviets begun to claim direct economic returns from their program.

In some ways, their claims are more justifiable than NASA's. In the Soviet Union, it is impossible to tell whether a particular project is actually returning more resources than it is absorbing. However, the Soviet Union has a strong need to create an inflow of hard currency, in order to purchase goods from the outside world needed to keep the Soviet economy limping along.

Most such inflows are gained by selling raw materials, such as petrochemicals, in the world market. The Soviet space program is one of the few industrial activities in that nation to provide products and services for which foreigners will readily pay hard cash. Consequently, the Soviets have begun offering a wide range of services from their space program for hard-currency customers, including both cargo and passenger service to space; access to their space station, Mir; and photographs taken from space, at finer resolution than any available from other sources. In all probability, the Soviet Union will offer any capacity of their program for which anybody cares to offer hard currency.

U.S. and Soviet companies have voiced concerns over predatory pricing strategies by the Soviets, particularly that the Soviet Union will deeply undercut the prices, reap large dollar profits, and use its control over access to space for further concessions from Western space customers. These predatory pricing concerns are most valid where industry response times are slow, and the capital

investment to reenter a market is high. This has been the case in space launch and other space services. For example, when the Atlas and Delta Launch vehicle production lines were shut down in the early '80s, it took several years and substantial investment to bring them into service again following the loss of the Challenger and the return of the expendable launch vehicle. Had the return been delayed a few more years and the production tooling been destroyed, it would have been even more time-consuming and difficult to restore competition. Therefore, concerns over predatory pricing have substantial merit.

The Soviets will continue to place high priority on maintaining space capabilities for defense purposes, and their space program will continue to be a source of national prestige in a multipolar, post-Cold War world, if indeed that is where events are leading. However, the Soviet economy will continue to have a strong need for hard currency no matter what the outcome of current events, and their space program will continue to need access to the hard-currency international market. This will receive stronger and stronger emphasis in Soviet international relations.

People's Republic of China. China, like the Soviet Union, developed a space launch capability to meet military needs. It also enjoys enhanced prestige and internal validation from its achievements in space, particularly as it was the first underdeveloped nation to acquire a space launch capability, achieved largely through its own efforts. China also has a strong need for hard currency and has been marketing its space launch capabilities aggressively as a result. Its launch service sales have already raised strong trade issues with the United States. Since the Tienanmen Square massacre of May 1989 and China's subsequent crackdown on reform, use of Chinese launch services has become a major symbolic issue in U.S.-Chinese relations. Because of the great importance of normalization of relations to the Chinese leadership, they have placed strong pressures on the U.S. government to resume the launches. This pressure has impeded due consideration by the U.S. government of the impact of such decisions on the struggle to establish a consistent U.S. space trade policy.

Like the Soviet Union, China will continue to have maintenance of its independent space capability as its primary goal. However, access to international markets will be the second, and strongly supported, goal of that government.

Emerging Space Powers. India, Iraq, and Israel have demonstrated launch capability, and Brazil, Argentina, South Korea, South Africa, Pakistan, and Taiwan are in various stages of attaining such capabilities. Brazil has formed a joint venture in space commerce with the People's Republic of China, which will lead to a substantial Brazilian launch capability by the mid-1990s. Perhaps another dozen nations could develop launch capability fairly readily. These nations differ widely, but in all of them, military, national-prestige, and technology development concerns, in various combinations, are the main motivating forces behind

these programs. All of the programs are government-run and closely linked with the military. Few have explicitly articulated commercial ambitions, but some, such as Israel, have been enterprising in capitalizing on previous military accomplishments and may seek commercial support for their space programs.

These nations all are strongly motivated to improve their access to the industrial and technological space capabilities of the more-advanced nations. This access is now either strictly controlled, in the case of the United States, Europe, and Japan, or available haphazardly on the basis of political considerations, on the part of China and the Soviet Union. The advanced nations, in turn, are concerned about the transfer of this technology on account of the military implications--the weapons proliferation issue. The ability to place a substantial payload into orbit also implies the ability to launch an atomic, chemical, or biological warhead. The nations capable of building such launchers are also often capable of building atomic or chemical warheads. The transfer of technology to develop launchers can be delayed but not prevented by export controls: any reasonably developed industrial nation can build a launcher, given that the few unique or special techniques required can be acquired by a determined power through espionage, recruitment of key trained personnel, or trial and error. The question of technology transfer intrudes inevitably into space trade relations and must be resolved as part of any general solution.

Space Service Customer Nations. Many nations that for one reason or another do not possess launch capability are customers for space launch services. Many nations find it useful or advantageous to have a domestic state or private operator purchase a satellite, have it launched, and use its services, or sell them to other parties. Such purchases have grown sufficiently common for their governments to take an interest in maintaining open competition in the provision of satellites and launch services.

Recently, this issue arose in U.S.-Australian relations, when Aussat, an Australian corporation, purchased satellites from Hughes Aircraft, an American company, and required that Hughes arrange their delivery in orbit. Hughes chose the Chinese government's launch service in order to provide a competitive quote. However, the U.S. government wavered on permitting the export of these satellites to China, both because of fears that some unauthorized technology from the satellites would be transferred to China in the process of preparing them for launch, and because of protests from U.S. launch companies (quietly supported by the Europeans) that the Chinese launch services were being sold at far less than market price--that is, they were being "dumped," in trade jargon.

After much discussion domestically, and after very strong diplomatic pressure from the Chinese government, the Bush administration negotiated an agreement with the Chinese government permitting the export subject to limits both on the number of launches that could be sold in coming years and on the prices at

which such launches could be sold. However, before the launches could be made, the Tienanmen Square massacre led to the cancellation of all "munitions" export licenses from the United States to China by the Reagan Administration. Recently, after further pressure from the Chinese and Australian governments, the administration revised its decision and permitted the first two launches to go ahead. The agreement as a whole is still under review. In this situation, the Australian government exhibited strong action to protect its interest as a launch customer in having the widest and best range of choices in launch services. Such actions by customer nations can be expected to continue.

Space Launch Infrastructure Providers. A novel class of interest has recently emerged--that of provider of infrastructure for space launches, separate from the interests of space launch providers. That infrastructure service is the provision of actual launch sites. The advent of this service relates to the physics of launching from the Earth, which provide that for most launches, a site closer to the Equator allows a launch with less energy and therefore economically more efficient than one further away. Large geosynchronous satellites can be launched from the Equator with several additional years of station-keeping fuel on board, thus substantially increasing their useful economic life. Neither the United States, Japan, nor the Soviet Union currently have launch sites close to the Equator.

The concept of an equatorial spaceport for international commercial launch providers was first introduced by the Sabre Foundation's Earthport Project in the late '70s. (2a) A number of nations have expressed interest in developing launch sites near the Equator for use by other nations. Of these, Australia is the most advanced in promoting the concept. A consortium of Australian companies, now with Japanese participation, is working with the government of the state of Queensland to develop a spaceport at Cape York in that state, only twelve degrees from the Equator.

The interesting question raised by this project lies in the use of the site by Soviet rockets. The Soviets have proposed selling Zenit launch vehicles to an Australian company at very low prices to be used in international launch service. The Zenit is a modern and attractive vehicle and would be quite competitive at low prices. This issue has been further complicated by the application of a U.S. company, United Space Boosters, Inc., to participate in the project. Once more, a complex set of fair-trade and strategic-industry protection questions are being decided through a mechanism designed to review technology-transfer issues.

U.S. manufacturers of launch vehicles have protested that the Cape York-Zenit project is merely a subterfuge on the part of the Soviets to avoid U.S. technology-transfer laws, which are the primary deterrent to launch of U.S. technology on Soviet vehicles. The Soviets and Australians have responded that this is equivalent to an Australian airline buying a foreign airliner to offer air transportation. Of course, the United States has strongly

protested "dumping" of transportation equipment as well as services in the past. Indeed, the sale of the European joint Airbus transport has been the subject of a long and vociferous trade dispute between those nations and the United States.

The emergence of an independent spaceport project has further complicated the space trade arena. The prospect has emerged of nations serving as "flag of convenience" registries for spacecraft, as well as for launch locations. The Australian proposal in effect offers a flag of convenience for the Zenit. Given the increasing tendency of space transportation to follow patterns set by other fields of commerce, the emergence of a wider set of options for launchers and customers, as exemplified by these developments, is a natural outcome, and further elaboration of launch infrastructure choices can be expected.

Appendix Two

A Community for Space Trade

I. A Space Trade Community: What Is It?

A Space Trade Community would be a permanent international community, established by treaty, which would bind its signatories to a charter of principles mandating in space commerce elimination of national subsidies; forge agreement on permitted actions in support of industries (access to surplus government resources, launch sites, technology research, etc.); set uniform standards for technology transfer and end-use controls; offer access to domestic markets; and free the flow of capital and people within the community.

The first phase of implementation would concentrate on trade-dispute resolution and technology transfer. The treaty would establish a mechanism for final arbitration of trade disputes, with the power to mandate cessation of subsidy practices. Some practices, such as range billing and accounting practices, would be standardized to assure that subsidies could be calculated on a common basis. Domestic markets would be opened to all community providers, with agreement on which launches could be reserved for national launchers on national security grounds. A uniform environmental code and assessment standard would be established to insure that no nation would be tempted to permit more-polluting operations than another. This regime would include standards for prevention of orbital debris, a growing problem which has eluded solutions either from the initiative of individual nations, or from the United Nations. A uniform system of technology-export licensing, end-use controls, and inspection would be instituted, while permitting free exchange of most levels of technology within the community. Other measures to encourage space commerce, such as a uniform set of standards for patent and copyright protection on space-based discoveries and inventions can be achieved.

These actions would effectively supersede the current set of space trade talks, the space-related activities of CoCom, the Missile Technology Control Regime, and various national measures. In addition, the community could aid in solving problems faced by existing bilateral and multilateral programs, for example, by providing a mutually acceptable mechanism for resolving disputes among commercial participants on projects such as Space Station.

The second phase would create a voluntary community commercial code and jurisdiction of incorporation open to any citizen of a community state. This would guarantee the option of establishing a company which could conduct business freely in any state of the community, and in outer space. Incorporation under individual national law would remain an option. In addition to private companies, international ventures including government partners,

such as the Space Station project, could be incorporated as Community entities, providing a neutral identity and a more impartial and flexible mechanism for dispute resolution. The extensive set of negotiations needed to establish the Space Station consortium might have been considerably simplified had such a Community been in existence, particularly as the opportunity to subject agreements to an independent adjudication process would have gone far to allay the concerns of the inter-national partners over the unreliability of U.S. commitments.

The community would create a community flag of registration for spacecraft or stations belonging to such companies. It would establish courts of space admiralty (the law governing space vessels and space navigation) and space civil law (the law governing disputes within nonterrestrial stations.) Such courts would resolve disputes within and among community-incorporated bodies, and between nationally incorporated companies of different community member nations, and, optionally, among nationally incorporated companies.

These institutions would permit the evolution of a practical, case law-based international space law, derived from the experience of actual spacefaring ventures, much as maritime law arose. Currently, the rather academic, United Nations-derived space law has to date been neither effective nor definitive on significant questions. Among other benefits would be the emergence of a practical set of standards for space liability, and a definitive standard for space salvage and rescue, which does not currently exist.

The third phase, or long-term agenda, might include the creation of a mutually agreeable regime for space resource utilization, which could become a model for a more realistic agreement to replace the failed United Nations Moon Treaty.

Community Structure. The structure of such a community would be expected to evolve as the community develops. The objective of such a structure should be the creation of an effective mechanism to insure decision-making, implementation, and adjudication based on the fundamental principles of the organization, which proceeds on a routine basis, rather than a structure which creates a new forum for pitting state against state. In short, the organization would more nearly function like the European Community in its better moments than the United Nations.

The primary key to avoiding getting bogged down in endless intergovernmental disputes lies in avoiding any role for the organization that would determine the allocation of substantial resources. The Community must be a framework for cooperation and dispute resolution, rather than an agency for conducting operational activities. Its permanent staff should be limited to such functions by the organization's founding charter.

In addition, the decision-making structure of the community should permit clean-cut decisions and minimize the introduction of short-term national political considerations into Community decisions. For example, delegates to some or all of the decision-making bodies of the Community might be appointments for a fixed term, rather than serving at the pleasure of their home governments: representatives rather than ambassadors.

To construct a strawman structure for purposes of discussion, the first phase might have a Council of Delegates in which each member government appoints several representatives, perhaps on staggered terms. Representation in this body might vary depending on some combination of size, level of space activity, and economic strength. Decisions within this body could be on a majority basis, with a supermajority (two-thirds or three-quarters) required for significant decisions.

An equivalent of the U.N. Security Council incorporating ambassadors of the major governments involved, serving at the pleasure of their governments, and giving veto power to each member state, might be convened for significant questions. A small secretariat would gather data and statistics, in a manner similar to the Organization for Economic Cooperation and Development, and have an inspectorate arm to monitor member compliance with agreements, particularly in technology transfer and end-use controls. A trade arbitration system would oversee resolution of disputes. A consultative committee made up of representatives of the various persons and organizations active in space would be established from the start to provide input to the organization from those with the requisite practical experience.

Membership and Charter. Membership in the organization would be available to any nation willing to adhere to the charter of the organization and abide by the decisions of the adjudicating bodies. Procedures would be established for the withdrawal of nations that had chosen to terminate participation, and also for the suspension or revocation of membership for nations which consistently violated the principles of the charter, by, for example, refusing to comply with community decisions.

The key to effective cooperation lies in setting terms for participation that, by complying with, no state with a substantially nonmarket economy, or violations of the civil rights of its citizens, could long tolerate. Essential elements of the principles and regulations of the community would have to include, for phase one:

- 1) Freedom of access to the markets of all member nations, with carefully defined exceptions such as military and intelligence payloads, including classified scientific research, and technology tests by national technology development agencies. All other launch and in-space activities, including communications satellites by government-owned civilian agencies, and government-sponsored scientific payloads, would ultimately have to be opened to competition.

2) Free flow of capital and technology within the community. Any venture would be able to invest in, or make an offer to acquire any venture in any community country, and most technology would be transferable within the community, subject to firm control against export beyond community lines. Each nation could, subject to some general rules, classify technology into two levels: critical defense technology, over which it could retain unilateral control, and community technology, which is freely exportable within the community. The community would then separate "community technology" into non-exportable (beyond the community), exportable subject to end-use controls, and freely exportable.

3) Uniform standards of pricing (but not price setting), costing, and permissible government assistance. This would require effective convertibility of currency, elimination of hidden subsidization and cross-subsidization, and "unbundling" of price elements, in a manner similar to the reform of telephone pricing subsequent to the breakup of AT&T. (Unlike that decision, however, community rules should not prohibit the "rebundling" of services offered to customers, once true pricing is established.) Operating subsidies identified would be eliminated. Launch support activities performed by personnel of other government agencies would be charged to the accounts of the launch operators according to uniform principles. Other practices amounting to subsidy, such as government sponsorship of technologies then turned over to domestic operating entities, would eventually be limited to basic research and development.

4) Uniform minimum standards of environmental regulation, health and safety, and operational liabilities. Standards and mechanisms for reducing the creation of orbital debris. A new third-party liability agreement, more in line with reasonable commercial practices, would supersede the 1987 U.N. Outer Space Treaty and 1972 Liability Convention to govern domestic and intercommunity disputes.

5) Establishment of the right of parties in any Community country to bring action against unfair activities directly, rather through their national government, and for the community adjudication body to order compliance on relief measures.

Phase two would go further in expanding individual rights. The key to this is the creation of a venue of incorporation that individuals in any community country could freely use. Phase two rights would include:

1) The right of any company, individual, governmental body, or combination of such to form a corporation, for profit or nonprofit, under the jurisdiction of the Community. Such a corporation would have the right to conduct operations in any community country, and in space. Its employees and agents would have the right to travel or reside in, communicate within, to and from, and in general conduct business in any community member nation, subject to their

compliance with local law. Their earnings, both individual and corporate, would be fully exportable in a convertible currency, subject to nondiscriminatory taxation (no worse than for companies in that jurisdiction) for the portion of business done in that jurisdiction alone. Such corporations could employ any resident of any community country, and could have as an owner or shareholder any community person. Such corporations and individuals could appeal local regulations, decisions, and actions to the community adjudication body, and have them overturned or nullified on the basis of noncompliance with the letter or general intent of Community law, as firms in the Common Market have done regarding national law.

2) The adjudication function of the community could be extended to the resolution of disputes between community-charted companies, between community-chartered companies and companies chartered in a community nation, between companies chartered in different community nations, and any other parties with ties to the community who desire such adjudication. The intent is to give parties the choice of an court of resort which is not seen as biased towards any particular nation, and is insulated from local political pressures.

In addition, the unique environment of space requires the development of expertise in space law questions. The creation of a space law code among market nations respecting property rights, sharing a tradition of constitutional protection, is more likely to ensure the emergence of a practical, flexible space law code than the current environment of universal negotiation of space law by highly politicized U.N. bodies, almost all of whose output to date has been highly flawed. Although community space law would not replace U.N.-derived international space law, it would make appeal to international law tribunals much rarer, as most disputes would naturally be among community nationals, since they would eventually represent the large majority of countries active in space. In addition, the gradual establishment of case law would create a powerful set of precedents that would tend to influence the evolution of international space law.

The growing need for workable measures for patent protection for products of space-based projects is an example of the contributions that a Community commercial space code could offer. Many projected space missions are industrial research projects. It would not be atypical to have a spacecraft registered in one country, launched on a vehicle registered in a second, launched from a third, carrying experiments owned and paid for by a fourth, fifth, and sixth nation, and landing in a seventh state. Disputes among the several parties as the applicable law and standards for patent rights to discoveries made in such a mission could create great confusion, and the parties at risk might despair of ever obtaining a binding and enforceable decision. The Community offers a chance to have a simple and predictable environment for resolution of such questions.

Phase Three would involve the evolution of a community law to deal with disputes on large space stations, projects such as a multinational Lunar research base, large space solar power projects, and other advanced projects. Discussion of likely directions for this development are too speculative for the purposes of this paper. However, I would note here that the proposed community framework is a more robust approach to resolution of these questions than either the continuation of a series of ad hoc, highly politicized, bilateral or multilateral decisions, or the ineffective United Nations international space law approach.

FOOTNOTES

1. See UPI, Dec. 20, 1989 ("Chinese Military Role in PRC Launches") and also see DeMeis, "China's Springboard to Space," Aerospace America, March 1989 as quoted in Draft Petition of the National Space Society before the USTR in re: "ELVs and Launch Services from the PRC," July 1990.
2. Memorandum of Agreement between the Government of the United States of America and the Government of the People's Republic of China regarding International Trade in Commercial Launch Services, and Guidelines for Implementation of the Memorandum of Agreement with the People's Republic of China, 54 Fed. Register 4931 (Jan. 31, 1989).
3. "Prepared Statement of Dr. Alan Lovelace, General Dynamics Commercial Launch Services," Hearing before the Subcommittee on International Economic Policy and Trade of the House Foreign Affairs Committee of the House Foreign Affairs Committee, 100th Congress, (Sept. 28, 1988) as quoted in Draft Petition of the National Space Society before the USTR in re: ELVs and Launch Services from the PRC, July 1990.
4. Determination Under Section 301 of the Trade Act of 1974, 50 Fed. Reg. 29631, July 22, 1985.
5. James Bennett, "Space, The New Trade Frontier," The Wall Street Journal, October 4, 1989.
6. Dr. Alan Lovelace as quoted in Draft Petition of the National Space Society, July 1990.
7. General Accounting Office, Missile Technological Control Regime, Report No. NSIAD-90-176, 1990.
8. James Fallows, More Like Us (Boston, MA.: Houghton Mifflin, 1989).
9. James Bennett and Phillip Salin: "Privatizing Space Transportation," Reason Foundation, 1987
10. The Economist, July 7, 1990, p.14.
11. Personal communication with Claud Gingrich, formerly of the Office of the U.S. Trade Representative.
12. Personal communication with Marjory Searing, International Trade Administration, U.S. Dept. of Commerce.
13. Comments of Mark Bender, CBS, in response to draft regulations of Department of Commerce implementing the Commercial Land Remote Sensing Act of 1984.

14. Alexander Cohen, "Cosmos 954 and the International Law of Satellite Accidents," Yale Journal of International Law 78 (1984), Reprint in Lynn H. Reynolds and Robert P. Merges, Outer Space: Problems of Law and Policy (Boulder, Co.: Westview Press 1989).

1a. Bennett and Salin: "Privatizing Space Transportation."

2a. The Earthport Project, Sabre Foundation, Santa Barbara, 1979.

ABOUT THE AUTHOR

James Bennett is an entrepreneur active in space projects since 1978. He is a co-founder of American Rocket Company, a privately funded company in the space transportation industry. He is the co-author (with Phillip Salin) of Privatizing Space transportation.

NOTES

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4/16/91 - Requested per DAB!
in r

DATE OF LETTER:

DATE RECEIVED: 03/12/91

FILE: P- INVITATION

*In honor of
The 1991 Corporate Members of
The Phillips Collection*

*Mr. and Mrs. Harold A. Poling
Chairman, Chief Executive Officer, Ford Motor Company
The Secretary of Transportation and Mrs. Skinner
Mr. and Mrs. Laughlin Phillips
request the pleasure of your company
at dinner
on Wednesday, the seventeenth of April
at seven-thirty o'clock*

*The William Mc Chesney Martin, Jr.
Federal Reserve Board Building
Twentieth and C Streets, Northwest
Washington*

*R. S. V. P.
by enclosed card*

*Business Attire
Valet Parking*



The Honorable
D. Allan Bromley
and Mrs. Bromley
The White House
Washington, D.C.

20500

9120 716

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91 MAR 12 A 9: 46

OFFICE OF THE
DIRECTOR

*1600 Twenty-first Street, N.W.
Washington, D C 20009*

In honor of
The 1991 Corporate Members of
The Phillips Collection

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Washington

R. S. V. P.
by enclosed card

Business Attire
Valet Parking

Dr. & Mrs. Bromley
representing _____

~~X~~ accepts

regrets

the kind invitation to dinner
honoring the 1991 Corporate Members
of The Phillips Collection
on Wednesday, the seventeenth of April
at The Federal Reserve Board

Tracy Unger

"INVITATION FOR DR. BROMLEY"

TYPE: INVITATION

DOCUMENT NUMBER: 9120726

SPEECH: YES NO

FROM: MORRISETT, Lloyd and James A. Thomson: THE RAND
CORPORATION

DATE OF EVENT: 04/10/91

LOCATION OF EVENT: 2100 M STREET, WASHINGTON, D.C.

TIME OF EVENT: 06:00PM

SUBJECT: WORKING RECEPTION OF THE BOARD OF TRUSTEES OF THE
RAND CORPORATION

RSVP:

CONTACT PERSON: MRS. LEE MEYER

CONTACT NUMBER: 202/296-5000

INVITATION ACCEPTED?

YES

~~NO~~

COPIES TO: Dr. Phillips

REMARKS:

*3/18/91 - Regretted to Mrs. Meyer.
mn*

DATE OF LETTER: 03/08/91

DATE RECEIVED: 03/12/91

FILE: *P*- INVITATION

THE **RAND** CORPORATION

March 8, 1991

9120726
RECEIVED

91 MAR 12 P 2: 29

OFFICE OF THE
DIRECTOR

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

Dear Dr. Bromley:

The Board of Trustees of The RAND Corporation invites you to join them at a working reception on the evening of Wednesday, April 10, at our offices at 2100 M Street, Washington, D.C., eighth floor. The reception will start at 6:00 p.m. and conclude about 8:00 p.m. Parking will be available in the garage on the west side of 21st Street (first entrance below M Street, see enclosed map).

This event is a long-standing part of the Board of Trustees' annual meeting in Washington, D.C. RAND is a private, nonprofit institution conducting policy research for government and foundation sponsors. Many government agencies and offices sponsor RAND work, and those who make use of our research results are even more numerous. The trustees have found that, in connection with their annual meeting, an informal occasion for discussion with policy-level government officials is an important and efficient aid in discharging their stewardship responsibilities. Experience indicates that this meeting is also informative for the government officials who attend.

Enclosed is a list of our board members and officers. If previous years are a guide, we can expect many appointed officials from throughout the government, senior military officers, and representatives from the Congress to attend.

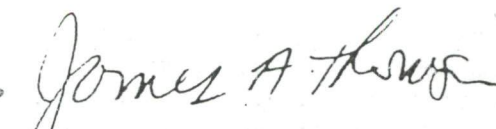
We realize that you have a busy schedule, and we would very much appreciate hearing whether you will be able to attend. Please call Mrs. Lee Meyer at RAND's Washington Office, (202) 296-5000.

We look forward to seeing you on April 10.

Sincerely,



Lloyd N. Morrisett
Chairman of the Board



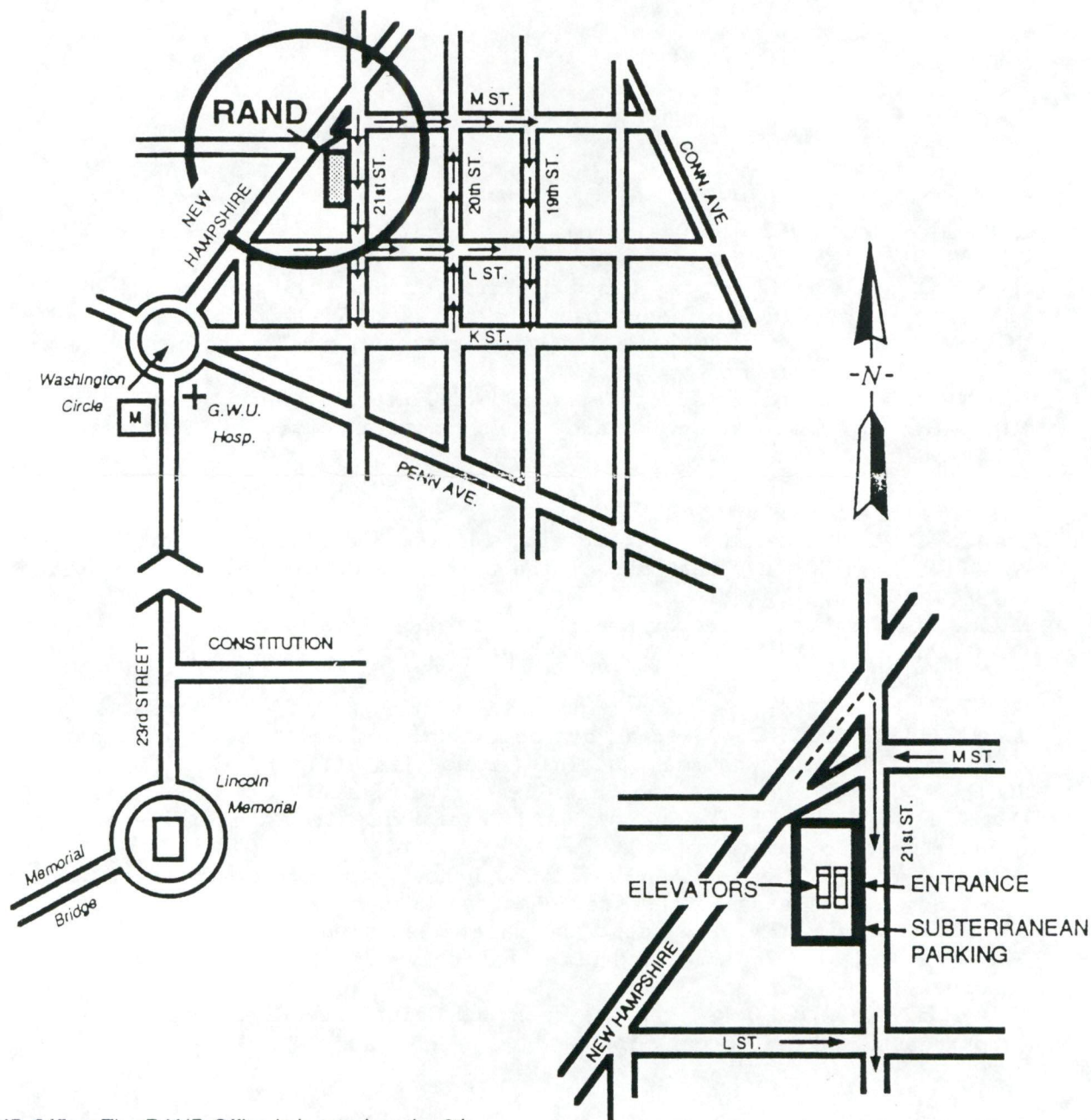
James A. Thomson
President & Chief Executive Officer

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and Deputy Vice President for Research
CHARLES WOLF, JR., Dean, The RAND Graduate School



RAND Office: The RAND Office is located on the 8th Floor of 2100 "M" Street, N.W., Washington D.C. The Entrance to the building lobby is on 21st Street, just South of "M" Street.

Parking: Space will be available in the PMI Garage of 2100 "M" Street, N.W. The Garage Entrance is slightly farther South on 21st Street than the Building Lobby. PLEASE NOTE: 21st Street is one way going South, and the Garage is located on the West [right] side of the street.

Metro: RAND can be reached by the Metro Blue Line (subway) from National Airport, The Pentagon, or Rosslyn. Disembark at the Foggy Bottom Station and walk North across Washington Circle; one block up New Hampshire Avenue; turn a right at "L" Street and left at 21st st. Walking distance is approximately four blocks.