1983 Twentieth Space Congress Program

Canaveral Council of Technical Societies
TWENTIETH
SPACE CONGRESS

Cocoa Beach, Florida  April 26, 27, 28, 1983
CHAIRMAN’S MESSAGE

The theme of the TWENTIETH SPACE CONGRESS is SPACE—THE NEXT TWENTY YEARS—and two decades after the first United States manned orbital flight seems an appropriate time to review the solid accomplishments of the space program, and project its most likely course as we move toward the next century.

The history of spaceflight spans barely a quarter-century, a very short time span for an incredible amount of progress in space exploration and utilization. This was brought home to me last year during a trip to Washington D.C., when I visited the Smithsonian National Air and Space Museum. In the Space Hall, and the Rocketry and Space Flight Exhibits, I viewed the systems of the past, and an exhibit called “Toward 2076: The Future of Rocket Propulsion.” These show clearly that the future, as always, will be vastly different from the past.

To date, all major space transportation systems have been powered by solid or liquid chemical rockets. In the future, small nuclear-powered rocket systems may provide much longer burn times and hence more overall powerful vehicles. Electrical propulsion systems employing electrostatic or magnetic forces to accelerate small quantities of propellants, operating for weeks or even months at a time, can achieve velocities that are very expensive to obtain with rockets that burn for only a few minutes. Both are radical departures from current technology, and both—or neither—may be the wave of the future.

The one fact of which we can be certain is that the process of constant change will continue, and bring many surprises in its wake. Those people who take reasoned, analytical looks at future possibilities and potentials, in symposiums such as the SPACE CONGRESS, will suffer less “future shock” than most. And they will be more able to take advantage of the limitless possibilities now opening up before us.

These three days will allow all of us to share the thoughts and ideas of prominent thinkers from industry, government (both civil and military), and education. We will hear stimulating panel discussions dealing with the lessons of the past and the complexities of the future. A high school science fair will be held in conjunction with the SPACE CONGRESS, featuring exhibits from some of today’s bright young students. Several leading aerospace companies also plan to have exhibits available.

Our agenda calls for a number of social activities, including a banquet at the Patrick AFB Officers Open Mess, a luncheon, and other functions hosted by symposium attendees. Family members may enjoy Florida attractions listed elsewhere in this brochure.

The staff and workers will be glad to assist you in making the Congress both informative and pleasant.

Al Reeser, Chairman, Twentieth Space Congress
GENERAL INFORMATION

HEADQUARTERS/REGISTRATION

Headquarters for the Twentieth Space Congress is the Holiday Inn, Cocoa Beach. Registration will take place in the Dolphin Room from noon to 5:00 p.m. Monday, April 25, 1983. Registration will continue from 7:00 a.m. to 5:00 p.m. on Tuesday and Wednesday, and from 8:00 a.m. to 1:00 p.m. on Thursday.

The Tuesday Space Congress Banquet has been sold out, but the following items are available as a package for $50.00.

<table>
<thead>
<tr>
<th>PACKAGE REGISTRATION</th>
<th>$50.00</th>
</tr>
</thead>
<tbody>
<tr>
<td>(Includes three items listed below)</td>
<td></td>
</tr>
<tr>
<td>Thursday Luncheon</td>
<td>6.00</td>
</tr>
<tr>
<td>Bound Copy of Proceedings</td>
<td>30.00</td>
</tr>
<tr>
<td>Sessions</td>
<td>25.00</td>
</tr>
</tbody>
</table>

This package registration will save you money, however, each item may be purchased individually at the listed price. Individual papers in the proceedings will be available at a cost of $.10 cents per page.

PRESS ROOM

Press headquarters is in the Pelican Room of the Holiday Inn and is staffed and directed by Melodie de Guibert from 12 noon to 5:00 p.m. on Monday and from 8:00 a.m. to 5:00 p.m. on Tuesday, Wednesday, and Thursday. The telephone number in the press headquarters is (305) 784-6925.

MESSAGE CENTER

A message center will be located in the lobby of the Holiday Inn. Messages and telephone calls will be placed on a message board in the lobby. During the Congress hours, calls to this center should be placed to (305) 784-6924. After session hours, calls can be made to the Holiday Inn operator at (305) 783-2271.

AUTO RENTALS

Reservations and rentals can be made at Cocoa Beach or at the Melbourne and Orlando airports. Agencies include:

<table>
<thead>
<tr>
<th>AVIS</th>
<th>NATIONAL</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>BUDGET</td>
</tr>
<tr>
<td></td>
<td>HERTZ</td>
</tr>
</tbody>
</table>

ATTRACTION CENTERS

Late April in Central Florida is a delightful time of the year for the entire family. The weather is usually mild, the Atlantic warm enough for swimming and the tourist attractions are not yet crowded. Cocoa Beach offers a long stretch of swimming and walking beach, surfing areas, and both deep-sea and shore fishing. Bus tours of The Kennedy Space Center and Cape Canaveral Air Force Station are available from the KSC Visitors Center. This is a free, exhibit-filled space museum which can be enjoyed by the entire family, including relatively small children. Within one or two hours drive are—a world of vacation fun in the Magic Kingdom of Walt Disney World, including the new attraction EPCOT, The Experimental Prototype Community of Tomorrow—Sea World, one of America’s finest marine attractions—Circus World, where you can perform instead of just watch—the mystery and excitement of Africa in Busch Gardens—the famed glass bottom boats at Silver Springs—the beautiful, recently enlarged gardens and daily water ski review at Cypress Gardens—and many other lesser-known attractions.

PROCEEDINGS

The proceedings of the Twentieth Space Congress are available at the registration desk in the Holiday Inn during the Space Congress.

After the close of the Space Congress, additional proceedings can be purchased for $35.00 each plus postage from:

Secretary, CCTS
Post Office Box 245
Cape Canaveral, Florida 32920

EXHIBITS

Exhibits will include displays of the Space Shuttle, Shuttle payloads, ground support systems, and communications satellites.

The exhibit hall will be open from 11:00 a.m. to 7:30 p.m. on Tuesday, from 11:00 a.m. to 7:45 p.m. on Wednesday, and from 9:00 a.m. to 1:00 p.m. on Thursday. Representatives of the exhibits will be in attendance to assist and inform visitors. The exhibit hall is located at the Crossway Inn, 3901 N. Atlantic Ave. (A1A) Cocoa Beach.

The general public is invited to view the exhibits. A free Shuttle Bus is available from the registration area, Holiday Inn, to the exhibit area every 30 minutes.

EXHIBITORS

Brevard Community College
The Boeing Company
Canaveral Council of Technical Societies
Computer Sciences Corporation
EG&G, Florida
Florida Institute of Technology
IBM
ILC Dover
Kodak
Lockheed
McDonnell Douglas Astronautics Company
Northrop Services, Inc.
Planning Research Corporation
Rockwell International Corporation
The Space Coast Tourism Committee
Thiokol Corporation
TRW
United Technologies Corporation
Wyle Laboratories

YOUTH SCIENCE FAIR

Science fair displays and demonstrations from local secondary school students will be open to the public from 7:00 a.m. to 7:30 p.m., on Tuesday and Wednesday, April 26 and 27, 1983. The Thursday schedule is from 8:00 a.m. to 2:30 p.m. All Youth Science Fair activities will take place in the Dolphin Room of the Cocoa Beach Holiday Inn. Judging will be conducted from 8:00 a.m. to 12:30 p.m. on Wednesday, April 27. The awards will be presented to the winners at the 8:00 p.m. "Meet the Astronauts" panel session to be held at the Cocoa Beach Theater on Wednesday.

PIONEERS' DAY

The Pioneers Banquet '83 will be held on Friday, April 29 at the Officers Open Mess, Patrick Air Force Base on the following schedule:
TWENTIETH SPACE CONGRESS PROGRAM
TUESDAY, APRIL 26

KEYNOTE ADDRESS (8:30 a.m. to 9:00 a.m.)
Cocoa Beach Theater

Introduction: Mr. Al Reeser
Speaker: Congressman Bill Nelson

Bill Nelson, mentioned as one of the outstanding young men in America in 1972, represents the 9th Congressional District of Florida in the United States House of Representatives.

Bill was elected to the 96th Congress in November 1978 with 62% of the vote and subsequently re-elected in 1980 with 71% of the vote. He serves as a member of the Budget Committee and the Science and Technology Committee. Prior to his national service, he combined the practice of law with an active career in the financial and public service sectors.

He attended public schools of Brevard County and graduated from Melbourne High School in 1960. At Yale University, he received a Bachelor of Arts Degree. He received a Juris Doctor Degree from the University of Virginia School of Law, and was admitted to the Florida Bar in 1968.

Bill was a Captain in the United States Army Reserve, where he served from 1965 to 1971, and was on active military duty from 1968 to 1970.

He was re-elected to the first of three terms in the Florida House of Representatives in 1972 and was elected subsequently without any opposition.

He is a member of the Kiwanis Club, the Jaycees, and is an entered apprentice Mason. He and his family attend the Tabernacle Church in Melbourne and the National Presbyterian Church in Washington.

Bill has been honored by the Florida Jaycees as one of the Five Outstanding Young Men of Florida in 1975 and nominated as the most valuable member of the Florida House of Representatives in 1976. Two Florida colleges have conferred upon him honorary degrees—a Doctor of Laws from Rollins College and a Doctor of Science from Florida Institute of Technology.

He is married to the former Grace Cavett of Jacksonville. They have two children: Billy, age 7, and Nan Ellen, age 6.

PAPER SESSIONS 1 (1:00 p.m. to 4:00 p.m.)
A. PRIVATE ENTERPRISE IN SPACE
Cocoa Beach Theater

Session Chairperson: DONALD "DEKE" SLAYTON, Vice Chairman, SSI, Houston, TX
Session Organizer: Mr. Owen Morris, President, Eagle Engineering, Inc., Houston, TX

1. Lansat as a Business
Mr. Russell Kossler, Director Office of Satellite Data Processing and Distribution, NOAA—NEDIS, Washington, D.C.

2. Space Service Progress Report
Dr. Lee R. Scherer, Consultant, SSI, Cocoa Beach, FL

3. Status and Plans for the Electrophoresis in Space Program
Mr. James T. Rose, Chief Program Engineer, McDonnell Douglas Corp., St. Louis, MO

Mr. William F. Rector, III, Vice President and Program Director—Space Programs, General Dynamics Convair Division, San Diego, CA

5. Orbital Economics: Engineering Growth
Mr. Terry W. Bain, Writer, Evansville, IN

6. SpaceTrans Plans for Private Launch Vehicles
Mr. Thomas Huntington, Director of Operations, The Space Transportation Co., Inc. (SpaceTran), Princeton, NJ

Mr. Robert E. Berry, Director Space Systems Operations, Ford Aerospace and Communications Corp., Palo Alto, CA

B. COMPUTERS AND SIMULATORS
Afterdeck Lounge in Ocean Landings

Session Chairperson: Mr. David P. Glenn, Director of Research, Naval Training Equipment Center, Orlando, FL
Session Organizer: Mr. Walter S. Chambers, Head-Visual Technology Research, Simulator Branch, Naval Training Equipment Center, Orlando, FL
C. ORBITAL OPERATIONS
Brassy's

Session Chairperson: Mr. Mac R. Morrison, Lab Manager, Test and Field Operations Division, TRW, Redondo Beach CA
Session Organizer: Mr. Robert S. Kreisberg, Project Engineer, Space Systems Operations Engineering Department, TRW, Redondo Beach, CA

1. Space Nuclear Power and Man's Extraterrestrial Civilization
Dr. Joseph A. Angelo, Jr., Chairman, Space Technology Program, Florida Institute of Technology, Melbourne, FL

2. Satellite Servicing Technology Development Missions
Mr. Robert Middleton, Aerospace Engineer — Program Development, NASA—MSFC, Huntsville, AL

3. Shuttle Remote Manipulator System and its use in Orbital Operations
Mr. Savi Sachdev, Manager, Systems, Controls and Analysis Engineering, RMS Division, Spar Aerospace Limited, Toronto, Canada

4. Network Operations with Tracking and Data Relay Satellite System
Mr. Robert E. Spearing, Deputy Project Manager/Ground, TDRSS Project, NASA—GSFC, Greenbelt, MD

5. Satellite Deployment from the Space Shuttle
Dr. William B. Lenoir, NASA Astronaut, NASA—JSC, Houston, TX

SPACE CONGRESS BANQUET
Officer's Club, Patrick Air Force Base

Cocktails: 7:00 p.m. to 8:00 p.m.
Banquet: 8:00 p.m.

Introduction: Mr. Al Reeser
Speaker: Dr. George E. Mueller, Systems Development Corporation, Santa Monica, CA

Dr. George E. Mueller, Senior Vice President of Burroughs Corporation and Chairman and Chief Executive Officer of System Development Corporation — A Burroughs Company, was responsible for and directed the United States manned space flight program from the beginning of Gemini flight operations through the second Apollo moon landing. As Associate Administrator for Manned Space Flight at NASA, the Marshall Space Flight Center, Manned Spacecraft Center, and the John F. Kennedy Space Center reported to him along with the Apollo, Gemini, Apollo Applications, and the Advanced Manned Missions Offices.

Dr. Mueller left NASA in 1969 to become Vice President of General Dynamics Corporation. Prior to joining NASA, he spent five years with Space Technology Laboratories, Inc., holding successive management positions as Director of the Electronics Laboratories, Vice President of Space Systems Management, and Vice President for Research and Development. In the latter post, he had overall responsibility for technical operations of the company. He also had overall responsibility for design, development, and testing of systems and components basic to Atlas, Titan, Minuteman, and Thor ballistic missile programs; for development of the United States' first successful space probe, Pioneer I; for several other space projects including Explorer VI and Pioneer V; and for establishment of the U.S. Air Force tracking network for deep space probes.

His more than 30 years experience includes six years as a researcher with Bell Telephone Laboratories and ten years with the electrical engineering faculty at Ohio State University. He has performed extensive research in electromagnetic theory and application, television, microwaves and microwave antennas, missile guidance systems, deep space communications, systems engineering, and space payload design. He was one of the originators of the concept and design of the Telstar digital telemetry system. He holds seven patents and is the author of more than 40 technical papers. With E. R. Spangler, he is co-author of a book, COMMUNICATION SATELLITES.

Dr. Mueller is President of the International Academy of Astronautics. He is a member of the National Academy of Engineering; a Fellow of the American Institute of Aeronautics and Astronautics (AIAA), the Institute of Electrical and Electronic Engineers, the American Association for the Advancement of Science, the American Astronautical Society, the American Geophysical Union, and the Royal Aeronautical Society; and an Honorary Fellow of the British Interplanetary Society. He is a past vice president of the International Astronautical Federation. He is Past-President of the AIAA. He is a member of the New York Academy of Sciences, the American Physical Society, and many other professional organizations.
He was born in St. Louis, Missouri, on July 16, 1918, and holds a B.S. in Electrical Engineering from Missouri School of Mines, and M.S. in Electrical Engineering from Purdue University, and a Ph.D. in Physics from Ohio State University.

The National Medal of Science was awarded to him by President Nixon in 1970 for his many individual contributions to the design of the Apollo system, including the planning and implementation of a large array of advanced experiments necessary to insure the success of this venture into a new and little known environment.

He has received honorary degrees from Wayne State University, New Mexico State University, University of Missouri, Purdue University, Ohio State University and Pepperdine University. His numerous awards include three NASA Distinguished Service Medals, the American Astronautical Society Space Flight Award, the Eugen Sanger Award, the American Academy of Achievement’s Gold Plate Award, and the National Transportation Award for 1979 “Father of the U.S. Space Transportation System,” which referred to his origination of the Space Shuttle.

WEDNESDAY, APRIL 27, 1983
PANEL SESSION II (8:30 a.m. to 11:30 a.m.)
NEXT TWENTY YEARS IN SPACE

Session Chairperson: Dr. Johannes Ortner, Director Austrian Solar and Space Agency, Vienna, Austria and Director Spacelab Program Board, ESA Planning Council.
Session Organizer: Dr. David Flinchbaugh, Senior Staff Specialist, McDonnell Douglas Astronautics Co., Titusville, FL

MEMBERS:

Dr. Hans Hoffmann, Director General, ERNO/Gesellschaft fuer Wissenschaftliche Nutzung von Raum, Bremen, Fed. Republic of Germany
Dr. Klaus P. Heiss, President, The Space Transportation Company, Inc. Princeton, NJ
Mr. Fred Haise, Vice President, Grumman Aerospace, Bethpage, NY
Dr. Arden L. Albee, Professor of Geology & Planetary Science, Cal Tech and Chief Scientist, JPL Pasadena, CA
Dr. Gerald W. Sharp, Future Aerospace Projects Office, NASA, Kennedy Space Center, FL

PAPER SESSIONS II (1:00 p.m. to 4:00 p.m.)

A. ENERGY APPLICATIONS Holiday Inn

Session Chairperson: Dr. Robert L. San Martin, Deputy Assistant Secretary for Renewables, U.S. Dept. of Energy, Washington, DC
Session Organizer: Dr. David L. Block, Director, Florida Solar Energy Center, Cape Canaveral, FL

1. Kennedy Space Center Polygeneration Facility
   Mr. Gary P. Gutkowski, Project Manager; Design Engineering Directorate, Kennedy Space Center, FL

   Dr. Robert J. Sprafka, Mr. Raymond R. Tison, and Mr. William J.D. Escher, E F Technology, Inc. St. Johns, MI

3. Alternative Liquid Fuels for Transportation
   Dr. John J. Thomas, Medical Research Institute, Florida Institute of Technology, Melbourne, FL
   AND
   Dr. Ronald G. Barile, Chemical Engineering Dept., Florida Institute of Technology, Melbourne, FL

4. Fuels of the Future
   Mr. Albert M. Momently, Manager of Transportation Energy, Boeing Commercial Airplane Co., Seattle, WA

5. Photovoltaics Overview
   Dr. Gerald G. Ventre, Deputy Director, Florida Solar Energy Center, Cape Canaveral, FL

B. STS CARGOS Holiday Inn

Session Chairperson: Mr. George V. Butler, Director – Advanced Space Program, McDonnell Douglas Astronautics Co., Huntington Beach, CA
Session Organizer: Ms. C. Darlene Bradwell, Manager, Customer Relations, McDonnell Douglas Astronautics Co., Huntington Beach, CA

1. Cargo Integration
   Mr. George R. Faenza, Director, Kennedy Space Division, McDonnell Douglas Technical Services, Co., Kennedy Space Center, FL

2. Processing and Deploying the McDonnell Douglas Payload Assist Module (PAM)
   Mr. C. E. Bryan, Unit Chief, Electronic Systems Requirements, McDonnell Douglas Astronautics Co., Huntington Beach, CA
   AND
   Mr. J. J. Webster, Manager, Mission Integration/Launch, PAM Programs, McDonnell Douglas Astronautics Co., Huntington Beach, CA

3. Spacelab Program Preparation for the Verification Flights & Projected Utilization
   Mr. James C. Harrington, Director of Spacelab Division, NASA – Headquarters, Washington, DC
   AND
   Mr. Alfred L. Ryan, Chief, Spacelab Operations, NASA – Headquarters, Washington, DC

4. Design of the Space Telescope for Deployment and Servicing by the Space Shuttle
   Mr. William F. Wright, Vice President, NASA Programs, Space Systems Division, Lockheed Missiles and Space Co., Inc., Sunnyvale, CA
   AND
   Mr. Marne L. F. Mercer, STS Interface Manager, Space Telescope Program, Lockheed Missiles and Space Co., Inc., Sunnyvale, CA

5. Teleoperator Maneuvering System (TMS) Mission Applications and Benefits
   Mr. David C. Cramblit, Chief, Space Systems Group, NASA – MSFC, Huntsville, AL
   AND
   Mr. James R. Turner, TMS Study Manager, NASA – MSFC, Huntsville, AL

6. Future Scientific Missions for STS
   Mr. Carmine E. DeSanctis, Chief–Space Science Group, Program Development, NASA – MSFC, Huntsville, AL

7. Space Transportation System Cargo Abort and Recovery Operations
   Dr. Dwight J. Easterly, Staff Engineer, Test and Field Operations Division, TRW, Cape Canaveral, FL
   AND
   Mr. L. Ernest Henshaw, Senior Specialist Engineer, Boeing Aerospace Co., Kennedy Space Center, FL

8. STS Science and Applications Payloads: An Evolving Perspective
   Mr. Michael J. Sander, Director Spacelab Flight Division, NASA – Headquarters, Washington, DC
C. FUTURE SPACE TRANSPORTATION SYSTEMS
Cocoa Beach Theater

Session Chairperson: Mr. Andrew J. Pickett, Associate Deputy Director, NASA—KSC, Kennedy Space Center, FL
Session Organizer: Mr. Thomas A. Feaster, Manager—Advanced Studies, NASA—KSC, Kennedy Space Center, FL

1. U.S. Launch Vehicles for the Future
   Mr. W. R. Marshall, Director, Program Development, NASA—MSFC, Huntsville, AL

2. Second-Generation Space Shuttle
   Mr. James P. Arrington, Head, Vehicle Analysis Branch, Space Systems Division, NASA—LRC, Hampton, VA

3. The Role of the SDV in the STS
   Mr. Vince Caluori, Manager of Preliminary Design, Boeing Space Systems Division, Boeing Aerospace, Co., Seattle, WA

4. The Role Rationale and Economics of a Shuttle Derived Cargo Vehicle
   Mr. Frank L. Williams, Director, Advanced Programs, Martin Marietta Aerospace, Michoud Division, New Orleans, LA
   AND
   Mr. J. Robert Tewell, Manager, Vehicle Systems, Martin Marietta Aerospace, Michoud Division, New Orleans, LA

5. External Tank Aft Cargo Carrier
   Mr. Thomas B. Mobley, ACC Project Manager, Martin Marietta Aerospace, Michoud Division, New Orleans, LA
   AND
   Mr. James E. Hughes, ACC Project Manager, NASA—MSFC, Huntsville, AL

6. Future Requirements and Applications for Orbital Transfer Vehicles
   Mr. Donald E. Charhut, Director, Advanced Space Programs, General Dynamics Convair Division, San Diego, CA
   AND
   Mr. W. J. Ketchum, Project Manager, Orbital Transfer Vehicles, General Dynamics Convair Division, San Diego, CA

PANEL SESSION III (8:00 p.m.)
Cocoa Beach Theater

MEET THE ASTRONAUTS

Session Chairperson: Richard G. Smith, Center Director, NASA John F. Kennedy Space Center, FL

A panel open to the general public with several astronauts and payload specialists discussing present and future activities for men and women in space.

THURSDAY, APRIL 28

PANEL SESSION IV (8:30 a.m. to 11:30 a.m.)
Cocoa Beach Theater

SPACE TRANSPORTATION SYSTEM UPDATE

Session Chairperson: Mr. Richard H. Kohrs, Deputy Manager, National STS Program Office, NASA, Johnson Space Center, TX
Session Organizer: Mr. Preston E. Beck, NASA-Retired, Satellite Beach, FL

MEMBERS:

Mr. Thomas E. Utsman, Director, Shuttle Management and Operations, NASA, Kennedy Space Center, FL
Mr. Daniel M. Germany, Assistant Manager, Orbiter Project Office, NASA, Johnson Space center, TX
Mr. Leonard S. Nicholson, Manager, Mission Integration, National STS Program Office, NASA, Johnson Space Center, TX
Mr. Enoch Jones, Manager, Systems Integration, National STS Program Office, NASA, Johnson Space Center, TX

LUNCHEON (11:30 a.m.)
Holiday Inn, Cocoa Beach, Manatee Room

Introduction: Al Reeser

Speaker: Isaac T. Gillam IV, Assistant Associate Administrator (Plans and Policy), Office of Space Flight of the National Aeronautics and Space Administration.

From October 1981 to October 1982 Mr. Gillam was Special Assistant to the Administrator for Space Transportation Systems and in that capacity was assigned to the White House Office of Science and Technology Policy to participate in the establishment of the National Space Policy.

From June 1978 to October 1981, he was Director of NASA's Dryden Flight Research Center landing site for Space Shuttle Columbia. Prior to that he was Deputy Director. He was named Director of Shuttle Operations at Dryden in 1976, and served there while Enterprise was going through approach and landing tests.

He joined NASA in 1963 as a Program Management Specialist, and in 1966 was appointed Assistant Program Manager for the Delta Launch Vehicle Program.

Born in Little Rock, Arkansas, Gillam graduated from Howard University in 1953. He served as a U.S. Air Force Pilot in Korea. During his ten years in the Air Force he served as a Missile Launch Crew Commander for SAC and was an Assistant Professor of Air Science at Tennessee State University, where he pursued graduate studies.

Gillam is a Tau Beta Pi, Fellow of the AAS, Associate Fellow of AIAA, and member of the Air Force Association. He is a recipient of NASA's highest award, the Distinguished Service Medal, two Exceptional Service Medals and numerous Civic and Educational Service awards.

PAPER SESSION III (2:00 p.m. to 5:00 p.m.)
Cocoa Beach Theater

A. SPACE STATION:
Cocoa Beach Theater

Session Chairperson: Phillip E. Culbertson, Associate Deputy Administrator, NASA Headquarters, Washington, D.C.
Session Organizer: Mr. Terrance T. Finn, Deputy Director—Technology Utilization and Industry Affairs, NASA—Headquarters, Washington, D.C.

1. Requirements/Characteristics for Transportation Mode
   Mr. Gerald M. Hanley, Program Manager, Space Station Rockwell International, Downey, CA

2. Requirements/Characteristics for Assembly and Construction
   Mr. Richard L. Kline, Director, Shuttle Applications, Grumman Aerospace, Bethpage, NY

3. Requirements/Characteristics for Satellite Servicing
   Mr. W. R. Marshall, Director, Program Development, NASA—MSFC Huntsville, AL
4. Requirements/Characteristics for Science
   Dr. James H. Trainor, Deputy Director, Sciences Directorate
   NASA—GSFC, Greenbelt, MD
5. Requirements/Characteristics for Commercial Activity
   Mr. David C. Wensley, Study Manager, Space Station Program
   McDonnell Douglas Astronautics Co., Huntington Beach, CA
6. Requirements/Characteristics for Semi-Autonomous
   "Permanently" Operations
   Mr. Clarke Covington, Acting Manager — Space Station
   Office NASA—JSC, Houston, TX
7. Accommodating Multiple and Possibly Conflicting Requirements
   and Characteristics
   Mr. John D. Hodge, Director — Space Station Task Force
   NASA—Headquarters, Washington, D.C.

B. GET AWAY SPECIAL FINALISTS
   Afterdeck Lounge in Ocean Landings
Session Chairperson: Mr. James A. Ralph, Manager Ground
   Operations Analysis—IBM, Cape Canaveral, FL
Session Organizer: Mr. Dean C. Zimmerman, Launch Site Support
   Manager — NASA, Kennedy Space Center, FL

1. Is Diamagnetic Oxygen Present in Space?
   Miss Jennifer Keedy, Amherst College, MA
2. \( ^{X} \) Ray Examination of Possible QSO Models
   Miss Karen Milewski, Titusville High School, Titusville, FL
3. The Operation of the Solar Powered Stirling Engine in Space
   Mr. Jon Ramer, Troy State University, Troy, AL
4. Cancer Observation in Zero G.
   Miss Andrea M. Brylanski, Florida Institute of Technology,
   Melbourne, FL
5. The Effects of A Zero—Gravity Environment on the Crossing
   Over Mechanism of Yeast Chromosomes: Recombination in
   Outer Space
   Miss Ava Lynn Rhodes, Yale University, New Haven, CT
6. Planaria Regeneration in Zero Gravity
   Miss Dena K. Rashkover, Pioneer Middle School, Cooper
   City, FL

C. SPECIAL TOPICS
   Holiday Inn
Session Chairperson: Dr. B. J. Bluth, Professor of Sociology,
   California State University, Northridge, Granada Hills, CA
Session Organizer: Mr. Roger N. Harmon, Staff Engineer, System
   Test Engineering Department, TRW, Redondo Beach, CA

1. Design of Microgravity Space Environments to Enhance
   Crew Health, Morale and Productivity
   Dr. Larry Bell, Director, Environmental Center, College of
   Architecture, University of Houston, Houston, TX
2. Artificial Intelligence and Man in Space
   Mr. Gordon Woodcock, Manager, Large Space Systems,
   Boeing Aerospace Co., Seattle, WA
3. Uncertainty Risk and Investment Decisions
   Mr. Joel S. Greenberg, Director, Techno-Economic Analysis,
   ECON, Inc. Princeton, NJ
   Mrs. Jeri W. Brown, Manager, Graphics Analysis Facility,
   NASA—JSC Houston, TX
5. A Comparison of Manned and Unmanned Orbital Construction
   and Maintenance
   Dr. Bruce W. Webbon, Senior Research Engineer, SRI Interna-
   tional, Menlo Park, CA

CANAVERAL COUNCIL OF TECHNICAL
   SOCIETIES

- Air Force Association
- American Institute of
  Aeronautics and Astronautics
- American Institute of
  Architects
- American Institute of
  Industrial Engineers
- American Meteorological
  Society
- American Society of
  Civil Engineers
- American Society of
  Heating, Refrigeration
  and Air Conditioning
  Engineers
- American Society for
  Industrial Security
- American Society of
  Mechanical Engineers
- American Society of
  Photo Optical
  Instrumentation
  Engineers
- American Society for
  Quality Control

THE MAP BELOW GIVES THE EXACT LOCATION
OF EACH ATTRACTION.
THURSDAY, April 28

7:00 a.m.  AUTHORS' BREAKFAST — Holiday Inn

8:00 a.m.  REGISTRATION DESK OPENS — Holiday Inn Dolphin Room

8:00 a.m. to 2:30 p.m.  YOUTH SCIENCE FAIR — Holiday Inn Dolphin Room

8:30 a.m. to 11:15 a.m.  PANEL SESSION IV—STS UPDATE
                        Cocoa Beach Theater

9:00 a.m. to 1:00 p.m.  EXHIBITS —
                        Crossway Inn, Convention Center

11:30 a.m. to 1:00 p.m.  SPACE CONGRESS LUNCHEON — Holiday Inn

1:00 p.m.  REGISTRATION DESK CLOSES

2:00 p.m. to 5:00 p.m.  PAPER SESSION III
                        A. SPACE STATION
                        Cocoa Beach Theater

                        B. GET AWAY SPECIAL FINALISTS
                        Afterdeck Lounge in Ocean Landings

                        C. SPECIAL TOPICS
                        Holiday Inn

FRIDAY, April 29

6:30 p.m.  MISSILE, SPACE, AND RANGE PIONEERS' ANNUAL REUNION BANQUET
            Patrick AFB Officers Open Mess

TWENTIETH SPACE CONGRESS COMMITTEE

GENERAL CHAIRMAN
Al Reeser
Rockwell International

VICE CHAIRMAN
Dallas Gillespie
NASA

ASSISTANT TO CHAIRMAN
Florette Haisten
Rockwell International

FINANCE
Dorsey Dean
General Dynamics Convair

PROGRAM CHAIRMAN
Wally Bogg
NASA

TECHNICAL PAPERS
Dwight Easterly
TRW

SPECIAL ARRANGEMENTS
Col. John Hesterman
USAF

LOCAL ACCOMMODATIONS
Gail Galloway
Rockwell International

LOCAL SUPPORT
Larry Holley
NASA

PUBLICATIONS/GRAPHICS
Jim Black
McGregor & Werner, Inc.

PUBLICITY
Melodie De Guibert
Martin Marietta Aerospace

REGISTRATION
Ritchie McConahy
Martin Marietta Aerospace

EXHIBITS
Dick Russell
McDonnell Douglas Astronautics Co.

SCIENCE FAIR
Dave Murray
Brevard County Schools

RECORDING SECRETARY
Lois Gray
Rockwell International

LEGAL
Jack Kirschenbaum
Cocoa Beach, FL

CCTS
Larry Gardenhire
Pan American

ADVISOR
Janet Bonder
PRC Systems Services