

Office of  
Aeronautics and  
Space  
Technology

IN-SPACE  
TECHNOLOGY EXPERIMENTS PROGRAM

*InSTEP*

DR. JUDITH H. AMBRUS  
ASSISTANT DIRECTOR FOR SPACE,  
LARGE SPACE SYSTEMS

131

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128

# SPACE R&T STRATEGY

**OAST**

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**REVITALIZE TECHNOLOGY FOR LOW EARTH ORBIT APPLICATIONS**

**DEVELOP TECHNOLOGY FOR EXPLORATION OF THE SOLAR SYSTEM**

**MAINTAIN FUNDAMENTAL R&T BASE**

**BROADEN PARTICIPATION OF UNIVERSITIES**

**EXTEND TECHNOLOGY DEVELOPMENT TO IN-SPACE EXPERIMENTATION**

**FACILITATE TECHNOLOGY TRANSFER TO USERS**

# IN-SPACE EXPERIMENTS IN OAST

*OAST*

*InSTEP*

- **IN-SPACE EXPERIMENTS HAVE ALWAYS BEEN PART OF OAST'S PROGRAM**
  - TO OBTAIN DATA THAT CAN NOT BE ACQUIRED ON THE GROUND
  - TO DEMONSTRATE FEASIBILITY OF CERTAIN ADVANCED TECHNOLOGIES
- **CONDUCTING TECHNOLOGY EXPERIMENTSS IN SPACE IS A VALUABLEE AND COST EFFECTIVE WAY TO INTRODUCE ADVANCED TECHNOLOGY INTO FLIGHT PROGRAMS**
- **THE SHUTTLE HAS DEMONSTRATED THE FEASIBILITY AND TIMELY BENEFITS OF CONDUCTING HANDS-ON EXPERIMENTS IN SPACE**
- **SPACE STATION WILL BE A PERMANENT LABORATORY IN SPACE AND WILL PROVIDE LOGICAL AND EVOLUTIONARY EXTENSION OF GROUND BASED R&T IN SPACE**

# IN-SPACE EXPERIMENTS PLANNING

**OAST**

**InSTEP**

ASEB PANEL ON NASA'S R&T PROGRAM	JUNE,	1983
INDUSTRY / DOD WORKSHOP	FEB,	1984
ADMINISTRATOR'S POLICY STATEMENT	APRIL,	1984
ASEB PANEL ON IN-SPACE ENGINEERING AND TECHNOLOGY DEVELOPMENT	MAY,	1985
OAST IN-SPACE TECHNOLOGY WORKSHOP	OCT,	1985
INITIATION OF IN-REACH / OUT-REACH PROGRAMS	OCT,	1986
SSTAC AD HOC COMMITTEE ON THE USE OF SPACE STATION FOR IN-SPACE ENGINEERING R&T	AUG,	1987
SPACE STATION OPERATIONS TASK FORCE	OCT,	1987
NASA MANAGEMENT STUDY GROUP (NMSG - 24)	DEC,	1987
NASA CENTER SCIENCE ASSESSMENT TEAM	MAY,	1988

# IN-SPACE TECHNOLOGY EXPERIMENTS PROGRAM

*OAST*

*InSTEP*

- **NASA EXPERIMENTS**

- ARISE FROM THE R&T BASE OR FOCUSED PROGRAMS
- INCLUDE PRESENTLY ONGOING EXPERIMENTS

- **INDUSTRY/UNIVERSITY EXPERIMENTS**

- FOLLOWING THROUGH ON OUR COMMITMENTS IN THE OUT-REACH PROGRAM

- **INTERNATIONAL EXPERIMENTS**

- COOPERATIVE ACTIVITIES WITH OUR ALLIES

# NASA IN-SPACE TECHNOLOGY EXPERIMENTS

*OAST*

*InSTEP*

- EXPERIMENTS CONTINUALLY ARISING AS A NATURAL EXTENSION OF R&T BASE AND FOCUSED PROGRAMS CONDUCTED BY NASA, SUCH AS

- ORBITER EXPERIMENTS PROGRAM (OEX)
- LONG DURATION EXPOSURE FACILITY (LDEF)
- LiDAR IN-SPACE TECHNOLOGY EXPERIMENT (LITE)
- ARCJET AUXILIARY PROPULSION SYSTEM
- SPACE STATION STRUCTURAL CHARACTERIZATION
- AEROBRAKING
- ETC

# INDUSTRY/UNIVERSITY IN-SPACE EXPERIMENTS

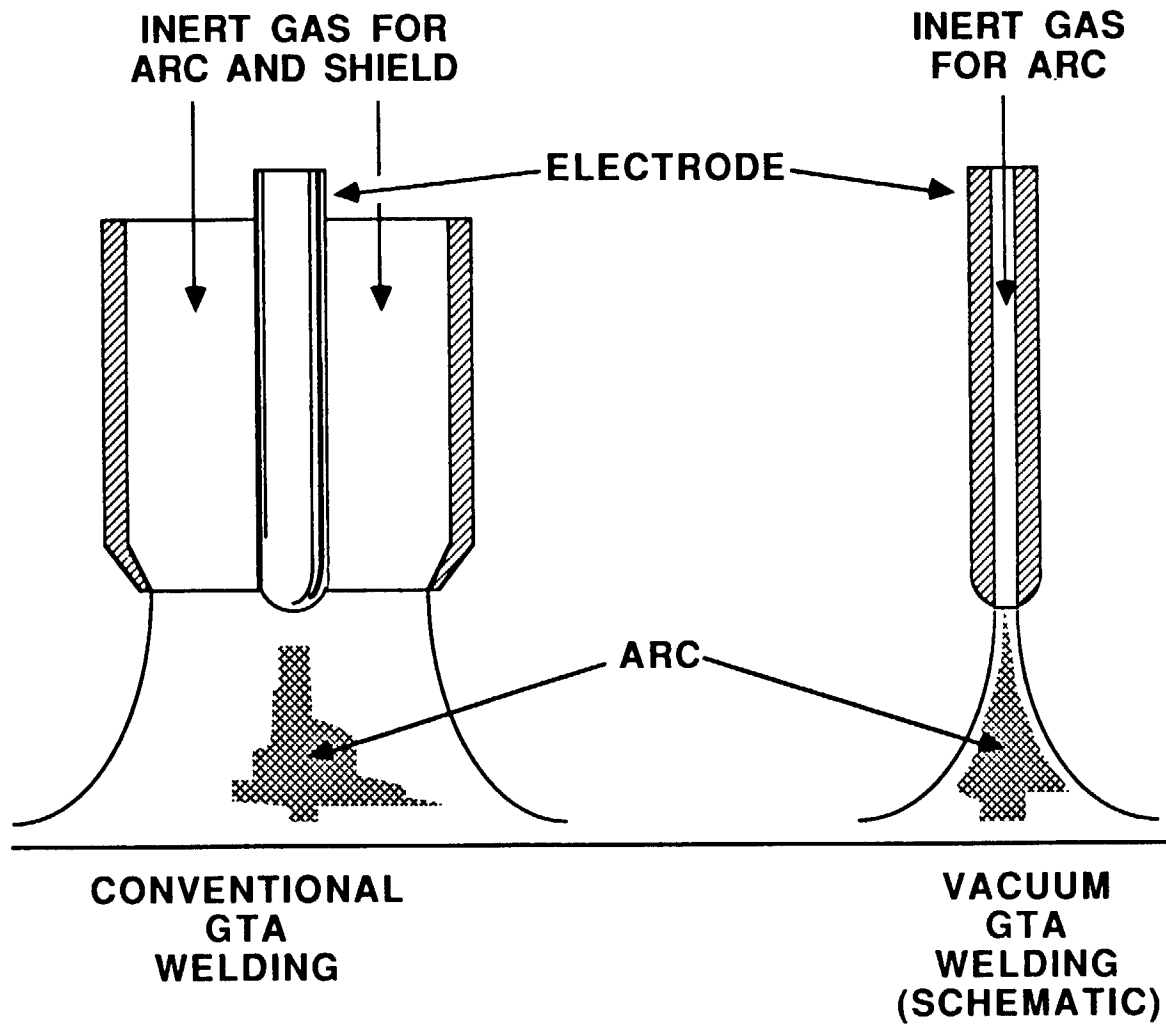
**OAST**

**InSTEP**

- PROVIDE ACCESS TO SPACE FOR INDUSTRY AND UNIVERSITIES TO DEVELOP SPACE TECHNOLOGY
  - ENTHUSIASTIC RESPONSE OF AEROSPACE COMMUNITY TO OUT-REACH SOLICITATION
  
- OAST HAS COMMITTED TO AEROSPACE COMMUNITY TO SERVE AS CONDUIT FOR TECHNOLOGY DEVELOPMENT IN SPACE
  - PERIODIC RESOLICITATIONS TO INDUSTRY/UNIVERSITY COMMUNITY FOR EXPERIMENT DEFINITION, DEVELOPMENT, AND FLIGHT

# IN-SPACE PLASMA ARC WELDING

OAST



138



# INTERNATIONAL IN-SPACE EXPERIMENTS

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*InSTEP*

- PROMOTES COOPERATION WITH ALLIES
- LEVERAGES TECHNOLOGY DEVELOPMENT BY OTHERS IN KEY AREAS
- LEVERAGES AND HUSBANDS SCARCE FLIGHT OPPORTUNITIES

# IN-SPACE EXPERIMENTS INITIATIVE - PHASE I

~~OAST~~

~~InSTEP~~

- **FLIGHT OPPORTUNITY RESTORED**
  
- **INITIATE MORE VIGOROUS PROGRAM ON SHUTTLE AND ELVs**
  - OBTAIN DATA THAT CAN NOT BE OBTAINED ON THE GROUND
  - VALIDATE ADVANCED TECHNOLOGIES FOR EARLY USE IN FLIGHT PROJECTS
  
- **GET A RUNNING START ON SPACE STATION**
  - GEAR UP NASA, INDUSTRY, UNIVERSITY ACTIVITY
  - CONDUCT SPACE STATION PRECURSOR EXPERIMENTS

140

# IN-SPACE EXPERIMENTS INITIATIVE - PHASE II

~~OAST~~

~~InSTEP~~

- **ROUTINE OPERATIONS IN LOW EARTH ORBIT WILL INITIATE ERA OF BOLD NEW INITIATIVES**
  - **NEED FOR TECHNOLOGY DEMONSTRATIONS FOR ENABLING TECHNOLOGIES WILL INCREASE**
  - **THE RANGE OF TECHNOLOGIES TO BE DEMONSTRATED IN SPACE WILL INCREASE**
  - **SPACE STATION WILL PROVIDE THE FACILITY FOR SIMPLER, FASTER ACCESS TO SPACE**
  - **SPACE STATION WILL ENABLE EXPERIMENTS NEEDING LONG-TERM HUMAN INTERACTION**
  
- **EXPERIMENTS PLANNED AND DEFINED FOR SPACE STATION DURING PHASE I WILL ENTER HARDWARE DEVELOPMENT STAGE**

141

# SUMMARY

**OAST**

**InSTEP**

- **TECHNICAL NEED IDENTIFIED**                      **1983**
  
- **PLANNING COMPLETE**                              **1983-86**
  
- **COMMITMENTS MADE**                              **1986-88**
  - **INDUSTRY / UNIVERSITIES (VIA OUT-REACH)**
  
  - **CENTERS (VIA IN-REACH)**
  
  - **INTERNATIONAL COMMUNITY**
  
- **OPPORTUNITY FOR SPACE FLIGHT RESTORED**
  - **SHUTTLE, ELV MANIFESTING**
  
  - **SPACE STATION PLANNING**

142