



Sandia National Laboratories

LASC



**Low-Cost Active Structural Control
Space Experiment
(LASC)**

DOE/Sandia National Laboratories

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- **The DOE Lab Director's Conference identified the need for the DOE National Laboratories to actively and aggressively pursue ways to apply DOE technology to problems of National need.**
- **Space structures are key elements of DoD and NASA space systems and a space technology area in which DOE can have a significant impact.**
- **LASC is a joint agency space technology experiment.
(DoD Phillips, NASA Marshall, DOE Sandia)**
- **Total cost is \$35 Million spread over a 3 year project life.**
- **We are seeking concurrence among the three participating agencies (DoD, NASA, DOE).**

LASC

Task Breakdown

NASA (MSEC)

Experiment Definition
Payload/Sensors & Actuators
Controllers/System ID
Ground Station
Ground Testing

Phase IV Guest
Investigator Testbed

DoD (USAF)

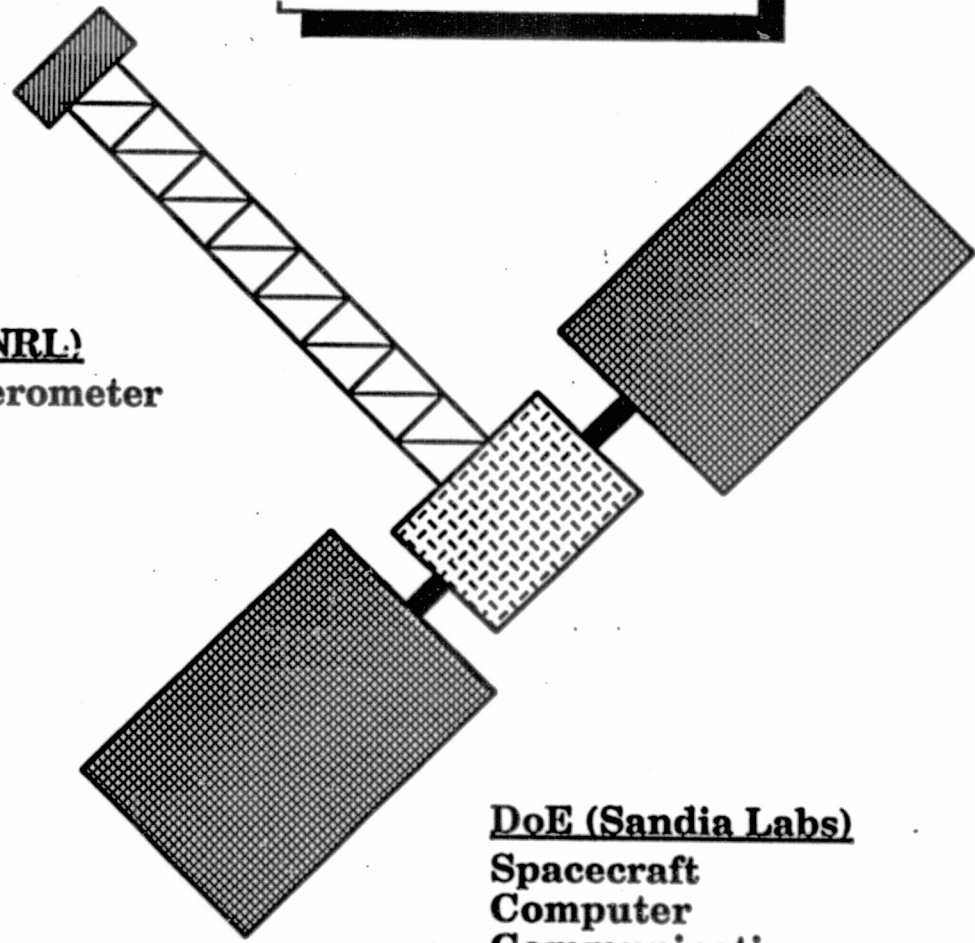
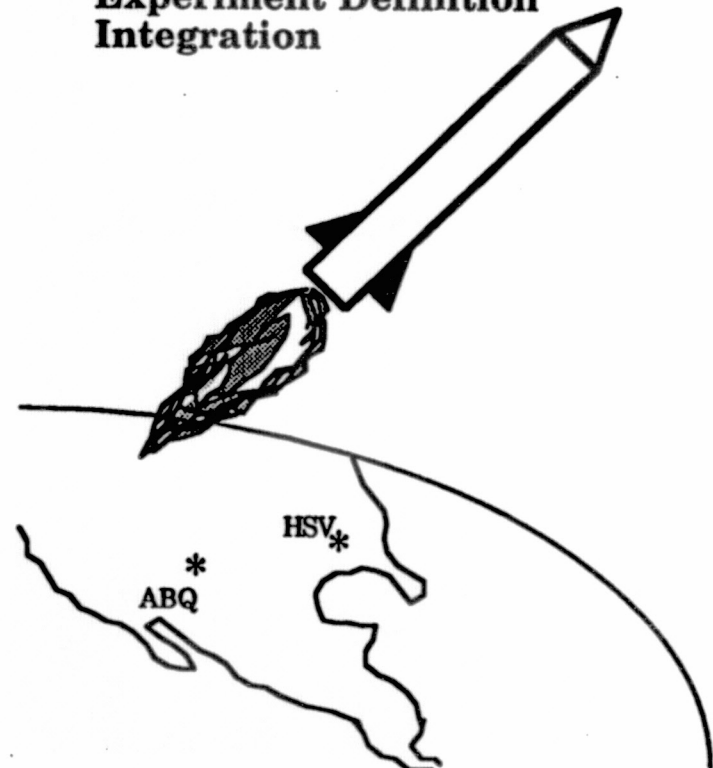
Launch Vehicle
Controllers
Experiment Definition
Integration

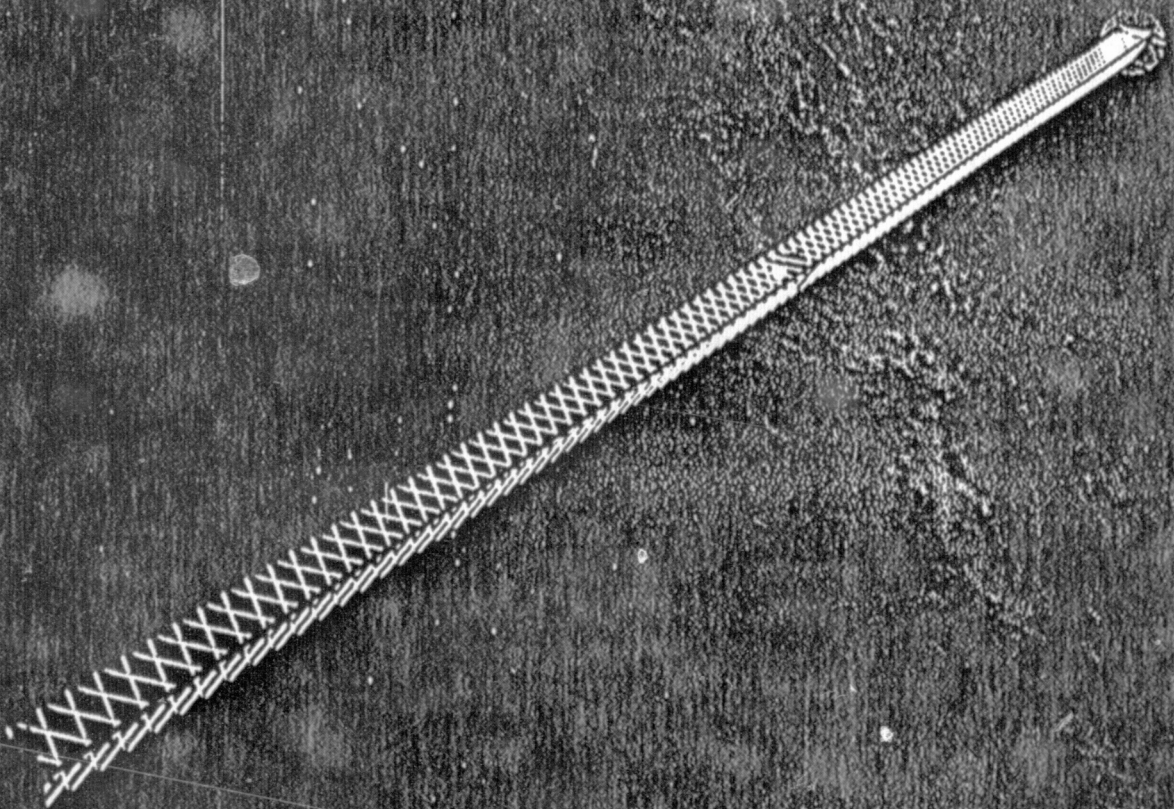
DoD (NRL)

Interferometer

DoE (Sandia Labs)

Spacecraft
Computer
Communications
Controllers/System ID
Ground Station
Experiment Definition





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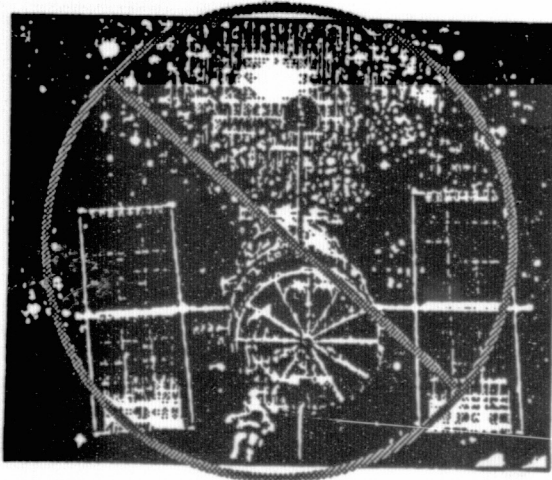
Critical Technology:

Control of Large Flexible Structures In-Orbit

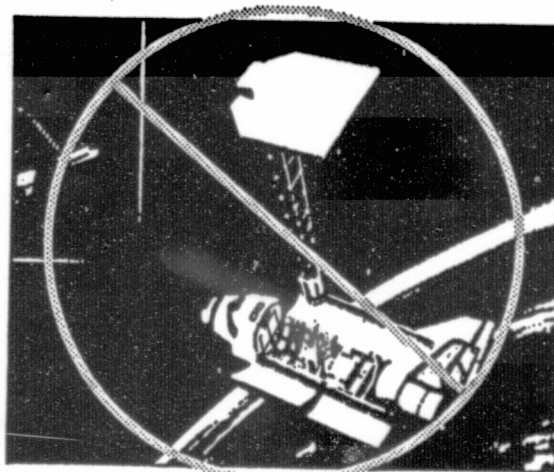
Necessary for:

- SEI
- Deep Space Exploration
- Solar System Observation
- EOS

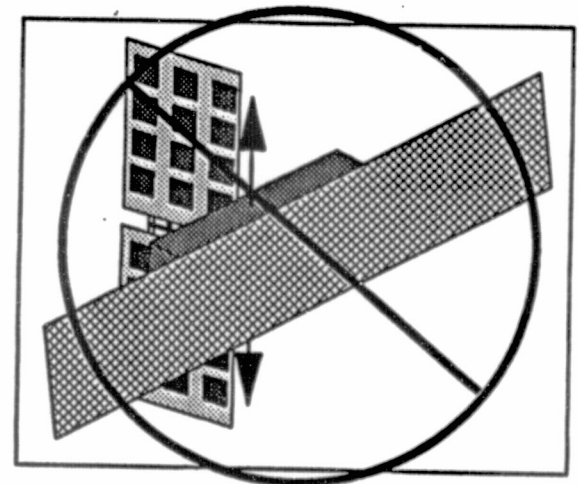
- Space Nuclear Power Systems
- Falcon Laser
- Solar Arrays
- SOLAR COLLECTORS



Hubble

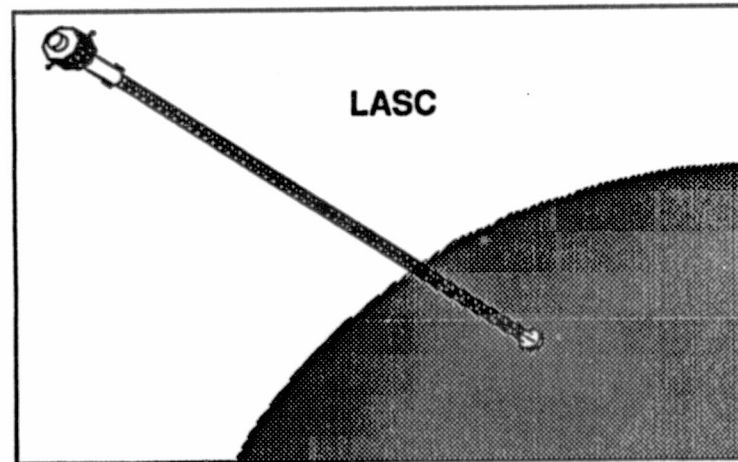


NASA
(CASES)



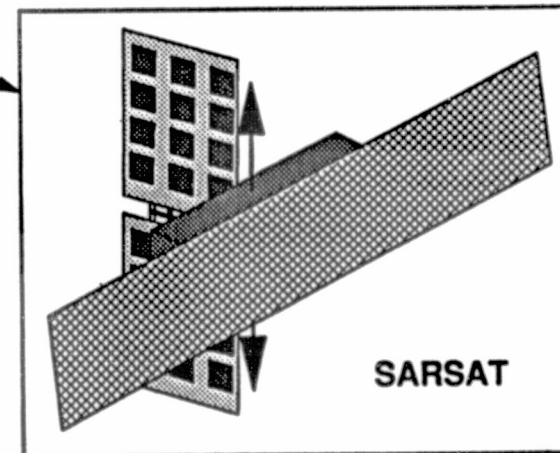
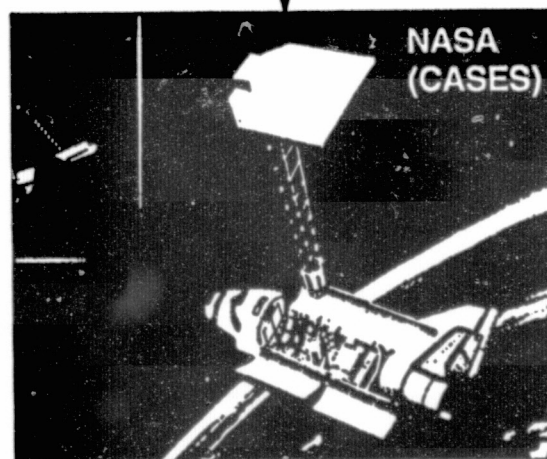
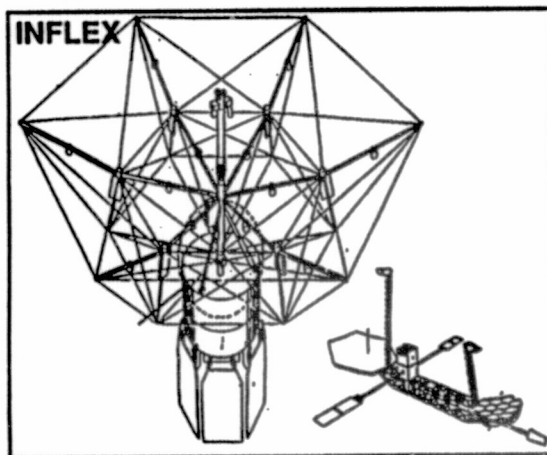
SARSAT

First Step of Technology Development



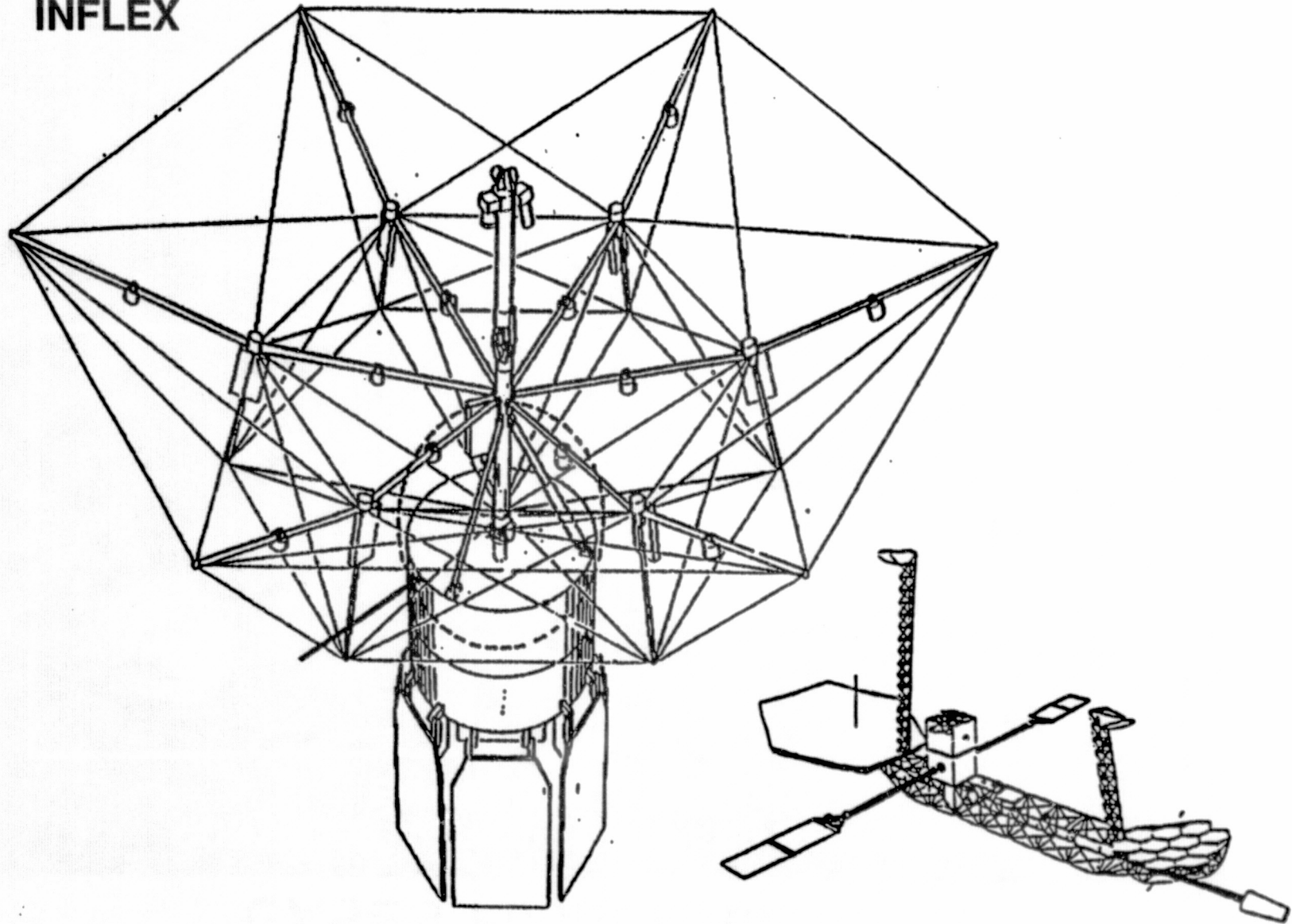
→ DOE

- SAR Technology
- Nuclear Electric Propulsion
- Falcon Laser
- Space-based Relay Mirrors
- Space Energy Solar Arrays



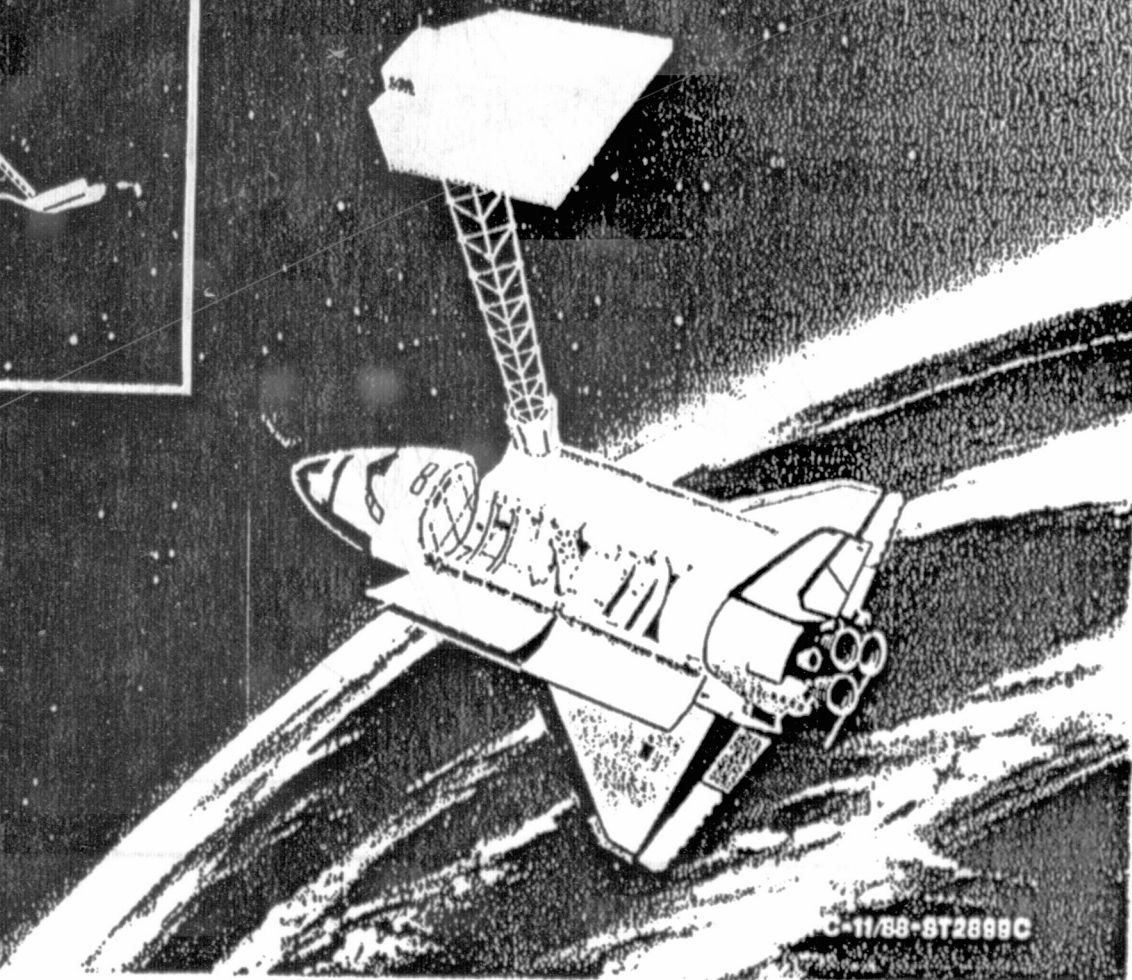
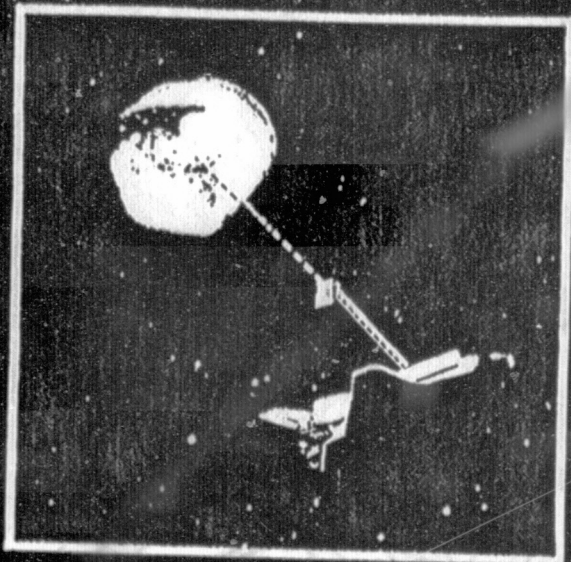


INFLEX



CASES Flight Experiment

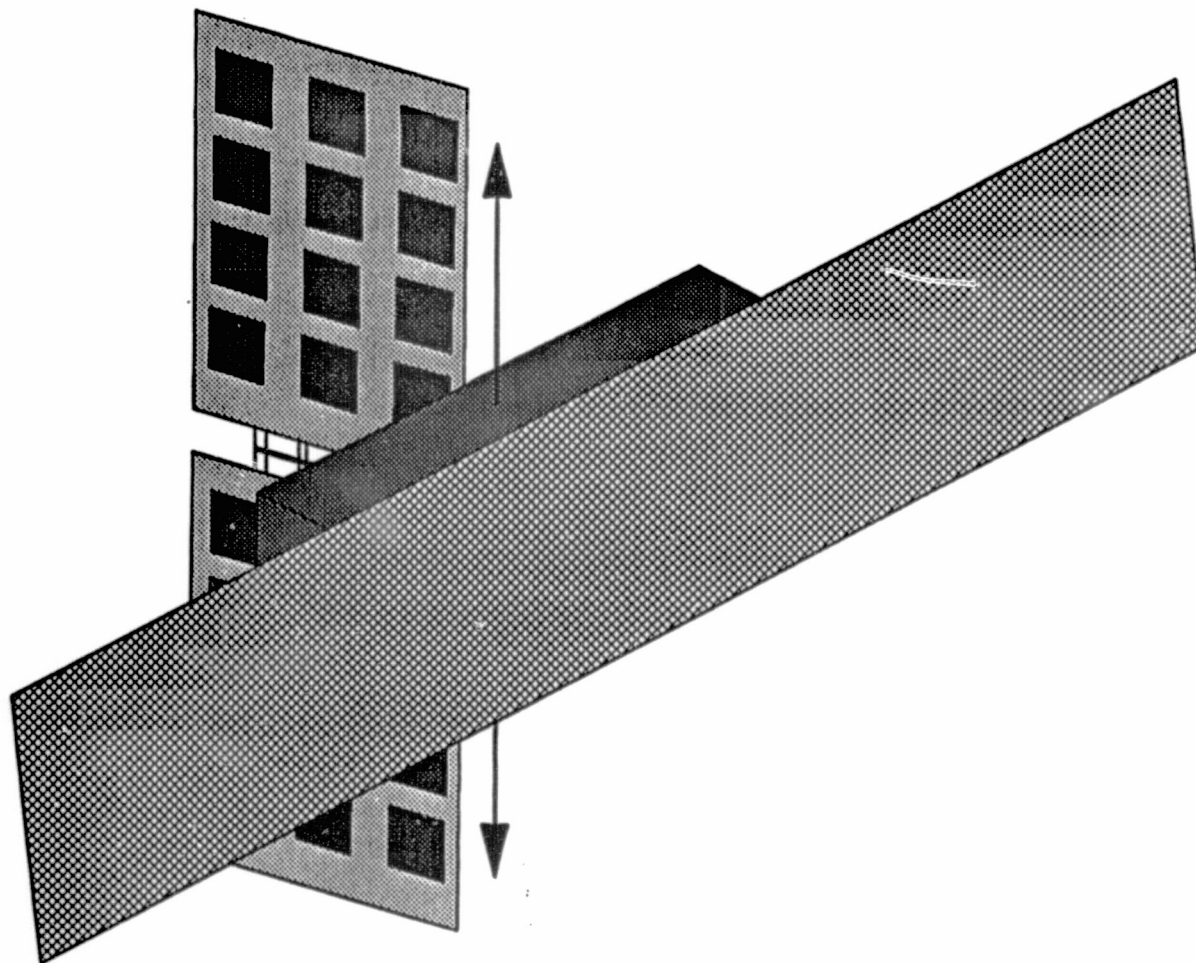
**CONTROLS, ASTROPHYSICS AND STRUCTURES
EXPERIMENT IN SPACE**



C-11/68-8T2899C

NASA

SARSAT





Fundamental Issue: Control of Flexible Structures In-Orbit

- a). Help determine the relevance of ground test environments to space environments**

- b). Technology development of active structural control**

- c). Technology development of structural system identification**

- d). Model verification/validation**



Objective: To provide a Low-Cost, Low Earth Orbit Active Structural Control Space-Based Testbed.

Why: To provide the first opportunity for a dedicated series of tests for the community that will address the CSI Issues of flexible structure control in-orbit.

How: By teaming with government labs, universities, and industry in order to combine funding from several government institutions interested in this technology.



LASC Mission Objectives

- **On-orbit modal testing and system identification for comparison to similar data obtained via ground testing and simulation.**
- **Conduct controls experiments in the areas of vibration suppression, pointing, slewing, disturbance rejection, and deployment & retraction stabilization to the degree possible.**
- **Employ active/passive damping elements within the structure to assess their effectiveness.**
- **Examine variable structure configurations control.**
- **Provide an on-orbit Guest Investigator laboratory.**
- **Investigate tendon control.**



Launch

