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Paper Session III-B - Creating Space Experiment Opportunities for the Academic Community

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CREATING SPACE EXPERIMENT OPPORTUNITIES FOR THE ACADEMIC COMMUNITY

(Including Academic Participation in an Experiment and
Payload Processing Initiative Consortium [EPPIC])

By James A. Ralph
and
Edward L. Ellegood

INTRODUCTION

Florida's involvement in the U.S. space program grew out of a geographic requirement to launch rockets. What started as the "Joint Long Range Proving Ground" ultimately became Kennedy Space Center and Cape Canaveral Air Force Station, both comprising the nation's busiest spaceport.

Unfortunately, since it was established primarily as a launch site, Florida's spaceport has not been sufficiently involved in the research and development activities at the heart of our nation's space program. While Florida developed space transportation infrastructure, other states became locations for space research, development, and mission management. Compared to Florida, these other states have enjoyed more high technology business, and more diversified space enterprise.

This situation is slowly changing as Florida's university system grows in stature and increases its expertise in space science and technology. The Spaceport Florida Authority was established to expand this space-related academic foundation, and integrate it into a comprehensive program for Florida's space enterprise development.

In addition to facilitating and encouraging university activities, the Spaceport Authority has concentrated on enabling high school students and teachers to participate in space research activities. The Authority believes that involving high school students in space experiments will instill in them a lasting interest for science and engineering studies during their college years. These same students will eventually comprise the high tech workforce that is so important to Florida's economic competitiveness.

This paper will summarize Florida's activities in space education, and describe a new initiative that could greatly increase Florida's (and the nation's) capability to support small academic and commercial space experiments.

EXISTING SPACE EDUCATION AND RESEARCH PROGRAMS

The Spaceport Authority has organized, sponsored, supported, and facilitated a growing number of Florida space research projects at middle school through post-graduate levels. Working with academic institutions, industry, federal agencies, other Florida agencies, other state governments, international governments, and non-profit organizations, the Spaceport Authority has helped establish unique capabilities in Florida for space education.

The following is a list of Florida space education projects sponsored or supported by the Spaceport Authority since its activation in 1990:

Cape San Blas Suborbital Launch Program. The Authority has activated a unique launch site in Northwest Florida for suborbital rockets. The Authority now provides the launch capability at Cape San Blas to support Florida university research. The Authority's first Cape San Blas launch was conducted on August 22, 1992.

The next Cape San Blas launch campaign is planned for May, 1993. As many as three

launches will be conducted during the campaign, one of them to support ozone measurement research by Florida State University. FSU will be the customer for two other ozone launches in 1993. The Authority is working with the Technological Research and Development Authority (TRDA) to sponsor another five launches for Florida university-developed experiments, each with mandatory participation from Florida high schools.

Mobile Launch Capability. In order to minimize the environmental impacts of Cape San Blas activation, the Authority has established a mobile launch system capable of operating from any approved site. This system was first used in Mexico during the July 11, 1991 solar eclipse to support research by the Florida Institute of Technology (FIT).

Rockets for Schools Program. In October, 1992, the Authority hosted students and teachers from 14 U.S. states, and Mexico, for four days of space education activities at Cape Canaveral. Together with the Aerospace States Association (ASA) and the U.S. Department of Transportation's Office of Commercial Space Transportation (OCST), the Authority was able to arrange a full agenda of lectures, tours, and hands-on activities, culminating in the launch of one of the Authority's suborbital rockets. Additional sponsorship for Rockets for Schools was provided by Astrotech, McDonnell Douglas, Lockheed, NASA Kennedy Space Center, and the U.S. Air Force.

The goal of Rockets for Schools was to expose disadvantaged students to the U.S. commercial launch industry and other aspects of our nation's space program. The program actually allowed one of the students to conduct the suborbital launch. The Authority looks forward to organizing additional Rockets for Schools programs, either in coordination with other ASA states, or for Florida students only (in conjunction with one of our previously scheduled

launches).

Space Communications Technology Center. The Authority was instrumental in the establishment of this NASA Center for the Commercial Development of Space (CCDS) geared toward research and development of satellite telecommunications systems. Based at the Florida Atlantic University, the SCTC CCDS places Florida at the forefront of U.S. telecommunications research, and increases the strength of our state's university system.

Space Shuttle Experiments. The Authority has provided a valuable capability for Florida high schools and universities to fly experiments aboard NASA's Space Shuttles. As a member of two NASA CCDS organizations (including the Space Communications Technology Center and Bioserve Space Technologies), the Authority has been able to sponsor access to the Space Shuttle on a regular basis for Florida experiments.

Space Law Institute. After TRDA funded the creation of a Space Law Institute within Stetson University's College of Law, the Spaceport Authority assisted in the development of a space law internship program. This program allowed students to gain specialized experience by working directly with the Authority and Florida's space businesses.

The Institute also was responsible for conducting a major study of regulatory factors which effect to the competitiveness of Florida's commercial launch industry. This study has been the impetus behind important activities at Cape Canaveral to improve the business conditions for commercial launchers.

Given the complicated legal and regulatory environment's impact on the space industry, We hope that Stetson's graduates will contribute to Florida's goals to increase space-related industry.

Promotion of Space Education. In addition to the Rockets for Schools program, the Authority has worked with Kennedy Space Center to sponsor spaceport tours and visits for Florida students. The Authority has also provided educational and promotional materials to Florida classrooms and public libraries to increase awareness of, and interest in, our nation's space program.

By maximizing student exposure to the excitement of space activities, we hope to increase the number and quality of engineers and scientists graduated from Florida institutions. A heightened level of interest on the part of students should also result in an increased commitment by colleges and universities to provide space-related education and coursework.

Students for the Exploration and Development of Space. The Authority has become increasingly involved with nationally organized student groups like SEDS. We have been able to involve SEDS students in space-related activities at Cape Canaveral, and will work closely with the organization on future student-oriented projects. We are currently working with SEDS to establish a more formal role for the Authority as a sponsor organization.

Lease of Spacehab Lockers. The Authority has access to three reduced-rate experiment lockers aboard *Spacehab* commercial experiment modules. These lockers were originally reserved by the Authority for experiments planned by the University of Central Florida. Although grant funds were not available for UCF to exercise their flight option, the lockers are still reserved, without a specific launch date requirement. They are now available from the Authority for either academic or commercial research.

NEW SPACE EDUCATION INITIATIVE

Although NASA encourages university space research as well as the commercialization of space industry, recognizing the need to both transfer and augment its own laboratory research capabilities, the agency does not currently involve formal technology transfer activities in its payload processing operations. The new Spaceport Authority initiative will ensure that users of its new tech transfer lab have ready access to the technologies, processes, and expertise available within NASA and other federal laboratories.

Experiment and Payload Processing Initiative Consortium (EPPIC).

The environment of space provides unique capabilities for the commercial research and development of technologies critical to our nation's international competitiveness and economic growth. Space research and development has resulted in products and services (such as telecommunications) that contribute billions of dollars to our economy. In pursuit of new commercial products and technologies, many small research projects are launched each year into space. The researchers who develop and fly these payloads represent only a small portion of the multitude of companies that can benefit from increased, low cost access to space and space technology. To enable this increased access, the Spaceport Florida Authority has formed the **Experiment and Payload Processing Initiative Consortium (EPPIC)**.

Critical technologies that can be developed and improved in the unique environment of space for application on earth include (among others): environmental technologies; aeronautics; materials synthesis & processing; electronic and photonic materials; ceramics; composites; advanced computing; high performance metals and alloys; superconductors and semiconductors; microelectronics & optoelectronics; high definition imaging and displays; biotechnology; medical

technology; energy technologies; artificial intelligence; and remote sensing/earth monitoring.

EPPIC will support the development of these and other technologies by enabling the transfer of research, processes, and expertise from NASA's Kennedy Space Center (KSC) to businesses through a unique tech transfer laboratory. EPPIC is activating such a facility near KSC to transfer NASA technologies into the commercial development and processing of small space payloads; to transfer space research results to industry, and to stimulate the commercial research and development of critical U.S. technologies.