

EXHIBIT No. 1 Form 442 Question 7: Experimentation Description

Program and objectives, as well as technical data, are described on the next pages.

The SPACEHAB Universal Communications System (SHUCS) program will research and develop units that will allow communication from orbiting vehicles in space to Earth, via the Inmarsat satellite constellation and earth station network. It will be a system independent from the space agencies' communication links, and it will therefore allow more freedom of communication between land and space. A prototype for this system flew on the STS-91 Shuttle mission in 1998, and the final version will be installed on the International Space Station.

The LYNXX terminals will be used as a starting point for research and testing needed to arrive to a prototype of a modified system, able to interface with the INMARSAT satellites from orbit.

Occasionally, the LYNXX terminals may be used in foreign countries such as Germany and Russia for research and/or communications purposes. These instances are not expected to be frequent (less than 10 per year). Export License agreements for technology transfers to partner companies in the aforementioned countries were filed with the Department of State:

- DaimlerChrysler (DASA) – Germany: License # ODTC Case TA 1310-99
- RSC Energia – Russia: License # ODTC Case TA 1309-99



MAINTAIN CONSTANT COMMUNICATION WITH YOUR MICROGRAVITY EXPERIMENT

SHUCS was designed and developed as a privately operated, communications link between ground-based laboratories and their microgravity missions in space. SPACEHAB Universal Communications System (SHUCS) supports real-time voice and data transmissions that are independent of mission communication links and therefore not subject to flight priorities which may cause communications delays. SHUCS is a flexible platform designed for deployment on SPACEHAB, Inc.'s Research Double Module, the Space Shuttle mid-deck, the Russian *Mir* Space Station, the International Space Station (ISS) and commercial satellites.

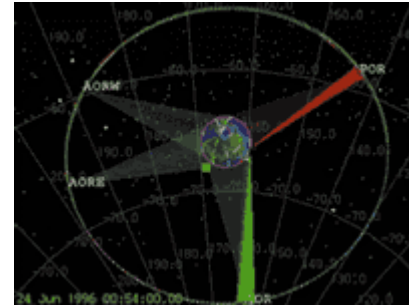
CAPABILITIES

SHUCS allows secure file transfer, commanding, up/downlink fax and voice communications globally via three ground stations and four satellites. SHUCS uses a standard TCP/IP file transfer protocol with a secure Internet address. Payload interaction during the entire mission is via the Inmarsat system of geosynchronous satellites and ground stations using the Internet navigation applications. The coverage is subject to attitude variations, but can be close to 100% in a gravity-gradient orientation



PARAMETERS

Size:
Internal:
20.32" x 10' x 17.3"
External:
Antenna 31" x 31"
Pan/Tilt Unit, various
Power:
Receiving: 124W
Transmitting: 196W
RF Frequencies:
Receive: 1525.0 - 1545.0 MHz
Transmit: 1626.5 - 1646.5 MHz



SHUCS Satellite Acquisition From Shuttle

SERVICES

Voice Service:
Digital Voice Rate: 16 Kbs

Optional Service:
Supports STU-III Secure Voice at 9.2 Kbs
Data Service:
Digital Data Rates: 56/64 Kbs, 16 Kbs, 9.6 Kbs
Forward Error Correction Rates: 1/2, 3/4



SHUCS/INMARSAT Coverage

EXTERNAL INTERFACE

DTMF Telephone, Group III Fax, RS232 Data, RS422/449, V.35 HSD 10 BaseT Ethernet

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