

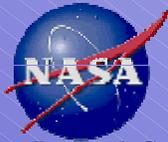
Glenn Research Center



Advanced Communications Technology Satellite (ACTS) Extension Workshop

October 24, 2000

Ohio Aerospace Institute Auditorium



Glenn Research Center

Agenda



9:30 Welcome and Introduction

Donald Campbell,
Director, NASA GRC

9:45 The Opportunity and NASA offer

Robert Bauer,
ACTS Project Manager, NASA GRC

10:15 The Consortium Approach

Joanne Poe,
GRC Consortium Consultant, Flowen

10:45 Break

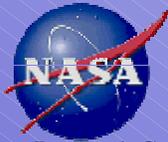
11:00 Technical Briefing, Part 1
ACTS System

Richard Krawczyk,
ACTS Operations Manager, NASA GRC
Steven Struharik,
NGS Manager, LMG

NASA Ground Station

12:00 Lunch

Sun Room, OAI



Agenda



1:00 Technical briefing, Part 2
Ground Station Capability

Multibeam Antenna

Richard Reinhart,
USAT and LET Manager, NASA GRC
Roberto Acosta,
Senior Researcher, NASA GRC

2:00 Break-out Meeting(s)
- Interest and Membership Meeting

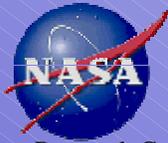
Auditorium, OAI

3:00 Break

4:15 Tour of NASA Ground Station Facility

NASA GRC, Building 55

5:00 Adjourn



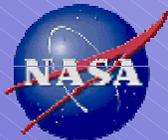
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ACTS Extension Workshop 10/24/00



Opportunity and NASA offer

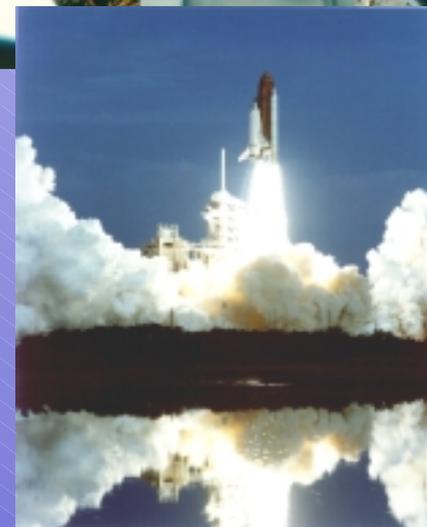
Robert Bauer
NASA Glenn Research Center
PH: 216-433-3431
robert.bauer@grc.nasa.gov



Overview of the ACTS



- Original program goals:
 - develop high-risk, high cost technology for next generation satellite systems
 - enable growth in capacity and utilization of frequency spectrum
 - maintain US pre-eminence in communications satellite technology
- NASA led experiments program December 6, 1993 - May 31, 2000
- ACTS is now permanently stationed at a geostationary (GEO) orbital gravity well at 105.2°W
- Opportunity for use by educational consortium for 2-4 years



Launched September 12, 1993
aboard STS 51 - Discovery

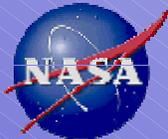


Overview of the Opportunity



ACTS Consortium for University Education

- NASA Glenn Research Center is offering the remaining life of the Advanced Communication Technology Satellite (ACTS) to a university consortium
- The mission of the consortium will be to maximize the use of a unique national asset to benefit space communications education, research and outreach



Overview of the Opportunity



COMMERCE BUSINESS DAILY - Sources Sought
[Posted in CBDNet on October 4, 2000]

ACTS EXTENDED MISSION

The National Aeronautics and Space Administration (NASA) announces willingness to extend operations of the Advanced Communications Technology Satellite (ACTS) for education and research purposes to an education-based consortium. The spacecraft is permanently retired on-orbit at 105.2 degrees West longitude, but further use of its payload is feasible. The consortium is expected to fully fund the operations. A workshop will be held on October 24, 2000 at the Glenn Research Center, Cleveland, Ohio to present the opportunity.

Point of contact: Mr. Robert Bauer tel: 216/433-3431
Email robert.bauer@grc.nasa.gov



Overview of the Opportunity



ACTS FACTS

- \$499 M spacecraft and ground segment development
 - Total program approximately \$550M
- Original 4 year design life now in its 7th year of operations
 - All major subsystems operating without failure
- NASA-coordinated experiments concluded 5/31/00
 - 103 experiments involving 61 unique Principal Investigators
 - Over 100 other participating organizations

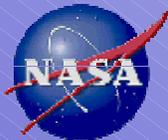


Satellite Focused Areas



- Assume ACTS spacecraft and control station operations
- Analyze spacecraft bus performance- thermal, electrical characterization/modeling
- Improve new software for operations - laptop based?
- Automate operations
- Orbital modeling
- Attitude control
- Conjunction assessment
- Earth station design and tradeoffs
- Link margin calculations
- Fade mitigation techniques





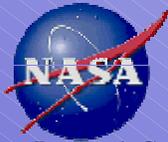
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Applications Areas



- Telemedicine
- Distance Education
- Emergency Response
- Telescience
- Aeronautical/Maritime/Mobile
- Videoconferencing
- High Speed Networking
- Hybrid-satellite Links (Ku & Ka)
- Protocol evaluation/improvements over long latency links





NASA Contributions



- Access to ACTS with two to four years of potential operations
- Ground stations
 - Access to control station at GRC
 - Access to 1 hub experimenter terminal at GRC (LET)
 - 4 transportable experimenter terminals (USATs)
- Up to \$10k per month to maintain the control station while ACTS is operative
- “Bridge funding” to continue operations of ACTS while the Consortium is being formed (≤ 6 mos.). During this time, GRC will seek alternative funding sources
- Licensing of spacecraft and NASA provided earth stations
- Hardware and software for spacecraft operations
- Engineering support during transition and ad hoc consultation after consortium in place



Universities/Consortium Contribution



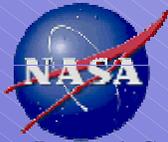
- Ensure consortium is academia-based whose primary purpose is education & research
- Consortium formed by January 2001
- Consortium & NASA share operation costs from January 01-April 01
- Assume all operations and associated costs no later than April 2001
- Consortium open to national participation
- Consortium handles scheduling of spacecraft resources
- Consortium supports transportable ground segment usage including moves and maintenance of USATs



NASA GRC's Minimum Requirements



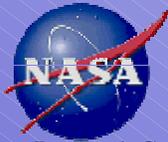
- Potential members commit soon to form an ACTS Education Consortium and demonstrate diligence in its formation
- GRC retains right to partial use of transponder for experiments
- Participation by GRC on the board or committee governing the consortium
- Recognition by potential consortium members that there is no guarantee of ACTS functionality or quality of service



Overview of Consortium Approach



- Phased approach
 - **Phase 1 (~ 6 months):**
 - Parties identify interest to NASA
 - Develop details of forming consortium
 - Seek consortium funding sources - (State, other Govt. agencies, industry,...)
 - Transition operations from NASA to consortium
 - **Phase 2: Full consortium**
 - Assume full operations
 - NASA participates as a charter member
- NASA is not developing the consortium
 - It is to be self-coordinated
 - NASA will work with interested parties



Operations Costs



- Spacecraft operations estimated at \$60k per month
- Cost estimate developed based on NASA's experience with its current contractors and assumptions on level of support needed
 - Continue with current contractors
 - 8 hrs/day, 5 days/week with minimal staffing
 - On-call, or remote ops during other hours
 - May need extra support during eclipse seasons
- Does not include payload usage activities, consortium overhead & administration, earth station maintenance and moves



Timeline



Item	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May
Workshop	▲ 10/24							
NASA Status		▲	▲	▲	▲	▲		
Consortium Readiness							▲ 4/28	
Consortium Development		—————						
Space Act Agreement				▲				
Transition Ops		-----						
Full Ops							—————	