NASA Propagation Studies

Status

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FOCUS DURING THE LAST FIVE YEARS: ACTS PROPAGATION CAMPAIGN

OBJECTIVE OF ACTS PROPAGATION CAMPAIGN:

- To leverage NASA's Advanced Communications Technology Satellite (ACTS) in order to characterize radiowave propagation at Ka-band for utilization by U.S. industry and the space community

EXPECTED RESULTS & OUTPUTS OF THE ACTS PROPAGATION CAMPAIGN:

- Ka-band propagation data
- Prediction models of rain and atmospheric attenuation and scintillation
- Fade and nonfade distributions
- Frequency scaling models
- Diversity models
- Mitigation schemes for signal impairments due to propagation
- Wet antenna effect model
- Rain climate region map revision
- Revised propagation handbooks for design of satellite communications systems
- Contributions to regulatory organizations

ACTS PROPAGATION CAMPAIGN MILESTONES

MILESTONE	CALENDAR YEAR
• First planning workshop held in Santa Monica, California	1987
• Announcement of Opportunity released	1989
• Virginia Polytechnic Institute commissioned to develop the ACTS Propagation Terminals	1989
• Terminals delivered and ACTS launched	1993
• Two years (14 station years) of ACTS propagation data distributed on CD-ROM	1996
• Work started to use ACTS propagation data to revise propagation models and handbooks	1996
• Three years (20 station years) of ACTS propagation data distributed on CD-ROM	1997
• Four years (27 station years) of ACTS propagation data distributed on CD-ROM	1998
• Revised propagation models and two handbooks	1999
• Contributions to regulatory organization ITU-R	1999
• Five years of ACTS propagation data to be distributed on CD-ROM	1999
• ACTS transitions into inclined orbit	1999

NEW FOCUS FOR NASA PROPAGATION STUDIES

- One source of funding for NASA propagation studies is NASA's Cross Cutting Technology UPN 632-50
  - Entire 632 program managed through a GSFC formulator (Gary Martin) and a JPL Implementor (Steve Prusha), with high level HQ oversight by Code SM
  - NASA Enterprises are the main customers for NASA's Cross Cutting Technology UPN
  - 632 program segregated into major "thrust areas"
  - Communications Technology is part of "High Rate Knowledge Delivery" thrust area with manager at LeRC (J. Bagwell)
  - JPL Propagation Studies is part of Communications Technology area
  - Funds from NASA's Cross Cutting Technology UPN 632-50 will focus on priorities of "High Rate Knowledge Delivery" as they are defined; two propagation areas have been already identified
    - Propagation Issues for Communications on and around Mars
    - Propagation Issues for Optical Space Communication

- JPL is looking for long-term source of funding for propagation studies of interest to the U.S. satellite industry