OPENING REMARKS: CURRENT AND FUTURE ACTIVITIES

Faramaz Davarian

It is our custom to present the Propagation Program's recent accomplishments and future plans at the onset of a NAPEX meeting. The following is a summary of our report card.

The data analysis phase of the U.S. **Olympus Campaign** is nearing its end. The final report will be published by Virginia Tech by midsummer 1993. The report will comprise measurement analysis for 12 months. It will include monthly and annual attenuation statistics and statistics on scintillation effects. A number of prediction models will be presented. Two talks are scheduled on the Olympus experiments in the morning session.

The **ACTS** propagation experiment preparations are moving forward as expected. Since we devoted all of yesterday to this topic, I will not elaborate on ACTS any further.

The **mobile/personal** channel characterization efforts continued during the last year. Data collected by the University of Texas in 1992 are being analyzed and will become available by September 1993. We have recently started a study to characterize LEO mobile/personal channels. Topics such as indoor reception, tree shadowing, blockage, and delay spread will be investigated. These results will become available in one to two years from now. We have also collected Ka-band mobile data using Olympus 20 GHz beacon transmissions. Wolf Vogel will present a paper on this topic in the afternoon session. To reflect our radio satellite broadcast (DBS-R) interest, Nasser Golshan will discuss this topic in a paper that will be presented this afternoon.

The University of Texas has already collected five years of **low-elevation angle, 11-GHz** propagation data. This experiment is the subject of a paper that will be presented later this morning.

The work on **database for propagation models** has progressed very well. The first release is ready, and the participants of this meeting will receive a copy of the software. Kris Suwitra will present a demonstration of the software after lunch.

We had an active year where **CCIR** is concerned. An input document on land mobile satellite system (LMSS) propagation models was submitted to the U.S. national committee and was approved and sent to Geneva. This document will be used at the October 1993 meeting of Working Party 5B to produce CCIR recommendations. This CCIR input document will be discussed by Dennis Bishop later today. We have also submitted LMSS data to the CCIR data base. Bob Crane has developed a new rain rate data base for CCIR.

Last year Virginia Tech completed an uplink power control algorithm. This scheme will be tested using JPL's ACTS mobile terminal. The initial tests will be performed this fall, with more tests to follow in 1994.

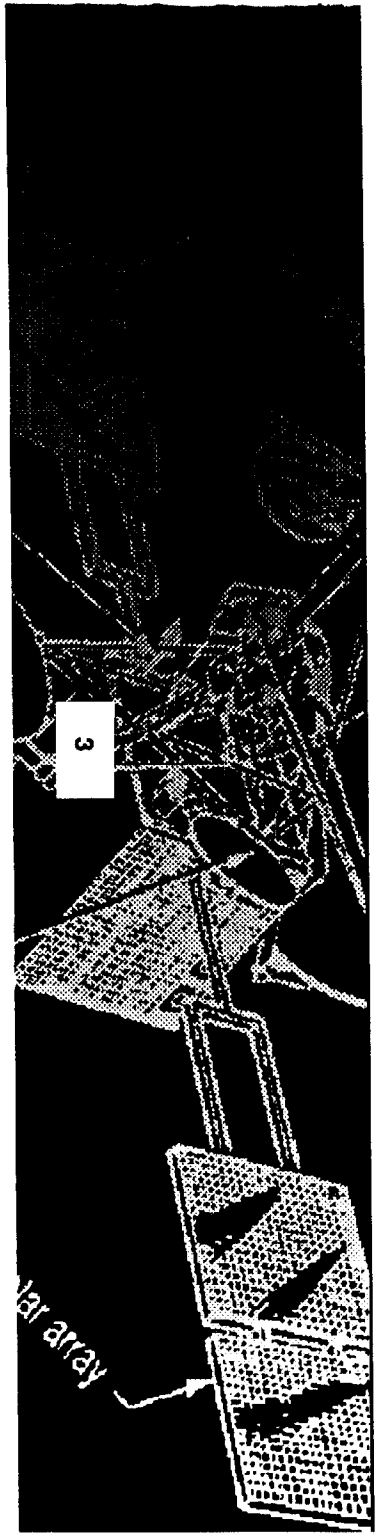
For the last four years the NASA Propagation Program has supported the Wave Propagation Laboratory of NOAA to conduct radiometric measurements of the sky noise temperature at 20, 30, and 90 GHz. Due to budget restrictions, the program was unable to support this activity in the current year. However, NOAA was able to continue the effort using internal resources. We will hear a presentation on this topic today from Mark Jacobson.

Due to Ernie Smith's retirement and budgetary constraints, the NASA Propagation Information Center at the University of Colorado will close later this year. Although it is difficult to match Ernie Smith's and Warren Flock's quality work, we will try to continue this effort at JPL.

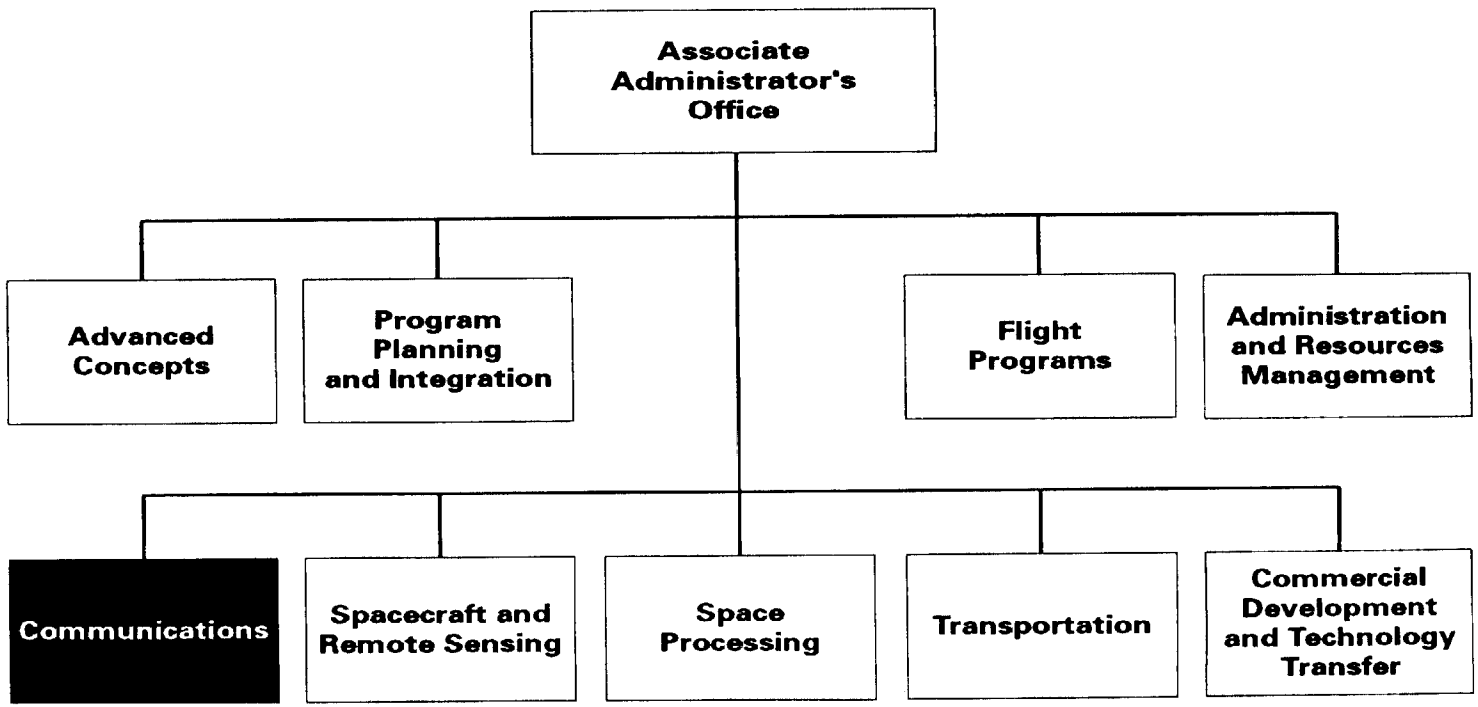
The NASA Propagation Handbooks are in need of revision. We have tried to attend to this need for the last two years; however, because of budget limitations we have not been able to do so. Regretfully, also due to funding limitations, the NASA Handbooks will not be revised next year either.

L-band ionospheric scintillation is of much concern to the FAA and the airlines. We are planning to investigate this problem and offer solutions. This will be a joint effort between our program and the FAA. It is expected that the initial results will be available for presentation at NAPEX XVIII.

We will also hear from two of our international guests, both members of the Olympus Propagation Experimenters (OPEX) group. Professor Jose Neves will discuss the Portuguese Olympus experiment, and Dr. Apolonia Bonati will introduce Itelsat millimeter wave propagation measurements in Italy.

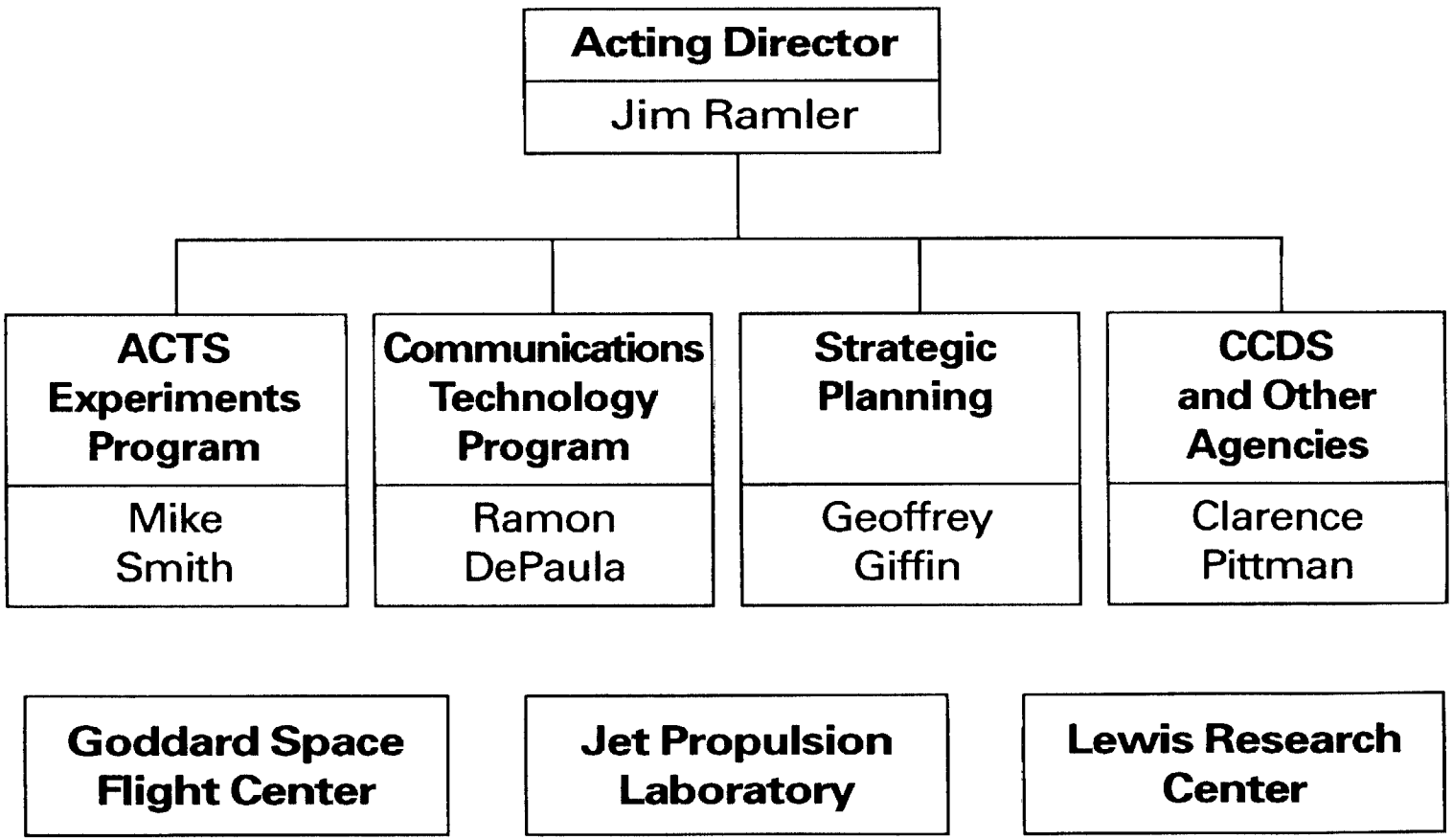


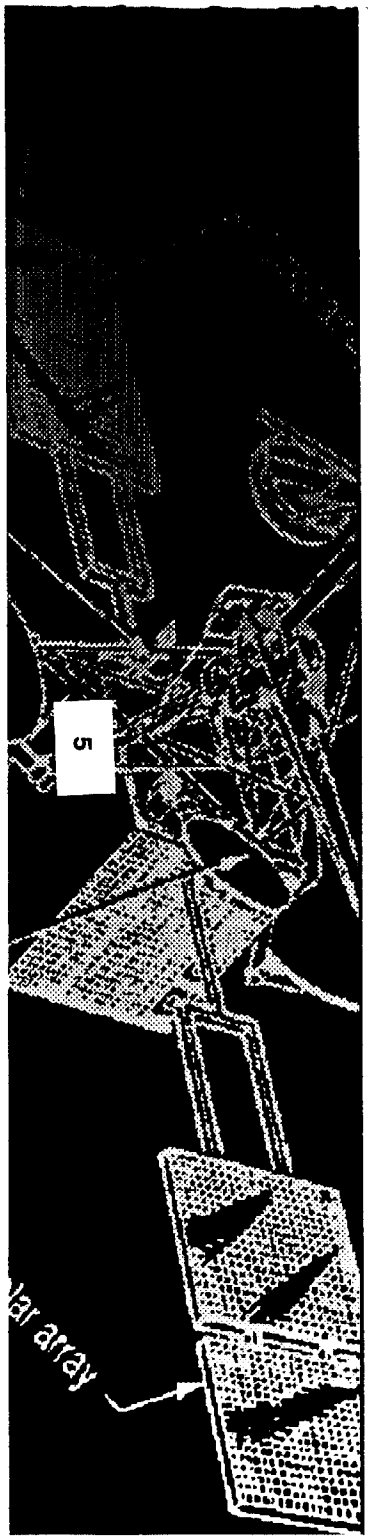
NASA Office of Advanced Concepts and Technology



OPENING REMARKS
John Kiebler, MITRE Corporation

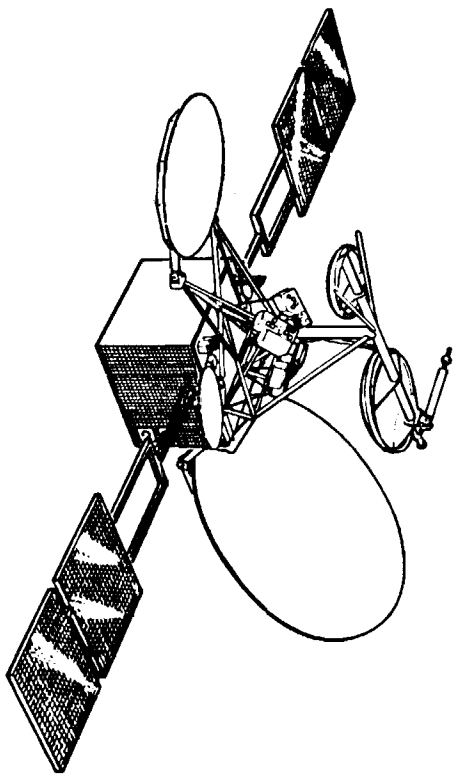
Communications Division



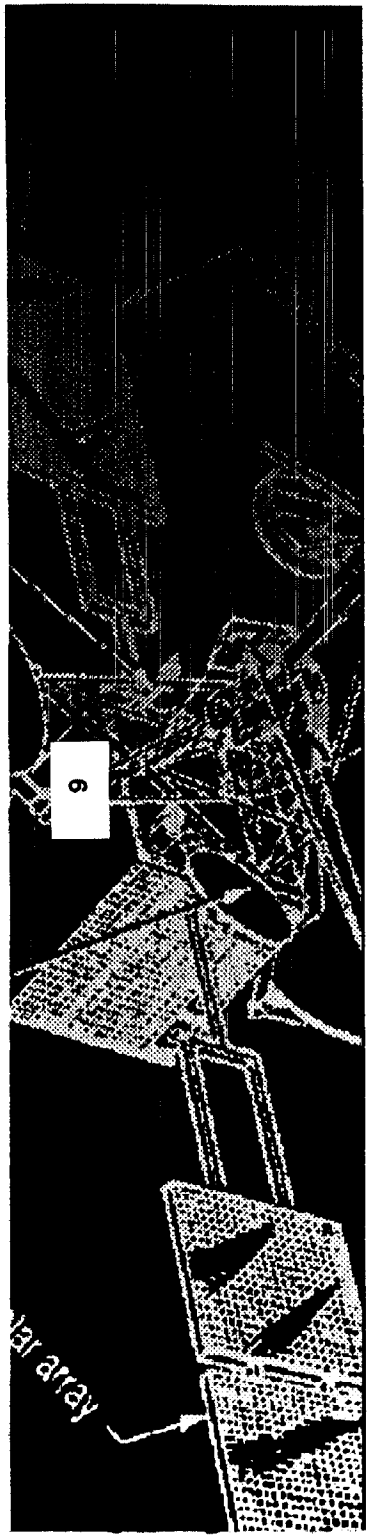


Mission

To pioneer innovative, customer-focused space communications concepts and technologies to enable advanced NASA missions and ensure U.S. competitiveness and preeminence in space communications



- Execute the ACTS Experiments Program as the centerpiece of the Nation's advanced communications development activities
  - Ensure strong participation by U.S. industry
  - Transfer ACTS technologies to U.S. industry
- Expand capability and reduce costs through technology advancements which increase U.S. competitiveness in communications and spacecraft performance in the areas of:
  - Near Earth communications
  - Deep space communications
  - Mobile communications
  - Fixed/broadband communications



Major Elements

- Advanced Communications Technology Satellite (ACTS) Experiments Program
- Communications Technology Program
- Centers for the Commercial Development of Space (CCDS) in satellite communications
- Advanced Studies
- Strategic Planning Activity

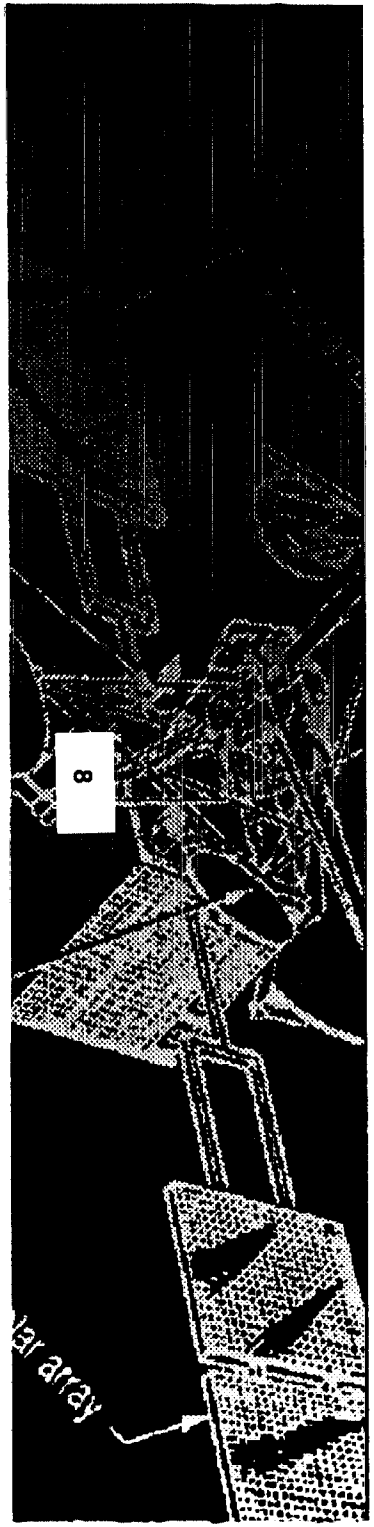
Advanced Studies Program

Objective

Perform system and architecture studies to identify new communications technology needs and service strategies, propagation studies and experiments, and spectrum utilization analyses to determine optimum utilization and application of new frequency bands.

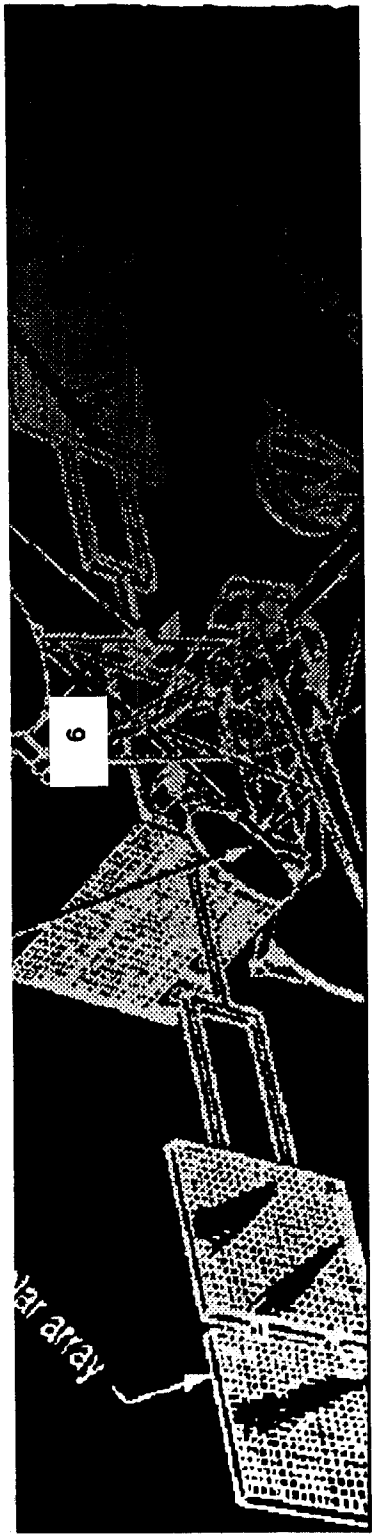
The program consists of the following elements:

- System studies
- Propagation studies
- Spectrum utilization studies



System Studies

- Identify and assess the needed technology developments for rapidly changing satellite communications market
- Provide basic requirements and design data from user/ market, propagation, and regulatory studies. Define innovative concepts for satellites and systems to meet current and future needs of U.S. Industry
- Maintain current knowledge of state-of-the-art in communications technology

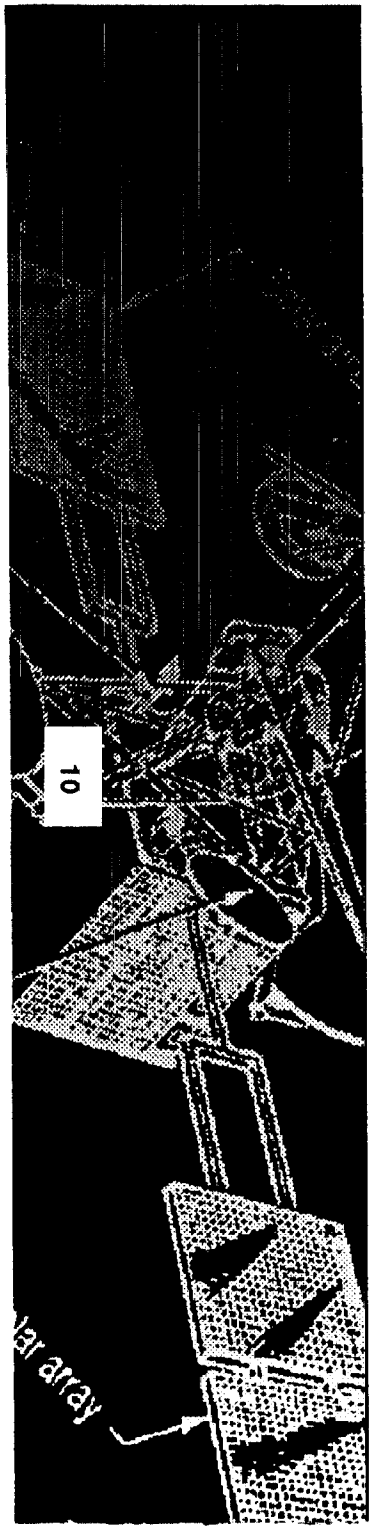


Propagation

- A coordinated NASA/University/Industry program which supports space communications science by conducting key propagation studies and experiments
- Perform analytical studies and conduct experiments to quantify impairments caused by: rain attenuation, depolarization, multi-path, scintillation, clouds, buildings and vegetation
- Develop mitigation techniques

ACTS Propagation Experiments

- *ACTS propagation experiments will be performed utilizing the 20 and 30 GHz beacons to characterize signal impairments and apply suitable compensation techniques*
- *Will conduct a series of workshops to establish requirements and coordinate experiment plans*



Orbit Spectrum Utilization

- Represent the interest of NASA and U.S. Industry in orbit/spectrum utilization for new and existing space services
- Participation in regulatory activities (CCIR meetings, World Administrative Radio Conferences [WARCs], etc.) to obtain necessary frequency allocations for future satellite services/applications
- Provide technical advice to NTIA and FCC
- Investigate new methods and concepts to utilize the existing orbit/spectrum resources more efficiently

Summary

- The immediate future poses exciting, challenging and potentially world changing opportunities in the communications industry
  - Any time/anywhere personal communications
  - High data rate mobile communications
  - Integrated services (voice, FAX, video)
  - Ultra-high data rates for fixed services
- Major challenge to participants to take advantage of the technical opportunities, defense conversion and the new environment of innovative partnerships and alliances
- NASA intends to be a significant player in maintaining the leadership of the U.S. in the space communications business