

**SESSION 4. PROPAGATION CAMPAIGN
WITH ACTS IN INCLINED ORBIT**

**Chair: R. Acosta
(NASA/LeRC)**

BLUE RIBBON PANEL & I/O OPERATIONS

ROBERT BAUER

ACTS PROPAGATION STUDIES WORKSHOP Xi
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ACTS INCLINED ORBIT READINESS REVIEWS

.SYSTEM TECHNICAL READINESS REVIEW

- 6/1 0/98
- IN-HOUSE PANEL FROM LEWIS ENGINEERING DIRECTORATE
- OPERATIONS PLANS AND PROCEDURES

PROGRAM READINESS REVIEW

- 6/1 2/98
 - 6 MEMBER BLUE RIBBON PANEL (BRP) FROM INDUSTRY & GOVT
 - . Dr Leonard Gelding, Hughes Network Systems (Chair)
 - . Dr. Louis Ippolito - Stanford Telecommunications, Inc
 - . Mr. Brian Abbe - Booz, Allen, Hamilton
 - . Ms Charlene Gilbert, NASA JSC
 - . Mr. Frank Dixon, NCS
 - . Dr Al Mac Rae, Mac Rae Technologies
 - . Dr. Stephen Goldstein, NSF
 - . Or Prakash Chitre, Comsat Labs
- PROGRAM PLANS AND DIRECTION



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SOMO DIRECTION (ROADMAP)

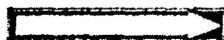


SOMO(JSC) TASKED WITH:

- **LOWERING OF NASA'S OPERATIONS COSTS BY**
 - COMMERCIAL ASSET UTILIZATION
 - Space Network (TDRSS); Ground Network (shuttle launch, polar programs); Deep Space Network; NASA Information System Network (NREN, HPCC...); Mission Control Center (Houston)
 - INTEROPERABILITY AND STANDARDIZATION
 - FLIGHT AND GROUND SEGMENT SYSTEM AUTOMATION
 - PROCESS INNOVATION TOOLS
- **PROVIDE ENABLING DATA AND MISSION SERVICES TO THE NASA ENTERPRISES**
 - HIGH PERFORMANCE COMMUNICATIONS
 - INTELLIGENT SYSTEMS AND AUTONOMY
 - INNOVATIVE MISSION INFORMATION SYSTEMS
- **ADVANCE US INDUSTRY LEADERSHIP IN COMMERCIAL SATELLITE COMMUNICATIONS**
 - HYBRID NETWORK UBIQUITY
 - PRE-COMPETITIVE RESEARCH AND TECHNOLOGY TO OPEN NEW MARKETS
 - SPACE ENVIRONMENT CHARACTERIZATION



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ACTS DIRECTION

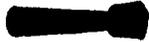


- **PROGRAM AND ACTIVITIES MUST BE RELEVANT TO NASA ENTERPRISES AND SOMO ROADMAP**
- **NEW GOALS DEFINED FOR ACTS IN INCLINED ORBIT. USE ACTS AS A TESTBED TO:**
 1. DEMONSTRATE NASA & OTHER GOVERNMENT USES OF TRANSITIONING TO COMMERCIAL SATELLITE SERVICES.
 2. TEST, VERIFY & RESOLVE TECHNICAL ISSUES USING ASYNCHRONOUS TRANSFER MODE (ATM), INTERNET PROTOCOL (IP), OR OTHER PROTOCOLS OVER SATELLITE, INCLUDING INTEROPERABILITY ISSUES WITH TERRESTRIAL NETWORKS.
 3. EVALUATE SPOT BEAM SATELLITE OPERATIONS IN AN INCLINED ORBIT.
 4. VERIFY NEW SATELLITE KA-BAND TECHNOLOGY AND HARDWARE



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HIGHLIGHTS OF BRP RECOMMENDATION

- .CONTINUATION OF THE 2 YR. INCLINED ORBIT OPERATIONS IS MERITED WITH HIGH PAYOFF POTENTIAL
- .THREE CLASSES OF EXPERIMENTS
 - PROPAGATION
 - TECHNICAL VERIFICATION
 - APPLICATIONS
- . 14 RECOMMENDATIONS
 - 8 CURRENTLY PLANNED
 - 2 NOT CURRENTLY PLANNED. BUT EASILY MET
 - 2 NOT CURRENTLY PLANNED, CHALLENGING TO MEET
 - 2 NOT PLANNED, INFEASIBLE
- .STRONG SUPPORT TO CONTINUE PROPAGATION PROGRAM.



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PLAN

MEET RECOMMENDATION AS BEST AS POSSIBLE



BEING PIANNED:

- SITE DIVERSITY
- WET ANTENNA MEASUREMENTS
- COMPARE RESULTS OF PRE-I/O WITH I/O MEASUREMENTS
- TCP/IP AND ATM OVER SATELLITE
- MULTICASTING OVER SATELLITE
- BANDWIDTH ON DEMAND/QUALITY OF SERVICE
- DEMONSTRATIONS
- CASTING STRATEGIC DIRECTION IN TERMS OF NASA, LeRC GOALS



BEING CONSIDERED:

- WIDEBAND MEASUREMENTS
- NGS0/GSO INTERFERENCE MEASUREMENTS
- (LIMITED) CONTINUATION OF DATA COLLECTION
DEPOLARIZATION EFFECTS



NOT CONSIDERED

- SHUTTLE EXPT.
- MEASUREMENTS DURING SUPER-ORBIT



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CONTINUATION OF DATA COLLECTION

- .TWO SITES ARE BEING CONSIDERED FOR 1 MORE YEAR OF DATA COLLECTION
- . FLORIDA
 - SUBTROPICAL (GLOBAL RAIN CLIMATE ZONE "E")
CLOSEST TO MEETING RECOMMENDATION FOR DATA FROM A TROPICAL SITE
- . OKLAHOMA
 - MID LATITUDE (GLOBAL RAIN CLIMATE ZONE D2/D1)
RECOMMENDED BY PANEL FOR DEPOL MEASUREMENTS
- .UNIVERSITY SITES CONSIDERED FOR EASE IN "EXTENDING" THROUGH A GRANT
- . MOVE SECOND APT TO SITES FOR DEPOLARIZATION
- .MODIFY TERMINALS FOR INCLINED ORBIT OPERATIONS
- .IS THERE INTEREST TO CONTINUE DATA COLLECTION ON A NO-COST BASIS (TO NASA) AT OTHER SITES?



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ISSUES/CONCERNS/QUESTIONS

- . IS THERE VALUE IN COLLECTING PAST 1 MORE YEAR IF 2 FULL YEARS CAN'T BE MET?
- . WHAT IS ADDED PRECISION TO DATA BASE BY CONTINUING*?
- .WHAT IS THE VALUE OF CONTINUING BEACON MEASUREMENTS AS SPACECRAFT SUPER-ORBITS TO THE HORIZON?
- .WHAT DATA IS STILL NEEDED FOR SITE DIVERSITY?
- " QUANTIFY HOW ACTS PROPAGATION DATA LOWERS NASA'S
 - AERATIONS COSTS.
 - IF STATISTICS ARE IMPROVED BY X% WHAT DOES THAT MEAN TO NASA IN \$'S SAVED?
 - CAN DATA BE USED IN DEEP SPACE NETWORK Ka-BAND OPERATIONS TO LOWER COSTS OR IMPROVE OPS?
 - WHAT DOLLAR SAVINGS DOES IMPROVED SYSTEM DESIGN MEAN TO A COMMERCIAL OPERATOR?



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