



# NASA Soyuz Interference

# Overview

- High level
  - System Design
  - Operations
  - Concerns and Assessment
  - Next Steps

# System Design



- In an emergency, NASA needs to transmit space-to-earth on 130.167 MHz (20 kHz bandwidth FM modulation) to the Soyuz capsule at the ISS
  - Only means of communication from Earth-to-Space in escape pod
- Array of Yagi Antennas, ~40 feet above the ground will track from 5 degrees above Horizon to 5 degrees above Horizon
- Worse case will be 8 minutes of transmission per site
  - Horizon to Horizon
  - Up to 8 times per day per site
  - Astronauts can stay in capsule for 5 days
- 3 Ground Stations
  - Wallops in VA
  - White Sands in NM
  - AFRC in Southern CA

# Operations



- NASA needs to do bi-annual testing of there ground stations
  - Coordinated for off peak hours
  - 8 minutes
- Live Scenario
  - 130.167 will be used to communicate to Soyuz from Earth to Space.
  - Only able to maintain contact when over US or Russia
  - Once they enter atmosphere (become “plane”) they will use different frequencies
  - 130.167 is also used on ISS as Space-to-Space communication (Astronaut to ISS or Vice-Versa)

# Concerns

- Concern over Power
  - Main beam 15 KW of effective power
- Affected channels range from 130.125 – 130.225 MHz
  - Still being assessed
  - May affect channels outside of range
    - ACARS at 130.025 MHz
- Coordination process has not been agreed yet
  - FAA investigating options
  - May not enough time for coordination with Airlines
  - Emissions can be started in minutes notice

# ASRI Assessment



- Political Issue
  - Soyuz has been around for 20+ years, NASA has been told NO multiple times by FAA/NTIA
- Testing is feasible, issue is with actual emergency
  - Can be turned on in minutes
- Further testing and studies needs to be done
  - ASRI needs additional data to provide its own analysis

# Current Status and Next Steps



- Theoretical assessment of Impact
  - Effected channels
  - Impact to nearby Ground Stations
- Determine if additional physical testing needs to be done
  - In flight and ground monitoring
- Notification process development
  - How and who in the affected airlines?

# Meeting with NASA



- Meeting with NASA to discuss questions and concerns will be scheduled next week (Oct. 31 – Nov 4)
- Slide deck from previous NASA meeting can be sent upon request

# End of Deck



## Questions?