

NASA Soyuz Interference



1

25-26 Oct 2016

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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

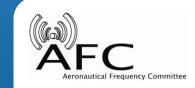
- NASA needs to do bi-annual testing of there ground stations
 - Coordinated for off peak hours
 - 8 minutes
- Live Scenario
 - 130.167 will be used to communicate to Soyuz from Earth to Space.
 - Only able to maintain contact when over US or Russia
 - Once they enter atmosphere (become "plane") they 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





Questions?



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