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# Soyuz-30/31 Mission Planning Network Support Group (NSG)



04/17/12  
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# Agenda



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- **International Space Station (ISS) Expeditions**
    - Overview of current and future launches
  - **Soyuz Missions/ISS Increments**
    - Soyuz 28S through 32S
    - Increments 30 to 34
  - **Expedition/Increment Definition**
  - **Soyuz Mission Support**
  - **Soyuz undocking support**
  - **C-Band Contingency Support**
  - **Summary**





# ISS Expeditions



## ISS Expeditions Nov. 2011 to Oct. 2012



### Soyuz-28/TMA-22-Expedition 29

• Launch 11/14/11



### Soyuz-29/TMA-03M-Expedition 30

• Launch 12/21/11



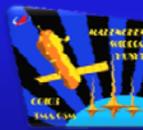
### Soyuz-30/TMA-04M-Expedition 31

• Launch 05/15/12



### Soyuz-31/TMA-05M-Expedition 32

• Launch 07/15/12



### Soyuz 32/TMA-06M-Expedition 33

• Launch 10/15/12





# Soyuz Missions/ISS Increments



- **Soyuz missions since last NSG (10/17-19/11) to next NSG (10/2012)**
  - Soyuz TMA-22/28S - 11/16/11 – 04/30/12
    - Standard undocking support planned – Increment 30 ends with undocking
  - Soyuz TMA-03M/29S - 12/23/11 – 07/01/12
    - Standard undocking support planned – Increment 31 ends with undocking
  - **Soyuz TMA-04M/30S - 05/15/12 – 09/17/12**
    - **Launch support in planning process**
    - **Increment 32 ends with undocking**
  - **Soyuz TMA-05M/31S - 07/15/12 – 11/12/12**
    - **Launch support in planning process**
    - **Increment 33 ends with undocking**
  - Soyuz TMA-06M/32S - 10/15/12 – 03/19/13
    - Future mission
    - Increment 34 ends with undocking

Planning missions





# Expedition/Increment Definition



- **Soyuz Crew**
  - Three crew members; Commander (CDR) and two Flight Engineers (FE)
- **ISS Expedition Crew**
  - A period of time that maintains the same ISS CDR and FE crew
  - Six crew operations for nominal staffing
  - Three crew operations from undocking of a Soyuz to docking of the next Soyuz crew vehicle
- **ISS Crew Increment**
  - A specific time period that combines different operations such as assembly, scientific research, maintenance and other ISS systems utilization
  - Time period from undocking of a Soyuz to undocking of the next Soyuz





# Soyuz Mission Support



- **Pre-mission, Launch and Early Orbit Operations**
  - **Conduct Mission Operation Readiness Reviews (MORR); generate and review mission support documentation**
    - **ISI, Network Advisories, Schedule Requests, TDRSS Network Operations Support Plan (TNOSP), etc**
  - **Verify readiness of Very High Frequency-2 (VHF) Network for Soyuz early orbit support through docking at the ISS**
    - **Two-Line-Elements (TLE) and Line Summary data distributed/Station Readiness Test (SRT) performed**
  - **Coordinate Critical Period tracking for emergency communications (Orbits 6-8)**
    - **Support Johnson Space center (JSC) verification of VHF-2 Station communications interfaces**
  - **Coordinate schedules for tracking of Continental United States (CONUS) view periods (orbit 6 thru docking)**
    - **Support critical ISS docking period**





# Soyuz Undocking Support



- **Soyuz undocking/landing support**
  - **Generate ISS Critical Period Interim Support Instruction (ISI) for undocking time frame**
    - **Based on Critical Support Request from ISS Ground Controller (GC)**
  - **Spaceflight Mission Manager (SMM) staffs Network Integration Center (NIC) console at undocking minus 3 hours**
    - **Conducts briefing with Communication Managers and White Sands Complex (WSC) Operations Supervisor (OS)**
    - **Informs ISS GC of Integrated Network (IN) status**
    - **Monitors Tracking and Data Relay Satellite (TDRS) support during defined critical period**
    - **Coordinates call-up of C-band radar for contingency support**
      - **Undocking normally occurs over the Russian Range with TDRS support to ISS only**
      - **Radar may be needed to provide tracking for extended Soyuz free-flyer orbital operations over US Range**
      - **C-band tracking provides pointing data for NASA VHF stations as backup to Russian vectors**





# C-Band Support



- **C-Band Support**
  - **C-band Radars are no longer scheduled for early orbit (4 through 8) support**
    - **JSC provides pre-launch vector to Flight Dynamics Facility (FDF)**
    - **FDF generates TLE data for VHF station antenna pointing**
      - **Tracking will be for contingency support**
      - **Uplink transmission authorized for emergencies only**
  - **Contingency declared by ISS Flight Director (FD)**
    - **ISS GC advises the network**
  - **Call up procedure for contingency support is included in the TNOSP**





# Summary



- **Soyuz 30 preparations in progress**
  - **Standard support similar to Soyuz 29**
    - **No C-band required except contingency**
  - **Line summary data to be available on Modernized FDF**
    - **Details to be provided in Early Orbit ISI**
  - **Soyuz TLE distributed via E-mail and on Modernized FDF**
  - **Advance planning E-mail to be issued following confirmation of launch time**
    - **Includes support times for orbit 6, 7 and 8**
  - **Standard documentation to be issued starting approximately launch minus 30 days**
- **Soyuz 31 preparations expected to mirror Soyuz 30**

