



SPACE SHUTTLE PROGRAM
Space Shuttle Program Flight Operations and Integration
NASA Johnson Space Center, Houston, Texas



S042013GE

**Update Flight Program Definition
And Planning for YERO**

MO/D. May



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Background

- **02/15/07 PRCB - S063515: “Develop Plan and Cost Estimate for Implementing Solution for YERO (Year End Roll Over)” presented an overall integrated solution for the Program to be able to fly over the year’s end**
 - **PRCB accepted the recommended approach which required a minimal FSW change along with corresponding operational procedures for the real-time execution**
 - **In addition, PRCB acknowledged the operational constraints that would be required for an actual Flight execution of YERO**
 - **Recommendation to document the operational constraints in NSTS 07700, Vol III, Flight Definition and Requirements Directive (FDRD) was accepted and assigned as forward work**



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Discussion

- This proposed update to the FDRD establishes several YERO guidelines necessary for planning a mission that would fly over the year's end
- Both Ground processing and Flight operational constraints have been identified for properly defining the necessary Launch Cutouts
 - Launch Cutouts ensures the execution of the YERO procedures during non-critical timeframes of ground processing or flight operations
- Definition of additional guidelines that may be required due to any flight specific mission operations will be the responsibility of the Flight's IPT
 - Based on the criticality and complexity of the Mission objective
- Implementation of these guidelines will follow the established processes of and protocol between the Flight's IPT and JOP

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DOCUMENT:

UPDATE FLIGHT PROGRAM DEFINITION AND PLANNING FOR YERO

Incorporate the following paragraph in NSTS 07700, Volume III, Section 3.1:

x. To allow for STS Missions to extend over the end of a calendar year, Flight Planning must adhere to several Ground and Flight operational constraints. These operational constraints establish the necessary Launch cutouts required for planning the timely execution of the Year End Roll Over (YERO) procedures during non-critical timeframes of Ground processing for Launch and Mission operations during Flight. Flight planning for these Launch Cutouts shall utilize the following YERO guidelines:

1. YERO will be avoided during the Ground processing timeframe of T-18 hours (L-11 hour hold) to T+24 hours.
2. No YERO will be planned during 24 hour Launch scrubs or 48 hour Launch scrubs with single commodity toff.
3. To protect for ascent phase operations plus the contingency of a First Primary Landing Site (PLS) scenario, Flight Day 1 (Launch day) will be avoided.
4. During Flight Day 2 operations, YERO planning will avoid the periods of Ground targeted burns.
5. During Planned Rendezvous days, Flight Day 3 or Flight Day 4, YERO will be avoided during the rendezvous phase, starting at the first Ground targeted burn and extending through Docking. This operational period will extend to include contingency waveoff periods.
6. YERO will be avoided for Undock and departure operations.
7. For Entry day, YERO planning will avoid the period of Entry preparations and Entry through Landing. This cutout will include all waveoff requirements as well as the period required for reconfiguring the vehicle for a extended orbit day.

Additional guidelines may be required due to specific Mission operations. Definition of these periods will be based on the criticality and complexity of the specific Mission requirements and will be identified by the specific Flight's Integrated Product Team (IPT).



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Evaluations

- Approve: EA, MK-SIO, MV, MX
- Approve w) mod: DM, KSC-PH, USA
 - KSC-PH & USA – correct L- and T- references in constraint x.1 as follows:
‘YERO will be avoided during the Ground processing timeframe of T-11 hour hold (L-18 hours) to T+24 hours.’
 - USA – insert ‘PRSD’ in constraint x.2 as follows:
‘No Yero will be planned during 24 hour Launch scrubs or 48 hour Launch scrubs with PRSD single commodity toff.’
 - DM & USA – insert ‘YERO on’ in constraint x.3 as follows:
‘To protect for ascent phase operations plus the contingency of a First Primary Landing Site (PLS) scenario, YERO on Flight Day 1 (Launch day) will be avoided.’



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Evaluations (cont')

- No Impact: None
- Disapprove: None

Recommendation

- Concur with Evaluation comments
- Approve with recommended modifications and request OSB processing