

International Space Station De-crewing and Re-crewing Plan

International Space Station Program

Baseline

July 2005



РОСКОСМОС



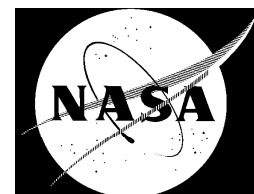
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REVISION AND HISTORY PAGE

REV.	DESCRIPTION	PUB. DATE
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INTERNATIONAL SPACE STATION PROGRAM

**INTERNATIONAL SPACE STATION
DE-CREWING AND RE-CREWING PLAN**

CHANGE SHEET

Month XX, XXXX

Baseline

Space Station Control Board Directive XXXXXX/(X-X), dated XX-XX-XX. (X)

CHANGE INSTRUCTIONS

SSP 50715, International Space Station De-crewing and Re-crewing Plan, has been baselined by the authority of SSCD XXXXXX. All future updates to this document will be identified on this change sheet.

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INTERNATIONAL SPACE STATION
DE-CREWING AND RE-CREWING PLAN

Baseline (Reference SSCD XXXXXX, dated XX-XX-XX)

LIST OF EFFECTIVE PAGES

Month XX, XXXX

The current status of all pages in this document is as shown below:

<u>Page</u>	<u>Change No.</u>	<u>SSCD No.</u>	<u>Date</u>
i - x	Baseline	XXXXXX	Month XX, XXXX
1-1 - 1-3	Baseline	XXXXXX	Month XX, XXXX
2-1 - 2-2	Baseline	XXXXXX	Month XX, XXXX
3-1 - 3-5	Baseline	XXXXXX	Month XX, XXXX
4-1	Baseline	XXXXXX	Month XX, XXXX
5-1 - 5-2	Baseline	XXXXXX	Month XX, XXXX
A-1 - A-5	Baseline	XXXXXX	Month XX, XXXX
B-1 - B-2	Baseline	XXXXXX	Month XX, XXXX
C-1 - C-2	Baseline	XXXXXX	Month XX, XXXX
D-1 - D-2	Baseline	XXXXXX	Month XX, XXXX
E-1 - E-8	Baseline	XXXXXX	Month XX, XXXX

INTERNATIONAL SPACE STATION PROGRAM

**INTERNATIONAL SPACE STATION
DE-CREWING AND RE-CREWING PLAN**

JULY 2005

PREFACE**INTERNATIONAL SPACE STATION
DE-CREWING AND RE-CREWING PLAN**

The purpose of this document is to define the program process requirements, milestones and general station configuration requirements should it become necessary to de-crew the International Space Station (ISS) and later re-crew and return to normal operations.

The contents of this document are intended to be consistent with the tasks and products to be prepared by the ISS Program participants as defined in SSP 50200-01, Station Program Implementation Plan, Volume 1: Station Program Management Plan, and SSP 50200-02, Station Program Implementation Plan, Volume 2: Program and Manifesting. This document is under the control of the Space Station Control Board (SSCB).

SSCB APPROVAL NOTICE

INTERNATIONAL SPACE STATION PROGRAM

**INTERNATIONAL SPACE STATION
DE-CREWING AND RE-CREWING PLAN**

JULY 2005

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INTERNATIONAL SPACE STATION
DE-CREWING AND RE-CREWING PLAN

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DE-CREWING AND RE-CREWING PLAN**

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**INTERNATIONAL SPACE STATION
DE-CREWING AND RE-CREWING PLAN**

LIST OF CHANGES

JULY 2005

All changes to paragraphs, tables, and figures in this document are shown below:

SSCB	Entry Date	Change	Paragraph(s)
	March 2006	Baseline	All

TABLE OF CONTENTS

PARAGRAPH		PAGE
1.0	INTRODUCTION	1-1
1.1	PURPOSE	1-2
1.2	SCOPE.....	1-2
1.3	PRECEDENCE.....	1-3
1.4	DELEGATION OF AUTHORITY	1-3
1.5	ISSUES AND OPEN WORK	1-3
2.0	DOCUMENTS.....	2-1
2.1	APPLICABLE DOCUMENTS	2-1
2.2	REFERENCE DOCUMENTS.....	2-2
3.0	DE-CREWING DECISION PROCESS	3-1
3.1	UNPLANNED DE-CREWING DECISION PROCESS	3-1
3.2	PLANNED DE-CREWING DECISION PROCESS.....	3-2
3.2.1	CONSUMABLES CRITERIA.....	3-4
3.2.2	MEDICAL CRITERIA.....	3-4
3.2.3	SYSTEMS CRITERIA.....	3-4
4.0	SYSTEM CONFIGURATION AND ACTIVITIES FOR DE-CREWING	4-1
4.1	INTERNATIONAL SPACE STATION SYSTEMS CONFIGURATION.....	4-1
5.0	RE-CREWING PROCESS	5-1
5.1	DECISION PROCESS.....	5-1
 APPENDIX		
A	ACRONYMS AND ABBREVIATIONS	A-1
B	GLOSSARY OF TERMS	B-1
C	OPEN WORK.....	C-1
D	45 DAY CONSUMABLE ESTIMATES.....	D-1
E	DETAILED SYSTEM CONFIGURATIONS.....	E-1
 TABLE		
C-1	TO BE DETERMINED ITEMS.....	C-2
C-2	TO BE RESOLVED ISSUES.....	C-2
D-1	45 DAY CONSUMABLE PLANNING ESTIMATES.....	D-2
E-1	UNITED STATES ON-ORBIT SEGMENT PLANNED UNMANNED CONFIGURATION	E-2
E-2	EXPECTED RUSSIAN ORBITAL SEGMENT PLANNED UNMANNED CONFIGURATION.....	E-7

FIGURE

3-1	UNPLANNED DE-CREWING DECISION FLOW	3-1
3-2	GENERIC PROCESS FOR A PLANNED DE-CREWING	3-3
5-1	INTERNATIONAL SPACE STATION RE-CREWING DECISION PROCESS	5-1

1.0 INTRODUCTION

De-crewing of the International Space Station (ISS) could occur as a result of several scenarios including; major system failure (unrecoverable or resulting in emergency condition), medical emergency or related problem, or insufficient consumables. Each of these scenarios initiates a decision making process where the de-crewing event will be classified as “planned” or “unplanned” for discussion purposes in this document. The approach to de-crewing is directly related to the scenario classification and additional definitions provided herein.

Unplanned de-crewing takes on 2 sub-classifications defined here as emergency and contingency:

- A. An emergency de-crewing is defined as a scenario requiring immediate departure of the ISS crew.

The preparation time could be as little as a few (30) minutes with little ability to configure the station systems or optimize undocking opportunities. Responses to these cases are defined by the procedures in SSP 50505-2 Basic Provisions on Crew Actions in Case of Fire on the ISS, SSP 50506-2 Basic Guidelines for Crew Activities During ISS Depressurization, All Increments/Flights and SSP 50653 Basic Provisions on Crew Actions in the Event of a Toxic Release on the ISS, All Increments/Flights, which focus on fire, cabin pressure loss, and toxic release events.

- B. A contingency de-crewing is defined as a scenario allowing up to 72 hours before a crew’s departure.

This scenario allows enough time to execute some or all of the system configurations outlined in this document but no time is available for special payload configuration needs or other system configuration “optimization” activity.

Planned de-crewing will be defined as a scenario offering greater than 72 hours before the crew needs to depart the ISS. This potentially allows for other tasks to be accomplished beyond the system configurations outlined in this document. As a result the crew can configure the station systems for optimal operation during the de-crewed phase and coordinate optimal undocking opportunities. This period includes time for crew sleep and rest.

Section 3 defines the de-crewing decision process and requirements. The decision making authorities are specifically defined since timely decisions during this process may be critical.

Section 4 outlines the baseline system configuration desired for de-crewing which also supports the ability to successfully facilitate in re-crewing. Additional steps may also be required to regain fault tolerance for ISS habitation. Deviations from the baseline may be necessary due to the ISS configuration at the time and will be appropriately analyzed for necessary changes and any required actions to be taken.

The ISS Program's top priority is to maintain ISS and crew safety and survival (reference SSP 50261-01, Generic Groundrules, Requirements, and Constraints Part 1: Strategic and Tactical Planning, Section 4.2.1A). As part of the nominal process to plan a safe and sustainable ISS configuration without a crew, the ISS and system configurations will be assessed. As time permits, depending on the scenario, a partial to full system configuration will be achieved. The risk and safety posture will be evaluated and appropriate actions taken by the ISS Program to maintain safety of the ISS and the returning crew.

Section 5 outlines the decision making process for re-crewing the ISS. This area is defined in general terms since the reasons for departure directly affect the decisions for return. The process does address the major elements of assuring crew safety upon return to the ISS and ability to restore system integrity. Ultimately the plans for return to ISS should mitigate the risk of de-crewing again but the processes must also recognize the potential risks associated with crew return to orbit.

1.1 PURPOSE

This document describes the processes, decision criteria, responsible organizations/boards, and timelines associated with both de-crewing and re-crewing the ISS. Preferred ISS system configurations for a de-crewing event are outlined as well.

1.2 SCOPE

This document addresses the anticipated program-level aspects of the de-crewing and re-crewing processes including the criteria and processes for decision making. The information contained herein is written at a level to allow operational team products (flight rules, procedures, etc.) to be adapted to the ISS configuration as it changes over time.

The ISS Program organization reviews potential Off Nominal Situations (ONS) to ensure that timely decisions and plans are made to preserve the ISS mission plan and mitigate any potential safety risk or impact. Programmatic planning ONS are covered in SSP 50562, ISS Program Off-Nominal Situation Plan. The increment planning ONS are in SSP 54004, Increment Definition and Requirements Document for Increment X Standard Blank Book, Appendix J (Increment Specific).

Real-time decision making authorities during standalone ISS operations, and while a visiting crew is present, are defined in NSTS 12820 Volume B, ISS Generic Operational Flight Rules, NSTS 12820 Volume C, Joint Shuttle-ISS Operational Flight Rules and NSTS 12820 Volume D, Soyuz/Progress ISS Joint Flight Rules. Several of these flight rules are reflected in this document in order to provide a complete understanding for how a decision to de-crew the ISS may be made. However, that document should be referenced for detailed information on real-time operations decision making authority.

Initial procedures and processes to support re-crewing planning/logistics following undocking are defined in JSC 29229, Flight Control Operations Handbook (FCOH)

Station Operations, DM-CH-06, Landing Support Officer Console Handbook, and are not restated here.

Additional actions will be invoked per SSP 50650, Program Management Operations Integration Procedures.

1.3 PRECEDENCE

In case of conflicts between this document and SSP 50200-02, Station Program Implementation Plan, Volume 2: Program Planning and Manifesting, (SPIP Vol 2), SSP 50200-02 will take precedence.

1.4 DELEGATION OF AUTHORITY

This document is approved by, and is subject to, the Space Station Control Board (SSCB) process. The ISS Program Mission Integration and Operations Office provides the book coordination for this document.

1.5 ISSUES AND OPEN WORK

Because of the complex and dynamic nature of ISS development and implementation, there can be unresolved issues concerning new or existing principles. These unresolved issues are identified by a **<TBR X-X>** in the text. Appendix C, Open Work, captures the To Be Resolved (TBR) issues associated with this operations concept. Principles associated with a TBR issue are not considered baselined until the issue is resolved and the operations concept text is updated.

Not all principles have been identified. As this document evolves, the principles will become better defined and will be incorporated into the operations concept. Open work is identified by a **<TBD X-X>** in the text. Appendix C, Open Work, captures the To Be Determined (TBD) items associated with the operations concept. Once the TBD information is defined, the correct text is inserted in place of the TBD in the document.

2.0 DOCUMENTS**2.1 APPLICABLE DOCUMENTS**

The following documents include specifications, models, standards, guidelines, handbooks, and other special publications. The documents listed in this paragraph are applicable to the extent specified herein. Inclusion of applicable documents herein does not in any way supersede the order of precedence identified in Paragraph 1.3 of this document.

DOCUMENT NO.	TITLE	TYPE
SSP 50011	Concept of Operation and Utilization	Multilateral
SSP 50200-01	Station Program Implementation Plan, Volume 1: Station Program Management Plan	Multilateral
SSP 50200-02	Station Program Implementation Plan, Volume 2: Program Planning and Manifesting	Multilateral
SSP 50261-01	Generic Groundrules, Requirements, and Constraints Part 1: Strategic and Tactical Planning	Multilateral
SSP 50489	ISS Mission Integration Template	Multilateral
SSP 50505-2	Basic Provisions on Crew Actions in Case of Fire on the ISS	Bilateral
SSP 50506-2	Basic Guidelines for Crew Activities During ISS Depressurization, Flights 5A.1 up to 10A	Bilateral
SSP 50562	ISS Program Off-Nominal Situation Plan	Multilateral
SSP 50650	Program Management Operations Integration Procedures	Multilateral
SSP 50653	Basic Provisions on Crew Actions in the Event of a Toxic Release on the ISS, Flights 5A.1 up to 10A	Bilateral
SSP 54004	Increment Definition and Requirements Document for Increment X Standard Blank Book	Multilateral

NSTS 12820 Volume B	ISS Generic Operational Flight Rules	Multilateral
NSTS 12820 Volume C	Joint Shuttle-ISS Operational Flight Rules	Multilateral
NSTS 12820 Volume D	Soyuz/Progress ISS Joint Flight Rules	Bilateral
MGT-OC-013	Replan Working Group Work Instruction	NASA Internal

2.2 REFERENCE DOCUMENTS

The following documents contain supplemental information to guide the user in the application of this document. These reference documents may or may not be specifically cited within the text of this document.

DOCUMENT NO.	TITLE	TYPE
SSP 50260	International Space Station Medical Operations Requirements Documents (ISS MORD)	Multilateral
SSP 50261-02	ISS Generic Groundrules and Constraints Part 2: Execute Planning	Multilateral
SSP 50643	Operations Interface Procedures Generic	Multilateral
JSC 29229	Flight Control Operations Handbook (FCOH) Station Operations	NASA Internal
ISS-MER-035	ISS MER Notification and Call In Requirements	NASA Internal
MGT-OA-019	On-Orbit Anomaly Resolution	NASA Internal
MGT-OC-014	Event Sequence Working Group Work Instruction	NASA Internal
DM-CH-06	Landing Support Officer Console Handbook	NASA Internal
MGT-OC-012	International Space Station Management Center Contingency Response Procedure Work Instruction	NASA Internal

3.0 DE-CREWING DECISION PROCESS

3.1 UNPLANNED DE-CREWING DECISION PROCESS

The decision process for unplanned de-crewing is initiated when an event occurs that warrants crew departure in less than 72 hours. An emergency unplanned departure is declared when the crew has to use the on-board emergency procedure book to respond to depress, fire, or toxic release conditions. A contingency unplanned departure is declared when a situation such as system failures or medical conditions dictate crew return within 72 hours or less but not immediately. Figure 3-1, Unplanned De-crewing Decision Flow, depicts the decision process for an unplanned de-crewing.

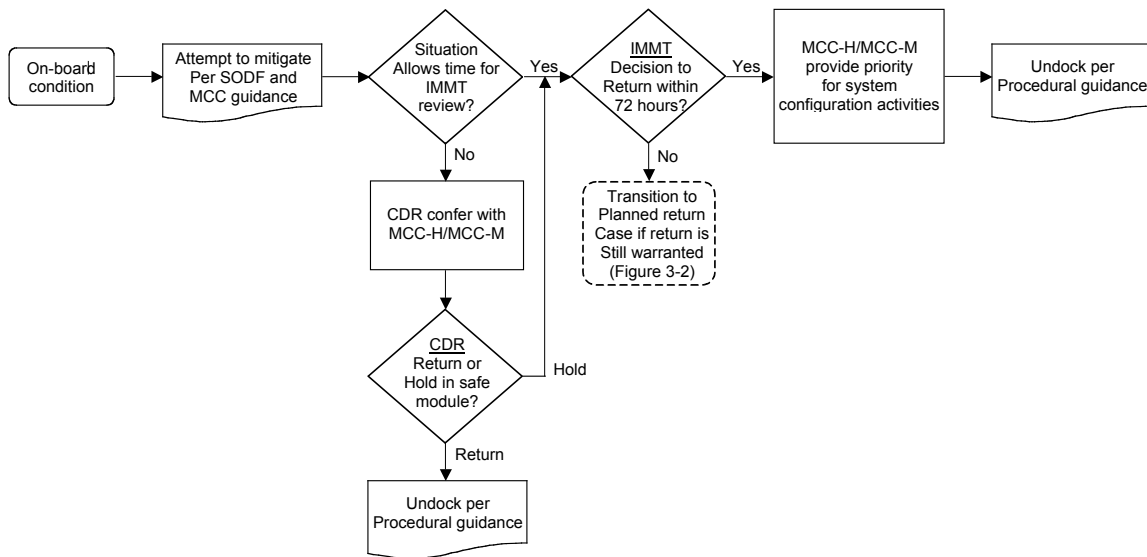


FIGURE 3-1 UNPLANNED DE-CREWING DECISION FLOW

Emergency Situations:

ISS emergency situations may result in an urgent need to de-crew the ISS. These situations are addressed in:

SSP 50506-2 Basic Guidelines for Crew Activities During ISS Depressurization for Flight 5A.1 up to 10A;

SSP 50505-2 Basic Provisions on Crew Actions in Case of Fire on the International Space Station;

SSP 50653 Basic Provisions on Crew Actions in the Event of a Toxic Release on the International Space Station for Flights 5A.1 up to 10A;

and entail:

- A. Loss of ISS crew cabin pressurization

