

# ISS Payload Integration Template

## International Space Station Program

**Revision B**

**TYPE 1 – APPROVED BY NASA**

**October 2003**

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## REVISION AND HISTORY PAGE

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ERU: /s/ M. Hehn 10-09-03

**INTERNATIONAL SPACE STATION PROGRAM**

**ISS PAYLOAD INTEGRATION TEMPLATE**

**OCTOBER 2003**

**PREFACE****ISS PAYLOAD INTEGRATION TEMPLATE**

Since Revision A of the Payload Integration Template was published, the International Space Station (ISS) Payload Office has implemented improvements based upon the Lean Six Sigma (L6S) approach. These improvements include changes to the payload integration documentation and processes. The process improvement initiatives have been focused on a goal of reducing the overall payload integration template. The most significant integration template change is the completion of the payload strategic planning process and initiation of the tactical integration process at Increment minus (I-) 16 months. Revision B of the ISS Payload Integration Template incorporates these changes, as well as numerous formatting changes to enhance the usability of the various schedule templates.

Revision B contains the L6S developed Level I (top-level) Space Station Payload Integration Flow. This process flow provides an overview of the entire payload integration process as defined in the L6S analysis and is the basis of the integration template.

The integration template is defined and organized in terms of the functional areas identified in the Level I flow: Payload Developer (PD), Research and Payload Mission Integration, Payload Engineering Integration (PEI), Payload Software Integration, Payload Operations Integration Function (POIF), and Kennedy Space Center (KSC) Integration. The payload milestone chronologies contained in Section 5, the generic schedule templates contained in Appendix A, and the Level II process flows contained in Appendix B, are each organized in accordance with these functional areas. The Level II process flows illustrate the relationship of integration activities between functional areas and the dependencies that drive the payload integration template.

APPROVED BY:

/S/ James Scheib for Dan Hartman

10/1/03

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Date



**INTERNATIONAL SPACE STATION PROGRAM****ISS PAYLOAD INTEGRATION TEMPLATE****LIST OF CHANGES****OCTOBER 2003**

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

<b>SSCD</b>	<b>Entry Date</b>	<b>Change</b>	<b>Paragraph(s)</b>
SSCD 002654	September 2000	Baseline	All
SSCD 006037	October 2002	Revision A	All
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## 1.0 INTRODUCTION

### 1.1 PURPOSE

The purpose of SSP 57057, ISS Payload Integration Template, is to establish and define the generic integration schedule templates that are used to produce payload-unique integration schedules and payload flight complement integration schedules.

This document provides the single authoritative source for all International Space Station (ISS) payload integration milestone template dates. This document also contains the Level I and Level II process flows for ISS payload integration that are associated with the generic schedule templates. This document serves as a reference source for ISS Payload Program implementing organizations for their respective integration product development schedules and corresponding processes. This document also provides the Payload Developer (PD) community a reference source for all integration submittals required by the ISS Payload Program.

Schedule templates in this document reflect integration data submittals from the PDs, ISS Payload Program product deliveries, and major milestones such as Program-level reviews. Schedule templates are used to ensure that the payload integration process can be completed successfully and in a timely manner. The Generic Payload Integration Manager (PIM) Schedule Templates are established by payload class (Pressurized, Small, Subrack Standard, and Attached) and reflect detailed activities that are relevant to managing the successful mission integration of a given payload. The Generic Payload Mission Integration Team (PMIT) Schedule Template reflects a high level rollup of milestones that are relevant to managing the overall integration of the payload flight complement.

### 1.2 SCOPE

The templates and descriptive material contained in this document cover all ISS payload integration activities performed by the NASA ISS Payload Office for NASA sponsored or bartered payloads that are launched on the Space Shuttle vehicle. Templates are applicable regardless of whether the payload will operate in the US Lab or in an International Partner (IP) provided research module.

The integration process, template, and products required for integration into Russian, European Space Agency (ESA) or Japanese (NASDA) launch vehicles is not covered within this current version of SSP 57057. This current version is limited to payload integration when launched aboard the Space Shuttle vehicle. However, SSP 57057 will be revised in the future to cover unique integration templates and products associated with IP launch vehicles.

The vast majority of payload specific submittals to the ISS Payload Program are provided by the PD organizations, but there can be some exceptions. With regards to payload submittals identified in this document, the PD and their respective Research Program Office (RPO) or Research Integration Office (RIO) are considered to be

synonymous. In other words, this document does not attempt to distinguish between submittals provided by the PD versus those provided by the RPO/RIO. However, the PD's submittals to the ISS Program defined in this document can not change the payload specific allocations as negotiated by the RPO/RIO and defined by the Research Planning Working Group (RPWG) for a given ISS Increment or Stage.

### **1.3 PRECEDENCE**

Actual payload-specific or flight-specific implementation schedules may deviate from the templates in this document. However, if there are discrepancies between other documentation and SSP 57057 with regard to the schedule milestone template dates, the following order of precedence shall be used:

- A. For ISS Program milestones, SSP 50489, ISS Mission Integration Template, shall take precedence.
- B. For Space Shuttle Program milestones, JSC 25187, Appendix A, Flight Production Generic Templates - Shuttle Templates, shall take precedence.
- C. SSP 57057, ISS Payload Integration Template

### **1.4 DELEGATION OF AUTHORITY**

This document is approved and controlled by the ISS Payload Control Board (PCB).

## 2.0 DOCUMENTS

### 2.1 APPLICABLE DOCUMENTS

The documents listed in this section 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.

SSP 50108	Certification of Flight Readiness Process Document
SSP 50489	ISS Mission Integration Template
SSP-52000-IDD-ERP	Expedite the Processing of Experiments to Space Station (EXPRESS) Rack Payloads Interface Definition Document
SSP 52000-PDS	Payload Data Sets Blank Book
SSP 52054	ISS Program Payloads Certification of Flight Readiness Implementation Plan, Generic
SSP 5410X-ANX 1	Increment Definition and Requirements Document for Planning Period X, Annex 1: Station Manifest (Series of Flight-Specific Station Manifests)
SSP 57001	Pressurized Payloads Hardware Interface Control Document Template
SSP 57002	Payload Software Interface Control Document Template
SSP 57004	Attached Payload Hardware Interface Control Document Template
JSC 25187 Appendix A	Flight Production Generic Templates Shuttle Templates

### 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.

SSP 50200-01	Station Program Implementation Plan, Volume 1: Station Program Management Plan
SSP 50200-02	Station Program Management Plan, Volume 2: Program Planning and Manifesting

SSP 50253	Operations Data File Standards
SSP 50254	Operations Nomenclature
SSP 50313	Display and Graphics Commonality Standard
SSP 50431	Space Station Program Requirements for Payloads
SSP 52000-PIH-WRP Volume VI-A	Window Observational Research Facility (WORF) Rack Payload Configuration Data Set Definition, PIH Volume VI-A
SSP 54504	Increment Definition and Requirements Document, Annex 5: Payload Tactical Plan Blank Book
SSP 57000	Pressurized Payloads Interface Requirements Documents
SSP 57003	Attached Payload Interface Requirements Documents
SSP 57059	Standard Payload Integration Agreement for Pressurized Payloads
SSP 57061	Standard Payload Integration Agreement for Attached Payloads
SSP 57063	Standard Payload Integration Agreement for Small Payloads
SSP 57064	Payload Integration Agreement Blank Book for Small Pressurized Payloads
SSP 57066	Standard Payload Integration Agreement for EXPRESS/WORF Rack Payloads
SSP 58311	Payload Operations Integration Center Payload Operations Handbook Volume 1: Pre-/Post- Increment Operations
SSP 58700	U.S. Payload Operations Data File Management Plan
NSTS 13830	Implementation Procedure for NSTS Payloads System Safety Requirements for Payloads Using the Space Transportation System
D683-35491-1	EXPRESS Configuration Data Sets Blank Book

### 3.0 ISS PROGRAM LEVEL I PAYLOAD INTEGRATION PROCESS FLOW

Figure 3.0-1 provides an overall top-level illustration of the integrated flow for the ISS payload integration process. The milestone chronology tables and integration templates provided in this document are organized in terms of the functional areas identified in the Level I flow: Payload Developer, Research and Payload Mission Integration, Payload Engineering Integration, Payload Software Integration, Kennedy Space Center (KSC) Integration, and Payload Operations Integration Function (POIF). The Level I process flow implies a schedule, but does not contain specific Increment minus (I-) or Launch minus (L-) dates. The Level II process flows contained in Appendix B provide further detail on the processes established to produce the products or conduct integration activities that are depicted at a top level in this Level I process flow.

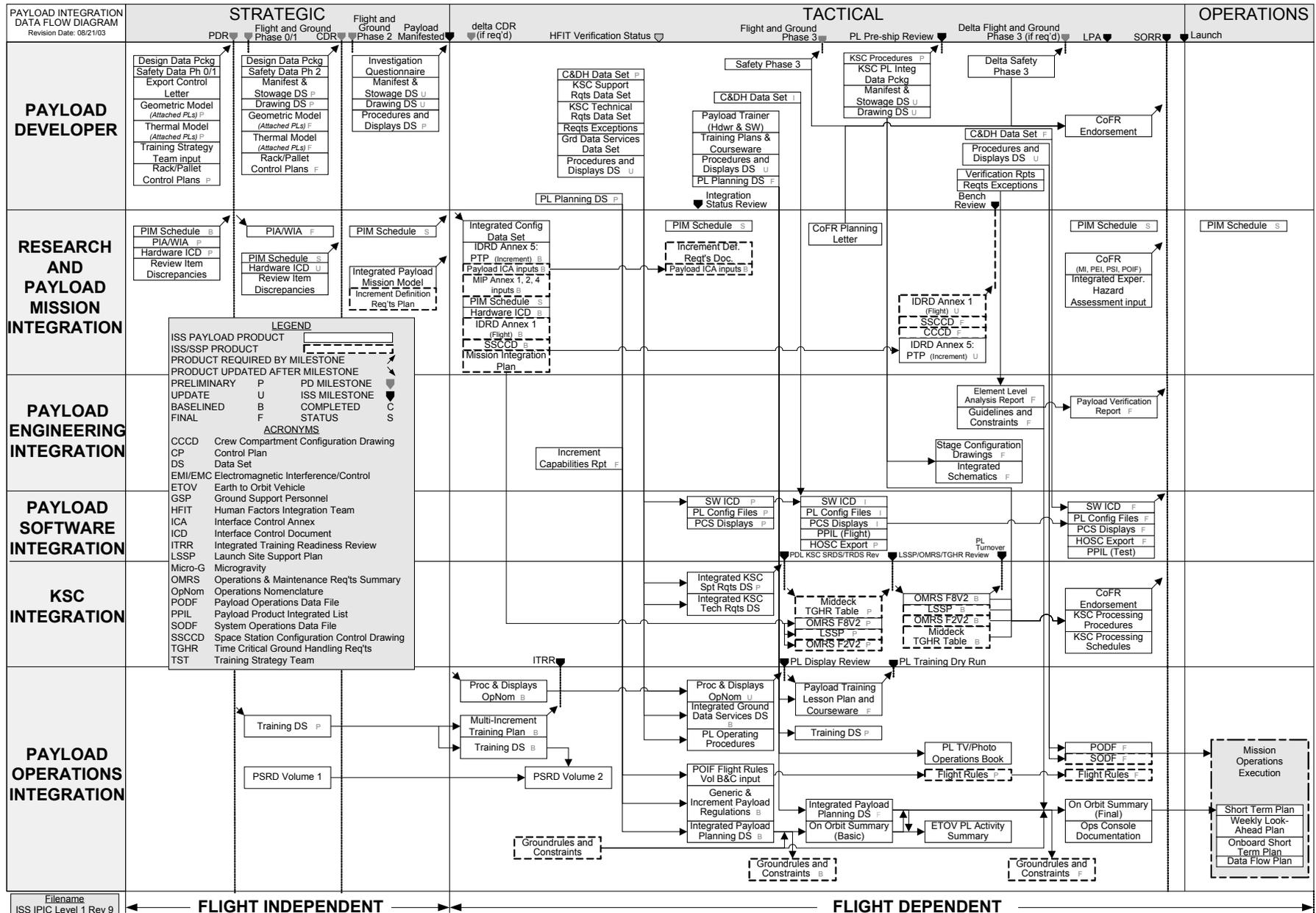


FIGURE 3.0-1 ISS PROGRAM LEVEL I PAYLOAD INTEGRATION PROCESS FLOW

#### 4.0 ISS PAYLOAD MILESTONE DEFINITIONS

For the purposes of this document, the term “milestone” is used to define the completion of a product, activity or process. A milestone may identify the submittal of a data item, the delivery or shipment of a hardware item, the development of an integration or operations product, or the completion of a Program or payload review. Table 4.0-1 defines each of the milestones used in the ISS Payload Integration Templates. The milestones acronyms are listed in alphabetical order to facilitate look-up. Table 4.0-1 includes the following column headers:

**Line Number:** The line number is assigned to each milestone acronym and is used to identify the milestone during documentation reviews, specific schedule development and internal coordination.

**Milestone Acronym:** The milestone acronym is the short-hand identifier used in the generic payload integration templates and on the flight and payload specific schedules.

**Milestone Definition:** The milestone definition provides a brief description of the milestone acronym including reference to applicable documentation that provides a more detailed description.

**TABLE 4.0-1 ISS PAYLOAD MILESTONE DEFINITIONS (PAGE 1 OF 14)**

LINE #	MILESTONE ACRONYM	MILESTONE DEFINITION
1	Acoustic Data (Middeck)	Results from Acoustic Testing
2	BR KSC	<p>Bench Review Kennedy Space Center</p> <p>MPLM: The initial MPLM bench review at KSC is nominally at L-3.5 months. Members of the Astronaut Office (crew members or designee) review cargo/stowage in its flight configuration during BRs. Bench reviews are scheduled at KSC according to various MPLM integration milestones. Hardware providers coordinate their shipments to KSC to meet processing schedules for turnover for the appropriate bench reviews based on rack integration, stowage location, and/or time.</p> <p>MPLM (Pad Stow H/W): Any hardware that requires MPLM Pad stow is required to conduct a crew review in place of the Bench Review.</p>
3	BR JSC	<p>Bench Review Johnson Space Center</p> <p>Middeck: Middeck bench review (MBR) is nominally at L-1 month. Payloads that are passive stowage and do not require any integrated activities or testing are O/D 2 weeks prior to that date (-6 weeks prior to launch). Launch Package Managers may require earlier O/D dates if other mission or bench review conflicts occur.</p> <p>MPLM: The initial MPLM bench review at JSC is nominally at L-3.75 months. Payloads that are passive stowage and do not require any integrated activities, testing or limited life are O/D 2 weeks prior to that date. Launch Package Managers may require earlier O/D dates if other mission or bench review conflicts occur.</p>
4	BR SpaceHab	<p>Bench Review SpaceHab</p> <p>SpaceHab: SpaceHab bench review of hardware prepacked at Flight Crew Equipment is nominally at L-3.5 months. SpaceHab bench review/CEIT is typically done between L-2 and L-1.5 months.</p>
5	C&DH DS	<p>Command and Data Handling Data Set</p> <p>C&amp;DH DS is a segregation of PDL data that defines the flight unique software interface requirements between Integrated Payload Systems and ISS flight data handling elements. See SSP 57002, Payload Software Interface Control Document Template.</p>
6	CCCD	<p>Crew Compartment Configuration Drawings</p> <p>SSP product to identify the MDK layout of all the hardware to review and support the CCCR.</p>
7	CCCR	<p>Crew Compartment Configuration Review</p> <p>SSP review of the crew compartment configuration at the Integrated Product Team meeting and the manifest freeze point for the MDK hardware.</p>
8	CCCR Freeze	<p>Crew Compartment Configuration Review Freeze</p> <p>The Middeck manifest requirements will be frozen to support preparation of the CCCR products which include the video, data and electrical plug-in plans in the Flight Requirements Document and CCCD. After CCCR, only change required to accommodate mission success are allowed by the Space Shuttle Program (SSP).</p>
9	CDR	<p>Critical Design Review</p> <p>Most Payloads Projects as part of their hardware development effort will conduct a CDR when their hardware design reaches 90% maturity. The CDR represents completion of the classical Project Development Cycle Phase C. The CDR demonstrates a "build-to" detailed design baseline to fabricate, integrate and verify. The ISS Program provides a baselined Interface Control Document in support of a CDR. The ISS Program also reviews the CDR data package for implications to ISS payload integration, and to provide verification guidance to the PD.</p>
10	CEIT	<p>Crew Equipment Interface Test</p> <p>CEIT allows the astronauts to interface with the flight hardware checking tool and payload interfaces and to become familiar with the hardware.</p>

TABLE 4.0-1 ISS PAYLOAD MILESTONE DEFINITIONS (PAGE 2 OF 14)

LINE #	MILESTONE ACRONYM	MILESTONE DEFINITION
11	CIR	Cargo Integration Review This review is conducted by the SSP Office to ensure that the ISS cargo elements manifested on a given Shuttle mission can be accommodated within the STS flight and ground capabilities. The Shuttle CIR is the major cargo-related review at which the ISS concurs with the integration and implementation of their requirements at the cargo/flight level.
12	CIRD	Cargo Integration Review Dry Run Conducted 3 weeks prior to CIR to identify any last issues that will possibly need to be worked at the CIR. Verify CIR electronic data package is complete for distribution.
13	CoFR Call Letter	Certification of Flight Readiness Call Letter OZ ISS Program distributed letter that provides required CoFR endorsement data and identifies ISS Program CoFR responsibilities. The letter includes projected CoFR planning dates and associated product delivery due dates. See SSP 52054.
14	CoFR (LPA)	Certification of Flight Readiness (Launch Package Assessment) The LPA is the first stage in the CoFR process. The LPA provides status of readiness for each organization to support Launch and mission operations. This status is determined by the open work required to complete CoFR. The status will include a statement of readiness for payload transfer to the pad.
15	CoFR LPA Input	Certificate of Flight Readiness Launch Package Assessment Input Input of the Payload readiness for payload transfer to the pad by identifying exceptions, open work tracking log which has a focus on threats and issues including a readiness statement (verbal acceptable). See SSP 52054.
16	CoFR LPA Review @ PMIT	Certificate of Flight Readiness Launch Package Assessment Review at Payload Mission Integration Team Review of the LPA Reports of each organization including a readiness statement (verbal acceptable). FPM Coordinates the PMIT review and web link of the LPA data provided from each responsible organization and generates an integrated open work tracking log. The integrated utilization status from this review is determined and presented at the LPA by OZ2. See SSP 52054.
17	CoFR Endorsements	Certificate of Flight Readiness Endorsements A responsible organization's verification of readiness that the CoFR endorsement statement objective has been met. Endorsements are the highest level of report to a Program manager for certification of flight readiness. Certification of Flight Readiness endorsement statements are defined in SSP 50108, Certification of Flight Readiness Process Document. Each responsible organization per SSP 52054, is required to submit CoFR endorsements to the Payload Program Office to certify a payload safety and operational readiness.
18	CoFR @ MPCB	Certification of Flight Readiness @ Multilateral Payload Control Board FPM coordinates the MPCB review from the CoFR endorsements provided and generates an integrated Open Work tracking log. Each implementing organizations presents CoFR endorsements at the MPCB. The signed endorsement and the electronic data submitted with any updates implemented at the MOCB is the quality record for CoFR. The IPM generates an integrated CoFR status from the MPCB data which is presented at the SORR. See SSP 52054.
19	CoFR (SORR)	Certification of Flight Readiness (Stage Operations Readiness Review) The CoFR certifies that the Launch Package/Cargo Element ground-support facilities and personnel are ready to support the flight, stage, and/or increment. It also certifies the readiness of the on-orbit stage configuration to accept the Launch Package/Cargo Element and the readiness for on-orbit increment operations. See SSP 52054.

TABLE 4.0-1 ISS PAYLOAD MILESTONE DEFINITIONS (PAGE 3 OF 14)

LINE #	MILESTONE ACRONYM	MILESTONE DEFINITION
20	Configuration Data Set	The Payload Configuration Data Set collects the PD engineering drawings and schematics necessary for Payload Engineering Integration to develop complement-level configuration drawings and schematics for the integrated International Standard Payload Rack and integrated EXPRESS rack. Payload schematics are used by the POIF to carry out the Payload Operations Plan. Payload schematics are specifically used by the PD teams and POIF personnel to communicate functional parameter monitoring features of the payload (e.g. to identify and isolate anomalies and to understand safety control features). The configuration data is used to configure the payload during all phases of flight including ascent, on-orbit, and return.
21	Drawing DS	Drawing Data Set The Drawing Data Set controls the format and content of selected Payload Engineering Integration, and Configuration data required from Payload Developers to develop complement-level configuration drawings and schematics for the integrated International Standard Payload Rack (ISPR) and EXPRESS Rack. ISS Payload Engineering Integration uses the On-Orbit Operational Configuration Drawings to create Integrated Laboratory Module Configuration Drawings for the ground control team at Payload Operations and the Integration Facility (POIF). The ground control team uses these drawings to visualize what the planned payload configurations are during real-time operations. POIF uses the On-Orbit Operational Configuration Drawings to assist in building Payload Crew Procedures. ISS Payload Engineering Integration uses the Payload Schematics to produce Integrated System Schematics for the Payload Operations and Integration Function. Schematics are used to perform troubleshooting during real-time payload operations. The configuration data is used to configure the payload during all phases of flight, including ascent, on-orbit, and return. See SSP 52000-PDS, Payload Data Sets Blank Book.
22	EIRR	EXPRESS Integration Readiness Review The purpose of the EIRR is to conduct an assessment of all mission related systems of the experiment launch package to determine the readiness of the package to be integrated into the EXPRESS carrier. The data presented will be sufficient to validate the required certification that proves the experiment systems are ready for integration and on-orbit operations.
23	EMC Data	Electromagnetic Compatibility Data EMC RF Data is results from electromagnetic interference and compatibility analysis. EMC Test Data is test results from electromagnetic compatibility testing.
24	EMC Thermal Blanket Data (Cargo Bay Payload)	Electromagnetic Compatibility Thermal Blanket (Cargo Bay Payload) Results from Electromagnetic compatibility testing with the thermal blanket on the hardware item.
25	Engineering Stage Analysis Report	The Payload Element-Level Engineering Analysis Report documents the stage-specific results of payload complement compatibility analysis for the specified element of the ISS, in response to the verification requirements of the Payload Verification Program Plan (PVPP).
26	EPAS	ETOV Payload Activity Summary The EPAS defines the ETOV Payload Planning Requirements to the Shuttle FAOs for development of the Flight Plan.
27	ETOV Payload Procedures	Earth-to-Orbit Vehicle Payload Procedures ETOV procedures are used for payload operations/monitoring during Shuttle ascent/descent and payload activities during transfer to/from ISS. The procedures reside on U.S. SODF.

**TABLE 4.0-1 ISS PAYLOAD MILESTONE DEFINITIONS (PAGE 4 OF 14)**

LINE #	MILESTONE ACRONYM	MILESTONE DEFINITION
28	Export Control Letter	Per ISS Payload Program Policy and the Standard PIA requirements, an export control classification letter for the payload is required of the Payload Developer or sponsoring organization at the beginning of the payload integration process. The PIM will request this letter from the Payload Developer soon after a PIM assignment is made, and the delivery of this letter is independent of flight manifesting. This letter is needed for every new payload that the ISS Payload Office will integrate. The export control letter will identify to the ISS Program the export classification of the payload hardware, software, technical data, and payload project supporting documentation.
29	EXPRESS/ WOLF Compatibility Analysis Report	The EXPRESS/WOLF Compatibility Analysis Report is used to show compatibility of the integrated EXPRESS/WOLF racks/payloads with the applicable requirements in SSP 57000, Pressurized Payloads Interface Requirements Document, as specified in the EXPRESS Interface Control Documents. The report documents the rack-level payload resource requirements for each stage and provides input to the element-level Stage Analysis.
30	EXPRESS/ WOLF Compliance Report	This report documents compliance of the EXPRESS and WOLF Racks to the applicable verification requirements in SSP 57000 as specified in the unique EXPRESS Rack Interface Control Documents.
31	FRD	Flight Requirements Document The document defines authorized requirements to be implemented on specific flights.
32	FOR	Flight Operations Review This review is conducted by MOD for the SSP and ISS Program Offices to ensure that the flight products to be used during real-time operations between the Space Shuttle and ISS meet ISS and SSP requirements for accomplishment of the mission.
33	FPSR (MDK)	Flight Planning and Stowage Review (Middeck) This review baselines crew activities, crew compartment, and cargo bay stowage. It marks the final opportunity to add standard MDK payloads or standard GAS payloads to the flight.
34	FR Annex	Flight Rules Annex The FR Annex documents pre-planned responses designed to minimize the need to develop real-time decisions in response to off-nominal situations that occur during mission operations. The FR Annex also documents the authority and responsibility of all organizations involved in the conduct of mission operations, including the IP mission control centers, POIC, engineering support functions, and the Mission Management Team. The FR Annex, Volume A contains the Space Shuttle generic rules. The FR Annex, Volume B will contain the generic ISS rules. The FR Annex, Volume C will contain generic joint ISS and Shuttle rules. Increment-specific flight rules will contain flight rules specific to a given increment activity or a joint ISS and Shuttle mission. A single annex will contain increment-specific rules for Volumes A, B, and C. Increment-specific flight rules are submitted by POIF to JSC MOD to support FOR.
35	FRR	Flight Readiness Review The purpose of the FRR is to conduct an assessment of all mission-related flight and ground systems to determine the readiness to support the upcoming flight. NASA, NASA contractors, and IP representatives will certify readiness in their areas of responsibility. The data presented during the review will be sufficient to validate, in unambiguous terms, the required certification that proves the systems are ready for flight and on-orbit operations.

TABLE 4.0-1 ISS PAYLOAD MILESTONE DEFINITIONS (PAGE 5 OF 14)

LINE #	MILESTONE ACRONYM	MILESTONE DEFINITION
36	FSR	<p>Flight Safety Review</p> <p>The flight safety process is conducted for all payloads and includes hazard analyses to systematically and objectively identify all hazards and hazard causes inherent in the design and flight operations, to evaluate controls, and to assess methods used to verify hazard controls. The integrated on-orbit safety encompasses both crew and vehicle safety. There are three phases of FSRs: Phase 0/I, Phase II, and Phase III.</p>
37	GCP Book	<p>Ground Command Procedure Book</p> <p>The Ground Command Procedures Book contains step-by-step instructions for the POIC Cadre to control and monitor payloads and the ISS systems supporting those payloads. The Ground Command Procedures Book consists of multiple volumes. The Ground Command Procedures Book Volume 3 is for payloads and is updated for each flight. The other volumes are updated as needed. The Ground Command Procedures Book is controlled by the U.S.PODFCB.</p>
38	GL&C	<p>Guidelines and Constraints</p> <p>The Payload Operations GL&amp;C Report documents the stage element-level operational restrictions for payloads located in the specified element of the ISS. These are derived from the Payload Element-Level Engineering Analysis Report.</p>
39	GSR	<p>Ground Safety Review</p> <p>The GSR process is conducted for the cargo elements, IP cargo elements, experiments, and all GSE/non-GSE planned for ground processing at KSC. There are three phases of GSRs: Phase 0/I, Phase II, and Phase III.</p>
40	HFIT Hardware Evaluation	<p>Evaluate the flight hardware requirement applicability against SSP 57000, Section 3.12, and SSP 52000-IDD-ERP, Expedite the Processing of Experiments to Space Station (EXPRESS) Rack Payloads Interface Definition Document, Section 12.</p> <p>The following items are required prior to HFIT visit to PD/site: Payload requirements applicability matrix, pre-release or related engineering drawings from CDR package, Form 881 will be issued by HFIT for Human Factor/Crew Hardware Interface Verification process.</p> <p>At the PD site: Mock-up, Engineering Unit, Qual Unit or Training Unit that reflected the flight hardware are available for HFIT Verification through one or combination of the following methods: Inspection (I), Analysis (A), Demonstration (D), and Test (T).</p> <p>HFIT provides feedback to the PD on requirements that have possible exceptions, list them in the internal forms and provides recommended closure of these requirements violations. Issues Certified of Compliance (CoC) to complete Payload Engineering Integration (PEI) requirement verifications.</p>
41	H/W Audit	<p>Hardware Audit</p> <p>A review conducted by the Launch Package Management Team of the Hardware Accountability Matrix Report to support the development of stowage drawings/engineering products such as SSCCD and CCCDs.</p>
42	H/W ICD	<p>Hardware Interface Control Document</p> <p>Defines the physical, functional, and environmental interfaces of PD H/W and the ISS. At CDR, a H/W ICD will be baselined that provides "design -to" interface data and verification requirements applicability matrix. An U/D at a later date will contain "mission-unique" configuration data. See SSP 57001, Pressurized Payloads Hardware Interface Control Document Template, SSP 57004, Attached Payload Hardware Interface Control Document Template, and SSP 52000-IDD-ERP.</p>
43	ICA (MDK)	<p>Interface Control Annex (Middeck/Orbiter Crew Compartment)</p> <p>ICA/MIP, Annex 6, contains information about items in the Orbiter MDK and defines overlays for aft flight deck equipment.</p>

**TABLE 4.0-1 ISS PAYLOAD MILESTONE DEFINITIONS (PAGE 6 OF 14)**

LINE #	MILESTONE ACRONYM	MILESTONE DEFINITION
44	IDRD	<p>Increment Definition and Requirements Document</p> <p>The baselined IDRD documents the assigned flight dates; the resource and accommodation allocations among assembly, system, and utilization; an overview of the assembly, system, and utilization flight and increment activities; and prioritized requirements for execution planning of ISS Program flight- and increment-specific objectives within the planning period. See SSP 50489.</p>
45	IDRD, Annex 1	<p>Increment Definition and Requirements Document, Annex 1</p> <p>The IDRD, Annex 1 includes the detailed cargo manifest for all launch vehicles on a flight. The baselined IDRD, Annex 1 includes cargo items, newly manifested items, LON items, hazardous cargo, etc. The update contains manifest data for pre-packed items. See SSP 50489.</p>
46	IDRD, Annex 5 PTP	<p>Increment Definition and Requirements Document, Annex 5: Payload Tactical Plan</p> <p>This document provides the integrated multi-lateral utilization input to the IDRD. The Annex 5 PTP is an increment-specific multilateral Payload Program plan including: research objectives, crew training and baseline data collection requirements, the ascent/descent payload manifest for each flight in the increment, the on-orbit payload complement resource requirements, payload specific station and lab support equipment requirements, Utilization rack and subrack rack topologies, and inter-Partner cross-segment resource requests. The IDRD, Annex 5: PTP provides Payload Program direction to the Research Integration Offices, IPs, and implementing field centers. See SSP 50489.</p>
47	IDRP	<p>Increment Definition Requirements Plan</p> <p>The IDRP contains the Planning Period overview, major increment/flight specific objectives, and increment resources and accommodations for assembly, system, and utilization. OZ uses the utilization allocations to initiate Annex 5 PTP development. See SSP 50489.</p>
48	Integrated Schematics	<p>Integrated schematics document the vehicle subsystems that are supporting payloads and detailed schematics of each payload's systems.</p>
49	IOR	<p>Increment Operations Review</p> <p>The IOR is a major review between the ISS Program and those organizational elements responsible for executing operations planned for the increment. The IOR will assess the preparation and status of ISS mission operations. It will ensure that the ground facilities and operational documentation will be ready to support the final phase of training for both flight and ground personnel, as well as execute the real-time operations planned for the increment. Those products that are required to support crew training activities or are required at the beginning of the increment will be reviewed at the IOR.</p>
50	IPLAT Label Evaluation	<p>The ISS Payload Label Approval Team (IPLAT) reviews and approves labels for compliance with SSP 57000, Appendix C, for all payload equipment that the crew will interface with during nominal operations, planned maintenance, and contingency operations.</p> <p>At the initial label evaluation phase, IPLAT provides a checklist to PD documenting the labeling requirements, which were violated as well as recommended solutions.</p> <p>At the final label evaluation phase, IPLAT reviews released engineering drawings/flight hardware labeling to check that all recommended changes were made and provides status for approval of the label drawing. IPLAT issues JSC Form 732-ISS Payload Label Final Disposition to complete label verifications.</p>
51	IPMM	<p>Integrated Payload Mission Model</p> <p>The IPMM represents the multi-increment payload manifest and research operations plans and consists of rack and attached payload traffic models, sub-pallet candidate lists, and a yearly research operations plan. The IPMM will be baselined on the same template as the MIM and feeds development of the IDRDs and associated PIAs and payload ICDS.</p>

**TABLE 4.0-1 ISS PAYLOAD MILESTONE DEFINITIONS (PAGE 7 OF 14)**

LINE #	MILESTONE ACRONYM	MILESTONE DEFINITION
52	IRR	<p>Increment Requirements Review</p> <p>Integrated review by the community involving increment requirements, stage requirements and joint docked operations. Review allocations and preliminary feasibility assessment of the implementation per flight.</p>
53	JMST	<p>Joint Multi-Segment Station Training</p> <p>JMST involves payload training for a crew with the POIC (integrated simulations) and with all other control centers (joint integrated simulations).</p>
54	KSC SRDS	<p>Kennedy Space Center Support Requirements Data Set</p> <p>The SRDS documents the launch and landing site advanced planning for ground processing support requirements necessary to process a single ISS payload through the following activities: simulations, preflight, in-flight, and post-flight phases associated with launch and recovery on the Space Shuttle system. This includes both hardware and science items to be processed at the launch and landing sites. See SSP 52000-PDS.</p>
55	KSC TRDS	<p>Kennedy Space Center Technical Requirements Data Set</p> <p>These payload-unique technical requirement submits are the detailed payload operations and maintenance requirements that are to be levied on KSC. These technical requirements are those that KSC is to perform on a payload during prelaunch, launch, recovery, and turnaround operations. See SSP 52000-PDS.</p>
56	Main Unit Top Assy Drawing, Subrack Payload	<p>Top level drawing provided by an EXPRESS or WORF Rack subrack Payload Developer for use in development of integrated rack drawing products.</p>
57	Manifest and Stowage DS	<p>Manifest and Stowage Data Set</p> <p>The Payload Manifest and Stowage Dataset defines the flight-specific manifest items and their characteristics, which specify manifest requirements for payloads including subkit items and Inventory Management System (IMS)/barcode data. The Payload Manifest and Stowage Data is required by ISS Program Manifest, ISS Program Cargo Integration (CI), and the Flight Crew Support Division (FCSD). The data collected for the manifest will support the production of SSP 5410X-ANX 1, Increment Definition and Requirements Document for Planning Period X, Annex 1: Station Manifest (Series of Annexes of Flight-Specific Station Manifests). ISS Program CI requires data in order to plan and design the launch, on-orbit, and return stowage configuration of payload stowage into on-orbit modules and logistic carriers. Physical data describing each payload manifest/stowage item to be packed and delivered/returned shall be electronically entered into PDL. FCSD requires data in order to plan and design the launch/return stowage configuration of the payload in the middeck locker(s). CI also requires data in order to plan and design the launch/return stowage configuration of the payload stowage item into trays or bags. See SSP 52000-PDS.</p>
58	MIM	<p>Multi-Increment Manifest</p> <p>Following the COUP, the ISS Program develops the MIM, which defines the Program traffic plan and crew rotation plan. The MIM is utilized in tactical planning to define the beginning and ending of each increment based on crew rotation, and to define all flights within each increment based on the traffic model. This document will be released on an annual basis to show a new five-year window.</p>

**TABLE 4.0-1 ISS PAYLOAD MILESTONE DEFINITIONS (PAGE 8 OF 14)**

LINE #	MILESTONE ACRONYM	MILESTONE DEFINITION
59	MIP	<p>Mission Integration Plan</p> <p>The MIP is the Program-to-Program agreement between the ISS and the SSPs for a specific Space Shuttle flight. The MIP is a joint Shuttle/ISS document that is mission-specific and covers agreed-upon overview requirements, products, and services. It also has annexes that contain detailed data and/or requirements for that particular mission. The Standard Integration Plan is used as the starting document to develop the mission-specific MIP and annexes.</p>
60	MIP, Annex 1	<p>Mission Integration Plan, Annex 1</p> <p>MIP, Annex 1 provides information on weight and center of gravity, plus Launch Package configuration to determine compatibility of flight hardware to facilities and KSC support equipment. It consists of detailed data on the physical as-built characteristics of the payload. It includes a definition of the sequence mass properties, payload constrained frequencies, modes description, configuration drawings of all major payload elements, radio frequency transmitter characteristics, and functional data on the payload. It is used in conjunction with the ICD by systems and cargo engineering to develop engineering flight products. These data are also used by Mission Operations in the unique mission operations development.</p>
61	MIP, Annex 2, Part 1 (Flight Planning)	<p>Mission Integration Plan, Annex 2, Part 1 (Flight Planning)</p> <p>MIP, Annex 2, Part 1 comes from the VMDB Drop 1, which contains electrical power, energy, and cooling data.</p>
62	MIP, Annex 4	<p>Mission Integration Plan, Annex 4</p> <p>MIP, Annex 4 contains details of measurement and command parameters to implement IVT for LP/CEs via Orbiter resources. It consists of commands, telemetry, and software required to operate the payload, measurements of the payload's status and health, measurements necessary for accomplishing payload objectives, and other data needed for processing and interpreting data. It is used by those entities involved in building the flight software for each flight to understand parameter characteristics, fault detection and annunciation, scaling coefficients, digital and analog command specification, decom data, payload recorder requirements, channelization requirements, and the definition of the high-rate data transmitted via the Ku-Band. The ISS inputs to Annex 4 are contained in the ISS standard out deliveries. The ISS provided standard out data is the ISS launch package/payload data in ISS format and is integrated with the SDT, channelization requirements, parameter characteristics, fault detection and annunciation, scaling coefficients, digital and analog command specification (Standard Out Data), decom data, and payload recorder requirements. It contains the 80 percent standard out and 100 percent standard out. It is baselined 6 months after 100 percent standard out.</p>
63	MIP, Annex 5	<p>Mission Integration Plan, Annex 5</p> <p>Detail interface agreement between SSP and the customer for operations support. Defines the format and content of the customer data required for SSP to integrate customer hardware into the flight and ground operations. Defines routing and remote customer control center interface requirements and resources for a flight.</p>
64	MIP, Annex 8 (LSSP Addendum)	<p>Mission Integration Plan, Annex 8 (Launch Site Support Plan Addendum)</p> <p>The LSSP Addendum is developed by KSC utilization to provide an overview of utilization payload processing that will take place at KSC. These plans are similar in content to the Launch Processing LSSP and are developed from the report capability of the PDL using the SRDS. LSSP milestones shown in the Payload Integration Flows reference LSSP Addenda.</p>

TABLE 4.0-1 ISS PAYLOAD MILESTONE DEFINITIONS (PAGE 9 OF 14)

LINE #	MILESTONE ACRONYM	MILESTONE DEFINITION
65	OMRS	Operations and Maintenance Requirements and Specifications The MIP OMRS replaces MIP, Annex 9. The Payload Interface Verification Summary contains ISS Launch Package-to-Space Shuttle integration requirements at the launch site. It is used to develop and document the ISS and Orbiter integration requirements. OMRS is also used for KSC technical requirements imposed on KSC by ISS Payloads. See SSP 52000-PDS.
66	On-Orbit Configuration Drawing	A drawing of each integrated rack and the payloads integrated into it and the routing of external cabling in its on-orbit operational configuration.
67	OS	Operations Summary The ISS Program-developed OS defines projected ISS capabilities and supporting services, which can be allocated in the COUP. This document will be released on an annual basis to show a new five-year window.
68	PCS Displays	Portable Computer System Displays The PCS displays are P/L unique crew displays for use on the P/L PCS that are built according to PD requirements. Payload-specific PCS displays are built (as needed) by PSIVF and delivered to the ISS Program. The ISS Program integrates the displays into a P/L PCS display load. See SSP 57002.
69	PDR	Preliminary Design Review Most Payloads Projects as part of their hardware development effort will conduct a CDR when their hardware design reaches 30% maturity. The PDR is the completion activity of the Classical Project Development Cycle Phase B. The PDR demonstrates and baselines a feasible and credible design that will accomplish the stated goals within the constraints imposed by the fiscal and operating environment. The ISS Program provides preliminary interface control documentation in support of a PDR, reviews the PDR data package for implications to ISS operations, and to provide development guidance to the PD.
70	PIA	Payload Integration Agreement The payload-unique PIA documents high-level agreements made between the ISS Program and the PD concerning ISS resources, capabilities, and services required to provide the payload with accommodations to, from, and onboard the ISS. The PIA also documents Program and technical agreements. The PIA includes customer and ISS Program points-of-contact and their separate and joint responsibilities.
71	P/L Engineering Verification Report	Payload Engineering Verification Report A report produced for each ISS Stage containing status of unique payload verification, element level verification, ISS level verification and Requirements Change Assessment Report (RCAR) submittal.
72	P/L Exceptions	Payload Exceptions When payloads violate any of the requirement(s) listed in the Interface Requirements Document, they are required to submit an exception PIRN and have it approved before they can be certified for flight. In the exception, the payload requests permission to violate a requirement and provides rationale for why this is acceptable. The PEI team and other effected groups review the exception and either determine it to be acceptable or unacceptable. If it is determined to be unacceptable, hardware modifications may be necessary. All exceptions must be signed by the PCB before they can be considered official.
73	P/L GDS DS	Payload Ground Data Services Data Set The P/L GDS DS documents the ground system and communications requirements for supporting the on-orbit operations of the payload. GDS are provided by the ISS Program-furnished operations support center (e.g., POIC, U.S.OC, and a TSC), as well as by other operations facilities. See SSP 52000-PDS.

**TABLE 4.0-1 ISS PAYLOAD MILESTONE DEFINITIONS (PAGE 10 OF 14)**

LINE #	MILESTONE ACRONYM	MILESTONE DEFINITION
74	P/L GR&C	<p>Payload Groundrules and Constraints</p> <p>Payload portion of the Increment-specific Execute Planning GR&amp;C. During the Basic planning cycle, this is the only GR&amp;C product developed.</p>
75	P/L MDM Configuration Files	<p>Payload Multiplexer/Demultiplexer Configuration Files</p> <p>P/L MDM Software functions and services are driven by payload config files. P/L MDM config files define current operational data and settings. P/L MDM services such as ancillary data services, file transfer, and health and status collection are controlled by PDF settings. See SSP 57002.</p>
76	P/L O/D	<p>Payload On-Dock Relative to Launch Date</p> <p>KSC: KSC processing involves a variety of customer offline and/or KSC integrated activities and testing. Payload developers coordinate their arrival at KSC based upon their processing requirements and KSC turnover dates. Scheduled integrated activities are based upon the types of payloads as follows:</p> <p>Payloads that require EXPRESS Rack integration testing, and facility racks are O/D at around L-6 months for MPLM missions. Missions with multiple payload testing could require earlier O/D times depending on testing schedules and off-line requirements.</p> <p>Middeck payloads that require FCU/PTCS EXPRESS integrated testing for a non-MPLM mission are O/D between L-4 and L-1 months.</p> <p>Middeck payloads or sample stowage that do not require EXPRESS integrated testing are O/D between L-1 month and L-1 week.</p> <p>Attached payloads may require extensive final offline assembly, checkout, and servicing, and subsequent Shuttle and ISS integrated testing. Other attached payloads arrive at KSC already integrated on their carrier and have no planned KSC activities. O/D dates are based on each payload's unique processing schedule of activities.</p> <p>JSC: Stowage HDW that supports the JSC MDK or MPLM Bench Review will be delivered to JSC based on the LPMT need date (Reference BR JSC).</p> <p>SpaceHab: Stowage HDW that supports the SpaceHab Bench Reviews will be delivered to SpaceHab based on the LPMT need date (Reference BR SpaceHab).</p>
77	P/L OOS	<p>Payload Increment On-Orbit Operations Summary</p> <p>The P/L OOS is a high-level plan providing a summary of payload activities for an entire increment. During the Basic planning cycle, this is the only OOS product developed.</p>
78	P/L Planning DS	<p>Payload Planning Data Set</p> <p>The P/L Planning DS contains the detailed payload operations and resource requirements specifications used to develop mission planning products. See SSP 52000-PDS.</p>
79	P/L Regulations	<p>Payload Regulations</p> <p>Onboard and ground, payload and system regulations and constraints for pre-increment/increment planning and execution of payload operations. Applicable to NASA payloads located anywhere on ISS and International Partner payloads located in the NASA element. See SSP 52000-PDS.</p>
80	P/L Simulator	<p>Payload Training Simulator</p> <p>The PD shall be responsible for providing a P/L Simulator to meet the training requirements for the crew and Ground Support Personnel (GSP) on the scientific and operational aspects of their payload. The P/L simulator requirements are agreed upon during the Training Strategy Team process and documented in the P/L Training Data Set. See SSP 52000-PDS.</p>

TABLE 4.0-1 ISS PAYLOAD MILESTONE DEFINITIONS (PAGE 11 OF 14)

LINE #	MILESTONE ACRONYM	MILESTONE DEFINITION
81	P/L T/O	<p>Payload Turn-Over (Kennedy Space Center)</p> <p>KSC: KSC receives custodial responsibility for payload hardware at turnover. Integrated racks will be turned over by KSC utilization to support MPLM install need dates. Hardware is turned over to support KSC "online" integrated mission processing activities as planned and required. When processing involves integrated testing activities, a thorough review of the flight hardware and its related IDP is performed. An IDP is not needed for flight-ready hardware, shipped directly to KSC logistics for stowage, and "turnover" is at hardware arrival, per shipping documentation. However, typically, hardware turnover follows a period of payload developer, offline activities at KSC.</p> <p>EXPRESS Racks or Facility Rack Payloads are turned over at around L-5 months.</p> <p>Middeck payloads that require FCU/PCTS EXPRESS integrated testing for a non-MPLM mission are turned over between L-4 and L-1 months.</p> <p>Middeck payloads or sample stowage are turned over for middeck integrated testing and/or stowage between L-1 week and L-26 hours.</p> <p>JSC: Stowage HDW that supports the JSC MDK or MPLM Bench Review will be turned over at JSC based on the LPMT need date (Reference BR JSC).</p> <p>SpaceHab: Stowage HDW that supports the SpaceHab Bench Reviews will be turned over at SpaceHab based on the LPMT need date (Reference BR SpaceHab).</p>
82	P/L Trainer Development Specification	<p>Payload Trainer Development Specification</p> <p>This specification documents the PD's understanding of the requirements levied against the PD provided Payload Training Unit (PTU) to be delivered to the appropriate JSC training facility to support payload crew training and Ground Support Personnel (GSP) training. The Development Specification for each PTU shall be included in the PD's PDR and CDR data packages.</p>
83	P/L Training DS	<p>Payload Training Data Set</p> <p>The P/L Training DS documents requirements for user-provided and user/ISS Program-provided payload training for the ISS crew and ISS Program ground support personnel, and ISS Program requirements for training of user personnel. See SSP 52000-PDS.</p>
84	P/L Verification Data	<p>Payload Verification Data</p> <p>Stage Analysis - Unique payload interface verification data required by PEI to complete ISS element level verification for each stage.</p> <p>Certificate of Compliance - Unique payload interface verification certification record that indicates the payload is in compliance with remaining applicable IRD requirements not utilized for Stage Analysis.</p>
85	PPD DS	<p>Payload Procedures and Displays Data Set</p> <p>The PPD DS addresses the requirements to supply United States (U.S.) Payload Operations Data File (PODF) products. Operations concept and analysis/flows, Payload displays, payload-unique Operations Nomenclature, manual procedures and support products, automated procedures, ground command procedures, and payload messages included in this data set. See SSP 52000-PDS.</p>
86	PRR	<p>Payload Readiness Review</p> <p>The goal of the PRR is for the ISS Program, with payload developer support, to provide a payload readiness statement for launch, if there is a direct payload interface with the Orbiter's payload bay or as requested by the cargo bay carrier integrator (e.g., SpaceHab, etc.). This is applicable for large attached payloads.</p>

**TABLE 4.0-1 ISS PAYLOAD MILESTONE DEFINITIONS (PAGE 12 OF 14)**

LINE #	MILESTONE ACRONYM	MILESTONE DEFINITION
87	PSM	<p>Payload System Manual</p> <p>The PSM provides the PRO with the operating and reference data necessary to perform real-time commanding and monitoring of the payloads and payloads support systems. It also provides the POIC with the single source reference of operational concepts and technical data associated with the increment-specific payloads and systems.</p>
88	PTDR	<p>Payload Training Dry Run</p> <p>Prior to crew training, a PTDR will be held for each payload or experiment course, included on-board training products, to prove the readiness of the facilities, instructors, and training equipment/products. The instructor that has been designated to perform the training for the crew prepares the Payload Training Lesson Plan and courseware and then conducts the PTDR. Attendance is required by the responsible Simulation Engineer and crew representative in order to sign-off and certify the lesson.</p>
89	PVP	<p>Payload Verification Plan (EXPRESS/WORF Subracks only)</p> <p>The PVP defines the complete set of payload verification requirements and provides instructions and guidelines for verifying interface compatibility and safety of as-built hardware and software for payloads to be placed on board the ISS. The requirements associated with the verification plan are identified in the Interface Definition Document (IDD). The PVP also provides the required verification data and template dates for those submittals.</p>
90	Questionnaire	<p>An ISS Payload Program resource planning questionnaire is required of the Payload Developer prior to flight manifesting. Payload Developers working in conjunction with their PIM will fill out an investigation-level Questionnaire for each Increment which the payload/investigation is operated. Completed Questionnaires will be submitted to the PIM and will be available on the PIM/PD Web Portal. Once a Questionnaire is completed for a given Increment it will not be maintained. The Questionnaire is used as an initial source of payload integration data to perform tactical planning, and populate Increment-specific PTPs, PIAs, and ICDs.</p>
91	Rack Mass Properties and Test Verified Model	<p>Rack mass properties consist of rack weight, center of gravity, moment of inertia and product of inertia.</p> <p>Rack test verified model is a model that has been shown to behave in a manner acceptably close to test results of the item the model represents. For models intended to be used in coupled loads analysis, such as the EXPRESS rack model, this is usually done through comparison of normal modes analysis results generated by the model with the results of a modal survey performed on the hardware. This assures that the model behaves in a realistic fashion in terms of the dynamic behavior of the hardware, within a limited frequency range. Models intended for stress or displacement analysis would be verified against stress or displacement test results.</p>
92	SpaceHab Ascent Manifest Freeze	<p>Freeze point for all ascent manifest requirements for hardware located in the SpaceHab module. This occurs two weeks prior to Bench Review.</p>
93	SpaceHab Descent Manifest Freeze	<p>Freeze point for all preflight descent manifest requirements for hardware located in the SpaceHab module</p>

TABLE 4.0-1 ISS PAYLOAD MILESTONE DEFINITIONS (PAGE 13 OF 14)

LINE #	MILESTONE ACRONYM	MILESTONE DEFINITION
94	SSCCD	Space Station Configuration Control Drawings The Space Station Configuration Control Drawings document the interior stowed configuration of the U.S. logistics carrier (currently, the MPLM) as required for launch and return. The top assembly drawing provides the mission unique cargo carrier configuration. Stowage rack level drawings provide the stowage locations of the hardware packed inside the racks. Bag/cushion level drawings provide the packed configuration and unique stowage instructions for the individual pieces of hardware. SSCCD bag level drawings are also provided for other launch vehicles such as the Shuttle Middeck, Spacehab, Soyuz, Progress, HTV and ATV to document JSC-packed Station hardware. Stowage Integration develops SSCCDs for the crew, systems, operational, logistics/maintenance hardware, and payload stowage items stowed in standard stowage racks. The results of all cargo layout planning are documented by the SSCCD which provide the physical installation requirements for the cargo with the logistics carriers.
95	Stage Configuration Drawings	Stage Configuration Drawings document the physical configuration of each payload (as viewed from the front) on-orbit during a given stage. See SSP 52000-PDS.
96	Stage XX EXPRESS/ WOLF Operations Guidelines and Constraints Document	This report identifies the engineering guidelines and constraints for the EXPRESS and WOLF subrack payloads integrated in the racks for a specific Stage
97	Start P/L Trng.	Start Payload Training P/L training is provided to the ISS crew going up on the first flight of the increment, regardless of launch vehicle. Training includes procedures training, increment-specific activities, proficiency training on skills, systems operations, and team training. Reflight - Reflight Training addresses payloads that have flown on a previous increment. Facility - New P/L Facility Training addresses new facility class payloads that have <u>not</u> flown on a previous increment. Subrack - New Payload Subrack Training addresses new subrack payloads that have <u>not</u> flown on a previous increment. Complement Training - Complement Training involves standalone training of the crew on the complement of payloads to be operated during ISS on-orbit activities. See SSP 52000-PDS.
98	S/W ICD	Software Interface Control Document Documents requirements for command, data, and payload support software accommodations for the on-orbit and related ground-activity phases. See SSP 57002.
99	TGHR	Time-Critical Ground Handling Requirements MDK P/L time-critical Orbiter requirements are documented in a mission-specific TGHR table. The TGHR also includes time-critical requirements for other non-payload crew compartment items. MDK time-critical requirements include late stowage, launch delay, and early de-stow requirements. MDK orientation and power interrupt constraints are also documented in the TGHR. MDK IVT and any other requirements will be documented in OMRS File II, Volume II. Currently, MDK fit-check requirements are documented in OMRS, but may eventually become TGHR requirements. See SSP 52000-PDS.
100	TRA	Tactical Resource Allocation The Research and Planning Working Group (RPWG) makes a tactical level allocation of available utilization resources to each IP and RPO by increment.

**TABLE 4.0-1 ISS PAYLOAD MILESTONE DEFINITIONS (PAGE 14 OF 14)**

LINE #	MILESTONE ACRONYM	MILESTONE DEFINITION
101	Transfer List	<p>Transfer List</p> <p>Transfer list is the product distributed and reviewed to support transfer cue card review meeting, which verify all stowage requirements/constraints are identified and scheduled to accommodate mission objectives.</p>
102	TST	<p>Training Strategy Team</p> <p>A NASA payload TST process has been defined to aid in the development of the payload training requirements for each payload or experiment and complements of payloads or experiments. Payload training requirements, and what will be needed to fulfill those requirements, for both crewmembers and GSP, are discussed, defined, and agreed upon during this process. The official membership of the TST consists of MSFC training personnel, JSC training personnel, SSTF/PTC SME, PD Representatives, Crew Representatives, and Program Office personnel. See SSP 52000-PDS.</p>
103	Usability Tests	<p>The Usability Test is an evaluation, conducted with case-appropriate rigor, to determine the readiness of a payload's on-board displays and procedures for PTDR, crew training and flight. It is performed to ensure operability for payloads, regardless of the type of Human Computer Interface (HCI). During the Usability Test, the onboard payload HCI is evaluated for commonality within a payload and across payloads (look and feel); compatibility of displays with procedures; usability of displays and procedures of displays and/or procedures. There are three types of tests: integrated displays and procedures; displays only; and procedures only. The tests can be formal (conducted on hardware, face-to-face with crew and PD) or informal (tabletop reviews via telecon; no hardware present; work session). Often in the case with small payloads, the procedures only usability evaluation is conducted via an informal, tabletop/work session.</p>
104	U.S. PODF	<p>U.S. Payload Operations Data File</p> <p>The U.S. PODF is the collection of procedures, displays and operations nomenclature necessary to perform U.S. payload operations. The procedures consist of manual, automated, and ground command procedures. The U.S. PODF is controlled by the U.S. PODFCB. See SSP 52000-PDS.</p>
105	VAR	<p>Verification Acceptance Review</p> <p>At the VAR, the Cargo Element (CE) developer has the responsibility to report the results of the CE structural assessment for the subject mission. This includes (but is not limited to) all structural margin assessment and any open issues concerning the CE hardware relative to the mission. This assessment shall be based upon the Verification Loads Analysis (VLA) results combined with CE thermal effects, random vibration effects, CE acoustic response, CE manufacturing tolerance effects, etc.</p>

## 5.0 ISS PAYLOAD MILESTONE CHRONOLOGY

The tables in this section provide a detailed listing and identify all of the payload integration process milestones in chronological order. The ISS payload integration milestones are grouped in this section within functional areas identified on the Level I process flow in Section 3.0. These functional groupings of integration milestones are:

Table 5.0-1: Payload Developer Milestone Chronology. This table is separated into two parts, Payload Development Phase (Table 5.0-1A) and ISS Mission Integration Phase (Table 5.0-1B). The Payload Development phase lists the typical payload project development activities that the ISS Program monitors or supports. These activities normally occur prior to the manifest assignment, therefore the dates provided represent a typical payload development template. Although the activities and submittals identified in the Payload Development phase are not required by the ISS Payload Program, it is in the best interest of the PD to solicit early ISS Payload Program guidance and support to avoid developmental cost and schedule impacts further downstream in the ISS Mission Integration phase. The specific dates for these activities if applicable will be dependent upon the payload project's unique development schedule, not the ISS payload integration process. The ISS Mission Integration phase lists the dates of all ISS Program "required" activities and submittals due from the PD. These activities and submittals commence with the PD delivery of the Investigation Questionnaire at I-18 months followed by manifesting of the payload via ISS Payload Program baseline of an Increment specific Payload Tactical Plan at I-16 months.

Table 5.0-2: Research and Payload Mission Integration Milestone Chronology. This table is separated into two parts, Payload Development Phase (Table 5.0-2A) and ISS Mission Integration Phase (Table 5.0-2B). This table lists ISS Payload Office Research and Payload Mission Integration (OZ4 and OZ2) submittals to the ISS Program/SSP and other key Program milestones.

Table 5.0-3: Payload Engineering Integration Milestone Chronology. This table lists ISS Payload Office Payload Engineering Integration (OZ3) submittals to the ISS Program/SSP and other key Program milestones.

Table 5.0-4: Payload Software Integration Milestone Chronology. This table lists ISS Payload Office Payload Software Integration (OZ5) submittals to the ISS Program/SSP and other key Program milestones.

Table 5.0-5: Payload Operations Integration Function Milestone Chronology. This table lists Payload Operations Integration submittals to the ISS Program/SSP and other key Program milestones.

Table 5.0-6: Kennedy Space Center Integration Milestone Chronology. This table lists Kennedy Space Center Utilization integration submittals to the ISS Program/SSP and other key Program milestones.

Dates within these chronology tables are for planning guidance and provide template data for the payload integration process generic schedule templates contained in Appendix A. Actual payload-unique schedules implementation may deviate from the templates. Flight-specific Level I and Level II schedule milestones and dates will be baselined through the appropriate ISS and SSP panels and boards. The chronology tables include the following column headers:

LINE #: The line number is assigned to each milestone acronym and is used to identify the milestone during documentation reviews, specific schedule development and internal coordination.

MILESTONE ACRONYM: The milestone acronym is a short-hand identifier used in the generic payload integration templates and on the flight- and payload-specific schedules.

DATE (MONTHS): Milestone date is referenced in relationship to start of an ISS Planning Period (PP), Increment (I), or Launch (L). Some milestone dates may reference Payload Project development activity such as Preliminary Design Review (PDR), Critical Design Review (CDR) or Hardware Readiness. The date is provided in months unless otherwise identified. The milestone date indicated is the template date for the completion of a given milestone.

PREDECESSORS AND SUCCESSORS: Identifies other milestones which typically occur prior to (predecessors) the milestone indicated, as well as other milestones that typically follow (successors) the milestone indicated.

P (Pressurized): An 'X' in this column indicates the milestone is applicable to pressurized payloads, including facility class payloads.

S (Small): An 'X' in this column indicates the milestone is applicable to small payloads, including stowed/deployed and Utility Outlet Panel payloads.

SS (Subrack Standard): An 'X' in this column indicates the milestone is applicable to subrack standard payloads, consisting of EXPRESS and WOLF subracks only.

A (Attached): An 'X' in this column indicates the milestone is applicable to attached (unpressurized) payloads.

PMIT (Payload Mission Integration Team): An 'X' in this column indicates the milestone is included in the PD section of the PMIT Flight schedules. An 'O' in this column indicates the milestone is included in other sections of the PMIT Flight schedules and represents a total flight complement milestone.

ORG (ISS Payload Program Organization): This column header is only found in the PD Milestone Chronology Tables 5.0-1A and 5.0-1B. This column is used to identify the ISS Payload Program organization that is the owner of the milestone with respect to this document. The five organization choices for this column are: PMI (Payload Mission Integration), PEI (Payload Engineering Integration), PSI (Payload Software Integration), Payload Operations Integration Function (POIF), and KSC (Kennedy Space Center Utilization integration).

The four payload classification columns identify which milestones are applicable to each payload class listed above. If a unique date appears in one of these columns instead of an 'X', this date supercedes the milestone date for that payload class. If a milestone is applicable to a payload classification, that milestone will appear on the Generic Payload Integration Manager (PIM) Schedule Template for that payload classification, and then be used to develop unique payload schedules.

Some milestones within Table 5.0-2A will not have any payload classification applicability identified since they are provided for reference purposes only. These milestones include ISS Program strategic planning products that are used by the ISS Payload Program to develop an Increment-specific Payload Tactical Plan.

**TABLE 5.0-1A PAYLOAD DEVELOPER MILESTONE CHRONOLOGY  
PAYLOAD DEVELOPMENT PHASE (STRATEGIC TIME FRAME) (PAGE 1 OF 3)**

LINE #	MILESTONE ACRONYM	DATE (MONTHS)	PREDECESSORS AND SUCCESSORS	P	S	SS	A	PMIT	ORG
1	Export Control Letter	*	Export Control Letter * Requested following new payload identification to the Program Must have prior to ISS Program support of PDR or any PD development effort involving ISS Program personnel	X	X	X	X		PMI
2	PDR	*	Preliminary Design Review * Typically would occur 3 years prior to launch PD controls actual date of PDR ISS Payload Program will support PDR PDR may not be held by all PDs	X	X	X	X		PMI
3	PIA (P)	PDR	Payload Integration Agreement (Preliminary) PD submit required at PDR or soon after PIM assignment is made Non-Flight/Increment specific except for "Small" payload PIA Typically precedes Increment specific Questionnaire submittal	X	L-14	X	X		PMI
4	H/W ICD (P)	PDR	Hardware Interface Control Document (Preliminary) Preliminary version at PDR is an optional PD submit for Pressurized and Attached payloads, would only contain draft "design-to" interface data and verification applicability matrix Preliminary version at L-14 is a required PD submit for Subrack Standard payloads, would contain final "design-to" interface data, verification applicability matrix, and "mission-unique" config data	X		L-14	X		PMI
5	PPD DS	PDR	Payload Procedures and Displays Data Set: Operations Concept; Operations Analysis/Flows These are optional PD submittals	X	X	X	X		POIF
6	Phase 0/I FSR DP	Ph 0/I FSR - 45 days	Phase 0/I Payload Flight Safety Review Data Pack 45 days before Phase 0/I FSR	X	X	X	X		PMI
7	Phase 0/I P/L FSR	PDR+2	Phase 0/I Payload Flight Safety Review	X	X	X	X		PMI

**TABLE 5.0-1A PAYLOAD DEVELOPER MILESTONE CHRONOLOGY  
PAYLOAD DEVELOPMENT PHASE (STRATEGIC TIME FRAME) (PAGE 2 OF 3)**

LINE #	MILESTONE ACRONYM	DATE (MONTHS)	PREDECESSORS AND SUCCESSORS	P	S	SS	A	PMIT	ORG
8	Phase 0/I GSR DP	Ph 0/I GSR -45 days	Phase 0/I Payload Ground Safety Review Data Pack 45 days before Phase 0/I GSR	X			X		PMI
9	Phase 0/I P/L GSR	PDR+3	Phase 0/I Payload Ground Safety Review	X			X		PMI
10	CDR	*	Critical Design Review  * Typically would occur 2 years prior to launch PD controls actual date of CDR ISS Payload Program will support CDR CDR may not be held by all PDs	X	X	X	X		PMI
11	HFIT Hardware Evaluation (P)	CDR	Human Factors Interface Team Hardware Evaluation (Preliminary)  After HFIT visit at PD site, Form 881 will be generated to include requirements verified. If requirement deviation occurs, Form 882 is generated to indicate which requirement verification is open.	X		X			PEI
12	Phase II FSR DP	Ph II FSR - 45 days	Phase II Payload Flight Safety Review Data Package 45 days before Phase II P/L FSR	X	X	X	X		PMI
13	Phase II P/L FSR	CDR+2	Phase II Payload Flight Safety Review	X	X	X	X		PMI
14	Phase II GSR DP	Ph II GSR - 45 days	Phase II Payload Ground Safety Review Data Package 45 days before Phase II P/L GSR	X			X		PMI
15	Phase II P/L GSR	CDR+2	Phase II Payload Ground Safety Review	X			X		PMI
16	P/L Trainer Development Specification	CDR	Payload Trainer Development Specification  Typically part of CDR data package As required per TST Process TIMs	X	X	X	X		POIF
17	TST Process	CDR to CDR+4	Training Strategy Team Process Participation  Starts at CDR and typically requires 4 months to complete	X	X	X	X		POIF
18	Drawing DS – Crew Interface Label Dwgs	CDR+4	Drawing Data Set: Crew Interface Label Drawings (Pre-released)  Same time as Preliminary Payload Unique Operations Nomenclature	X	CDR+6	CDR+6	X		PEI

**TABLE 5.0-1A PAYLOAD DEVELOPER MILESTONE CHRONOLOGY  
PAYLOAD DEVELOPMENT PHASE (STRATEGIC TIME FRAME) (PAGE 3 OF 3)**

LINE #	MILESTONE ACRONYM	DATE (MONTHS)	PREDECESSORS AND SUCCESSORS	P	S	SS	A	PMIT	ORG
19	PPD DS	CDR+4	Payload Procedures and Displays Data Set: Preliminary Payload Unique Operations Nomenclature; Initial Crew Displays Same time as Crew Interface Label Drawings (Pre-released) Before Candidate Flight Crew Displays submittal	X	CDR+6	CDR+6	X		POIF
20	Usability Tests	CDR+4	Usability Testing of Payload Specific Procedures and Displays Same time as Initial Crew Displays submittal Before PTDR	X	CDR+6	CDR+6	X		POIF
21	P/L Training DS	CDR+6	Payload Training Data Set No later than 2 months after TST process complete	X	X	X	X		POIF
22	PPD DS	CDR+7	Payload Procedures and Displays Data Set: ECR to Baseline Payload Unique Operations Nomenclature; Candidate Flight Crew Displays After Crew Interface Label Drawings (Pre-released)	X	CDR+9	CDR+9	X		POIF

**TABLE 5.0-1B PAYLOAD DEVELOPER MILESTONE CHRONOLOGY  
PAYLOAD MISSION INTEGRATION PHASE (TACTICAL TIME FRAME) (PAGE 1 OF 11)**

LINE #	MILESTONE ACRONYM	DATE (MONTHS)	PREDECESSORS AND SUCCESSORS	P	S	SS	A	PMIT	ORG
1	Questionnaire	I-18	Investigation Level Questionnaire for Payload Developer Increment Specific Requirements 2 months before IDR Annex 5 PTP Baseline	X	X	X	X	X	PMI
2	PPD DS	I-16	Payload Procedures and Displays Data Set: Manual Procedures; Procedure/Display Files List; Reference Data; Validation Plan; Validation Record Report; Log Files; MPV Links; Payload Messages 6 months before Start New P/L Training	X	I-14	I-14	X		POIF
3	Start Reflight P/L Training	I-16	Start Training for "Reflight" Payloads PD participation only required if PD provides instructor Reflight Pressurized facility (rack-level) payloads not requiring PD training support could start earlier 8-10 months before Start Complement Training	X	I-14	I-14	I-14		POIF
4	Configuration DS - Gases & Potable Water - I&C Data (P)	L-16	Configuration Data Set: Gases and Potable Water - Interface and Consumable Data (Preliminary)			X			PEI
5	PCS Display Requirements (P)	L-16	PCS Requirements for Program Built Displays (Preliminary) 2 months before P/L MDM Configuration Files/PCS Displays (P) 4 months before S/W ICD (P)	X		X	X		PSI
6	C&DH DS (P)	L-16	Command and Data Handling Data Set (Preliminary) (If Program is not to build displays) 2 months before P/L MDM Configuration Files/PCS Displays (P) 4 months before S/W ICD (P)	X		X	X		PSI
7	EXPRESS/WORF Laptop Payload SW Application and Displays (P)	L-16	EXPRESS/WORF Laptop Payload SW Application and Displays (Preliminary) (If application is not the sole payload application to be integrated onto the laptop) Demonstrate EXPRESS/WORF laptop integrated SW load is compatible			X			PSI

**TABLE 5.0-1B PAYLOAD DEVELOPER MILESTONE CHRONOLOGY  
PAYLOAD MISSION INTEGRATION PHASE (TACTICAL TIME FRAME) (PAGE 2 OF 11)**

LINE #	MILESTONE ACRONYM	DATE (MONTHS)	PREDECESSORS AND SUCCESSORS	P	S	SS	A	PMIT	ORG
8	Configuration DS (B/L) - MPLM/SpaceHab	L-15.5	Configuration Data Set: Manifest and Stowage Data (Baseline) 1.5 month before MR Cut-off for the IDR D Annex 1 B/L			X			PEI
9	Manifest and Stowage DS (B/L)- MPLM/SpaceHab/ External/Middeck	L-14.75	Manifest and Stowage Data Set (Baseline) - ORU level including Trash Survey 3 wks before MR cutoff for the IDR D Annex 1 B/L 3 weeks before Mission Unique H/W ICD data submittal	X	X		X	O	PMI
10	Configuration DS (B/L) - Middeck	L-14.75	Configuration Data Set: Manifest and Stowage Data (Baseline) - ORU level including Trash Survey 3 wks before MR cutoff for the IDR D Annex 1 B/L 3 weeks before Mission Unique H/W ICD data submittal			X			PEI
11	H/W ICD - Mission Unique Data	L-14	Hardware Interface Control Document update to incorporate Mission Unique Data 2 months before Program U/D of the previously baselined ICD	X			X		PMI
12	PVP	L-14	Payload Verification Plan 2 months before PVP Baseline			X			PMI
13	P/L Simulator O/D at JSC	I-13	Payload Simulator hardware and software delivery to JSC training facility 3 months before Start New P/L Training	X	I-11	I-11	I-11		POIF
14	P/L GDS DS	I-13	Payload Ground Data Services Data Set 3 months before GDS DS Baseline	X		X	X	O	POIF
15	EMC RF Data (Cargo Bay Payload)	L-13	EMC Radio Frequency Data for Cargo Bay Payloads Prior to EMC Panel approval 4 months before CIR 8 months before ISS Program EMC Test Data to SSP				X	X	PMI
16	KSC TRDS ISS to P/L OMRS, File 10, Volume 2 (P)	L-12.5	Kennedy Space Center Technical Requirements Data Set International Space Station to Payload Operations and Maintenance Requirements and Specifications, File 10, Volume 2 (Preliminary) 0.5 month before KSC TRDS OMRS, File 10, Volume 2 (P)	X	X	X	X	O	KSC

**TABLE 5.0-1B PAYLOAD DEVELOPER MILESTONE CHRONOLOGY  
PAYLOAD MISSION INTEGRATION PHASE (TACTICAL TIME FRAME) (PAGE 3 OF 11)**

LINE #	MILESTONE ACRONYM	DATE (MONTHS)	PREDECESSORS AND SUCCESSORS	P	S	SS	A	PMIT	ORG
17	KSC TRDS Bay to P/L OMRS, File 2, Volume 2 (P)	L-12.5	Kennedy Space Center Technical Requirements Data Set Bay to Payload Operations and Maintenance Requirements and Specifications, File 2, Volume 2 (Preliminary) 0.5 month before KSC TRDS OMRS, File 2, Volume 2 (P)				X	O	KSC
18	P/L Planning DS (B)	I-12	Payload Planning Data Set (Basic) 5.5 months before P/L OOS (B) and P/L GR&C (B)	X	X	X	X	O	POIF
19	Configuration DS - On-Orbit Configuration Drawings (B/L)	L-12	Configuration Data Set: On-Orbit Configuration Drawings (Baseline)			X			PEI
20	Configuration DS - Main Unit Top Assy Drawing (B/L)	L-12	Configuration Data Set: Main Unit Top Assembly Drawings Payload (Baseline)			X			PEI
21	Configuration DS - Schematics (P)	L-12	Configuration Data Set: Schematics (Electrical, C&DH, Thermal, Vacuum) (Preliminary)			X			PEI
22	PPD DS	L-12	Payload Procedures and Display Data Set: Preliminary Ground Command Procedures 3 months before GCP Book (Preliminary)	X	X	X	X		POIF
23	P/L Verification Data	L-12 to L-3	Payload Verification Data (EXPRESS and WOLF subracks only) Data submittals are required at L-12, L-11.5, L-11, L-10.5, L-10, L-9.5, L-9, L-7, L-6.5, L-5, L-4.5, L-3			X		O	PEI
24	PTDR	I-11	Payload Training Dry Run This milestone is only applicable to new payloads 1 month before Start New P/L Training	X	I-9	I-9	I-9		POIF
25	PCS Display Requirements (I)	L-11	PCS Requirements for Program Built Displays (Interim) These requirement updates will be used as the basis for baselining the PL PCS SW Requirements Specification (SRS) 4 months before P/L MDM Configuration Files/PCS Displays (I)	X		X	X		PSI
26	Drawing DS - On-Orbit Configuration Drawings (P)	L-11	Drawing Data Set: On-Orbit Configuration Drawings (Preliminary) 1 month before SSP need date for Installed P/L drawings 5 months before Baseline	X			X	O	PEI

**TABLE 5.0-1B PAYLOAD DEVELOPER MILESTONE CHRONOLOGY  
PAYLOAD MISSION INTEGRATION PHASE (TACTICAL TIME FRAME) (PAGE 4 OF 11)**

LINE #	MILESTONE ACRONYM	DATE (MONTHS)	PREDECESSORS AND SUCCESSORS	P	S	SS	A	PMIT	ORG
27	Drawing DS - Assy and Installation Dwgs (P)	L-11	Drawing Data Set: Assembly and Installation Drawings (Preliminary) 1 month before SSP need date for Installed P/L drawings 5 months before Baseline	X			X	O	PEI
28	Drawing DS - Stowage H/W Dwgs and Installed P/L Dwgs	L-11	Drawing Data Set: Stowage hardware drawings and installed P/L drawings 1 month before SSP need date for installed P/L drawings 2 month before ICA B/L Before Hardware Audit (MPLM/SpaceHab)	X	X		X	O	PMI
29	Configuration DS - Stowage H/W Dwgs and Installed P/L Dwgs	L-11	Configuration Data Set: Stowage hardware drawings and installed P/L drawings 1 month before SSP need date for installed P/L drawings 2 month before ICA B/L Before Hardware Audit (MPLM/SpaceHab & MDK)			X			PEI
30	Start New P/L Training	I-10	Start Training for "New" Payloads 1 month after PTDR 2-4 months before Start Complement Training	X	I-8	I-8	I-8		POIF
31	Phase III FSR DP	Ph III FSR - 45 days	Phase III Flight Safety Review Data Pack 45 days before Phase III FSR	X	X	X	X	X	PMI
32	Phase III FSR	L-10	Phase III Flight Safety Review  The phase III Safety Review must be completed 30 days prior to delivery to the launch site. Actual Safety Review date is flexible, but must consider the complexity of the hardware and operations, potential safety issues, and whether the safety activities will be required to support integrated assessments.	X	X	X	X	X	PMI
33	HFIT Final Hardware Evaluation	L-10	All requirements in Form 881 have been met, accompanied by final release engineering drawings for the flight hardware.  A closed Form 882 reflecting all open issues generated from the HFIT Preliminary Hardware Evaluation have been closed during the development of the flight hardware toward Final Phase.  The CoC and Form 883 Hardware Compliance forms will be issued to PD for the CoFR, following this process.	X	X	X			PEI

**TABLE 5.0-1B PAYLOAD DEVELOPER MILESTONE CHRONOLOGY  
PAYLOAD MISSION INTEGRATION PHASE (TACTICAL TIME FRAME) (PAGE 5 OF 11)**

LINE #	MILESTONE ACRONYM	DATE (MONTHS)	PREDECESSORS AND SUCCESSORS	P	S	SS	A	PMIT	ORG
34	Rack Mass Properties and Test Verified Model	L-9.5	Rack Mass Properties and Test Verified Model 2.5 months before VADAR 3 months before submitting monthly mass properties	X				X	PMI
35	C&DH DS (I)	L-9	Command and Data Handling Data Set (Interim) 2 months before P/L MDM Configuration Files/PCS Displays (I) 1 month before S/W ICD (I)	X		X	X		PSI
36	EXPRESS/WORF Laptop Payload SW Application and Displays (I)	L-9	EXPRESS/WORF Laptop Payload SW Application and Displays (Interim) (If application is not the sole payload application to be integrated onto the laptop) Demonstrate EXPRESS/WORF laptop integrated SW load is compatible			X			PSI
37	Drawing DS – Crew Interface Label Dwgs	I-8	Drawing Data Set: Crew Interface Label Drawings (Released) After Crew Interface Label Drawings (Pre-released) Before IPLAT grants approval for PD to produce/order labels	X	X	X	X		PEI
38	Manifest and Stowage DS (U/D) - MPLM/SpaceHab/ External	L-8	Manifest and Stowage Data Set (Update) – Subkit Data 4 months before SSCCDs Final to support Bench Review 2.5 months before SpaceHab & MPLM HAMR B/L 2 weeks before MPLM/SpaceHab hardware audit	X	X		X	O	PMI
39	Configuration DS (U/D) – MPLM/SpaceHab	L-8	Configuration Data Set: Manifest and Stowage Data (Update) – Subkit Data 4 months before SSCCDs B/L to support Bench Review 2.5 months before SpaceHab & MPLM HAMR B/L 2 weeks before MPLM/SpaceHab Hardware Audit			X			PEI
40	PCS Display Requirements (F)	L-8	PCS Requirements for Program Built Displays (Final) These requirement updates will be used as the basis for updating the PL SW Requirements Specification (SRS) to its final flight baseline state 4 months before P/L MDM Configuration Files/PCS Displays (F)	X		X	X		PSI

**TABLE 5.0-1B PAYLOAD DEVELOPER MILESTONE CHRONOLOGY  
PAYLOAD MISSION INTEGRATION PHASE (TACTICAL TIME FRAME) (PAGE 6 OF 11)**

LINE #	MILESTONE ACRONYM	DATE (MONTHS)	PREDECESSORS AND SUCCESSORS	P	S	SS	A	PMIT	ORG
41	Configuration DS – On-Orbit Configuration Drawings (U/D)	L-7.5	Configuration Data Set: On-Orbit Configuration Drawings (Update) 4.5 months after Baseline			X			PEI
42	Configuration DS - Main Unit Top Assy Drawing (U/D)	L-7.5	Configuration Data Set: Main Unit Top Assembly Drawings Payload (Update) 4.5 months after Baseline			X		O	PEI
43	Configuration DS – Schematics (B/L)	L-7.5	Configuration Data Set: Schematics (Electrical, C&DH, Thermal, Vacuum) (Baseline) 4.5 months after Preliminary submittal			X		O	PEI
44	P/L Exceptions	L-7.5	Payload Exceptions	X	X	X	X	O	PEI
45	P/L Verification Data	L-7.5	Payload Verification Data (Stage Analysis Data) 3 months before Final Stage Analysis Report	X	X		X	O	PEI
46	Phase III GSR DP	Ph III GSR - 45 days	Phase III Ground Safety Review Data Pack 45 days before Phase III GSR	X	X	X	X	X	PMI
47	Phase III GSR	L-7	Phase III Ground Safety Review  The phase III Safety Review must be completed 30 days prior to delivery to the launch site. Actual Safety Review date is flexible, but must consider the complexity of the hardware and operations, potential safety issues, and whether the safety activities will be required to support integrated assessments.	X	X	X	X	X	PMI
48	EXPRESS/WORF Laptop Payload SW Application and Displays (F) (Multiple P/L applications being integrated on laptop)	L-7	EXPRESS/WORF Laptop Payload SW Application and Displays (Final) (Multiple P/L applications being integrated on laptop)  CD with the P/L application will be provided to the PSIVF so that an integrated laptop load can be developed			X			PSI

**TABLE 5.0-1B PAYLOAD DEVELOPER MILESTONE CHRONOLOGY  
PAYLOAD MISSION INTEGRATION PHASE (TACTICAL TIME FRAME) (PAGE 7 OF 11)**

LINE #	MILESTONE ACRONYM	DATE (MONTHS)	PREDECESSORS AND SUCCESSORS	P	S	SS	A	PMIT	ORG
49	Drawing DS – Stowage H/W Dwgs and Installed P/L Dwgs (U/D)	L-7	Drawing Data Set: Stowage hardware drawings and installed P/L drawings (Update) 1.5 months before HAMR B/L 2 months before SSCCD Released	X	X		X	O	PMI
50	Configuration DS – Stowage H/W Dwgs and Installed P/L Dwgs (U/D)	L-7	Configuration Data Set: Stowage hardware drawings and installed P/L drawings (Update) 1.5 months before HAMR B/L 2 months before SSCCD Released			X			PEI
51	P/L Planning DS (F)	I-6	Payload Planning Data Set (Final) 2.75 months after Payload Planning DS (B) 4.25 months before P/L OOS (F) and P/L GR&C (F)	X	X	X	X	O	POIF
52	Start Complement Training	I-6	Start Complement Training for the Increment 2-4 months after Start New P/L Training 3 months before Start JMST	X	X	X	X		POIF
53	Configuration DS – P/L Transfer Dwgs/Reqms (B/L)	L-6	Configuration Data Set: Payload Transfer Drawings/Requirements (Baseline)			X			PEI
54	Drawing DS - On-Orbit Configuration Drawings (B/L)	L-6	Drawing Data Set: On-Orbit Configuration Drawings (Baseline) 5 months after Preliminary input	X			X		PEI
55	Drawing DS - Assy and Installation Dwgs (B/L)	L-6	Drawing Data Set: Assy and Installation Dwgs (Baseline) 5 months after Preliminary input	X			X		PEI
56	Drawing DS - Engineering Configuration List (B/L)	L-6	Drawing Data Set: Engineering Configuration List (Baseline)	X			X		PEI
57	Drawing DS – Schematics (B/L)	L-6	Drawing Data Set: Schematics (Electrical, C&DH, Thermal, Vacuum) (Baseline)	X	X		X		PEI

**TABLE 5.0-1B PAYLOAD DEVELOPER MILESTONE CHRONOLOGY  
PAYLOAD MISSION INTEGRATION PHASE (TACTICAL TIME FRAME) (PAGE 8 OF 11)**

LINE #	MILESTONE ACRONYM	DATE (MONTHS)	PREDECESSORS AND SUCCESSORS	P	S	SS	A	PMIT	ORG
58	KSC TRDS Orbiter MDK to P/L OMRS, File 2, Volume 2 (P)	L-6	Kennedy Space Center Technical Requirements Data Set Orbiter Middeck to Payload Operations and Maintenance Requirements and Specifications, File 2, Volume 2 (Preliminary) 1 month before OMRS, File 2, Volume 2 (P)	X	X	X	X	O	KSC
59	PPD DS	L-6	Payload Procedures and Displays Data Set: Final Ground Command Procedures 6 months after Preliminary Ground Command Procedures submittal 3 months before GCP Book (Final)	X	X	X	X		POIF
60	EXPRESS/WORF Laptop Payload SW Application and Displays (F) (Only one application being integrated on laptop)	L-6	EXPRESS/WORF Laptop Payload SW Application and Displays (Final) (Only one application being integrated on laptop) CD with the P/L application will be provided to the SSPOCCB for inclusion in the ISS CD library			X			PSI
61	C&DH DS (F)	L-6	Command and Data Handling Data Set (Final) 2 months before P/L MDM Configuration Files/PCS Displays (F) 3 months before S/W ICD (F)	X		X	X		PSI
62	P/L O/D (KSC)	L-6	Payload On-Dock at KSC 1 month after LSSP Addenda (B/L) 30 days after GSR Phase III 1 month/10 working days before P/L T/O to KSC FSR Phase III complete Excludes from this (L-6) milestone is MDK/MPLM/SpaceHab stowage H/W and MDK installed P/Ls	X	X	X	X	X, O	KSC
63	P/L O/D (SPPF)	L-6	Payload On-Dock at SpaceHab Payload Processing Facility	X	X	X	X	X, O	PMI

**TABLE 5.0-1B PAYLOAD DEVELOPER MILESTONE CHRONOLOGY  
PAYLOAD MISSION INTEGRATION PHASE (TACTICAL TIME FRAME) (PAGE 9 OF 11)**

LINE #	MILESTONE ACRONYM	DATE (MONTHS)	PREDECESSORS AND SUCCESSORS	P	S	SS	A	PMIT	ORG
64	PPD DS	I-5.5	Payload Procedures and Displays Data Set: ECR to Baseline Manual Procedures; Procedure Hazard Control List 10.5 months after Manual Procedures submit 2 months before Manual Procedures Baseline	X	X	X	X		POIF
65	Configuration DS – Gases & Potable Water – I&C Data (F)	L-5	Configuration Data Set: Gases and Potable Water – Interface and Consumable Data (Final) 11 months after Preliminary submittal			X			PEI
66	Manifest and Stowage DS (U/D) – MPLM/SpaceHab /External	L-5	Manifest and Stowage Data Set (Update) – Bar Code/IMS and Serial Number Data 1.5 months before MPLM & SpaceHab Bench Review	X	X		X	O	PMI
67	Configuration DS (U/D) – MPLM/SpaceHab	L-5	Configuration Data Set: Manifest and Stowage Data (Update) - Bar Code/IMS and Serial Number Data 1.5 months before MPLM & SpaceHab Bench Review			X			PEI
68	Manifest and Stowage DS (U/D) – Middeck	L-5	Manifest and Stowage Data Set (Update) – Subkit Data 5 weeks before MDK HAMR B/L 1 month before MDK Hardware Audit	X	X		X	O	PMI
69	Configuration DS (U/D) - Middeck	L-5	Configuration Data Set: Manifest and Stowage Data (Update) – Subkit Data 5 weeks before MDK HAMR B/L 1 month before MDK Hardware Audit			X			PEI
70	P/L T/O (KSC)	L-5	Payload Turn-Over to KSC 1 month after payload O/D KSC 1 month before payload installation into Carrier Excludes from this (L-5) milestones is MDK/MPLM/SpaceHab stowage H/W and MDK installed P/Ls	X	X	X	X	X	KSC

**TABLE 5.0-1B PAYLOAD DEVELOPER MILESTONE CHRONOLOGY  
PAYLOAD MISSION INTEGRATION PHASE (TACTICAL TIME FRAME) (PAGE 10 OF 11)**

LINE #	MILESTONE ACRONYM	DATE (MONTHS)	PREDECESSORS AND SUCCESSORS	P	S	SS	A	PMIT	ORG
71	EMC Test Data (Cargo Bay Payload)	L-5	EMC Test Data for Cargo Bay Payloads 3.5 months before ISS Program/SSP Final EMC Report				X	X	PMI
72	KSC TRDS Orbiter MDK to P/L TGHR Table (P)	L-4.5	Kennedy Space Center Technical Requirements Data Set Orbiter Middeck to Payload Time-Critical Ground Handling Requirements Table (Preliminary) 0.5 month before Orbiter MDK TGHR table (P)	X	X	X		O	KSC
73	MPLM/SpaceHab Stowage H/W O/D & T/O @ KSC	L-4.5	MPLM/SpaceHab Stowage H/W O/D & T/O to support Bench Review & KSC 1 month before the MPLM or SpaceHab Bench Review	X	X	X	X	X	PMI
74	MPLM Stowage H/W O/D & T/O @ JSC	L-4.25	MPLM Stowage H/W O/D & T/O to support Bench Review & JSC (Off nominal for payloads) 2 weeks before the MPLM Bench Review	X	X	X	X	X	PMI
75	P/L Verification Data	L-3.5	Payload Verification Data (Certificates of Compliance) Before LPA activity start	X	X		X	O	PEI
76	VAR	L-3.5	Verification Acceptance Review 3.5 months after VADAR	X				X	PMI
77	Start JMST	I-3	Start Joint Multi-Segment Station Training 3 months after Start Complement Training	X	X	X	X	O	POIF
78	LPA Input	L-12 weeks	Launch Package Assessment Input for CoFR 5 weeks before LPA 2 weeks before LPA input review at PMIT	X	X	X	X	O	PMI
79	Manifest and Stowage DS (U/D) – Middeck	L-3	Manifest and Stowage Data Set (Update) – Bar Code/IMS and Serial Number Data 2 months before MDK Bench Review	X	X		X	O	PMI
80	Configuration DS (U/D) - Middeck	L-3	Configuration Data Set: Manifest and Stowage Data (Update) – Bar Code/IMS and Serial Number Data 2 months before MDK Bench Review			X			PEI
81	EMC Thermal Blanket Data (Cargo Bay Payload)	L-3	EMC Thermal Blanket Data for Cargo Bay Payloads 1.5 months before ISS Program/SSP Final EMC Report				X	X	PMI

**TABLE 5.0-1B PAYLOAD DEVELOPER MILESTONE CHRONOLOGY  
PAYLOAD MISSION INTEGRATION PHASE (TACTICAL TIME FRAME) (PAGE 11 OF 11)**

LINE #	MILESTONE ACRONYM	DATE (MONTHS)	PREDECESSORS AND SUCCESSORS	P	S	SS	A	PMIT	ORG
82	EMC Data (Middeck)	L-2.5	EMI/EMC Data for Active Middeck Payloads 1 months before ISS Program/SSP Final EMC Report	X		X		X	PMI
83	Acoustic Data (Middeck)	L-2.5	Acoustic Data for Active Middeck Payloads 2 weeks before SSP Acoustics Report	X		X		X	PMI
84	PPD DS	L-2	Payload Procedures and Displays Data Set: Payload Automated Procedures (Timeliner Files)	X	X	X			POIF
85	CoFR Endorsements	L-6 weeks	Certification of Flight Readiness Endorsements 2.5 weeks before SORR 1.5 weeks before MPCB review	X	X	X	X	X	PMI
86	P/L MDK Stowage H/W O/D @ JSC	L-1.5	Payload On-Dock at Johnson Space Center 2 weeks before L-1 JSC MDK Bench Review	X	X	X	X	X, O	PMI
87	MPLM Stowage H/W O/D & T/O @ KSC	L-3 weeks	MPLM Stowage H/W O/D & T/O to support Pad Stow Crew Review 1 week before Pad Stow Crew Review	X	X	X	X	X, O	KSC
88	MDK O/D KSC (Standard Installation)	L-22 days to H/W T/O	Middeck On-Dock Kennedy Space Center (Standard Installation) For Pressurized - Approximately 7 working days before MDK T/O KSC for launch For Attached, Subrack Standard and Small - Approximately 10 working days before MDK T/O KSC for launch	X	X	X	X	X, O	KSC
89	MDK O/D KSC (Late Installation)	L-15 days to H/W T/O	Middeck On-Dock Kennedy Space Center (Late Installation) Approximately 10 working days before MDK T/O KSC for launch	X	X	X	X	X, O	KSC
90	MDK T/O KSC (Standard Installation)	L-8 days	Middeck Turn-Over Kennedy Space Center (Standard Installation) Approximately 7 working days after MDK O/D KSC	X	X	X	X	X, O	KSC
91	MDK T/O KSC (Late Installation)	L-3 days to L-28 hours	Middeck Turn-Over Kennedy Space Center (Late Installation) Approximately 10 working days after MDK O/D KSC	X	X	X	X	X, O	KSC
92	KSC SRDS (P)	H/W O/D-6	Kennedy Space Center Support Requirements Data Set (Preliminary) 6 months before payload hardware on dock at KSC 5 months before LSSP Addendum (B/L)	X	X	X	X	O	KSC

**TABLE 5.0-2A RESEARCH AND PAYLOAD MISSION INTEGRATION MILESTONE CHRONOLOGY  
PAYLOAD DEVELOPMENT PHASE (STRATEGIC TIME FRAME)**

LINE #	MILESTONE ACRONYM	DATE (MONTHS)	PREDECESSORS AND SUCCESSORS	P	S	SS	A	PMIT
1	MIM	PP-44, PP-32	Multi-Increment Manifest (Annual Release) 2 months before OS This is an ISS Program product					
2	OS	PP-42, PP-30	Operations Summary (Annual Release) 2 months after MIM This is an ISS Program product					
3	IPMM	PP-42, PP-30	Integrated Payload Mission Model (Annual Release) 2 months after MIM This is a MPCB product					
4	IDRP	PP-24	Increment Definition Requirement Plan 6 months after OS 5.5 months before TRA This is an ISS Program product					
5	TRA	I-18.5	Tactical Resource Allocations 5.5 months after IDRP 2.5 months before PTP B/L This is a RPWG product					
6	ISS Payload Process Overview	*	* Initial PIM meeting with PD following PIM assignment to present the ISS Payload process Overview (Roadshow). Also will cover optional services the Program could provide to the PD such as HFIT evaluation, procedures, displays and OpNom developmental guidance, and operations concept support.	X	X	X	X	
7	Export Control Letter Concurrence	*	ISS Program concurrence for Export Control Letter * 1 month after receipt of Export Classification Letter from PD	X	X	X	X	
8	PIA (B/L)	CDR+1	Payload Integration Agreement (Baseline)	X	L-11	X	X	X
9	H/W ICD (B/L)	CDR+1	Hardware Interface Control Document (Baseline) only contains "design-to" data and verification applicability matrix except for SS payloads which will also have "mission-unique" data	X		L-12	X	X

**TABLE 5.0-2B RESEARCH AND PAYLOAD MISSION INTEGRATION MILESTONE CHRONOLOGY  
PAYLOAD MISSION INTEGRATION PHASE (TACTICAL TIME FRAME) (PAGE 1 OF 7)**

LINE #	MILESTONE ACRONYM	DATE (MONTHS)	PREDECESSORS AND SUCCESSORS	P	S	SS	A	PMIT
1	IDRD P/L B/L Input	PP-18	Increment Definition and Requirements Document (Payload Baseline Input) In parallel with PTP development 2 months before IDRD (B/L)					O
2	MIP P/L B/L Input	L-17	Mission Integration Plan (Payload Baseline Input) P/L Office submittal made in parallel with PTP Baseline					O
3	IDRD (B/L)	PP-16	Increment Definition and Requirements Document (Baseline) 8 months after IDRP release 2 months after IDRD Payload Office input This is an ISS Program product					O
4	IDRD Annex 5: PTP (B/L)	I-16	Increment Definition and Requirements Document Annex 5: Payload Tactical Plan (Baseline) 2.5 months after TRA Concurrent with IDRD B/L and MIP B/L Updated as required to support P/L inputs to IDRD, approximately every 3 months. Last update occurs at L-3 for the last flight within the Increment	X	X	X	X	O
5	MIP (B/L)	L-16	Mission Integration Plan (Baseline) 7 months before CIR					O
6	MIP Annex 1 P/L Input	L-14.5	Mission Integration Plan Annex 1 Payload Data Package (Payload input) Input for Cargo Bay Payloads only 4.5 months before MIP Annex 1 B/L				X	O
7	MIP Annex 5 P/L Input	L-14.2	Mission Integration Plan Annex 5 Payload Operations Control Center (Payload input) 7 months before Baseline					O
8	Manifest and Stowage DS input to support IDRD Annex 1 (B/L) - IDRD Annex 1 MR Cut-off	L-14	Payload Increment Definition and Requirements Document Annex 1 Baseline Submit 2 months after IDRD Annex 5: PTP 3 weeks after PD Manifest and Stowage submit 2 months before IDRD Annex 1 B/L	X	X	X	X	O

**TABLE 5.0-2B RESEARCH AND PAYLOAD MISSION INTEGRATION MILESTONE CHRONOLOGY  
PAYLOAD MISSION INTEGRATION PHASE (TACTICAL TIME FRAME) (PAGE 2 OF 7)**

LINE #	MILESTONE ACRONYM	DATE (MONTHS)	PREDECESSORS AND SUCCESSORS	P	S	SS	A	PMIT
9	FRD (B/L)	L-13.2	Flight Requirements Document (Baseline) 2.8 months after MIP B/L 4.2 months before CIR					O
10	IDRD P/L Rev A Input	PP-13	Increment Definition and Requirements Document Revision A (Payload Input) 1 month before IDRD U/D to Rev A					O
11	IDRD Rev A (U/D)	PP-12	Increment Definition and Requirements Document Revision A (Update) 4 months after IDRD (B/L)					O
12	IRR	I-12	Increment Requirements Review Use PTP latest revision					O
13	H/W ICD (U/D)	L-12	Hardware Interface Control Document (Update) 2 months after PD submit of mission unique data	X			X	X
14	PVP (B/L)	L-12	Payload Verification Plan (Baseline) 2 months after PD input			X		X
15	IDRD Annex 1 L-12 (B/L)	L-12	Increment Definition and Requirements Document Annex 1 L-12 (Baseline) 1 month before MPLM Maps released 1 month before ICA inputs are due to SSP 3 months before CIR					O
16	MIP Annex 4 P/L Input	L-11.6	Mission Integration Plan Annex 4 Command and Data (Payload Input) 1.8 month minimum before MIP Annex 4 B/L					O
17	MIP Annex 2 Part 1 P/L Input	L-11	Mission Integration Plan Annex 2 Part 1 Flight Planning (Payload Input) 5.1 months before MIP Annex 2, Part 1 B/L					O
18	P/L ICA Input	L-11	Payload Interface Control Annex Input 2 months before ICA B/L					O
19	MIP P/L B/L Input - MDK	L-11	Mission Integration Plan (Payload Baseline Input) for Middeck 2 months before ICA B/L Per PTP latest revision					O

**TABLE 5.0-2B RESEARCH AND PAYLOAD MISSION INTEGRATION MILESTONE CHRONOLOGY  
PAYLOAD MISSION INTEGRATION PHASE (TACTICAL TIME FRAME) (PAGE 3 OF 7)**

LINE #	MILESTONE ACRONYM	DATE (MONTHS)	PREDECESSORS AND SUCCESSORS	P	S	SS	A	PMIT
20	MIP (B/L) - MDK	L-10.2	Mission Integration Plan (Baseline) for Middeck 1.2 month before ICA B/L					O
21	MIP Annex 1 (B/L)	L-10	Mission Integration Plan Annex 1 Payload Data Package (Baseline) 1 month before CIR					O
22	CIRD	L-9.8	Cargo Integration Review Dry Run 3 weeks before CIR					O
23	MIP Annex 4 (B/L)	L-9.8	Mission Integration Plan Annex 4 Command and Data (Baseline) 3 weeks before CIR					O
24	IDRD P/L Rev B Input	PP-9	Increment Definition and Requirements Document Revision B (Payload Input) 1 month before IDRD U/D to Rev B					O
25	CIR	L-9	Cargo Integration Review 7 months after MIP B/L 1 month after released stowage dwgs and installed P/L dwgs 1 month after MIP Annex 1 and MIP Annex 4 B/L 4.2 months after FRD B/L 3 months after IDRD Annex 1 B/L					O
26	IDRD Annex 1 L-9 (U/D)	L-9	Increment Definition and Requirements Document Annex 1 L-9 (Update) 1 month after IDRD Annex 1 (L-9) MR Cutoff 3 months after IDRD Annex 1 (L-12) Baseline					O
27	ICA (B/L)	L-9	Interface Control Annex (Baseline) 7 months after MIP B/L 1 month after released stowage dwgs and installed P/L dwgs 3 months after IDRD Annex 1 B/L 1.3 months before FPSR					O
28	IDRD Rev B (U/D)	PP-8	Increment Definition and Requirements Document Revision B (Update) 4 months after IDRD Rev A (U/D)					O

**TABLE 5.0-2B RESEARCH AND PAYLOAD MISSION INTEGRATION MILESTONE CHRONOLOGY  
PAYLOAD MISSION INTEGRATION PHASE (TACTICAL TIME FRAME) (PAGE 4 OF 7)**

LINE #	MILESTONE ACRONYM	DATE (MONTHS)	PREDECESSORS AND SUCCESSORS	P	S	SS	A	PMIT
29	FPSR	L-7.7	Flight Planning and Stowage Review 1.3 months after ICA B/L 2.3 months after released stowage dwgs and installed P/L dwgs Freeze point for Middeck Powered Payload requirements					O
30	MPLM/ SpaceHab H/W Audit	L-7.5	MPLM/SpaceHab Hardware Audit 2 weeks after MPLM/SpaceHab HAMR released by the LPMT 2 months before MPLM/SpaceHab HAMR B/L 2.5 before SSCCDs released					O
31	MIP Annex 5 (B/L)	L-7.3	Mission Integration Plan Annex 5 Payload Operations Control Center (Baseline) 4.3 months or greater before JMSTs 3.5 months before FOR					O
32	IDRD Annex 1 L-6 (U/D)	L-6	Increment Definition and Requirements Document Annex 1 L-6 (Update) 1 month after IDRD Annex 1 (L-6) MR Cut-off 3 months after IDRD Annex 1 (L-9) Update					O
33	CoFR Call Letter	L-5	Certification of Flight Readiness Call Letter 2 months before LPA input due 3.5 months before CoFR endorsements due	X	X	X	X	O
34	MIP Annex 2 Part 1 (B/L)	L-4.9	Mission Integration Plan Annex 2, Part 1 Flight Planning (Baseline)					O
35	IOR	I-4	Increment Operations Review 2.5 months after P/L OOS (B) 2.5 months after P/L GR&C (B)					O
36	MDK HDW Audit	L-4	Middeck Hardware Audit 1 months before CCCD Released 2 months before CCCR 1 month before CRRR Freeze					O
37	SSCCD (F)	L-4	Space Station Configuration Control Drawings (Final) 2 months after Drawing DS 1 to 3 weeks after SSCCDs released 2 weeks before Bench Review					O

**TABLE 5.0-2B RESEARCH AND PAYLOAD MISSION INTEGRATION MILESTONE CHRONOLOGY  
PAYLOAD MISSION INTEGRATION PHASE (TACTICAL TIME FRAME) (PAGE 5 OF 7)**

LINE #	MILESTONE ACRONYM	DATE (MONTHS)	PREDECESSORS AND SUCCESSORS	P	S	SS	A	PMIT
38	SpaceHab Ascent Manifest Freeze	L-4	SpaceHab Ascent Manifest Freeze 2 weeks before SpaceHab Bench Review					O
39	MPLM Phase III FSR DP	L-4	MPLM Phase III Flight Safety Review Data Package 1.5 month before the MPLM Phase III FSR					X
40	MPLM BR (JSC)	L-3.75	Multi-Purpose Logistics Module Bench Review at Johnson Space Center 2 weeks after H/W O/D	X	X	X	X	X, O
41	FOR	L-3.7	Flight Operations Review 3 weeks before the Start of JMSTs					O
42	MPLM BR (KSC)	L-3.5	Multi-Purpose Logistics Module Bench Review at Kennedy Space Center 1 month after H/W O/D	X	X	X	X	X, O
43	SpaceHab BR#1 (SPPF)	L-3.5	SpaceHab Bench Review no.1 at SpaceHab Payload Processing Facility 1 month after H/W O/D	X	X	X	X	X, O
44	CCCR Freeze	L-3	CCCR Freeze 1 months before CCCR					O
45	CCCD	L-3	Crew Configuration Compartment Drawings 4 months after U/D stowage dwgs & installed P/L dwgs 1 month before CCCR					O
46	IDRD Annex 1 L-3 (U/D)	L-3	Increment Definition and Requirements Document Annex 1 L-3 (Update) 1 month after IDRD Annex 1 (L-3) MR Cut-off 3 months after IDRD Annex 1 (L-6) Update					O
47	LPA @ PMIT	L-10 weeks	Launch Package Assessment review at Payload Mission Integration Team 3 weeks before LPA	X	X	X	X	O
48	MPLM Phase III FSR	L-2.5	MPLM Phase III Flight Safety Review					X

**TABLE 5.0-2B RESEARCH AND PAYLOAD MISSION INTEGRATION MILESTONE CHRONOLOGY  
PAYLOAD MISSION INTEGRATION PHASE (TACTICAL TIME FRAME) (PAGE 6 OF 7)**

LINE #	MILESTONE ACRONYM	DATE (MONTHS)	PREDECESSORS AND SUCCESSORS	P	S	SS	A	PMIT
49	CCCR	L-2	Crew Configuration Compartment Review 5 months after U/D stowage dwgs & installed P/L dwgs 1 month after CCCR Freeze 1 month after CCCD Released					O
50	SpaceHab Descent Manifest Freeze	L-2	SpaceHab Descent Manifest Freeze					O
51	SpaceHab BR#2 (SPPF/CEIT)	L-2 to L-1.5	SpaceHab Bench Review no.2 at SpaceHab Payload Processing Facility, includes CEIT 1 month after HW O/D	X	X	X	X	X, O
52	LPA	L-7 weeks	Launch Package Assessment 3 weeks after LPA PMIT	X	X	X	X	O
53	Transfer List	L-1.5	Transfer List 2 weeks before transfer cue card reviews weekly beginning at L-4 weeks 1 week to 1 day prior to transferring information to the crew					X, O
54	IDRD Annex 1 L-6 weeks (U/D) and subsequent	L-6 weeks to L-1 week	Increment Definition and Requirements Document Annex 1 L-6 weeks (Update) Weekly update as required 1 week after IDRD Annex 1 weekly MR Cut-off					O
55	CoFR @ MPCB	L-4.5 weeks	Certification of Flight Readiness review at Multilateral Payload Control Board 1 week before SORR	X	X	X	X	O
56	MBR (JSC)	L-1	Middeck Bench Review at Johnson Space Center 2 weeks after H/W O/D	X	X	X	X	X, O
57	SORR	L-3.5 weeks	Stage Operations Readiness Review 2.5 weeks after CoFR submittal	X	X	X	X	O
58	FRR	L-2 weeks	Flight Readiness Review					O

**TABLE 5.0-2B RESEARCH AND PAYLOAD MISSION INTEGRATION MILESTONE CHRONOLOGY  
PAYLOAD MISSION INTEGRATION PHASE (TACTICAL TIME FRAME) (PAGE 7 OF 7)**

LINE #	MILESTONE ACRONYM	DATE (MONTHS)	PREDECESSORS AND SUCCESSORS	P	S	SS	A	PMIT
59	MPLM Pad Stow Crew Review (KSC)	L-2 weeks	Pad Stow Crew Review for MPLM late access stowage at Kennedy Space Center 1 week after H/W O/D	X	X	X	X	X, O
60	MBR (JSC)	L-10 days	L-10 day Middeck Bench Review at Johnson Space Center 2 weeks after H/W O/D	X	X	X	X	X, O
61	EIRR	KSC Testing Start -4 weeks	EXPRESS Integration Readiness Review			X		

TABLE 5.0-3 PAYLOAD ENGINEERING INTEGRATION MILESTONE CHRONOLOGY (PAGE 1 OF 2)

LINE #	MILESTONE ACRONYM	DATE (MONTHS)	PREDECESSORS AND SUCCESSORS	P	S	SS	A	PMIT
1	Drawing DS - Crew I/F Label Dwgs (IPLAT Label Evaluation) (P)	CDR+4.5	IPLAT Initial Label Evaluation of (Pre-released) Crew Interface Label Drawings 2 weeks after submittal of Crew Interface Label Drawings (Pre-released) IPLAT returns ISS Payload Label Verification checklist to PD containing IPLAT concurrence or recommendations. The PD will make corrections to label design if violations occur.	X	CDR +6.5	CDR +6.5	X	
2	On-Orbit Configuration Drawing, EXPRESS/WORF (P)	L-11	On-Orbit Configuration Drawing, EXPRESS/WORF (Preliminary) 5 months before B/L This milestone is applicable at the integrated EXPRESS or integrated WORF rack level only. It does not apply to Subrack level payloads.	X				O
3	A&I Drawings, EXPRESS/WORF (P)	L-11	Assembly and Installation Drawings, EXPRESS/WORF (Preliminary) 5 months before B/L This milestone is applicable at the integrated EXPRESS or integrated WORF rack level only. It does not apply to Subrack level payloads.	X				O
4	HFIT Final Hardware Evaluation	L-9	Issued CoC and Form 883 after Form 882 is completely closed.	X	X	X		
5	Drawing DS – Crew I/F Label Dwgs (IPLAT Label Evaluation) (F)	I-7.5	IPLAT Final Label Evaluation of (Released) Crew Interface Label Drawings 2 weeks after submittal of Crew Interface Label Drawings (Released) Before Bench Review IPLAT will issue JSC Form 732 Label Approval. JSC Form 732 will be included into HFIT CoC and Form 883.	X	X	X	X	
6	Rack Engineering Analysis Complete	L-7	Rack Engineering Analysis Complete Submit to Verification			X		
7	On-Orbit Configuration Drawing, EXPRESS/WORF (B/L)	L-6	On-Orbit Configuration Drawing, EXPRESS/WORF (Baseline) 5 months after Preliminary This milestone is applicable at the integrated EXPRESS or integrated WORF rack level only. It does not apply to Subrack level payloads.	X				O

TABLE 5.0-3 PAYLOAD ENGINEERING INTEGRATION MILESTONE CHRONOLOGY (PAGE 2 OF 2)

LINE #	MILESTONE ACRONYM	DATE (MONTHS)	PREDECESSORS AND SUCCESSORS	P	S	SS	A	PMIT
8	A&I Drawings, EXPRESS/WORF (B/L)	L-6	Assembly and Installation Drawings, EXPRESS/WORF (Baseline) 5 months after Preliminary This milestone is applicable at the integrated EXPRESS or integrated WORF rack level only. It does not apply to Subrack level payloads.	X				O
9	Stage XX EXPRESS/WORF Operations Guidelines and Constraints	L-6	Stage XX EXPRESS/WORF Operations Guidelines and Constraints			X		O
10	EXPRESS/WORF Compatibility Analysis Report for Stage XX	L-6	EXPRESS/WORF Compatibility Analysis Report for Stage XX			X		
11	Engineering Stage Analysis Report (F)	L-4.5	Payload Element Level Engineering Analysis Report (Final) 3 months after PD submittal of Stage Analysis verification data	X	X		X	O
12	GL&C (F)	L-4	Payload Operations Guidelines and Constraints Element-Level Report (Final)	X	X		X	O
13	P/L Engineering Verification Report	L-6 weeks	Payload Engineering Verification Report – Stage Level Before SORR activity start	X	X		X	O
14	Stage Configuration Drawings (B/L)	L-5 weeks	Stage Configuration Drawings (Baseline) 5 months after B/L submittal	X	X		X	O
15	Integrated Schematics (B/L)	L-5 weeks	Integrated Schematics (Baseline) 5 months after B/L submittal	X	X		X	O
16	EXPRESS/WORF Compliance Report	L+2 weeks	EXPRESS/WORF Compliance Report			X		

**TABLE 5.0-4 PAYLOAD SOFTWARE INTEGRATION MILESTONE CHRONOLOGY**

LINE #	MILESTONE ACRONYM	DATE (MONTHS)	PREDECESSORS AND SUCCESSORS	P	S	SS	A	PMIT
1	P/L MDM Configuration Files/PCS Displays (P)	L-14	Payload MDM Configuration Files/Portable Computer System Displays (Preliminary) 2 months after Preliminary C&DH data set 2 months before Preliminary S/W ICD	X		X	X	
2	S/W ICD (P)	L-12	Software Interface Control Document (Preliminary) 4 months before S/W ICD (I)	X		X	X	X
3	S/W ICD (I)	L-8	Software Interface Control Document (Interim) 4 months after S/W ICD (P) 1 month before P/L MDM Configuration Files/PCS Displays (I) Submit to S/W ICD (F)	X		X	X	X
4	P/L MDM Configuration Files/PCS Displays (I)	L-7	Payload MDM Configuration Files/Portable Computer System Displays (Interim) 2 months after Interim C&DH data set 1 month after Interim S/W ICD	X		X	X	
5	P/L MDM Configuration Files/PCS Displays (F)	L-4	Payload MDM Configuration Files/Portable Computer System Displays (Final) 2 months after Final C&DH data set 1 month before Final S/W ICD	X		X	X	
6	S/W ICD (F)	L-3	Software Interface Control Document (Final) 5 months after S/W ICD (I)	X		X	X	X

TABLE 5.0-5 PAYLOAD OPERATIONS INTEGRATION FUNCTION MILESTONE CHRONOLOGY (PAGE 1 OF 4)

LINE #	MILESTONE ACRONYM	DATE (MONTHS)	PREDECESSORS AND SUCCESSORS	P	S	SS	A	PMIT
1	PPD DS OpNom (B/L)	I-16	Payload Procedures & Displays Data Set: Payload Unique Operations Nomenclature (Baseline) 1 month after ECR submittal	X	I-14	I-14	X	O
2	PPD DS Displays (B/L)	I-16	Payload Procedures & Displays Data Set: Candidate Flight Crew Displays (Baseline) 1 month after Candidate Flight Crew Displays submittal	X	I-14	I-14	X	O
3	Start Reflight P/L Training	I-16	Start Training for "Reflight" Payloads Reflight Pressurized facility (rack-level) payloads not requiring PD training support could start earlier. 8-10 months before Start Complement Training	X	I-14	I-14	I-14	
4	P/L Training DS (B/L)	I-12	Payload Training Data Set (Baseline) 1 month before PTDR 2 months before Start New P/L Training	X	I-10	I-10	I-10	O
5	PTDR	I-11	Payload Training Dry Run This milestone is only applicable to new payloads 1 month before Start New P/L Training	X	I-9	I-9	I-9	
6	Start New P/L Training	I-10	Start Training for "New" Payloads 1 month after PTDR 2-4 months before Start Complement Training	X	I-8	I-8	I-8	
7	GDS DS (B/L)	I-10	Ground Data Services Data Set (Baseline) 3 months after GDS DS submittal	X		X	X	O
8	GCP Book (P)	L-9	Ground Command Procedures Book (Preliminary) 3 months after Preliminary Ground Command Procedures submittal	X	X	X	X	
9	PSM (P)	L-9	Payload System Manual (Preliminary) 6 months before PSM (F)	X	X	X	X	
10	P/L Planning DS (B)	I-8.75	Payload Planning Data Set (Basic) 2.25 months before P/L OOS (B) and P/L GR&C (B)	X	X	X	X	O

TABLE 5.0-5 PAYLOAD OPERATIONS INTEGRATION FUNCTION MILESTONE CHRONOLOGY (PAGE 2 OF 4)

LINE #	MILESTONE ACRONYM	DATE (MONTHS)	PREDECESSORS AND SUCCESSORS	P	S	SS	A	PMIT
11	EPAS (Basic)	I-8	Earth-To-Orbit Vehicle (Shuttle) Payload Activity Summary (Basic) 4 months after Payload Planning Data Set (B) submittal 4 months before first Shuttle flight FOR This is a POIF product submittal to MOD	X	X	X	X	O
12	P/L Regs (Draft)	I-8	Payload Regulations (Draft) 5 months before Payload Regulations (Baseline)	X	X	X	X	O
13	P/L OOS (B)	I-6.5	Payload Increment On-Orbit Operations Summary (Basic) 2.25 months after Planning Data Set (B) Same time as P/L GR&C (B)	X	X	X	X	O
14	P/L GR&C (B)	I-6.5	Payload Groundrules and Constraints (Basic) 2.25 months after Planning Data Set (B) Same time as P/L OOS (B)	X	X	X	X	O
15	Start Complement Training	I-6	Start Complement Training for the Increment 2-4 months after Start New P/L Training 3 months before Start JMST	X	X	X	X	O
16	Flight Rules Annex	L-6	Flight Rules Annex 2 months before Shuttle Flight FOR This is a POIF product submittal to MOD	X	X	X	X	O
17	ETOV Payload Procedures to U.S. SODF	L-6	Earth-To-Orbit Vehicle (Shuttle) Payload Procedures Submit to U.S. Systems Operations Data File 2 months before Shuttle flight FOR This is a POIF product submittal to MOD	X	X	X	X	O
18	EPAS (Rev A)	L-5.5	Earth-To-Orbit Vehicle (Shuttle) Payload Activity Summary (Rev A) Flight specific milestone 0.5 month after Planning Data Set (F) submittal 1.5 months before Shuttle flight FOR This is a POIF product submittal to MOD	X	X	X	X	O

TABLE 5.0-5 PAYLOAD OPERATIONS INTEGRATION FUNCTION MILESTONE CHRONOLOGY (PAGE 3 OF 4)

LINE #	MILESTONE ACRONYM	DATE (MONTHS)	PREDECESSORS AND SUCCESSORS	P	S	SS	A	PMIT
19	P/L Planning DS (F)	I-3.5	Payload Planning Data Set (Final) 2.5 months after Planning Data Set (F) submittal 1.75 months before P/L OOS (F) and P/L GR&C (F)	X	X	X	X	O
20	PPD DS Procedures (B/L)	I-3.5	Payload Procedures and Displays Data Set: Manual Procedures (Baseline) 2 months after submittal of ECR to Baseline Manual Procedures	X	X	X	X	O
21	P/L Regs (B/L)	I-3	Payload Regulations (Baseline) 5 months after Payload Regulations (Draft)	X	X	X	X	O
22	U.S. PODF (F)	I-3	U.S. Payload Operations Data File (Final) 0.5 month after Manual Procedures (Baseline)					O
23	Start JMST	I-3	Start Joint Multi-Segment Station Training 3 months after Start Complement Training	X	X	X	X	O
24	GCP Book (F)	L-3	Ground Command Procedures Book (Final) 6 months after GCP Book (P)	X	X	X	X	
25	PSM (F)	L-3	Payload System Manual (Final) 6 months after PSM (P)	X	X	X	X	
26	EPAS (F)	L-3	Earth-To-Orbit Vehicle (Shuttle) Payload Activity Summary (Final) Flight specific milestone 1 month after Shuttle flight FOR This is a POIF product submittal to MOD	X	X	X	X	O
27	P/L OOS (F)	I-1.75	Payload Increment On-Orbit Operations Summary (Final) 1.75 months after Planning Data Set (F) Same time as P/L GR&C (F) 0.75 month before OOS (F) and GR&C (F) This is a POIF product submittal to MOD	X	X	X	X	O

**TABLE 5.0-5 PAYLOAD OPERATIONS INTEGRATION FUNCTION MILESTONE CHRONOLOGY (PAGE 4 OF 4)**

LINE #	MILESTONE ACRONYM	DATE (MONTHS)	PREDECESSORS AND SUCCESSORS	P	S	SS	A	PMIT
28	P/L GR&C (F)	I-1.75	Payload input to Groundrules and Constraints (Final) 1.75 months after Planning Data Set (F) Same time as P/L OOS (F) 0.75 month before OOS (F) and GR&C (F) This is a POIF product submittal to MOD	X	X	X	X	O

TABLE 5.0-6 KENNEDY SPACE CENTER INTEGRATION MILESTONE CHRONOLOGY (PAGE 1 OF 2)

LINE #	MILESTONE ACRONYM	DATE (MONTHS)	PREDECESSORS AND SUCCESSORS	P	S	SS	A	PMIT
1	KSC TRDS ISS to P/L OMRS, File 10, Volume 2 (P)	L-12	Kennedy Space Center Technical Requirements Data Set International Space Station to Payload Operations and Maintenance Requirements and Specifications, File 10, Volume 2 (Preliminary) 0.5 month after KSC TRDS OMRS File 10, Volume 2 (P) submittal 3 months before KSC TRDS OMRS, File 10, Volume 2 (B/L)	X	X	X	X	O
2	KSC TRDS Bay to P/L OMRS, File 2, Volume 2 (P)	L-12	Kennedy Space Center Technical Requirements Data Set Bay to Payload Operations and Maintenance Requirements and Specifications, File 2, Volume 2 (Preliminary) 0.5 month after KSC TRDS OMRS File 2, Volume 2 (P) submittal 4 months before KSC TRDS OMRS, File 2, Volume 2 (B/L)				X	O
3	KSC TRDS ISS to P/L OMRS, File 10, Volume 2 (B/L)	L-9	Kennedy Space Center Technical Requirements Data Set International Space Station to Payload Operations and Maintenance Requirements and Specifications, File 10, Volume 2 (Baseline) 3 months after OMRS, File 10, Volume 2 (P)	X	X	X	X	O
4	KSC TRDS Bay to P/L OMRS, File 2, Volume 2 (B/L)	L-8	Kennedy Space Center Technical Requirements Data Set Bay to Payload Operations and Maintenance Requirements and Specifications, File 2, Volume 2 (Baseline) 4 months after OMRS, File 2, Volume 2 (P)				X	O
5	KSC TRDS Orbiter MDK to P/L OMRS, File 2, Volume 2 (P)	L-5	Kennedy Space Center Technical Requirements Data Set Orbiter Middeck to Payload Operations and Maintenance Requirements and Specifications, File 2, Volume 2 (Preliminary) 1 month after MDK OMRS, File 2, Volume 2 (P) submittal 2 months before MDK OMRS, File 2, Volume 2 (B/L)	X	X	X	X	O
6	KSC TRDS Orbiter MDK to P/L TGHR Table (P)	L-4	Kennedy Space Center Technical Requirements Data Set Orbiter Middeck to Payload Time-Critical Ground Handling Requirements Table (Preliminary) 0.5 month after Orbiter MDK TGHR table (P) submittal 2 months before Orbiter MDK TGHR table (B/L)	X	X	X		O

TABLE 5.0-6 KENNEDY SPACE CENTER INTEGRATION MILESTONE CHRONOLOGY (PAGE 2 OF 2)

LINE #	MILESTONE ACRONYM	DATE (MONTHS)	PREDECESSORS AND SUCCESSORS	P	S	SS	A	PMIT
7	CEIT	L-4	Crew Equipment Interface Test Before Cargo Bay/Carrier installation	X	X	X	X	O
8	KSC Utilization T/O Rack	L-3.5	KSC Utilization Hardware T/O for MPLM installation. H/W T/O need date will be provided by the ISS Program to support outfitting the MPLM schedule	X				X, O
9	KSC TRDS Orbiter MDK to P/L OMRS, File 2, Volume 2 (B/L)	L-3	Kennedy Space Center Technical Requirements Data Set Orbiter Middeck to Payload Operation and Maintenance Requirements and Specifications, File 2, Volume 2 (Baseline) 2 months after MDK OMRS, File 2, Volume 2 (P)	X	X	X	X	O
10	KSC TRDS Orbiter MDK to P/L TGHR Table (B/L)	L-2	Kennedy Space Center Technical Requirements Data Set Orbiter Middeck to Payload Time-Critical Ground Handling Requirements Table (Baseline) 2 months after Orbiter MDK TGHR table (P)	X	X	X		O
11	CEIT (Middeck)	L-1.6	Crew Equipment Interface Test for P/L flying in the Middeck	X	X	X	X	O
12	PRR	L-6 weeks	Payload Readiness Review 2.5 weeks before SORR					O
13	KSC SRDS (B/L)	H/W O/D-3	Kennedy Space Center Support Requirements Data Set (Baseline) 3 months before P/L H/W O/D at KSC 2 months before LSSP Addendum (B/L)	X	X	X	X	O
14	MIP Annex 8 LSSP Addendum (B/L)	H/W O/D-1	Launch Site Support Plan Addendum (Baseline) 2 months after KSC SRDS (B/L) 1 month before P/L H/W O/D at KSC	X	X	X	X	O

## **6.0 INTERNATIONAL PARTNER SECTION**

The ISS Payload Integration Template will be revised at a later date to cover IP payload integration templates and high-level inter-partner deliveries, but this current version is limited to NASA-sponsored or bartered payloads.

**APPENDIX A**  
**SCHEDULE TEMPLATES**

## APPENDIX A

This Appendix contains various types of PIM schedule templates and a PMIT flight schedule template. When developing a unique PIM or PMIT schedule, the actual calendar need dates for schedule activities are initially calculated based on the templates in this Appendix. The templates identify the activities that could be included on the unique schedule and when they must occur based on their relation to each other and to the projected launch date or increment start date. These templates merely provide a “start-point” from which unique PIM or PMIT schedules can be tailored to reflect those milestones appropriate to a given payload or flight.

### Figure A-1 Pressurized Payload Generic PIM Schedule Template

The pressurized payload generic PIM schedule is the payload integration schedule for pressurized payloads with the lowest level of detail. It reflects the progression of PD integration data in support of the ISS Payload Office need dates, and in-turn the Payload Office products that are delivered to the ISS Program or SSP. This is a payload unique scheduling tool used by the PIM and PD to manage the integration of the specific payload into the ISS Program.

### Figure A-2 Small Payload Generic PIM Schedule Template

The small payload generic PIM schedule is the payload integration schedule for small payloads with the lowest level of detail. It reflects the progression of PD integration data in support of the ISS Payload Office need dates, and in-turn the Payload Office products that are delivered to the ISS Program or SSP. This is a payload unique scheduling tool used by the PIM and PD to manage the integration of the specific payload into the ISS Program.

### Figure A-3 Subrack Standard Payload Generic PIM Schedule Template

The subrack standard payload generic PIM schedule is the payload integration schedule for subrack standard payloads with the lowest level of detail. It reflects the progression of PD integration data in support of the ISS Payload Office need dates, and in-turn the Payload Office products that are delivered to the ISS Program or SSP. This is a payload unique scheduling tool used by the PIM and PD to manage the integration of the specific payload into the ISS Program.

### Figure A-4 Attached Payload Generic PIM Schedule Template

The attached payload generic PIM schedule is the payload integration schedule for attached payloads with the lowest level of detail. It reflects the progression of PD integration data in support of the ISS Payload Office need dates, and in-turn the Payload Office products that are delivered to the ISS Program or SSP. This is a payload unique scheduling tool used by the PIM and PD to manage the integration of the specific payload into the ISS Program.

Figure A-5 Generic Payload Mission Integration Team Schedule Template

The generic payload mission integration schedule is the summary level payload integration schedule by flight. It reflects the ISS Payload Office need dates for the flight complement to support development of Payload Office products which are delivered to the ISS Program or SSP. This is a flight-specific scheduling tool used by the Increment Payload Manager (IPM) and Flight Payload Manager (FPM) to provide a weekly status at the PMIT meeting.

The following definitions describe the legend symbols used in the generic schedule templates:

PD SUBMIT (Down Triangle) ▼

Represents the milestone date on a payload-unique PIM Schedule for which the Payload Developer plans to submit data or hardware to the ISS Payload Program. The generic PIM Schedules in this document will not carry “down triangles” associated with the milestones.

OZ NEED DATE (Up Triangle) ▲

Represents the ISS Payload Program need date for which a Payload Developer is required to provide data or hardware in support of a given milestone. On the generic PIM Schedules in this document the “up triangles” reflect the template need dates which can be adjusted per PIM negotiations with the milestone owner when creating a payload-unique PIM Schedule.

OZ PRODUCT DELIVERY (Circle) ●

Represents an ISS Payload Program product which typically results from the collection and integration of data submitted by the Payload Developers.

ISS Program/SSP MILESTONE (Up Arrow) ↑

Represents a significant ISS or Shuttle Program milestone event such as a major Flight or Increment review. Dates for these key milestones are typically established by the ISS Program Office and are supported by the ISS Payload Program. These milestones maybe referenced on the generic PIM Schedules and the Generic PMIT Schedule for visibility to the Payload Developers and payload implementing community.

Pressurized Payload  
Generic PIM Schedule

		A S O N D J F M A M J J A S O N D J F M A M J J A S O N D J F M A M J J A S O N D J F M A M J											
1	Legend				▽ = PD Submit		△ = OZ Need Date		○ = OZ Product Delivery		◇ = ISS/SSP Milestone		
2					P=Preliminary		B/L=Baseline		U/D=Update		B=Basic		I=Interim
3	ISS Planning	Increment											Incr. X
4		Launch											Fit. Y
5	Project Milestones (Development)	Hardware Reviews											
6		*PDR											
7		*CDR											
8		*Pre-Ship Review											
9		ISS Development Hardware Delivery											
10		*ISPR (Flight Rack)											
11		*ARIS											
12		ISS Integration Hardware Delivery											
13		*PRCU											
14		*STEP											
15		*TReK											
16		PD Hardware											
17		*Mockup											
18		*Engineering Model											
19		*Proto Flight											
20		*Ground Integration Unit											
21		*Flight Unit											
22	Safety	Flight Safety Reviews (FSR)											
23					△ Ph 0/I P/L DP (-45days)		△ Ph II P/L DP (-45days)		△ Ph III FSR DP (-45days)				
24					◇ Ph 0/I P/L FSR (PDR+2)		◇ Ph II P/L FSR (CDR+2)		◇ Ph III FSR (L-10)				
25		Ground Safety Reviews (GSR)											
26					△ Ph 0/I P/L DP (-45days)		△ Ph II P/L DP (-45days)		△ Ph III GSR DP (-45days)				
27				◇ Ph 0/I P/L GSR (PDR+3)		◇ Ph II P/L GSR (CDR+2)		◇ Ph III GSR (L-7)					
28	CoFR												Call Letter (L-5) ○
29													LPA Input (L-12wks) △
30													LPA @ PMIT (L-10 wks) ○
31													LPA (L-7 wks) ◇
32													CoFR Endorsements (L-6 wks) △
33													CoFR @ MPCB (L-4.5 wks) ○
34													SORR (L-3.5 wks) ◇
35	Research and Mission integration	Export Control Letter			Letter ▽								○ ISSP Concurrence
36		ISS Payload Process Overview			Roadshow ◇								
37		Payload Integration Agreement			P (PDR) ▽								B/L (CDR+1) ○

FIGURE A-1 PRESSURIZED PAYLOADS GENERIC PIM SCHEDULE



































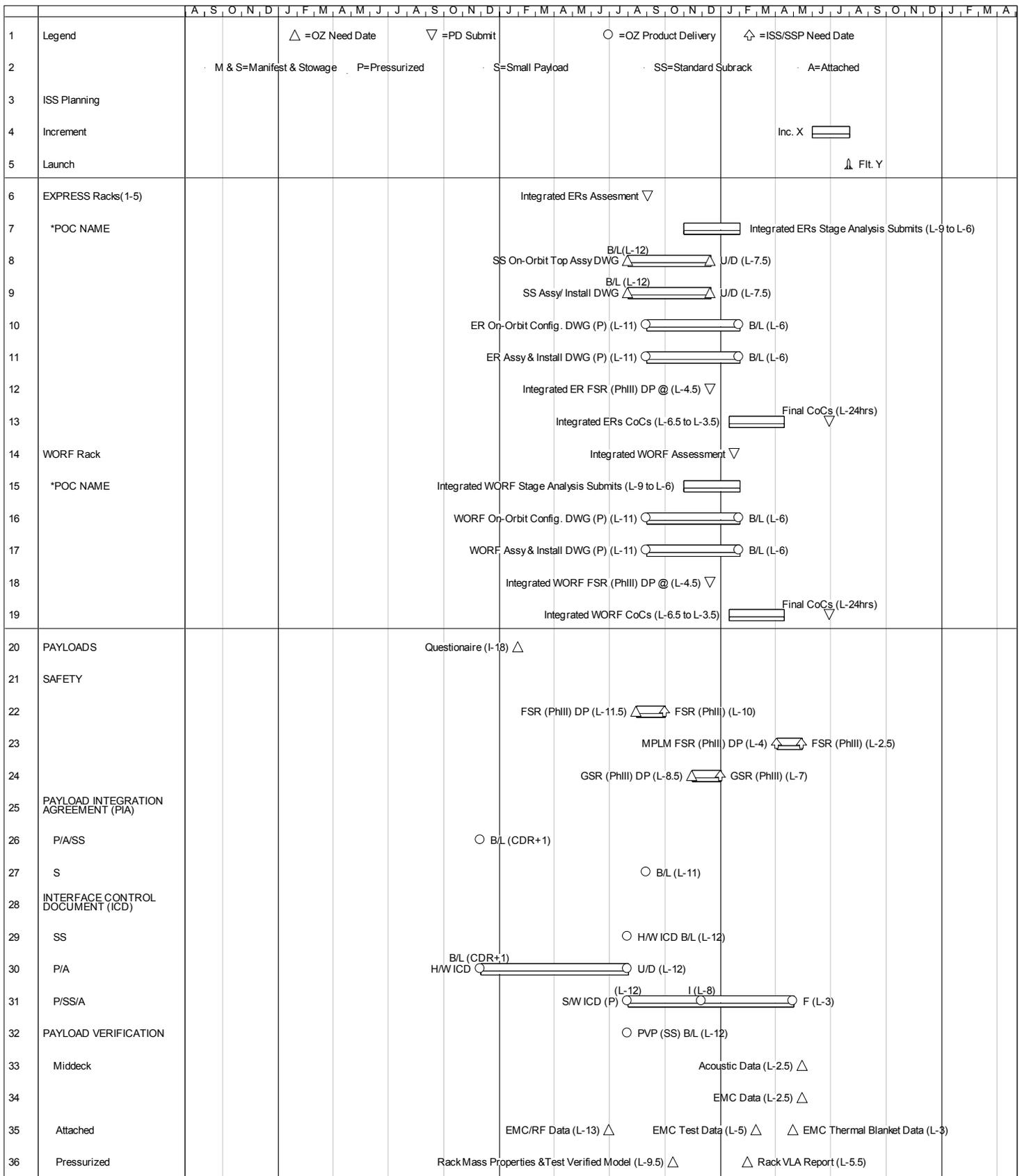


FIGURE A-5 GENERIC PAYLOAD MISSION INTEGRATION TEAM SCHEDULE







**APPENDIX B**  
**LEVEL II PROCESS FLOWS**

**APPENDIX B LEVEL II PROCESS FLOWS**

This Appendix contains the Level II Process Flows for payload integration. The Level II Process Flows illustrate the interrelationships of the various data products and activities necessary to carry out the major process(es) within each functional area. Each Level II Process Flow relates to the Level I Flow, and the primary data product or activity depicted on the Level II Flow appears on the Level I Flow. The Level II Flows indicate relationships and dependencies, and depict all related data inputs, outputs and supporting processes.

A further level of understanding and detail behind these Level II Process Flows can be found by referring to the ISS Payload Office SIPOCs which are available on-line via the PIM/PD Web portal (<http://stationpayloads.jsc.nasa.gov/pd/index.cfm>). These SIPOCs (also known as Desk Instructions) complement the Level II Process Flows while providing further explanation of the payload integration process-product, input-output-usage relationships.

Figure B.1-1 through B.1-8 are Level II Process Flows for Research and Payload Mission Integration.

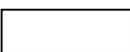
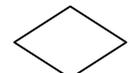
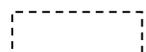
Figure B.2-1 through B.2-6 are Level II Process Flows for Payload Engineering Integration.

Figure B.3-1 is the Level II Process Flow for Payload Software Integration.

Figure B.4-1 through B.4-3 are Level II Process Flows for KSC Integration.

Figure B.5-1 through B.5-17 are Level II Process Flows for Payload Operations Integration.

For increased understanding of the Level II Process Flows, the following flow legend is provided:

-  Payload Developer Input
-  Process or Product
-  Decision
-  Process or Product not performed by Payloads Office
-  Key Product or Process (appears on Level I ISS Program Payload Integration Process Flow Figure 3.0-1)

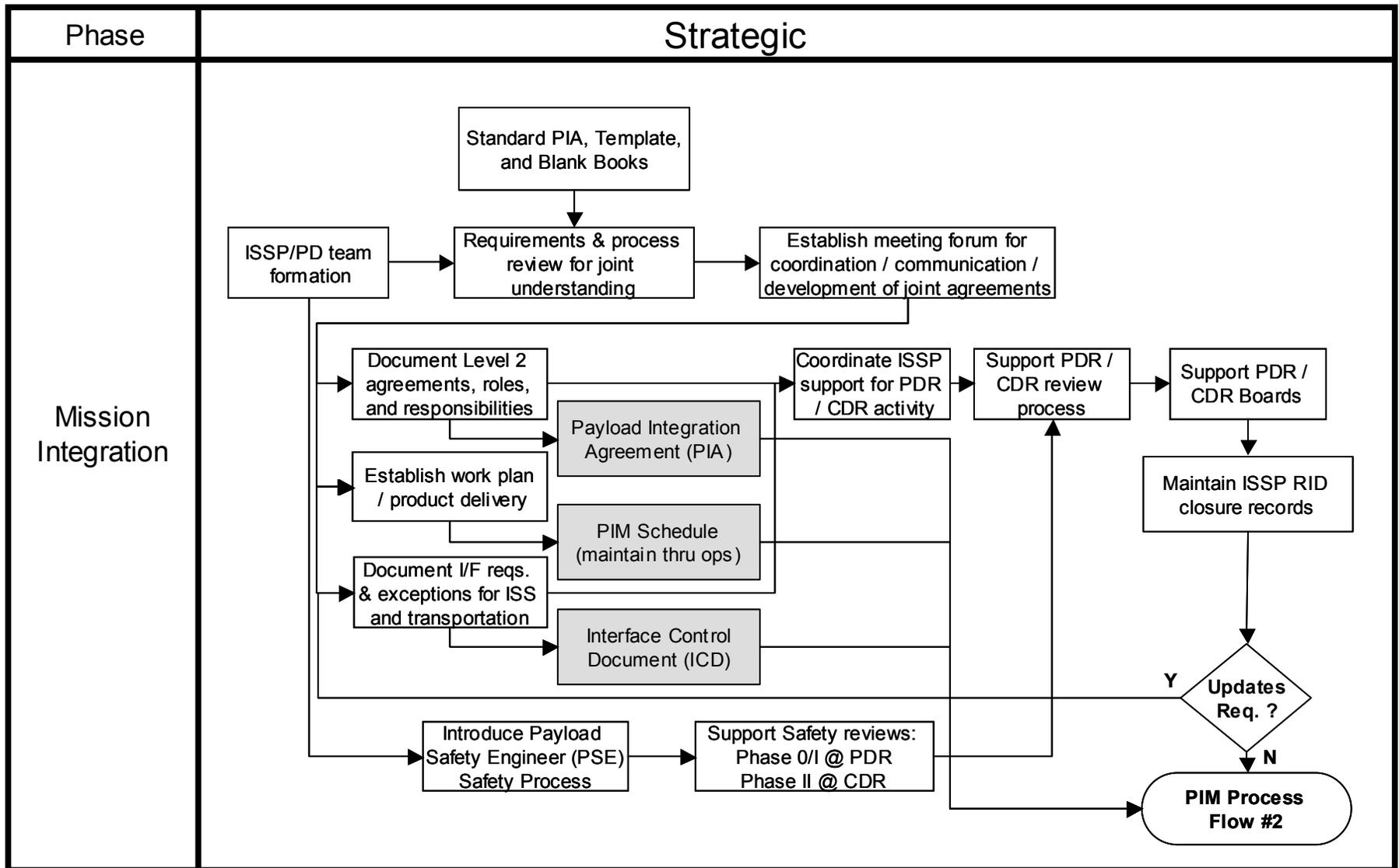
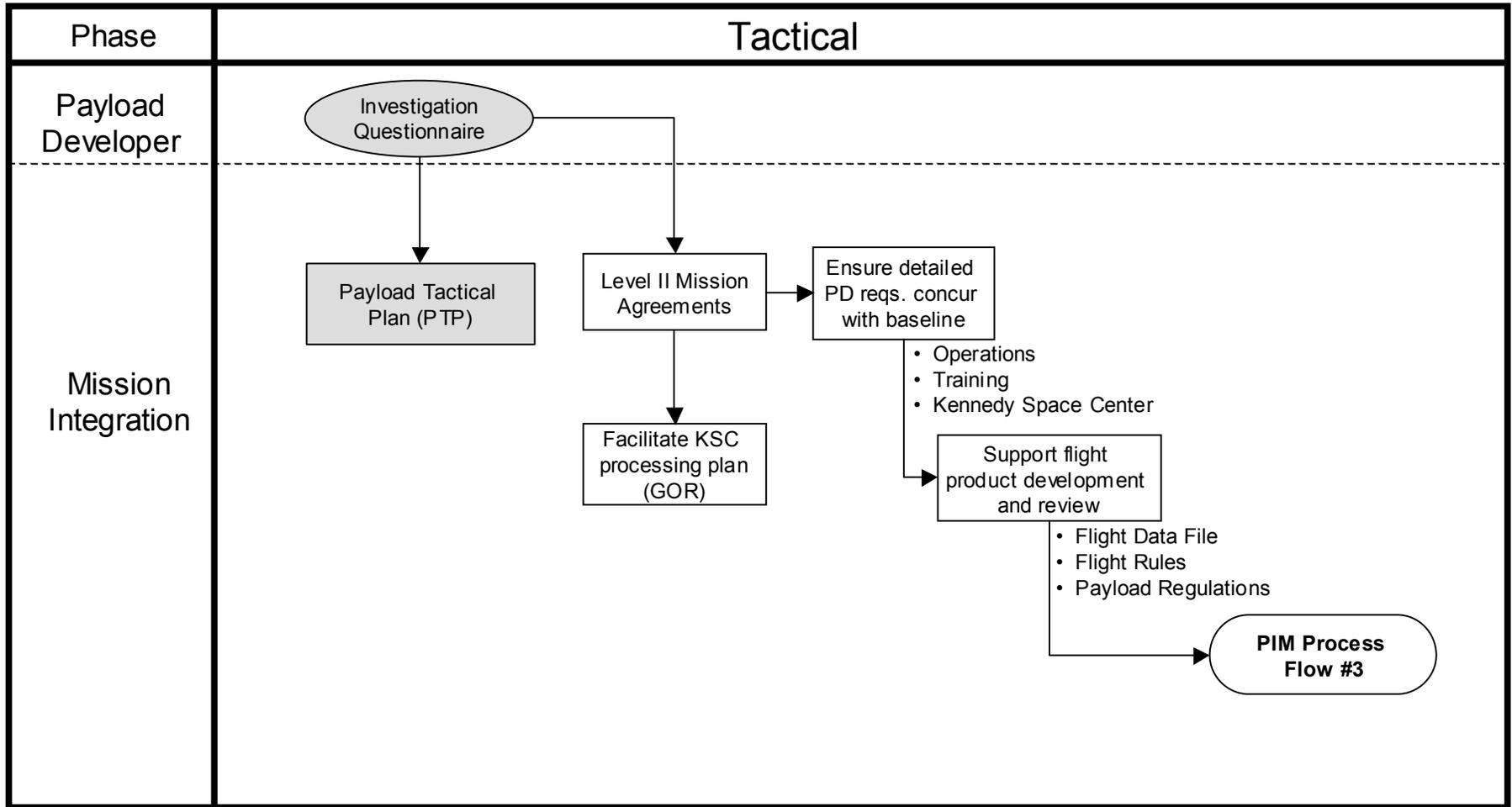
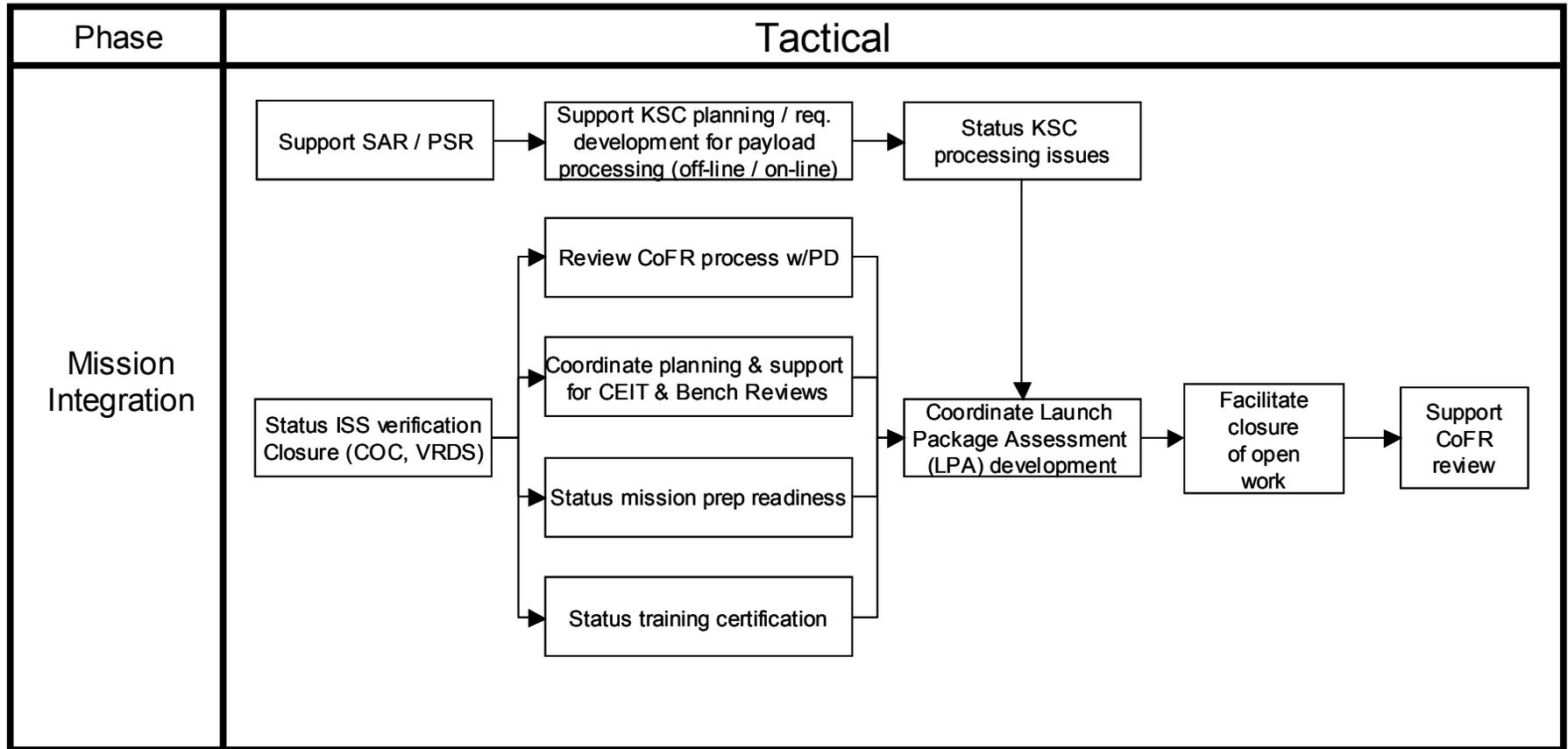


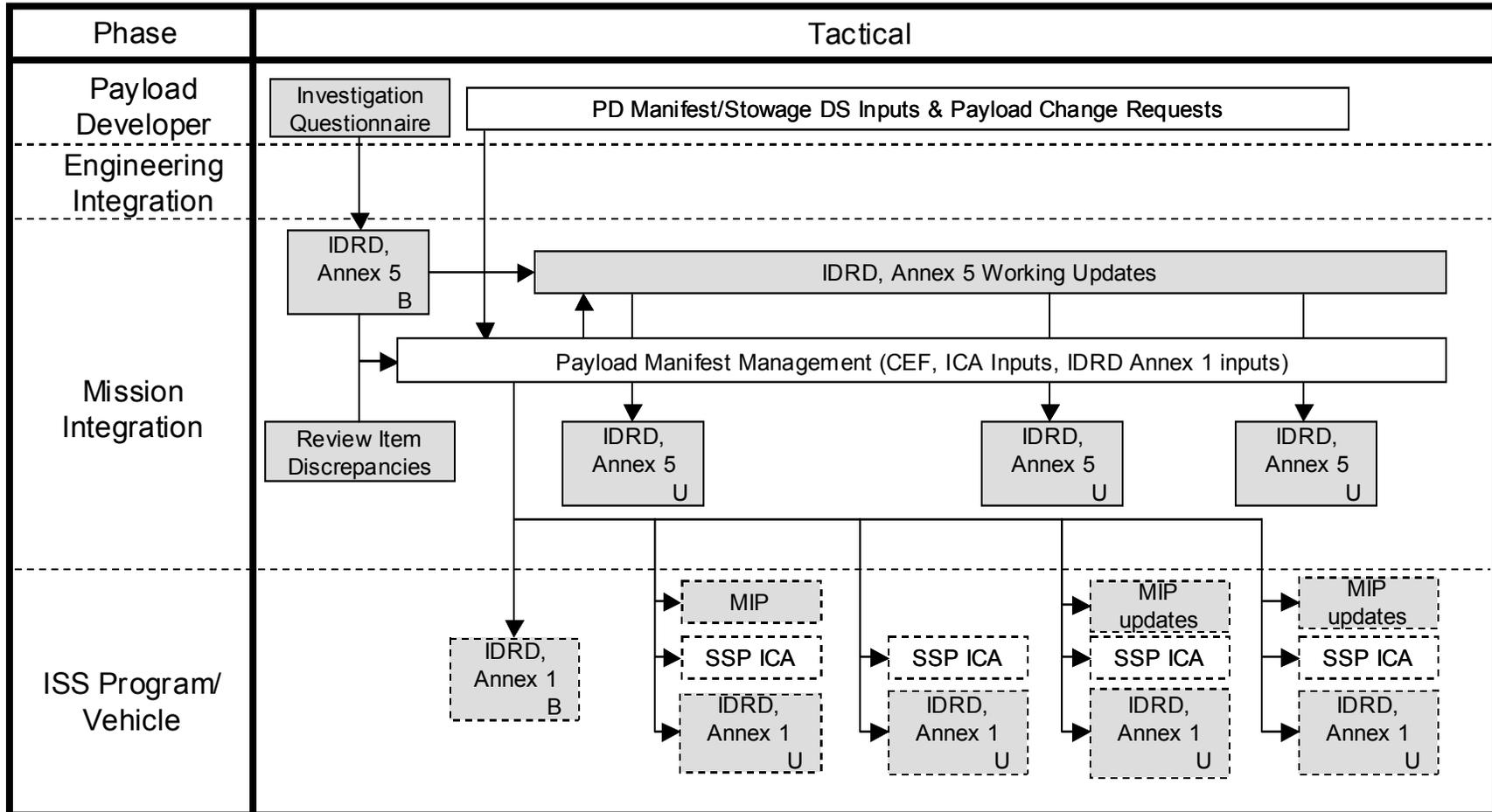
FIGURE B.1-1 PAYLOAD INTEGRATION MANAGEMENT STRATEGIC DESIGN LEVEL II PROCESS FLOW



**FIGURE B.1-2 PAYLOAD INTEGRATION MANAGEMENT TACTICAL/MISSION PLANNING LEVEL II PROCESS FLOW**



**FIGURE B.1-3 PAYLOAD INTEGRATION MANAGEMENT FINAL FLIGHT PREPARATION/CERTIFICATION OF FLIGHT READINESS (COFR) LEVEL II PROCESS FLOW**



**FIGURE B.1-4 MISSION MANAGEMENT PAYLOAD MANIFEST MANAGEMENT AND PAYLOAD TACTICAL PLAN LEVEL II PROCESS FLOW**

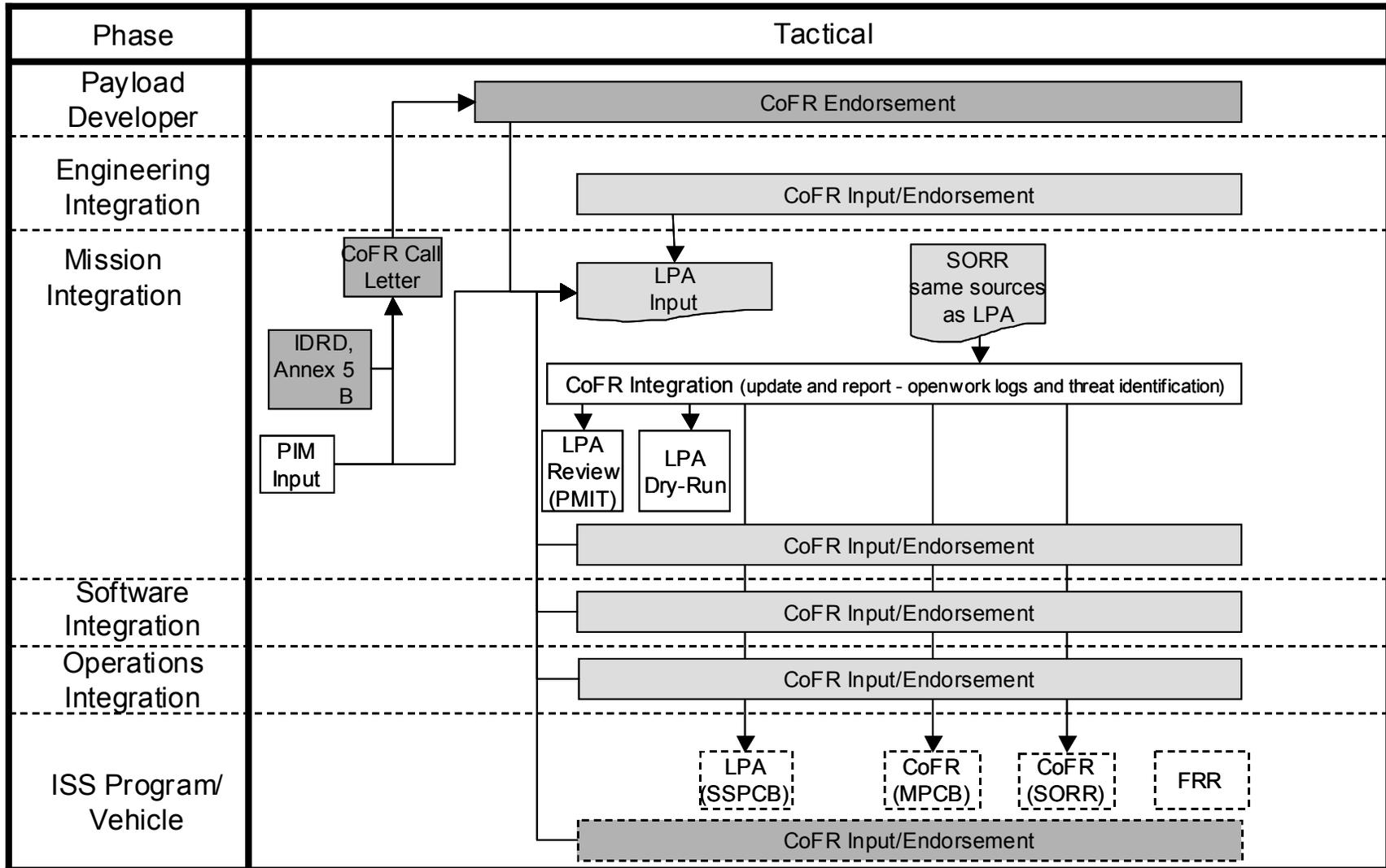
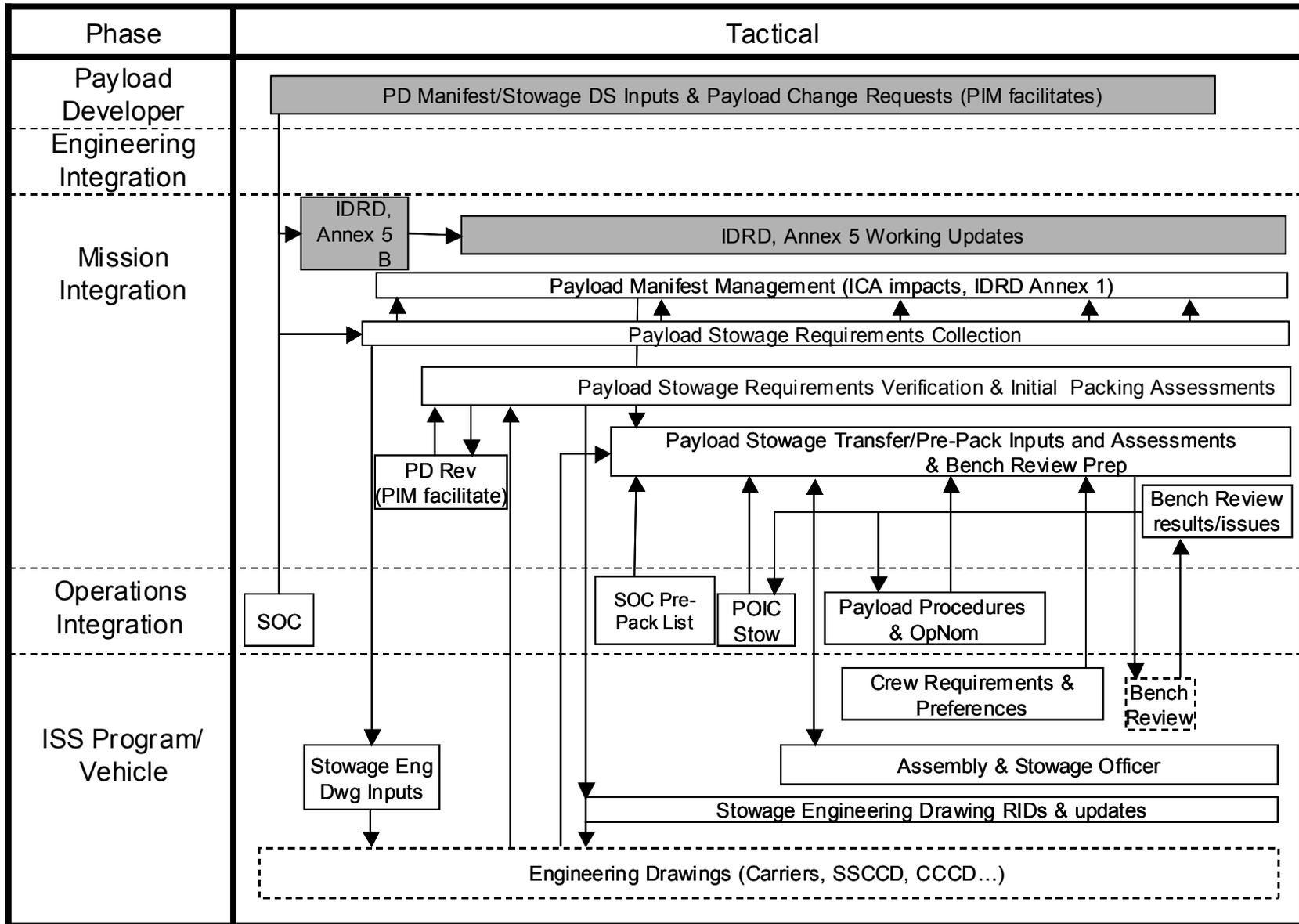


FIGURE B.1-5 MISSION MANAGEMENT COFR MANAGEMENT LEVEL II PROCESS FLOW



**FIGURE B.1-6 MISSION MANAGEMENT STOWAGE PAYLOAD INTEGRATION MANAGEMENT LEVEL II PROCESS FLOW**

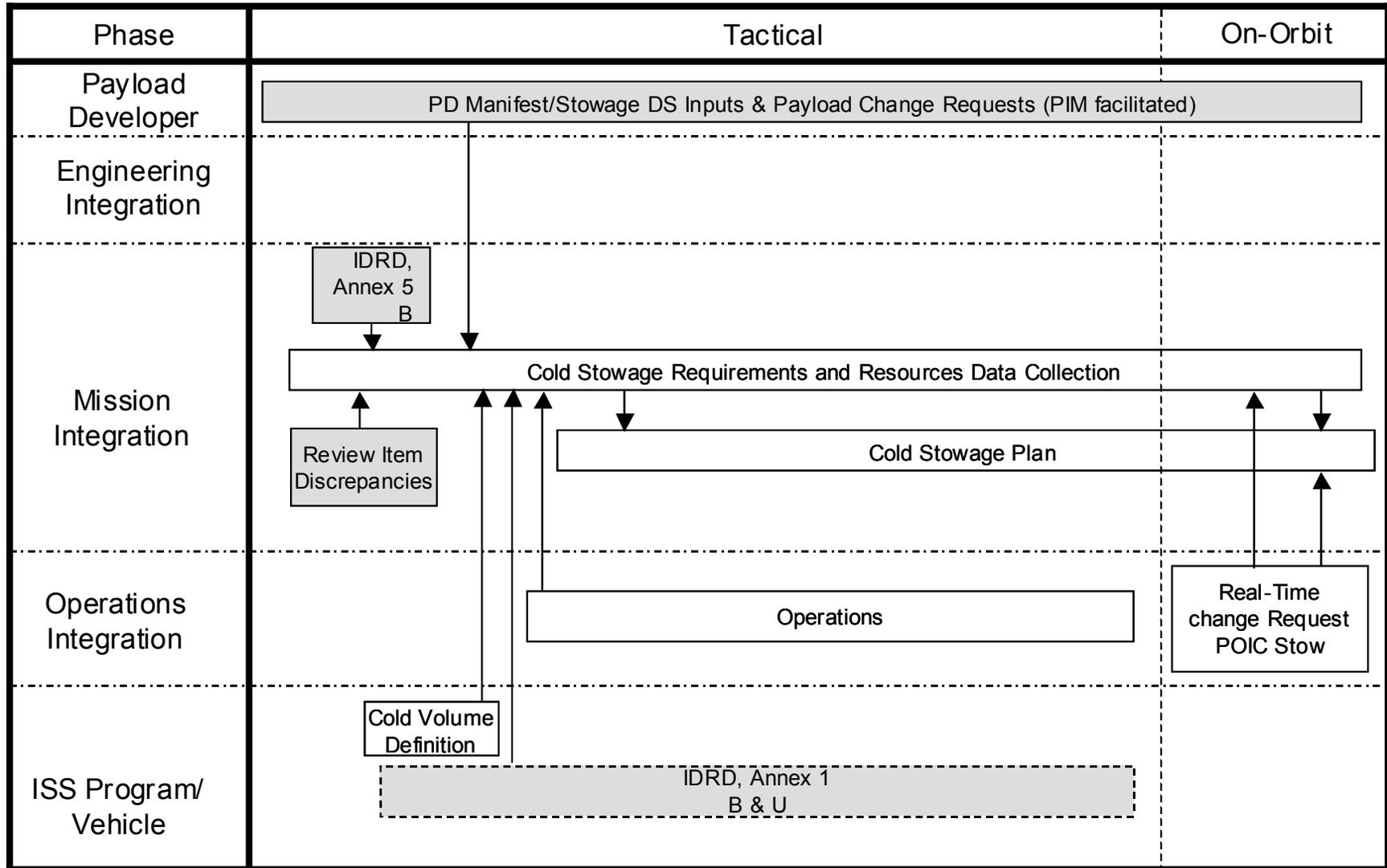


FIGURE B.1-7 MISSION MANAGEMENT COLD STOWAGE MANAGEMENT LEVEL II PROCESS FLOW

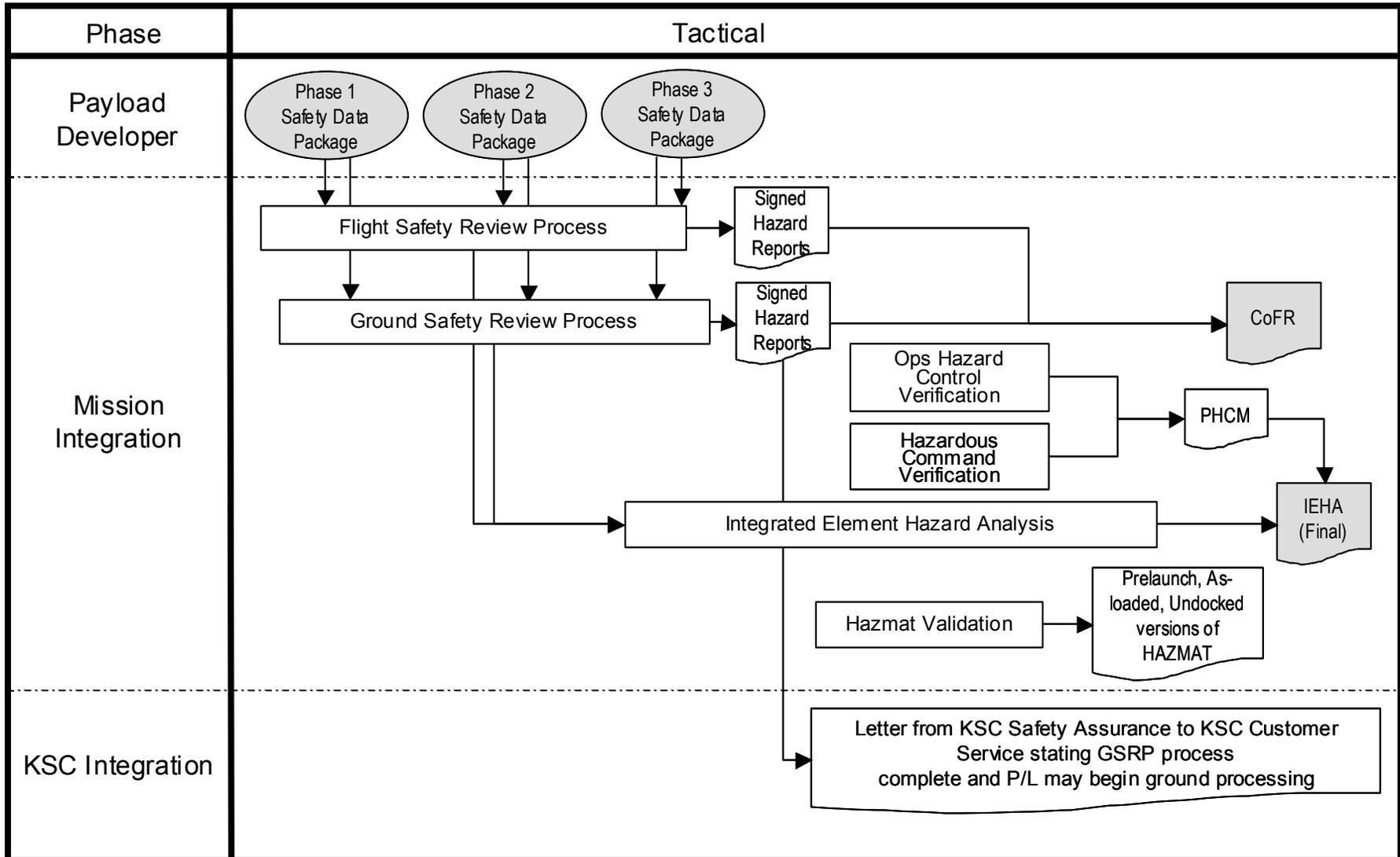


FIGURE B.1-8 PAYLOAD SAFETY PROCESS LEVEL II PROCESS FLOW

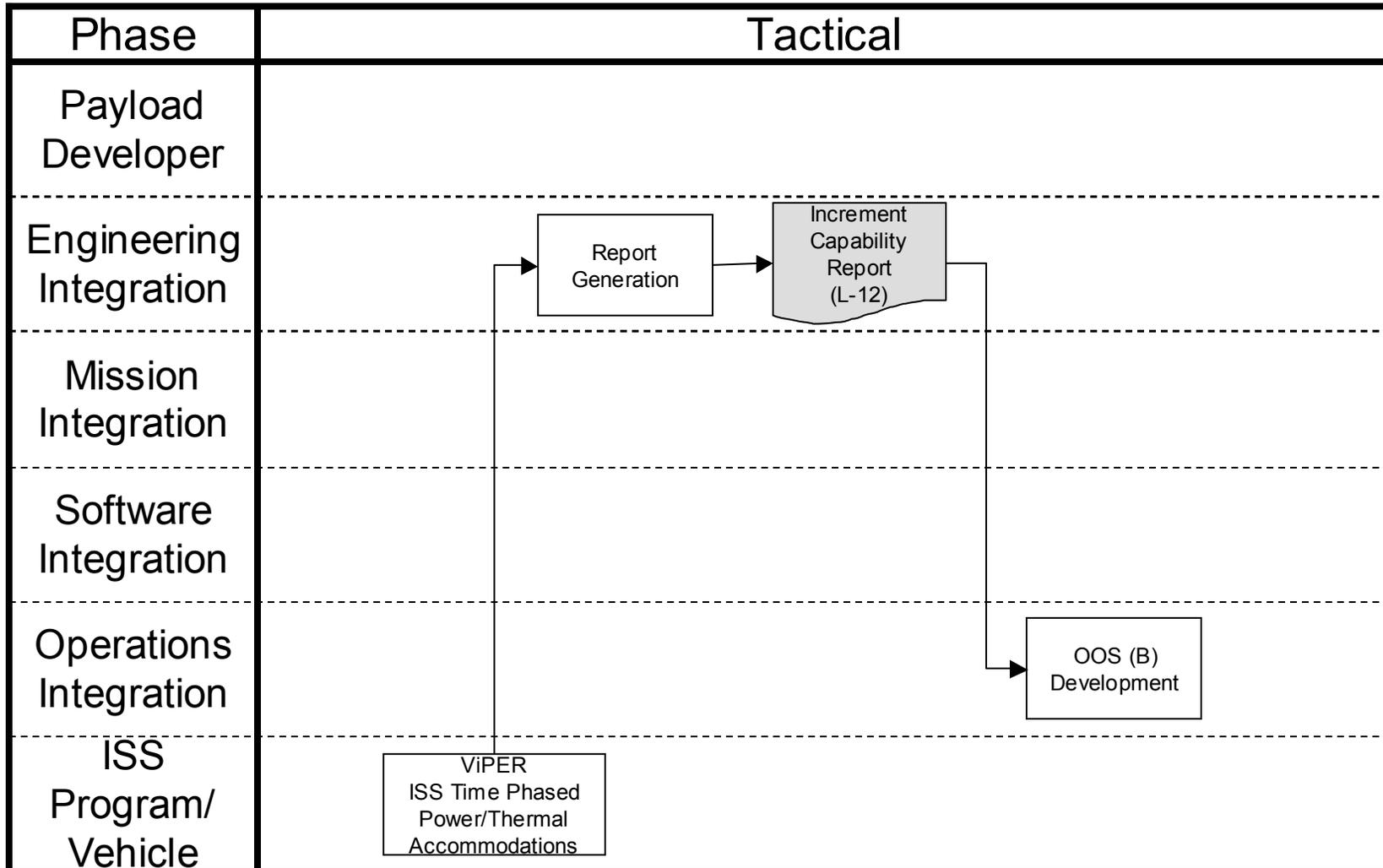


FIGURE B.2-1 INCREMENT CAPABILITY REPORT LEVEL II PROCESS FLOW

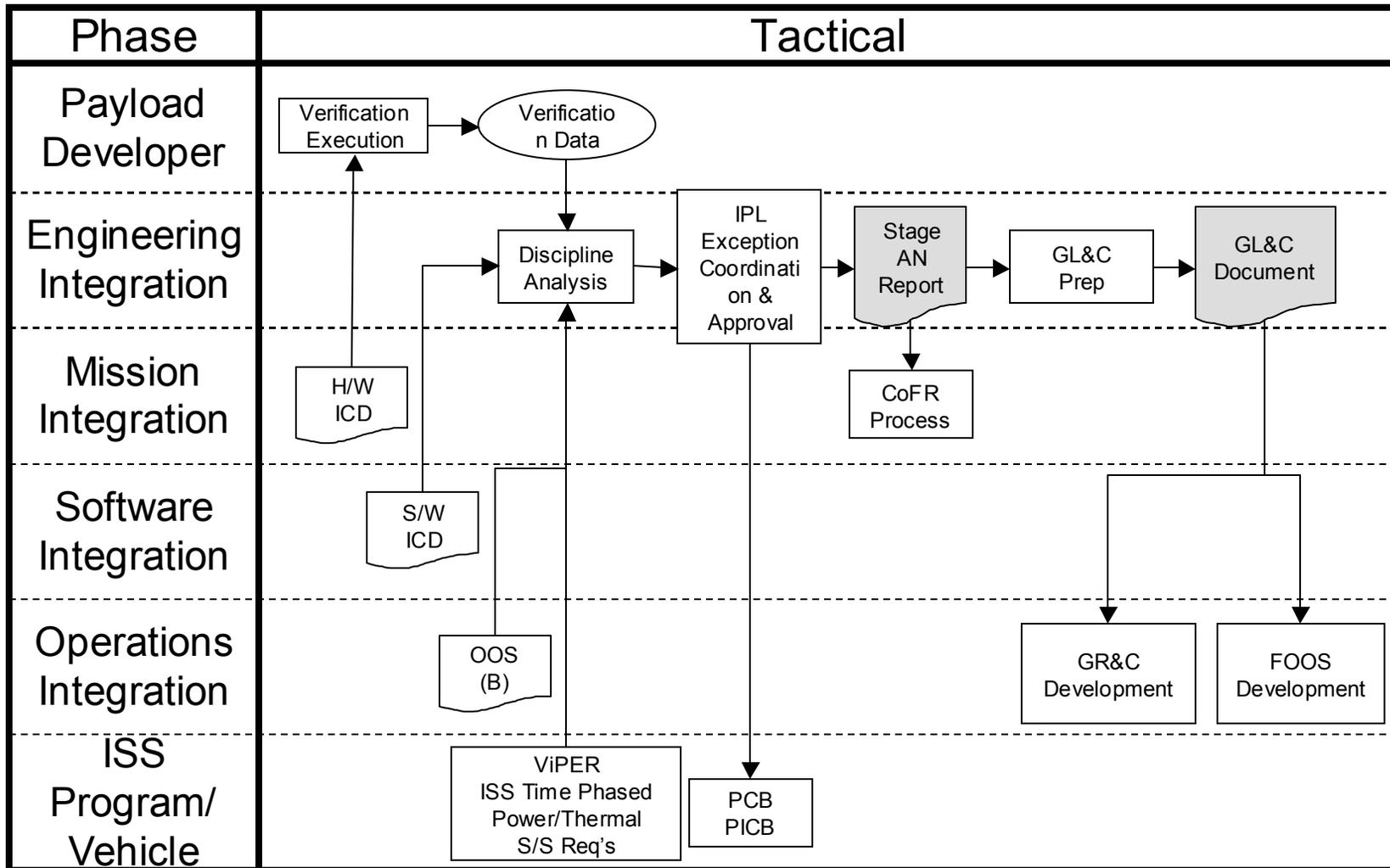


FIGURE B.2-2 STAGE ANALYSIS/GL&C (FACILITY/RACK/PALLET) LEVEL II PROCESS FLOW

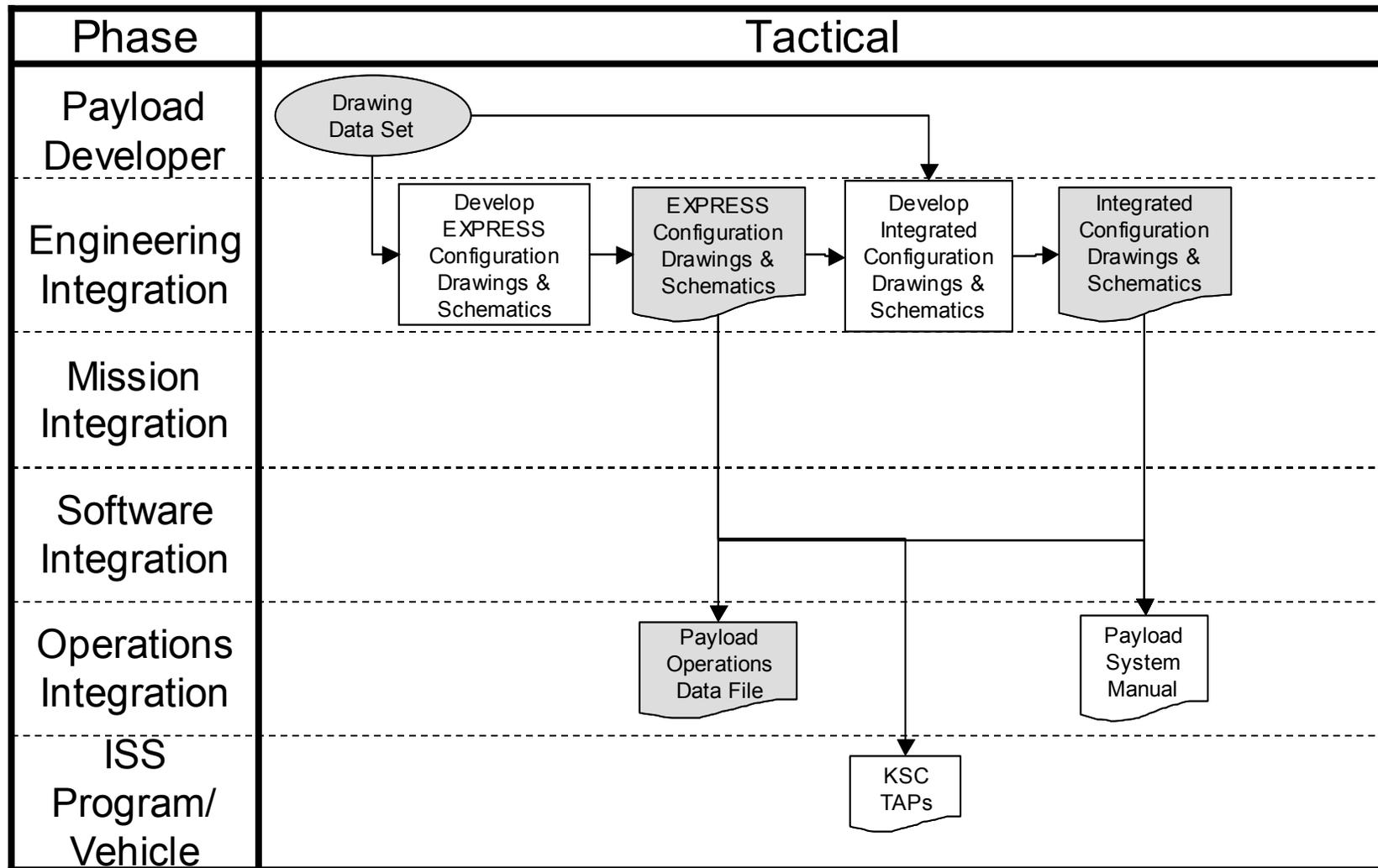


FIGURE B.2-3 STAGE CONFIGURATION DRAWINGS/SCHEMATICS LEVEL II PROCESS FLOW

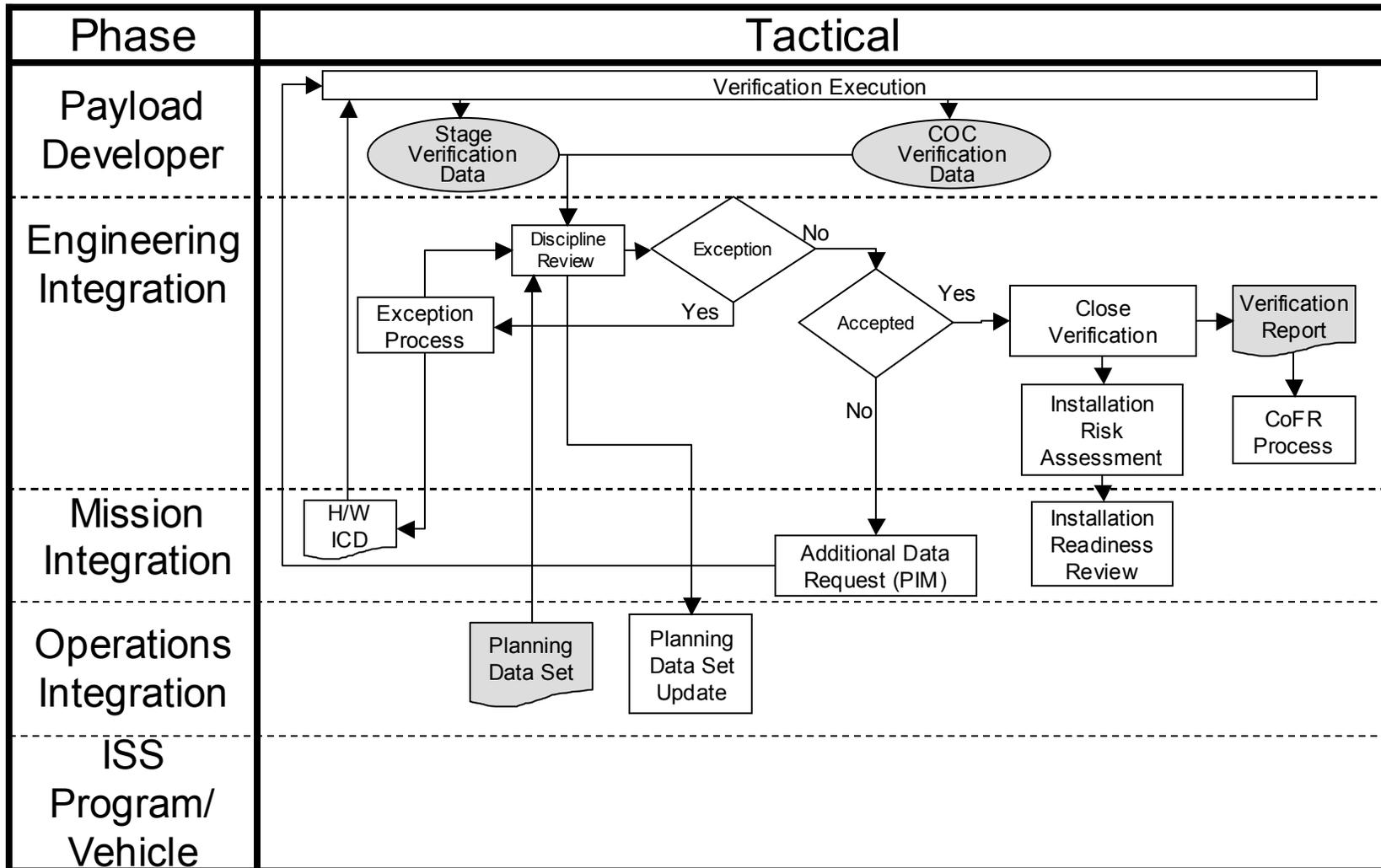


FIGURE B.2-4 VERIFICATION DATA REVIEW/CLOSURE LEVEL II PROCESS FLOW

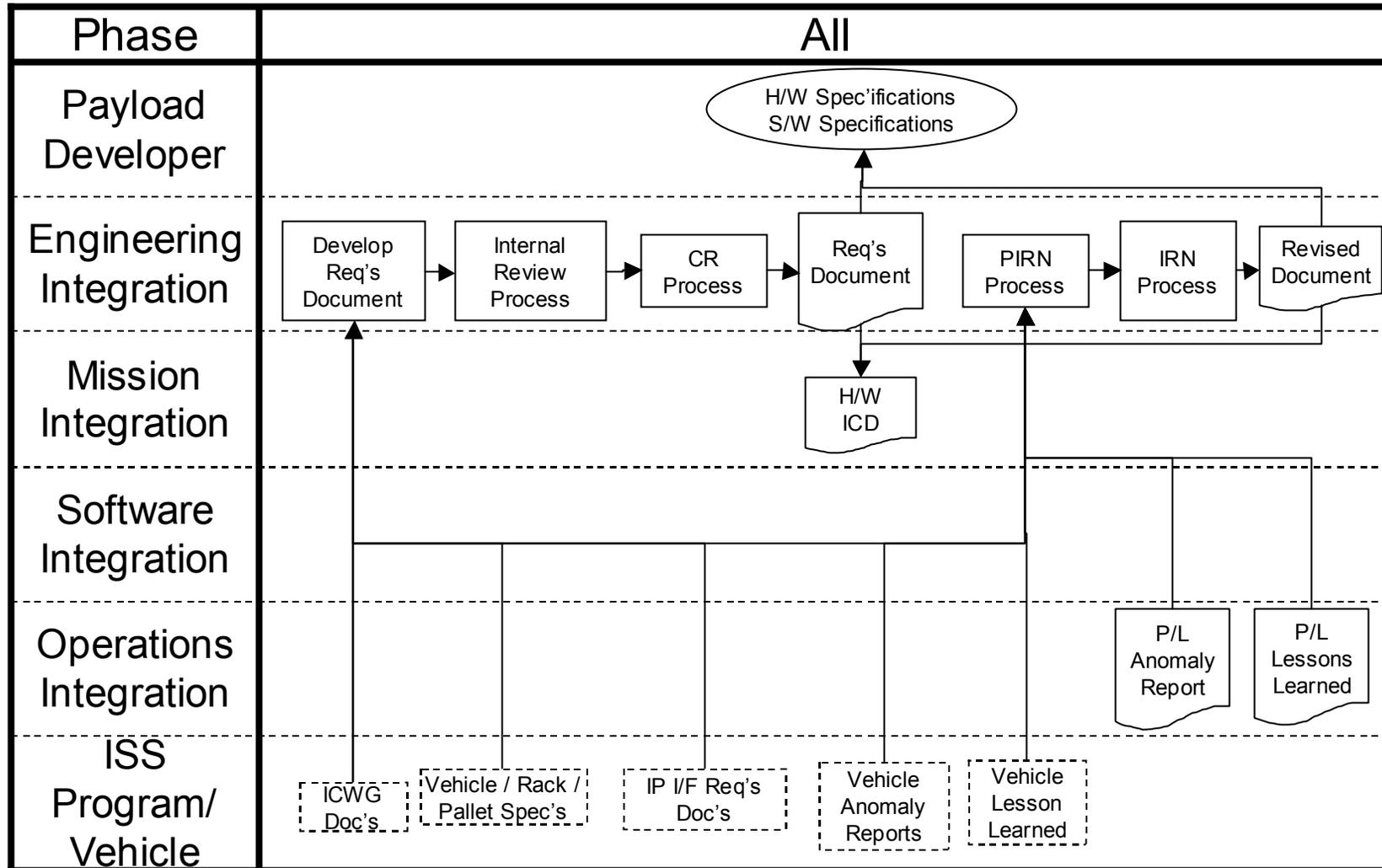


FIGURE B.2-5 REQUIREMENTS DOCUMENT DEVELOPMENT/MAINTENANCE LEVEL II PROCESS FLOW

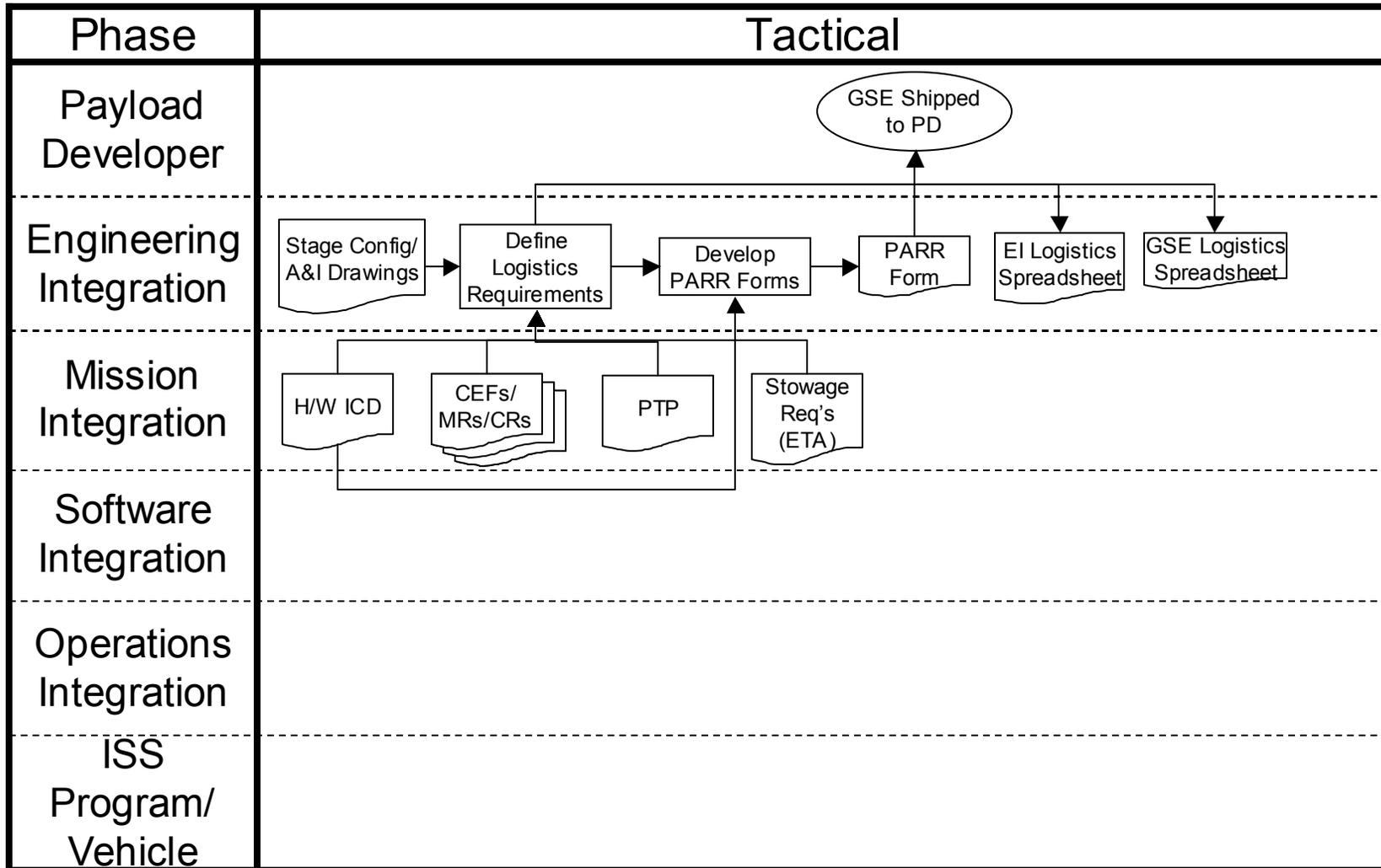
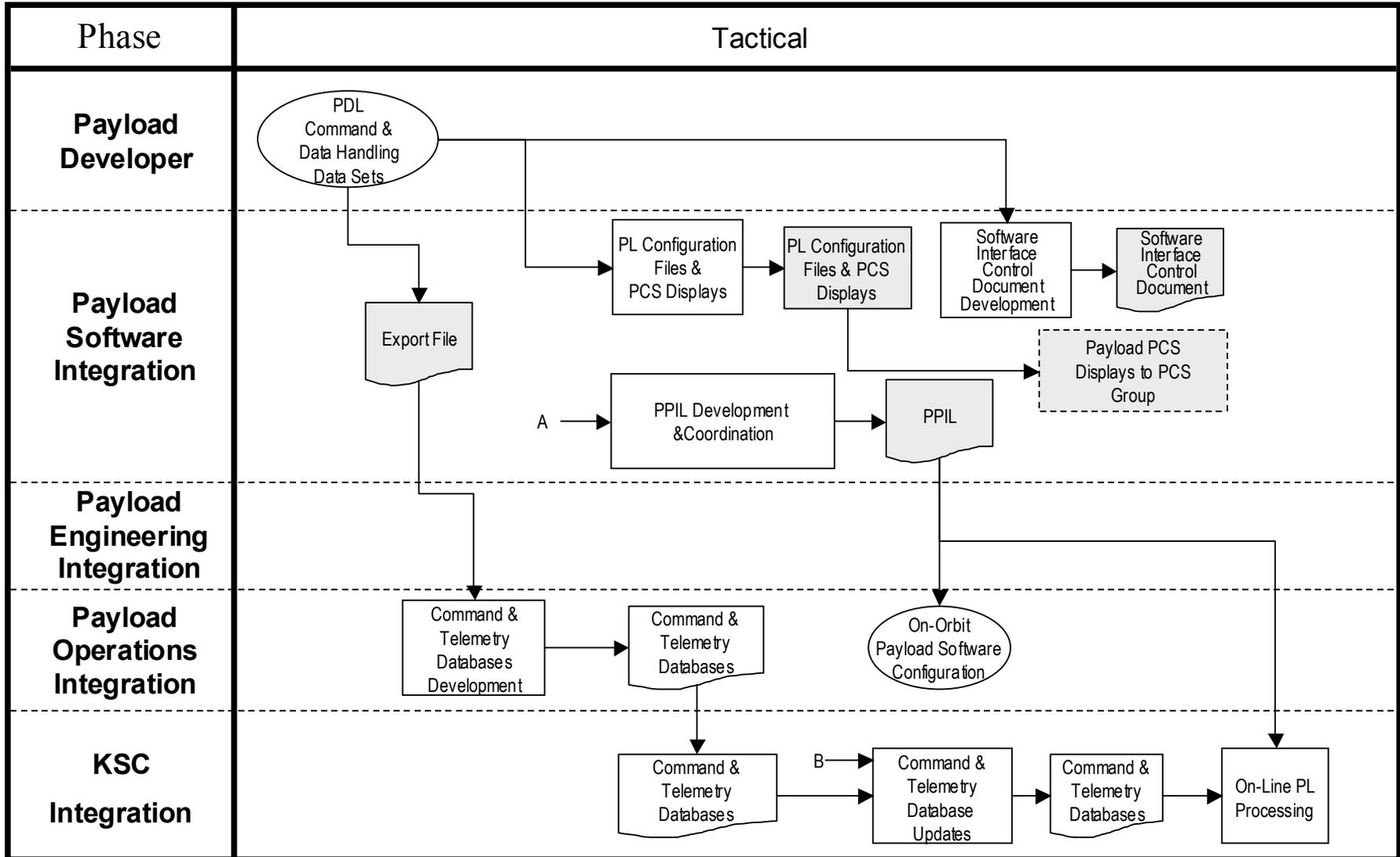


FIGURE B.2-6 EXPRESS RACK LOGISTICS LEVEL II PROCESS FLOW



A = Payload Developers, Facility Developers, POIC, Payload MDM Developers, SSC, PCS, KSC  
 B = DSCRs developed via PSCP activities  
 Iterative Process – Preliminary, Interim, and Final

**FIGURE B.3-1 PAYLOAD SOFTWARE INTEGRATION PROCESS LEVEL II PROCESS FLOW**

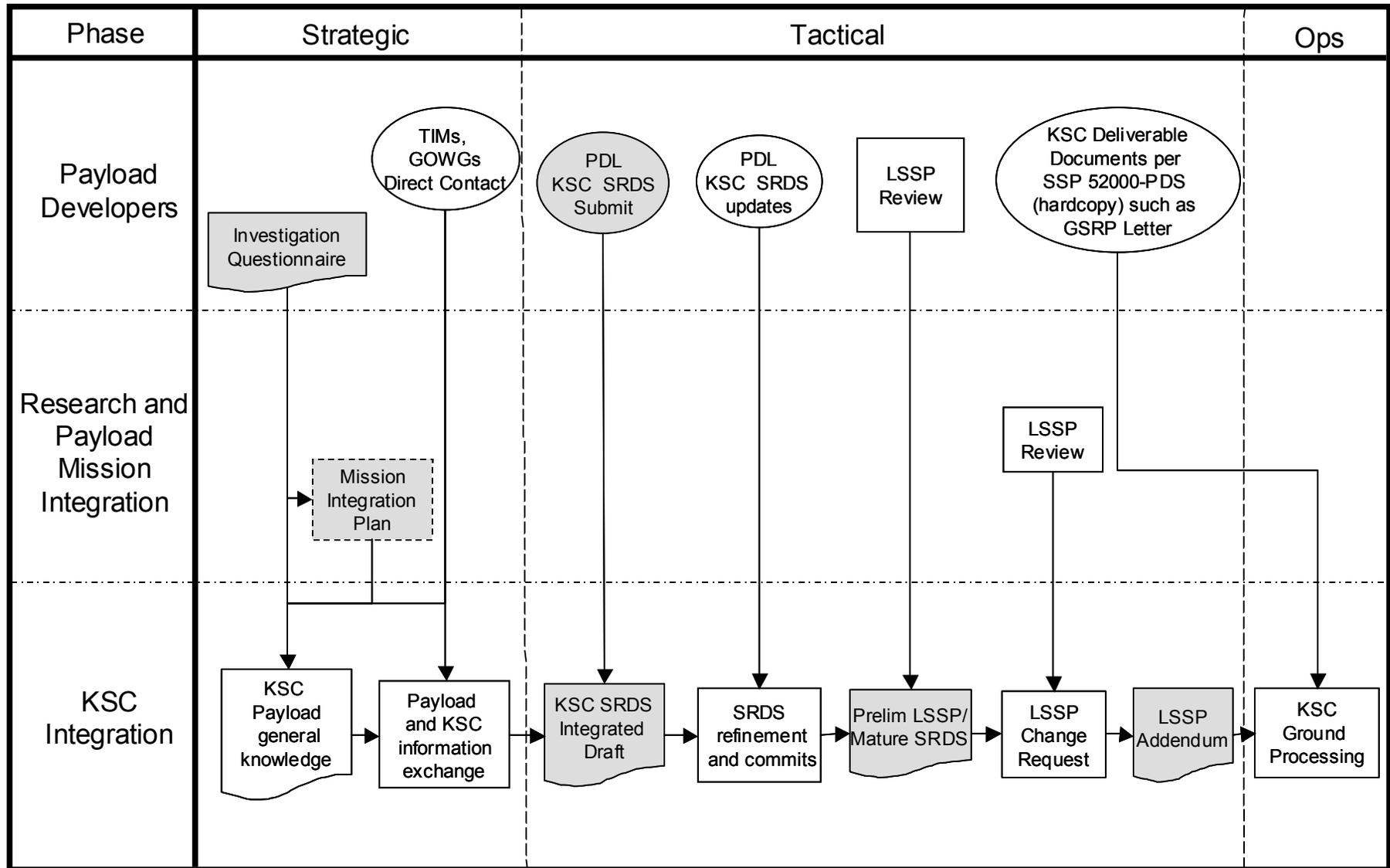


FIGURE B.4-1 KSC INTEGRATION – SRDS/LSSP/GROUND PROCESSING LEVEL II PROCESS FLOW

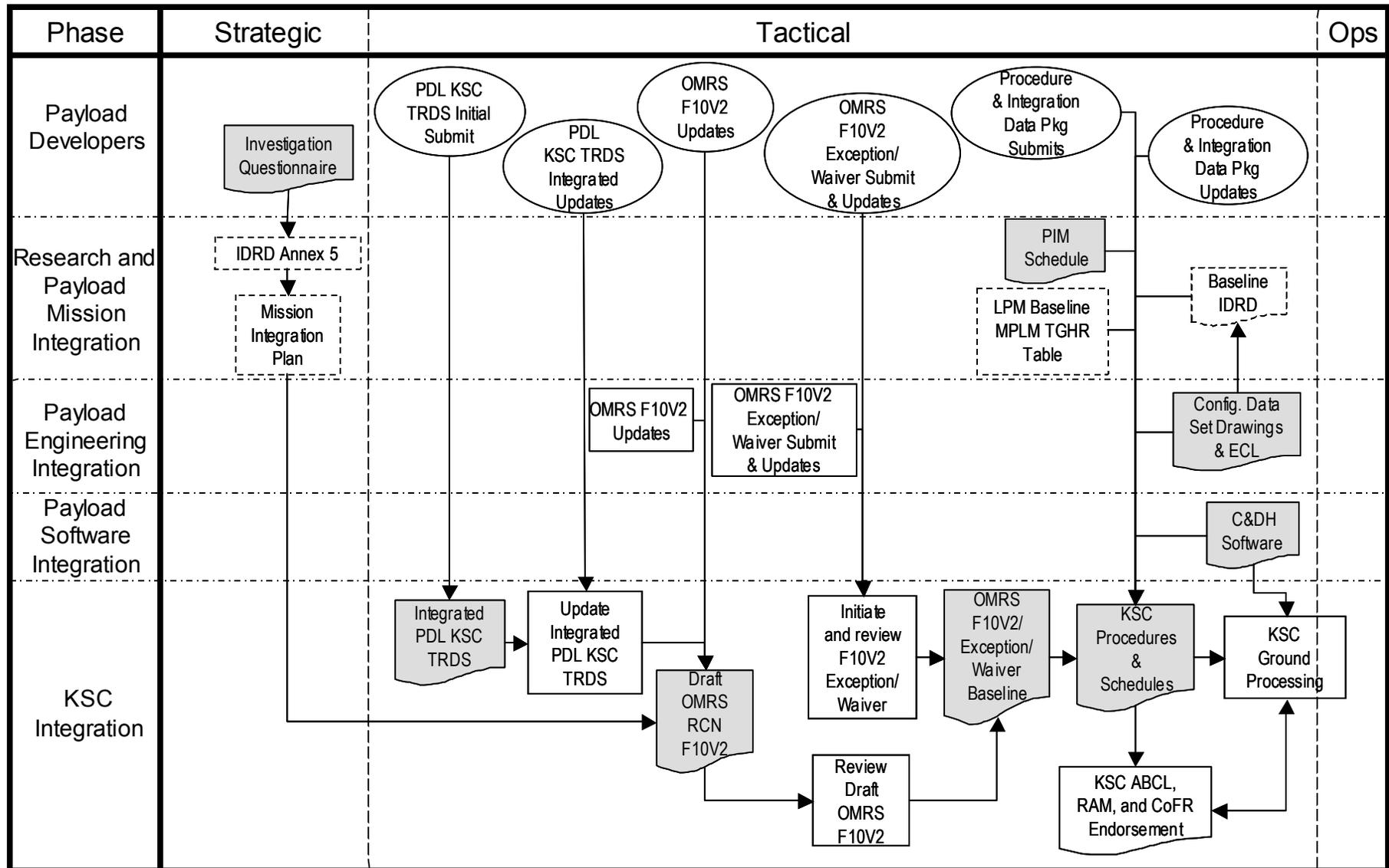


FIGURE B.4-2 KSC INTEGRATION – TRDS/OMRS F10V2/GROUND PROCESSING LEVEL II PROCESS FLOW

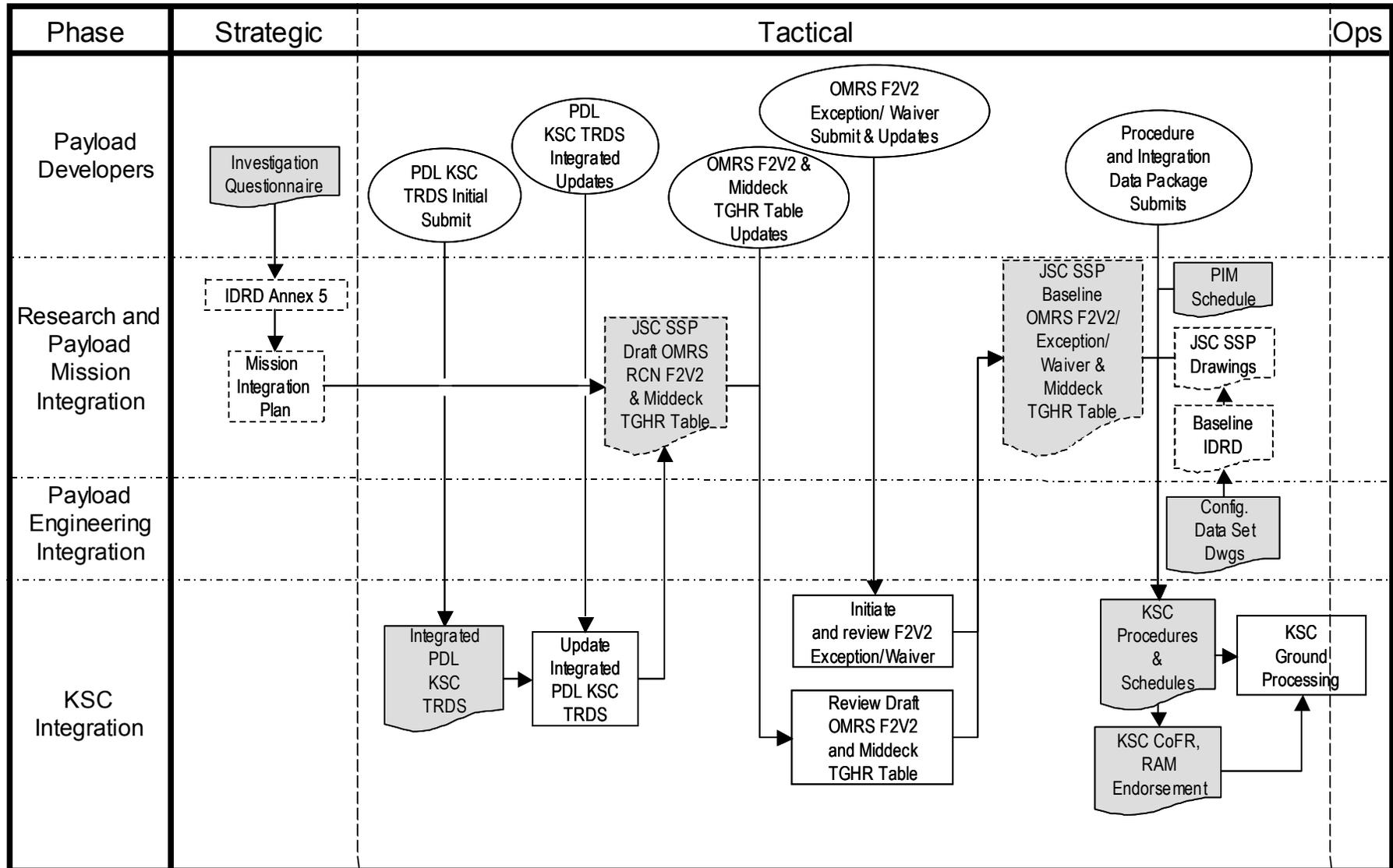
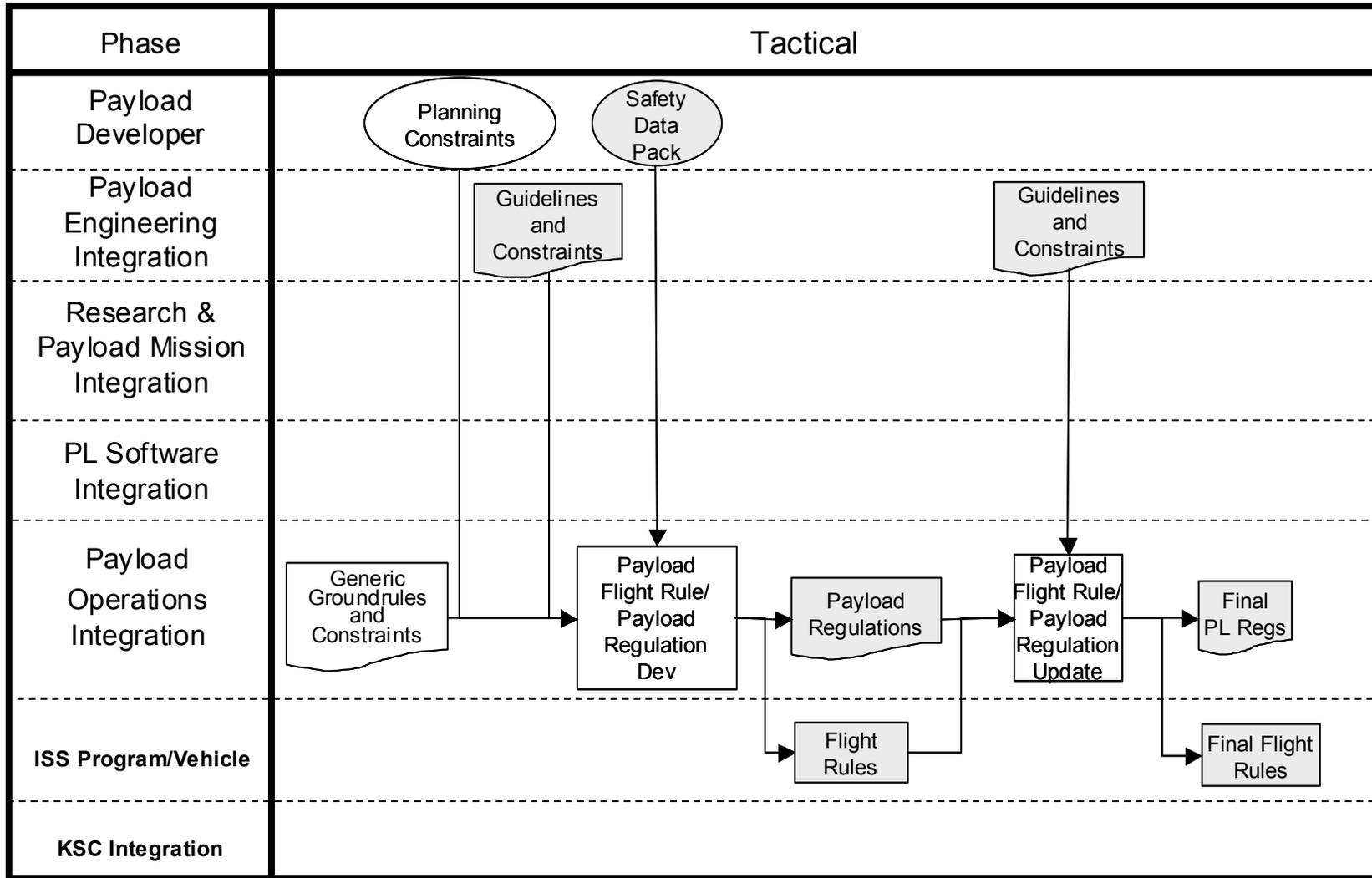


FIGURE B.4-3 KSC INTEGRATION – TRDS/OMRS F2V2/MIDDECK TGHR/GROUND PROCESSING LEVEL II PROCESS FLOW



**FIGURE B.5-1 PAYLOAD OPERATIONS INTEGRATION: CONSOLE DOCUMENTATION/TOOLS FLIGHT RULES AND PAYLOAD REGULATION DEVELOPMENT LEVEL II PROCESS FLOW**

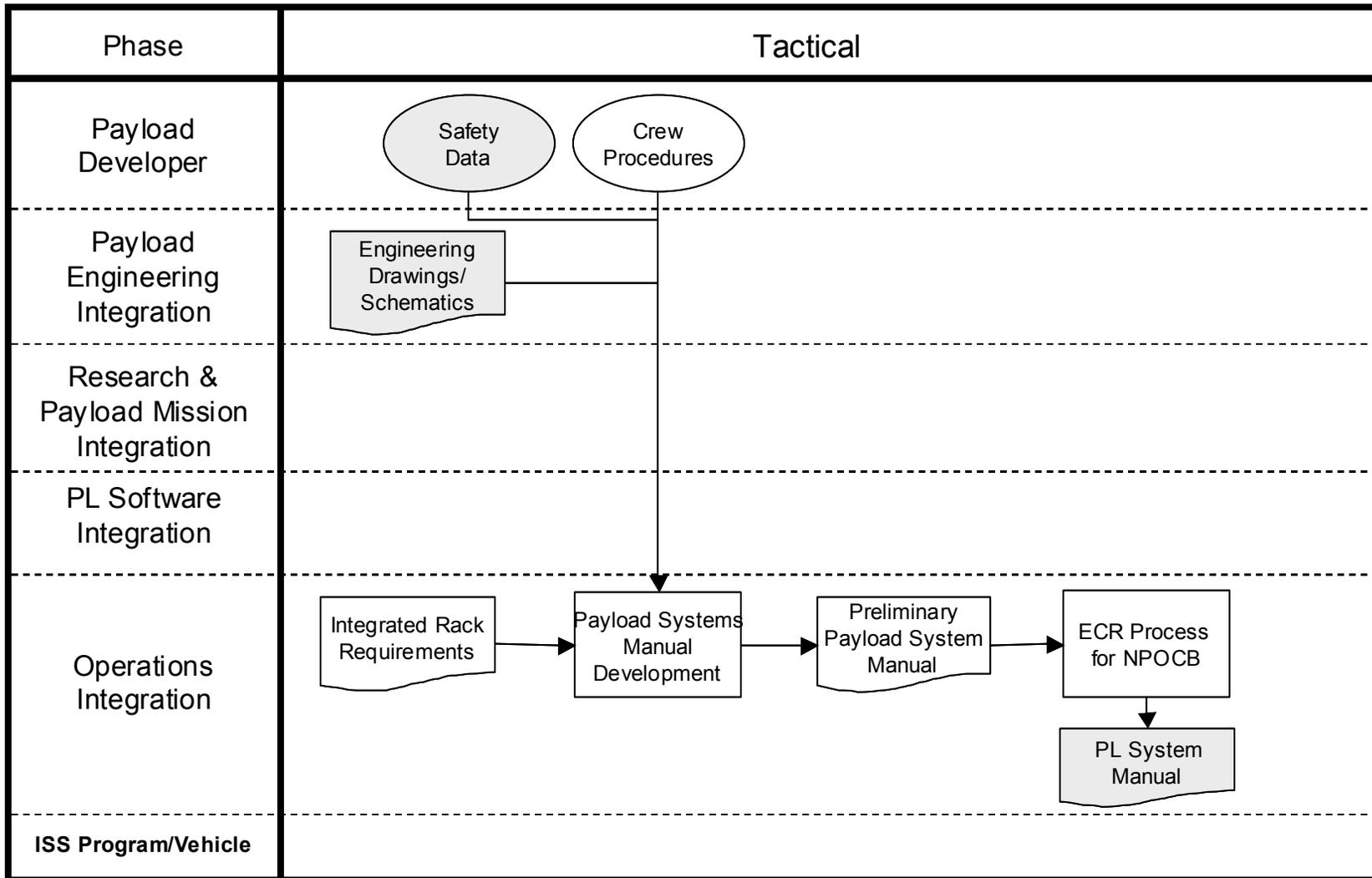


FIGURE B.5-2 ISS PAYLOAD SYSTEM MANUAL DEVELOPMENT LEVEL II PROCESS FLOW

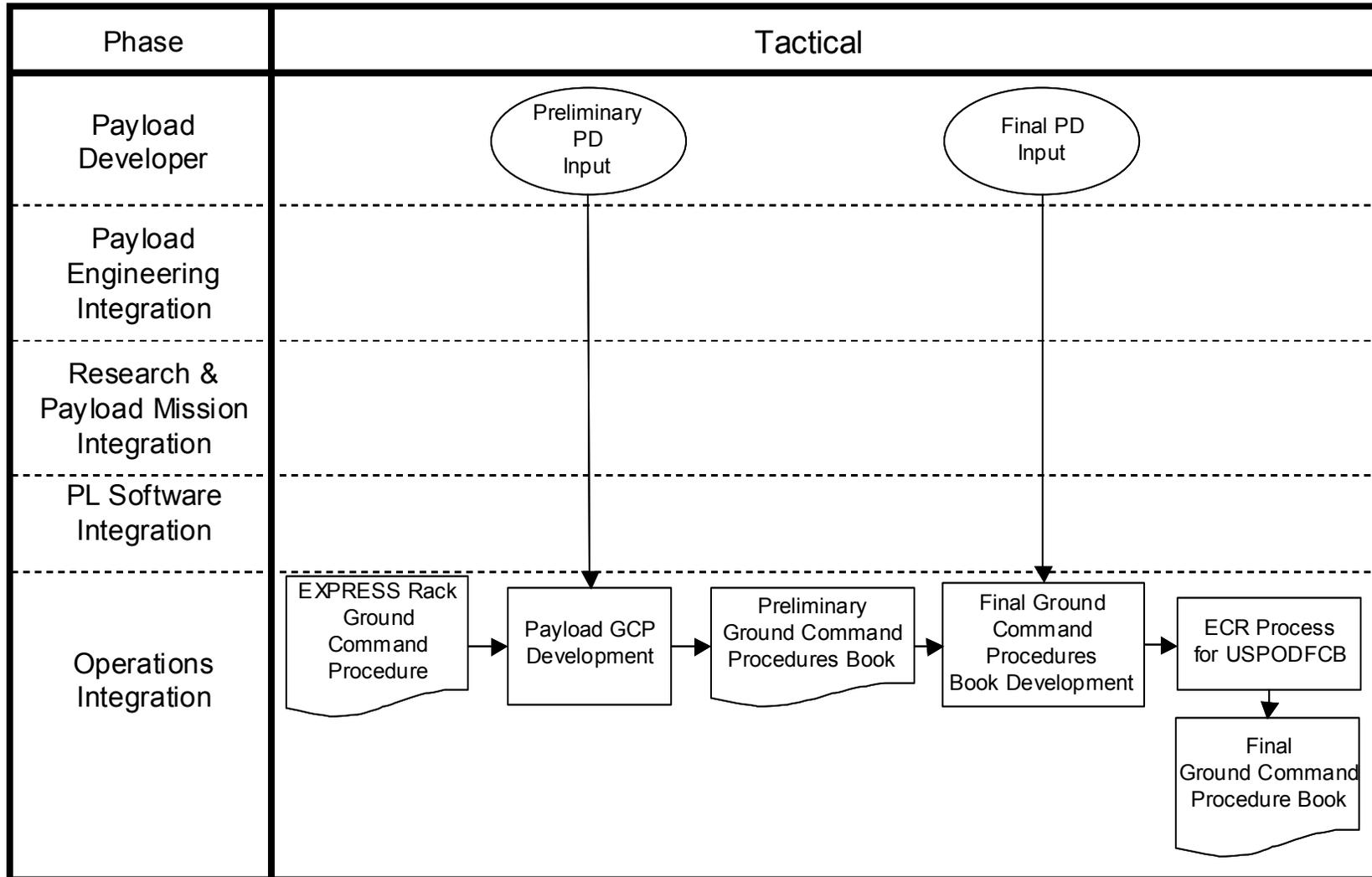


FIGURE B.5-3 ISS PAYLOAD GROUND COMMAND PROCEDURE BOOK DEVELOPMENT LEVEL II PROCESS FLOW

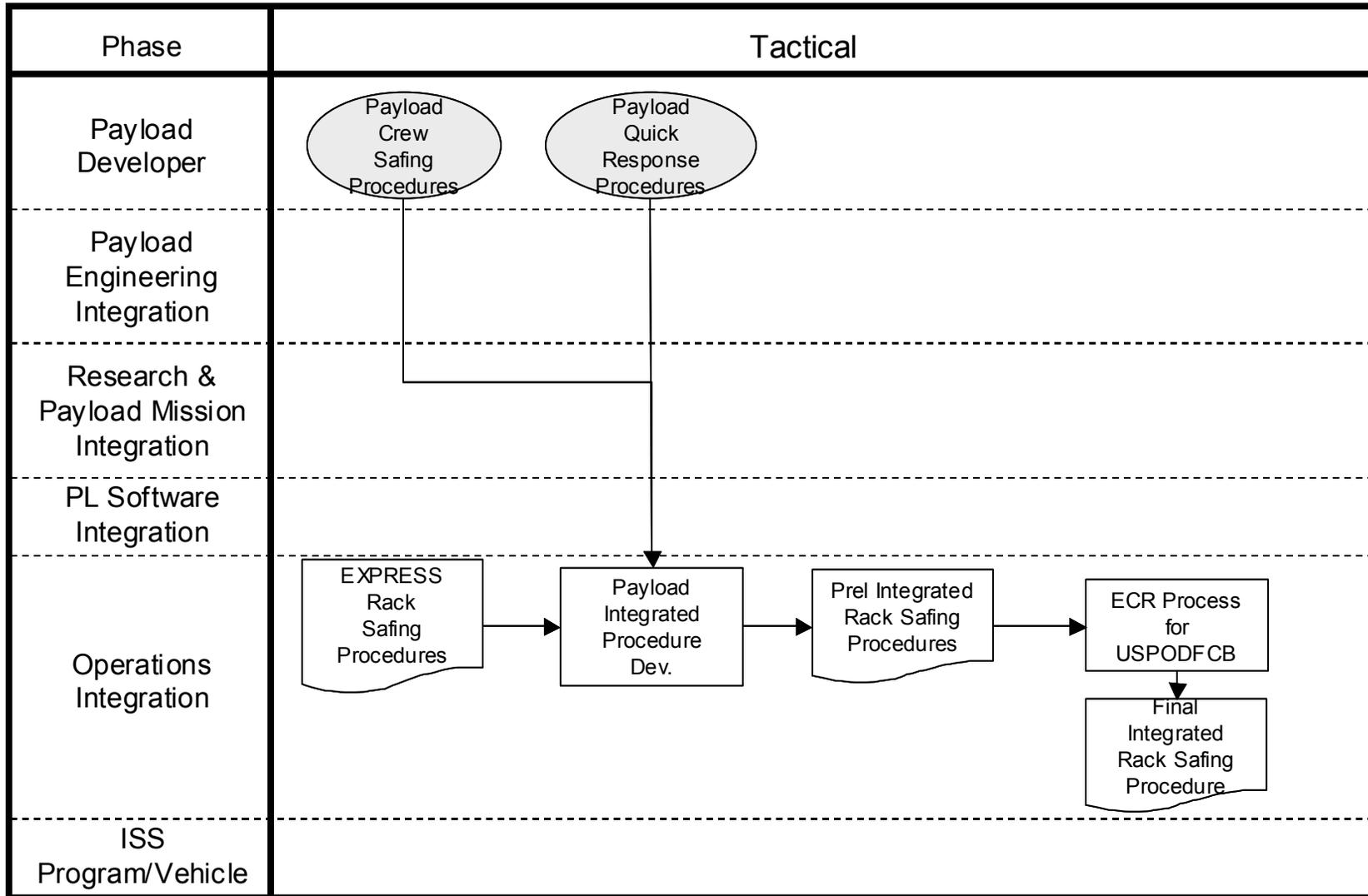


FIGURE B.5-4 INTEGRATED PAYLOAD SAFING PROCEDURE DEVELOPMENT PROCESS LEVEL II PROCESS FLOW

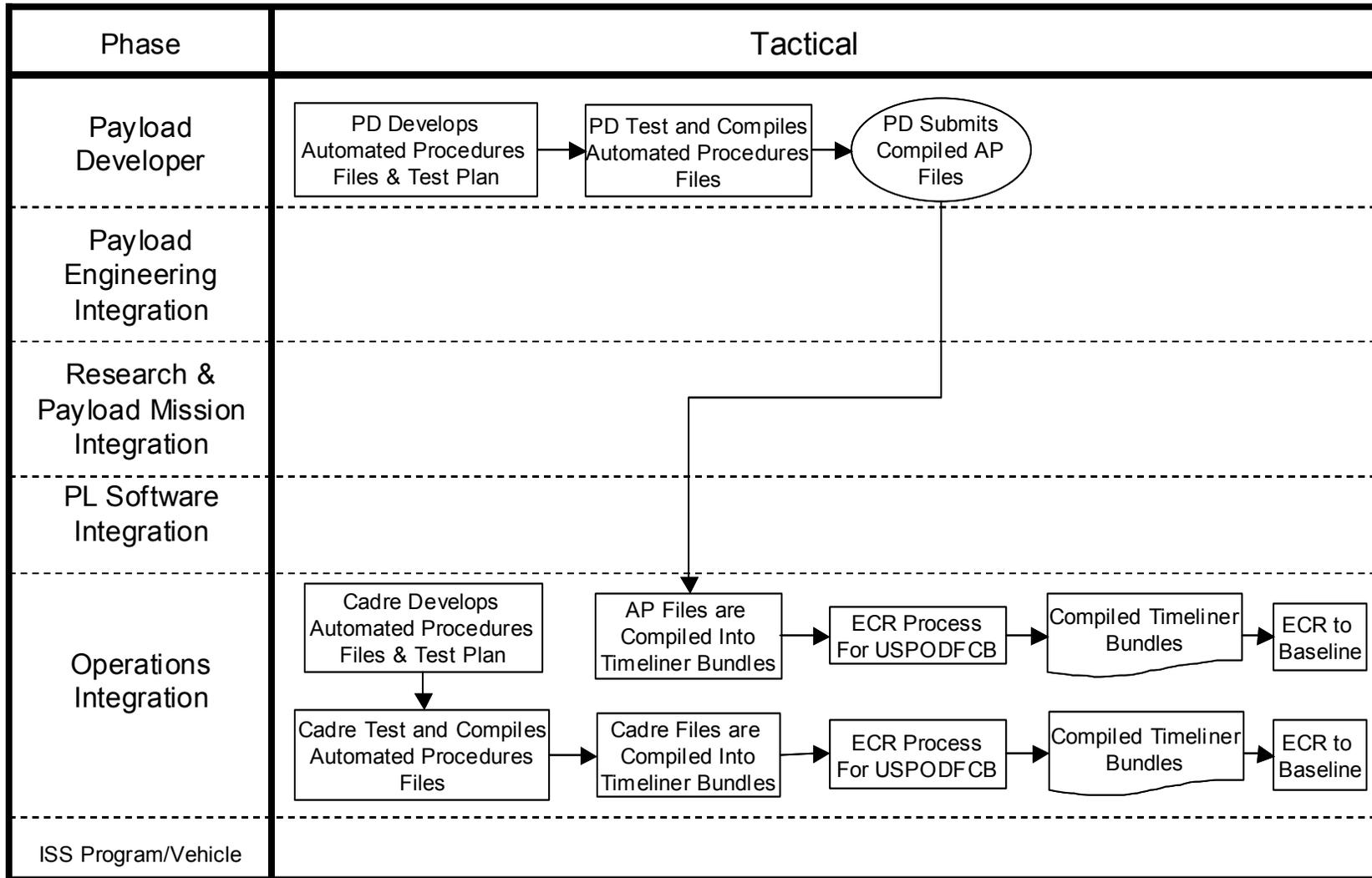
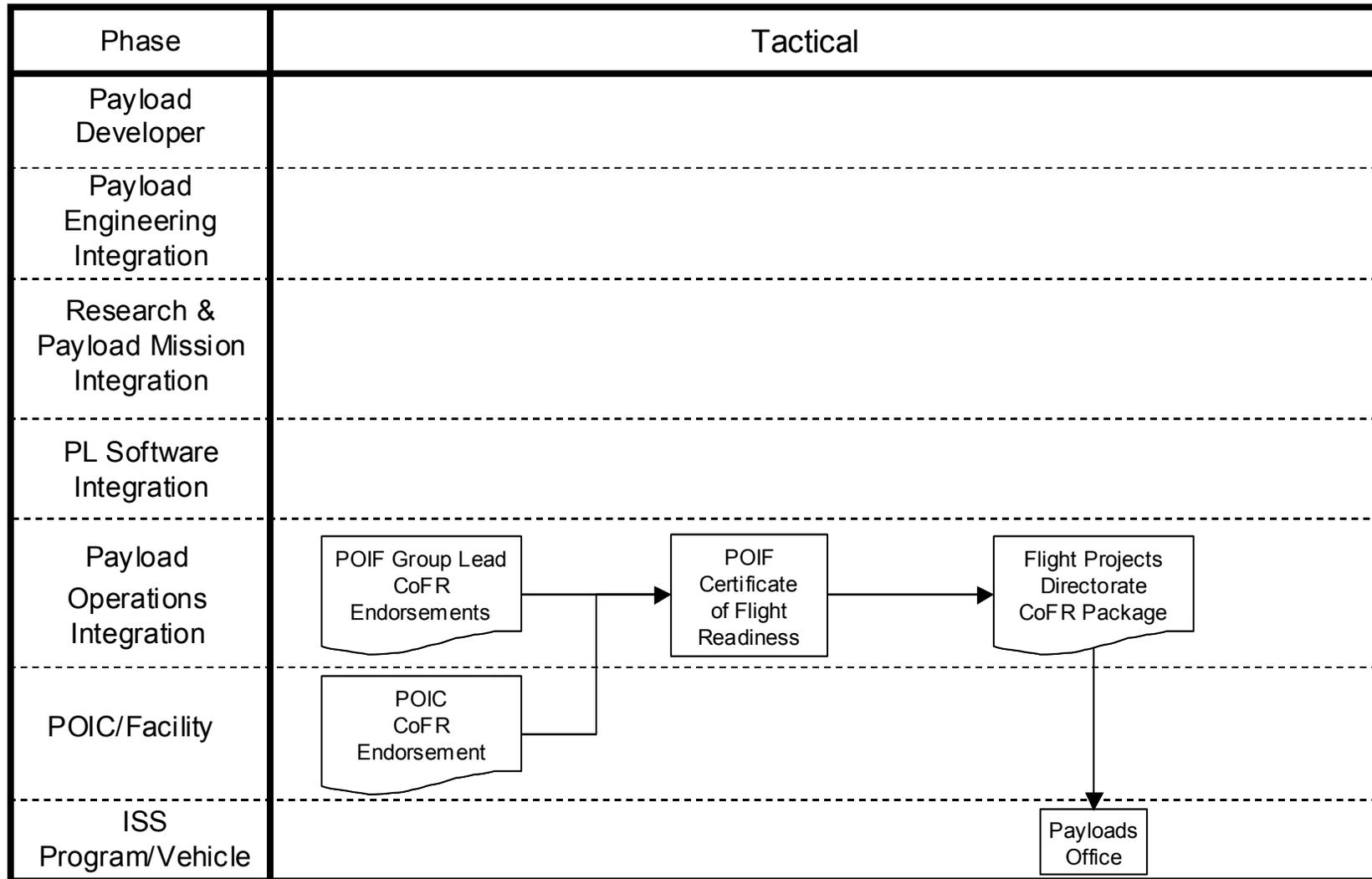
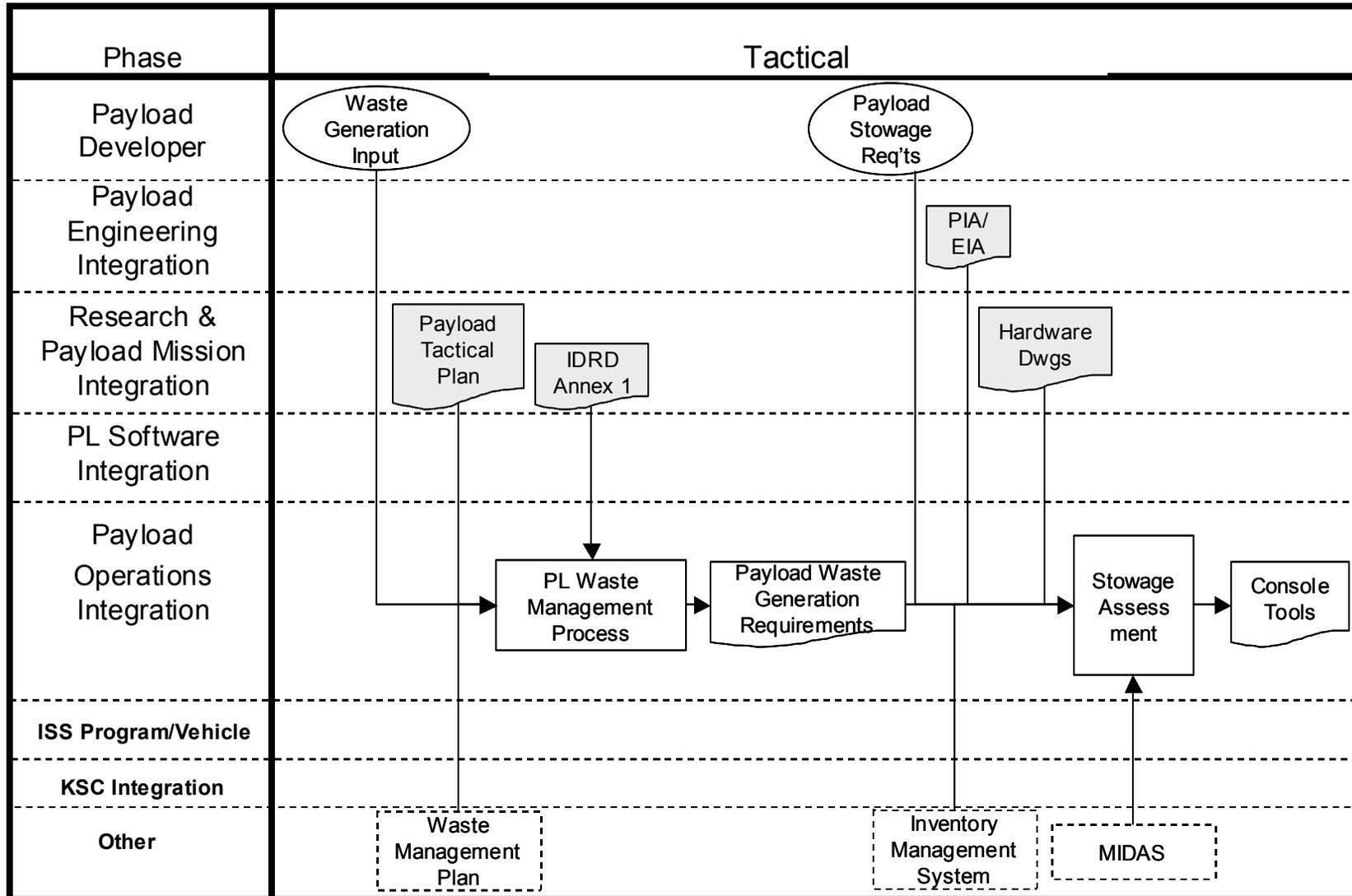


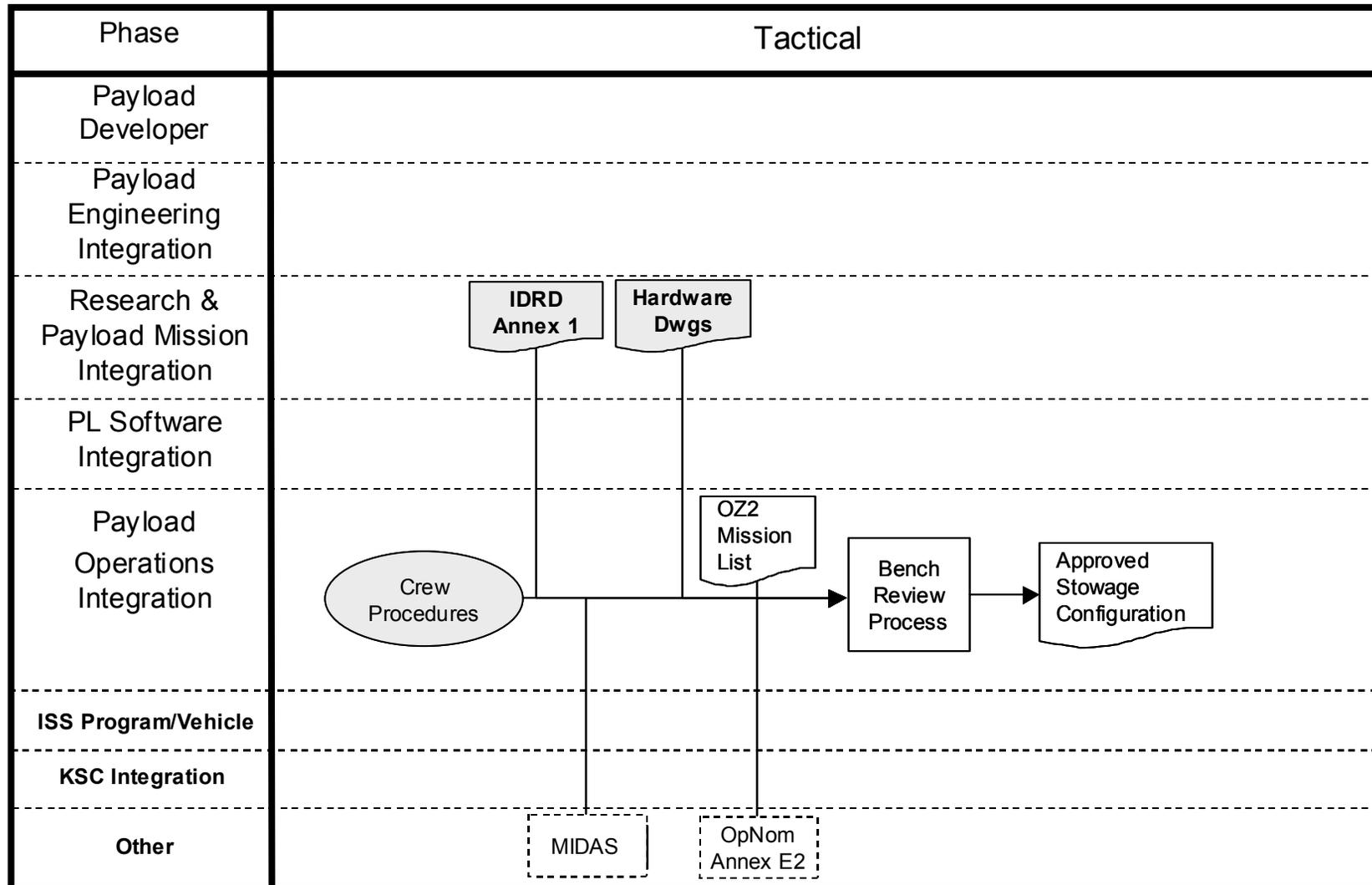
FIGURE B.5-5 AUTOMATED PROCEDURE FILE DEVELOPMENT LEVEL II PROCESS FLOW



**FIGURE B.5-6 PAYLOAD OPERATIONS INTEGRATION: CONSOLE DOCUMENTATION/TOOLS COFR PROCESS LEVEL II PROCESS FLOW**



**FIGURE B.5-7 PAYLOAD OPERATIONS INTEGRATION: CONSOLE DOCUMENTATION/TOOLS STOWAGE ASSESSMENT AND WASTE MANAGEMENT LEVEL II PROCESS FLOW**



**FIGURE B.5-8 PAYLOAD OPERATIONS INTEGRATION: CONSOLE DOCUMENTATION/TOOLS BENCH REVIEWS LEVEL II PROCESS FLOW**

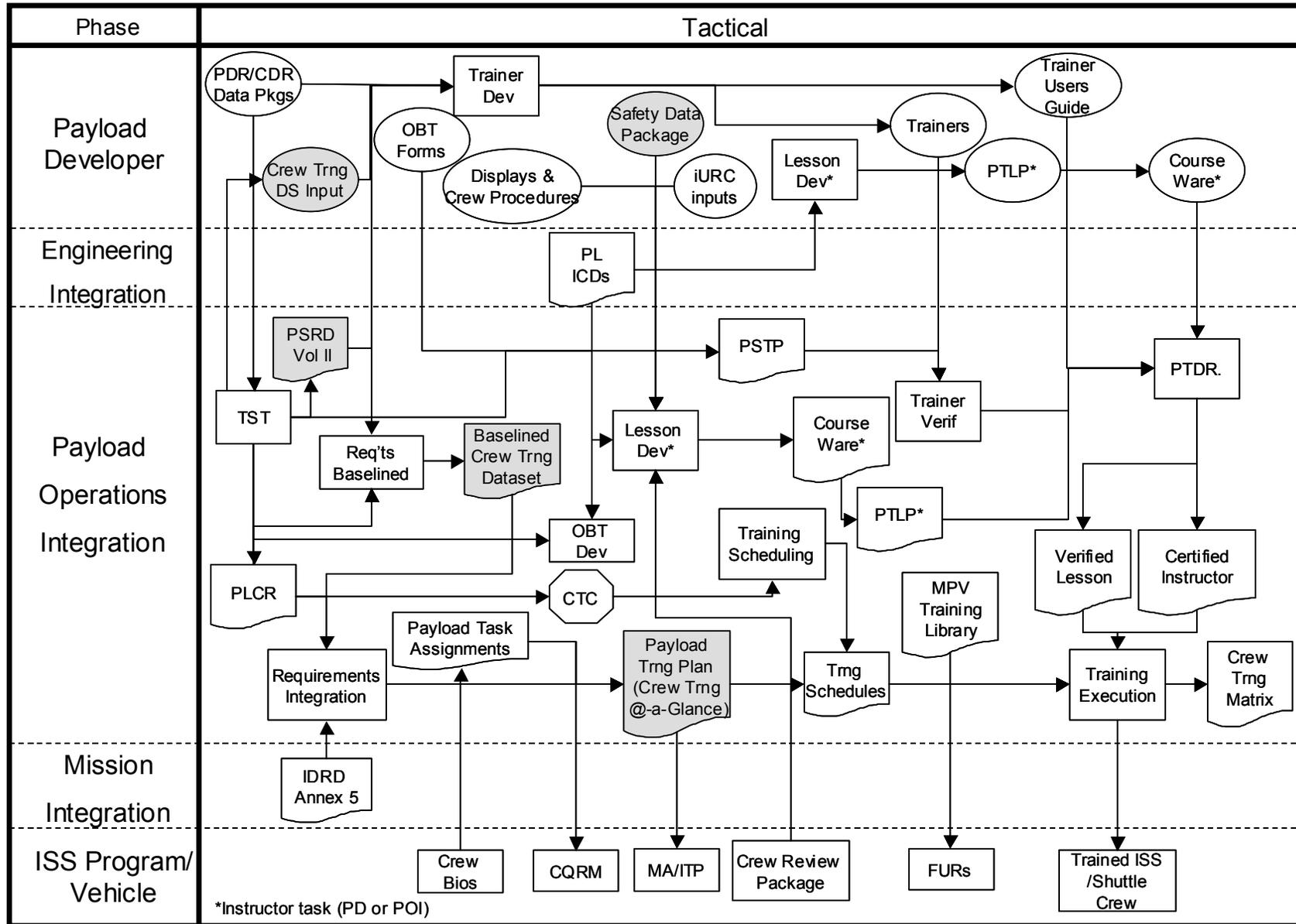


FIGURE B.5-9 CURRENT ISS PAYLOAD CREW TRAINING PROCESS LEVEL II PROCESS FLOW



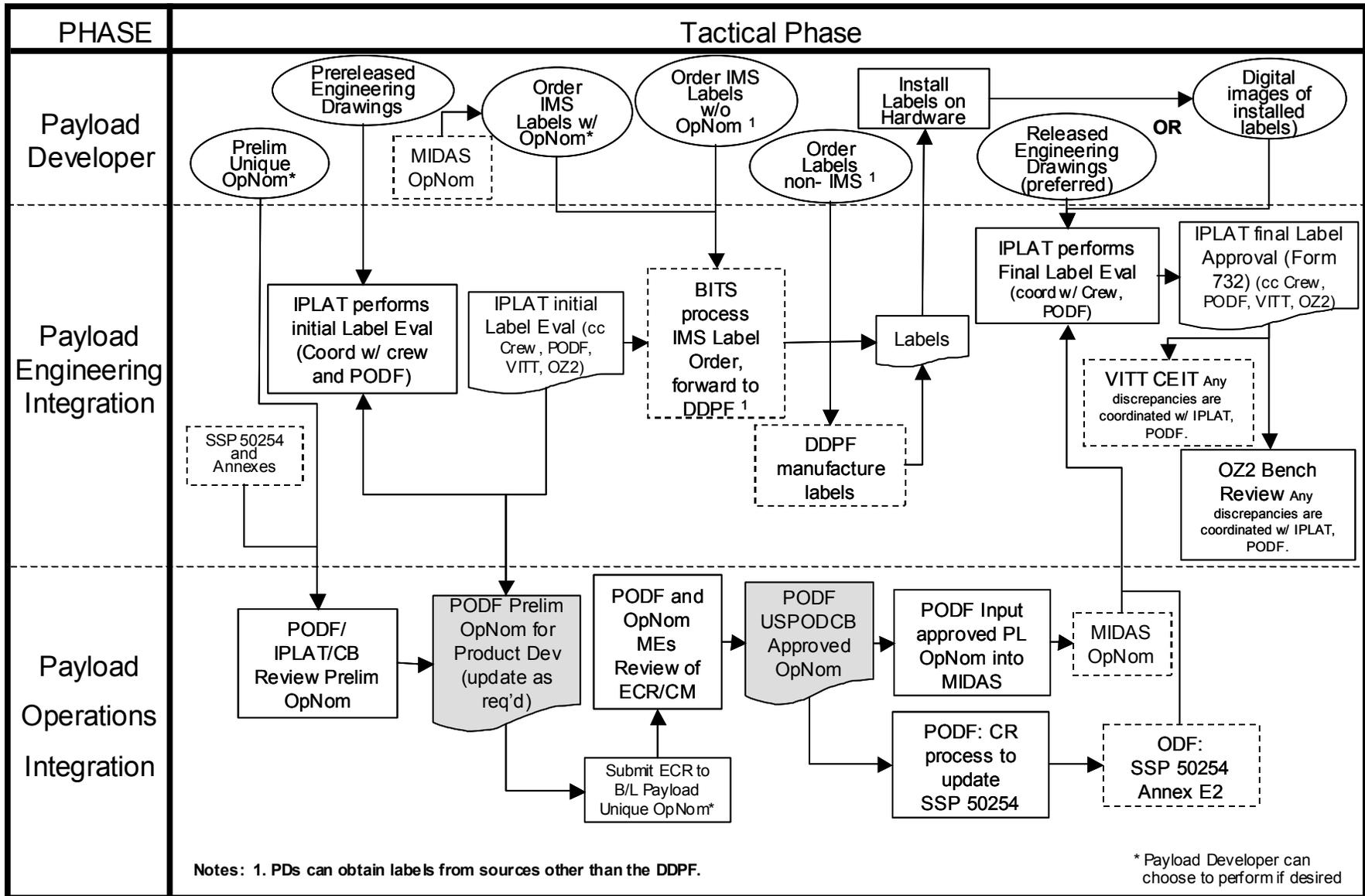


FIGURE B.5-11 ISS PAYLOAD OPNOM LEVEL II PROCESS FLOW

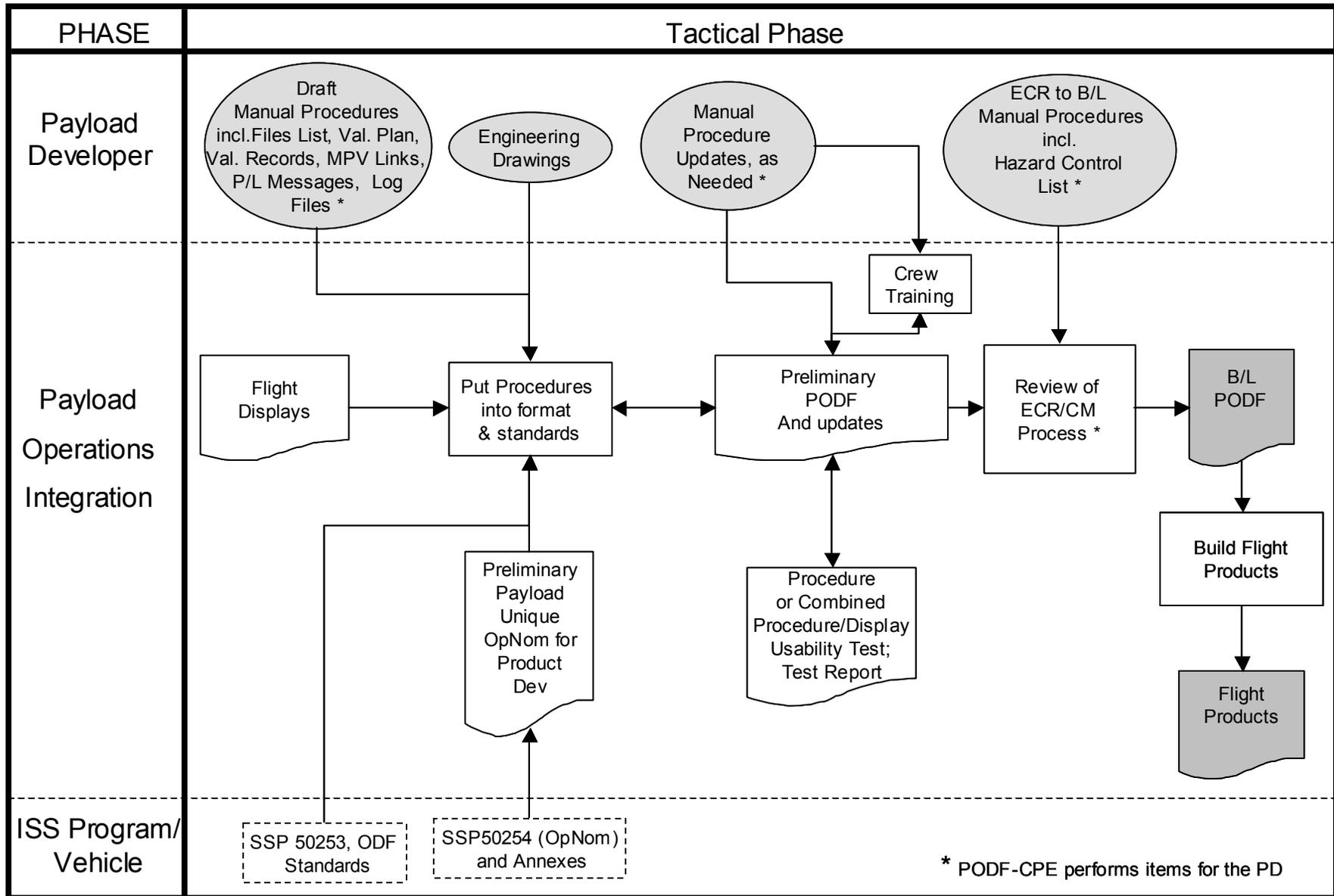


FIGURE B.5-12 ISS PAYLOAD CREW PROCEDURES LEVEL II PROCESS FLOW

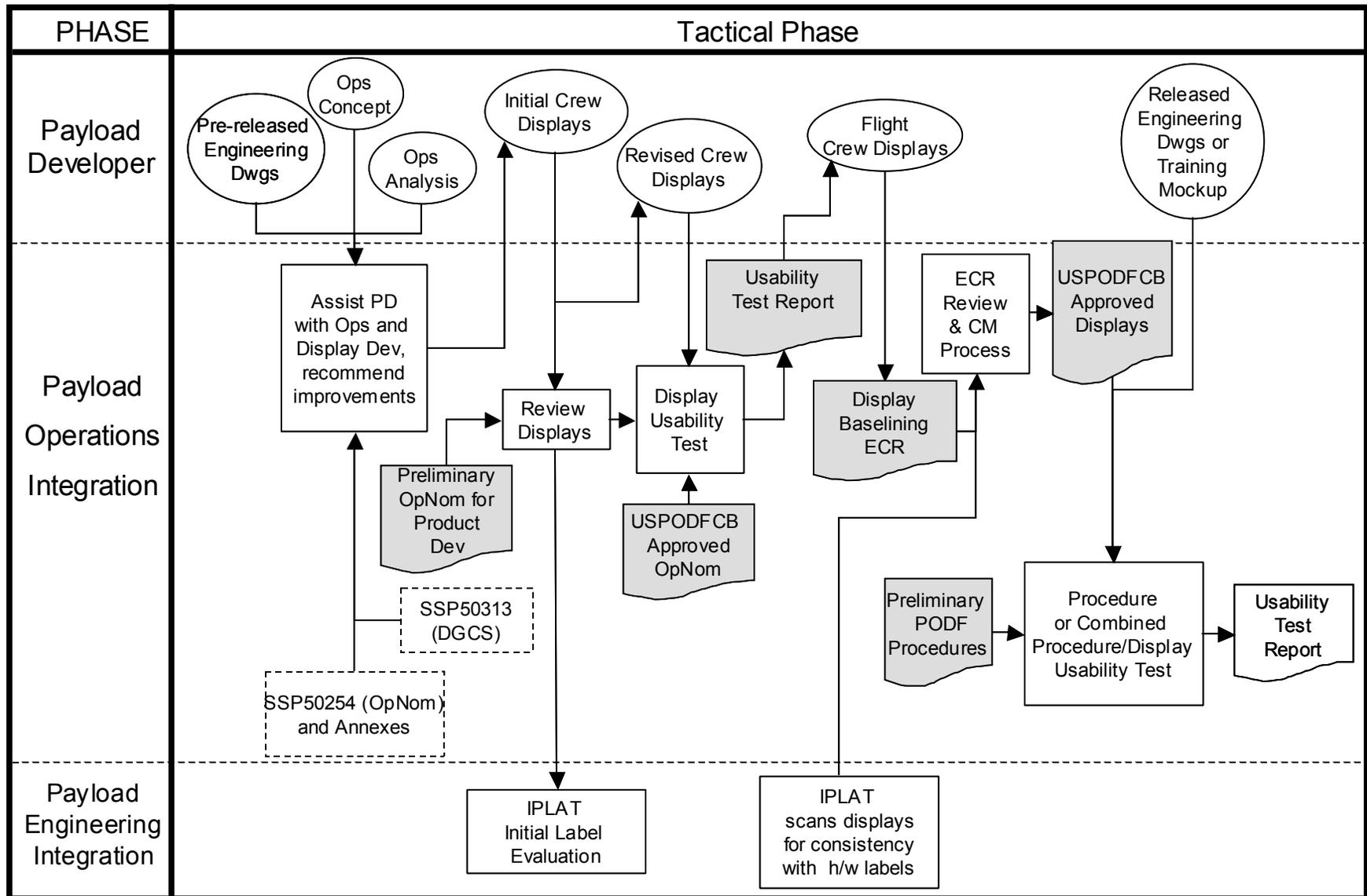


FIGURE B.5-13 ISS PAYLOAD DISPLAYS LEVEL II PROCESS FLOW

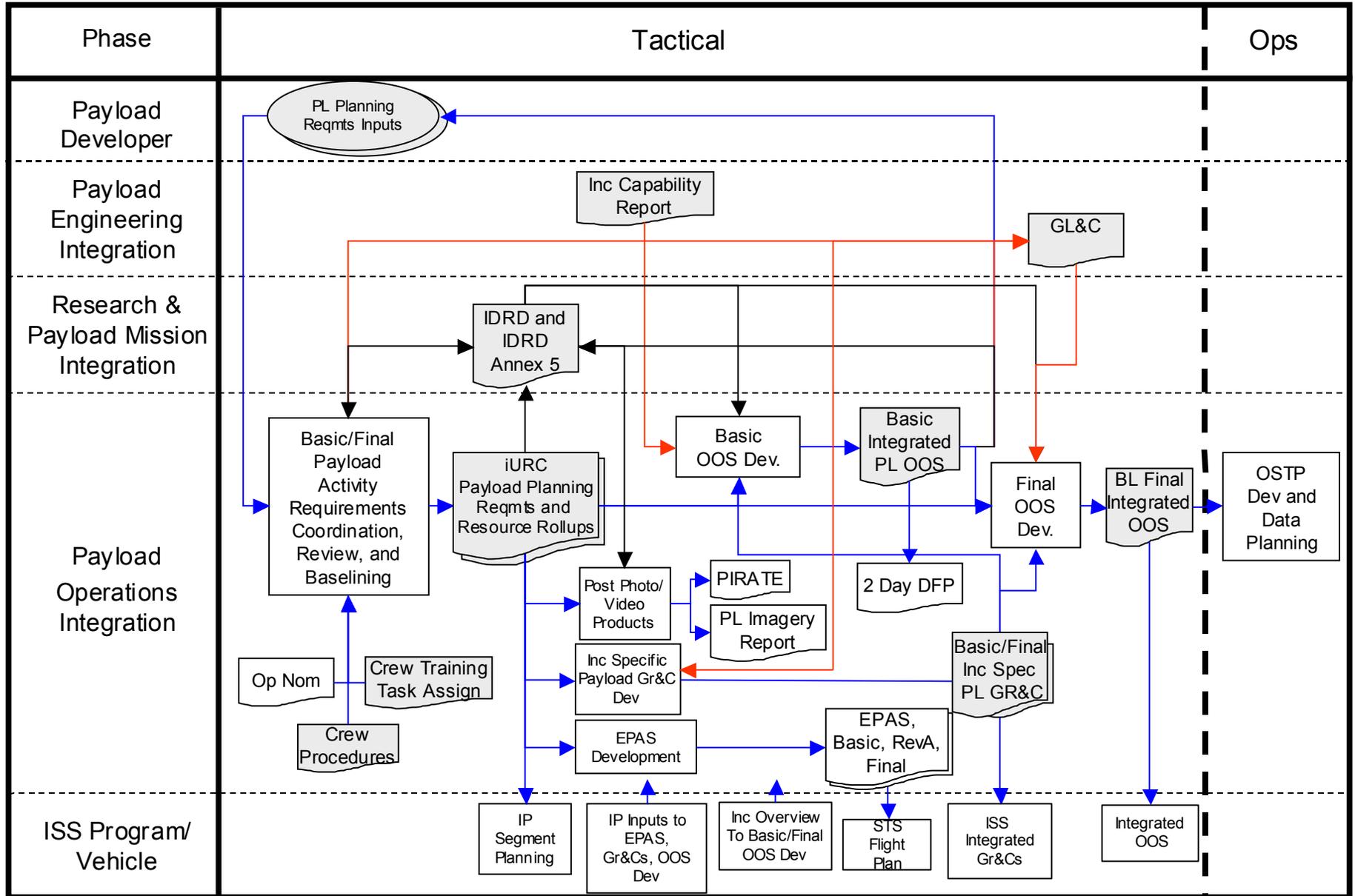


FIGURE B.5-14 PAYLOAD OPERATIONS INTEGRATION: PAYLOAD PLANNING LEVEL II PROCESS FLOW

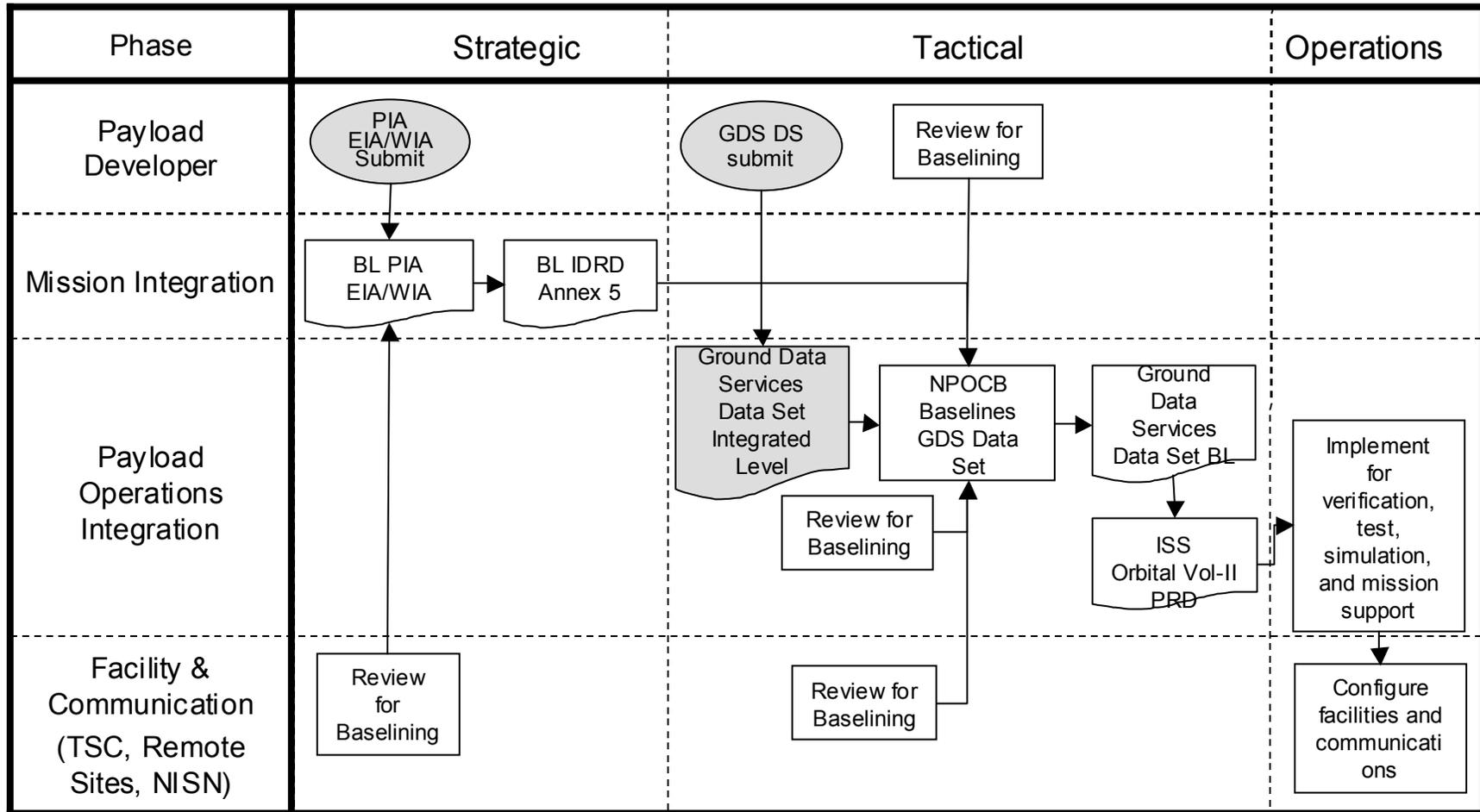


FIGURE B.5-15 PAYLOAD OPERATIONS INTEGRATION: GROUND DATA SERVICES LEVEL II PROCESS FLOW

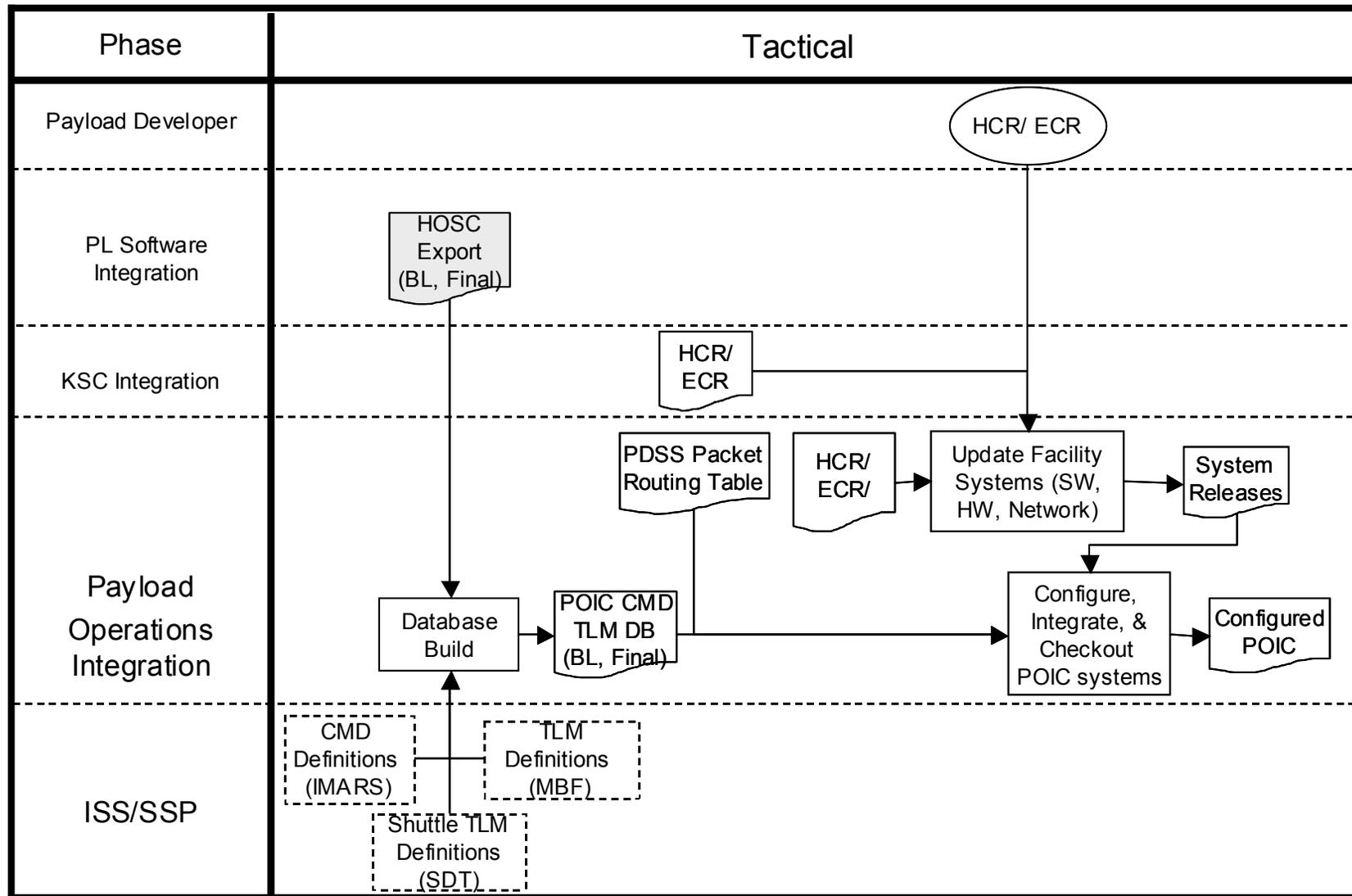
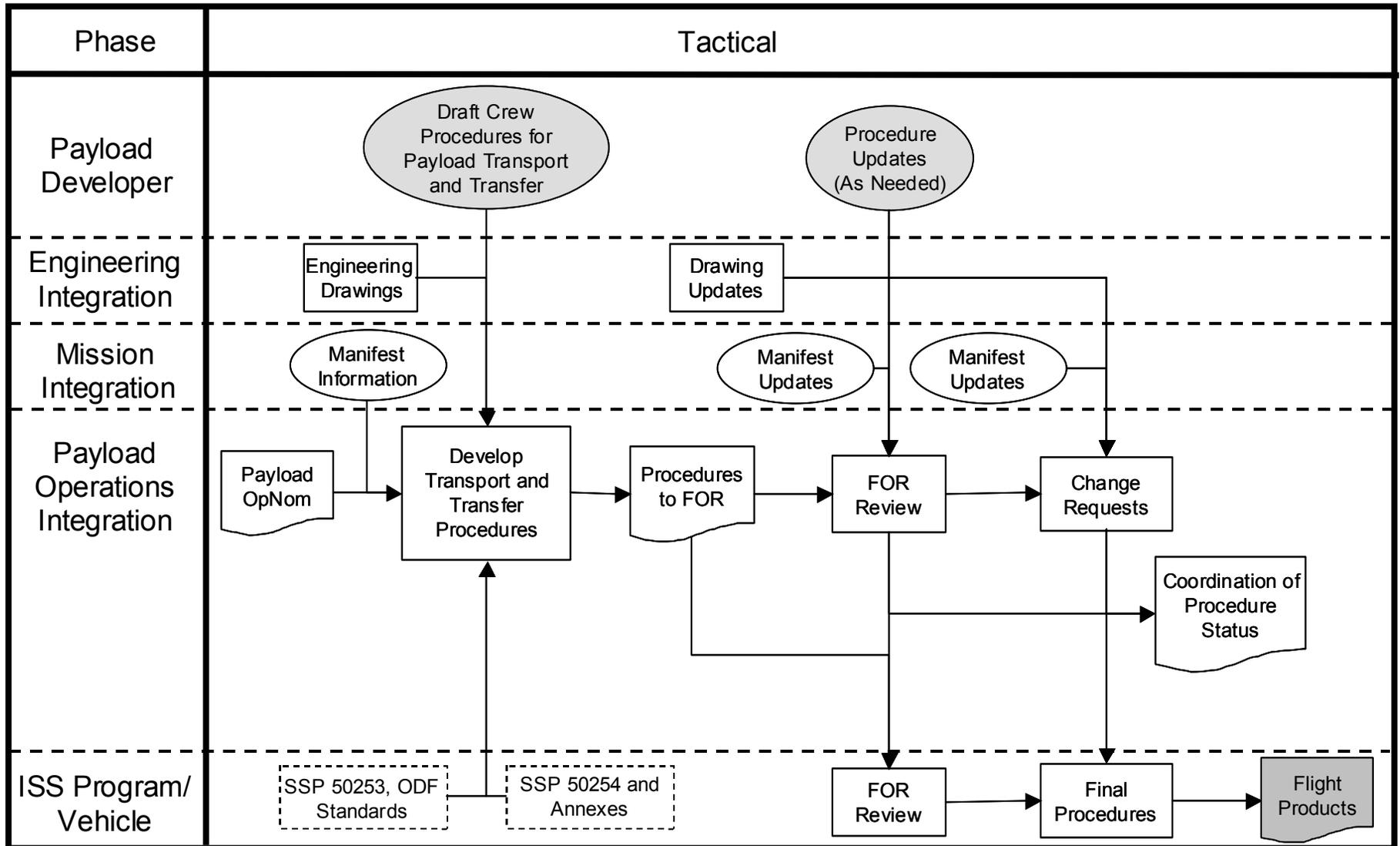


FIGURE B.5-16 PAYLOAD OPERATIONS INTEGRATION: GROUND SYSTEM INTEGRATION LEVEL II PROCESS FLOW



**FIGURE B.5-17 PAYLOAD OPERATIONS INTEGRATION: SHUTTLE PROCEDURE DEVELOPMENT LEVEL II PROCESS FLOW**

**APPENDIX C**  
**ACRONYMS AND ABBREVIATIONS**

**APPENDIX C - ACRONYMS AND ABBREVIATIONS**

A	Analysis Attached Assembly
A&I	Assembly and Installation
ACASS	Active Common Attach System Simulator
ARIS	Active Rack Isolated System
ATV	Automated Transfer Vehicle
B	Basic
B	Baseline
BITS	Barcode Inventory Tracking System
B/L	Baseline
BR	Bench Review
C	Completed
C&DH	Command and Data Handling
CCCD	Crew Compartment Configuration Drawing
CCCR	Crew Compartment Configuration Review
CD	Command Data
CDR	Critical Design Review
CE	Cargo Element
CEF	Change Evaluation Form
CEIT	Crew Equipment Interface Test
CI	Cargo Integration
CIR	Cargo Integration Review
CIRD	Cargo Integration Review Dry Run
CMD	Command
CoC	Certificate of Compliance
CoFR	Certification of Flight Readiness
Config	Configuration
COUP	Consolidated Operations and Utilization Plan
CP	Control Plan
CQRM	Crew Qualification Requirements Matrix
CR	Change Request
D	Demonstration
DDPF	Decal Design Production Facility
DFP	Daily Flight Plan
DGCS	Display and Graphics Commonality Standard
DP	Data Pack
DQA	Data Quality Assurance
DS	Data Set
Dwg	Drawing
EBCS	External Berthing Camera System

ECR	Engineering Change Request
EI	Engineering Integration
EIA	EXPRESS Integration Agreement
EIRR	EXPRESS Integration Readiness Review
EMC	Electromagnetic Compatibility (Control)
EMI	Electromagnetic Interference
EPAS	ETOV Payload Activity Summary
ETA	EXPRESS Transportation Agreement
ETOV	Earth-to-Orbit Vehicle
Exper	Experiment
EXPRESS	EXpedite the PROcessing of Experiments to the Space Station
F	Final
FCSD	Flight Crew Support Division
FCU	Functional Checkout Unit
FOR	Flight Operations Review
FPM	Flight Payload Manager
FPSR	Flight Planning and Stowage Review
FR	Flight Rules
FRD	Flight Requirements Document
FRR	Flight Readiness Review
FSR	Flight Safety Review
FUR	Facility Utilization Request
GAS	Getaway Special
GCP	Ground Command Procedure
GDS	Ground Data Services
GL&C	Guidelines and Constraints
GOR	Ground Operations Review
GOWG	Ground Operations Working Group
GR&C	Groundrules and Constraints
Grd	Ground
GSE	Ground Support Equipment
GSP	Ground Support Personnel
GSR	Ground Safety Review
GSRP	Ground Safety Review Panel
HAMR	Hardware Accountability Matrix Report
HCI	Human Computer Interface
HCR	HOSC Configuration Request
Hdwr	Hardware
HFIT	Human Factors Interface Team (Integration)
HOSC	Huntsville Operations Support Center
HTV	H-II Transfer Vehicle
H/W	Hardware
I	Increment

	Inspection
	Interim
I-	Increment minus
I&C	Interface and Consumable
ICA	Interface Control Annex
ICD	Interface Control Document
ICWG	Interface Control Working Group
IDD	Interface Definition Document
IDP	Integrated Data Package
IDRD	Increment Definition and Requirements Document
IDRP	Increment Definition Requirements Plan
IEHA	Integrated Element Hazard Analysis
I/F	Interface
IFOR	Increment Flight Operations Review
IMS	Inventory Management System
Integ	Integration
IOR	Increment Operations Review
IP	International Partner
IPIC	ISS Payload Integration Contract
IPLAT	ISS Payload Label Approval Team
IPM	Increment Payload Manager
IPMM	Integrated Payload Mission Model
IRD	Interface Requirements Document
IRN	Interface Revision Notice
IRR	Increment Requirements Review
ISPR	International Standard Payload Rack
ISS	International Space Station
ITRR	Integrated Training Readiness Review
iURC	interim User Requirements Collection
IVT	Interface Verification Test
JMST	Joint Multi-Segment Station Training
JSC	Johnson Space Center
KSC	Kennedy Space Center
Ku-Band	15.250 to 17.250 Gigahertz
L	Launch
L-	Launch minus
L6S	Lean Six Sigma
LON	Launch On Need
LPA	Launch Package Assessment
LP/CE	Launch Package/Cargo Element
LSSM	Launch Site Support Manager
LSSP	Launch Site Support Plan
MA/ITP	Multilateral Advanced Increment-specific Training Plan

MBR	Middeck Bench Review
MBF	Mission Build Facility
MCC	Mission Control Center
MDK	Middeck
MDM	Multiplexer/Demultiplexer
ME	Mandatory Evaluator
MI	Mission Integration
Micro-G	Microgravity
MIDAS	Mission Integration Database Applications System
MIM	Multi-Increment Manifest
MIP	Mission Integration Plan
MOD	Mission Operations Directorate
MPCB	Multilateral Payloads Control Board
MPLM	Multi-Purpose Logistics Module
MPV	Manual Procedure Viewer
MR	Manifest Request
MSFC	Marshall Space Flight Center
NASA	National Aeronautics and Space Administration
NASDA	National Space Development Agency of Japan
NISN	NASA Integrated Service Network
NLT	No Later Than
NPOCB	NASA Payload Operations Control Board
OBT	Onboard Training
O/D	On-Dock
OMRS	Operations and Maintenance Requirements and Specifications
OOS	On-Orbit Operations Summary
OpNom	Operations Nomenclature
Ops	Operations
ORG	Organization
OS	Operations Summary
OSTP	On-board Short Term Plan
P	Preliminary
	Pressurized
PARR	Payload Action Request Record
PCB	Payloads Control Board
Pckg	Package
PCS	Portable Computer System
PD	Payload Developer
PDL	Payload Data Library
PDR	Preliminary Design Review
PDS	Payload Data Set
PDSS	Payload Data Services System
PEI	Payload Engineering Integration
Ph	Phase

PHCM	Payload Hazard Control Matrix
PIA	Payload Integration Agreement
PICB	Payload Integration Control Board
PIM	Payload Integration Manager
PIRN	Preliminary/Proposed Interface Revision Notice
P/L	Payload
PLCR	Payload Lesson Change Request
PMI	Payload Mission Integration
PMIT	Payload Mission Integration Team
POC	Point-of-Contact
PODF	Payload Operations Data File
PODFCB	Payload Operations Data File Control Board
POIC	Payload Operations Integration Center
POIF	Payload Operation Integration Function
	Payload Operation and Integration Facility
PP	Planning Period
PP-	Planning Period minus
PPD	Payload Procedures and Displays
PPIL	Payload Product Integrated List
PRCU	Payload Rack Checkout Unit
PRD	Program Requirement Document
Proc	Procedure
PRR	Payload Readiness Review
PSCP	Payload Software Control Panel
PSE	Payload Safety Engineer
PSI	Payload Software Integration
PSIVF	Payload Software Integration Verification Facility
PSM	Payload System Manual
PSR	Payload Safety Review
PSRD	Payload Simulator Requirements Document
PSTP	Payload Simulator Test Procedure
PTC	Payload Training Compliment
PTCS	Payload Test and Checkout System
PTDR	Payload Training Dry Run
PTLP	Payload Training Lesson Plan
PTP	Payload Tactical Plan
PVP	Payload Verification Plan
PVPP	Payload Verification Program Plan
RAM	Requirements Allocation Matrix
RCN	Requirements Change Notice
Req'd	Required
Rev	Review
RF	Radio Frequency
RID	Review Item Discrepancy
RIO	Research Integration Office

RPO	Research Program Office
Rpt	Report
RPWG	Research Planning Working Group
Rqts	Requirements
S	Small Status Submit
SAR	Systems Acceptance Review
SC	Support Contractor
SDT	Shuttle Data Tape
SIPOC	Supplier, Input, Process, Output, Customer
SME	Subject Matter Expert
SN	Serial Number
SOC	Shuttle Operations Controller
SODF	System Operations Data File
SORR	Stage Operations Readiness Review
SpaceHab	Space Habitat Module
SPOE	Standard Payload Outfitting Equipment
SPPF	SpaceHab Payload Processing Facility
Spt	Support
SRDS	Support Requirements Data Set
SRS	Software Requirements Specification
SS	Subrack Standard
SSC	Station Support Computer
SSCCD	Space Station Configuration Control Drawing
SSP	Space Shuttle Program
SSPCB	Space Station Program Control Board
SSPOCCB	Space Station Portable On-board Computer Control Board
SSTF	Space Station Training Facility
STEP	Suitcase Test Environment for Payloads
STS	Space Transportation System
S/W	Software
T	Test
TAP	Test and Assembly Procedure
TBD	To Be Determined
TBR	To Be Resolved
Tech	Technical
TGHR	Time-Critical Ground Handling Requirements
TIM	Technical Interchange Meeting
TLM	Telemetry
T/O	Turn-Over
TRA	Tactical Resource Allocation
TRDS	Technical Requirements Data Set
TreK	Telescience Resource Kit

TSC	Telescience Support Center
TST	Training Strategy Team
TV	Television
U	Update
U/D	Update
UMA	Umbilical Mechanism Assembly
U.S.	United States
US Lab	United States Laboratory
USOC	United States Operations Center
US PODFCB	United States Payload Operations Data File Control Board
VADAR	Verification Analysis Data Acceptance Review
VAR	Verification Acceptance Review
ViPER	Vehicle Integration Performance and Resources
VITT	Vehicle Integration Test Team
VLA	Verification Loads Analysis
VMDB	Vehicle Master Database
Vol.	Volume
VRDS	Verification Requirements Data Sheet
WIA	WORF Integration Agreement
WIF	Work Station Interface
WORF	Window Observation Rack Facility

**APPENDIX D**  
**GLOSSARY OF TERMS**

## APPENDIX D – GLOSSARY OF TERMS

### HARDWARE ACCOUNTABILITY MATRIX REPORT

The Hardware Accountability Matrix Report (HAMR) is used to track completion of ISS requirements and completion of physical processing actions associated with physical processing milestone activities. The HAMR is generated from a subset of data in Mission Integration Database Applications System (MIDAS) to be used by the Launch Package Manager and Hardware providers. MIDAS includes all components of the IDRD Annex 1 (the Manifest) and additional information for ISS hardware. Categories utilized in MIDAS for the HAMR typically include, but are not limited to: nomenclature, quantity, part number, on-dock and bench review dates, barcode/imagery/certification requirements, and hardware points of contacts.

### LEVEL 1 - PAYLOAD INTEGRATION DATA FLOW DIAGRAM

Process flow diagram providing relationships between all major data products provided and produced as a part of the payload integration process. Process owners are identified as Payload Developer, Research and Payload Mission Integration, Payload Engineering Integration, Payload Software Integration, KSC Integration, and Payload Operations Integration. Milestones are identified during the strategic and tactical phases to illustrate product to milestone relationships.

### LEVEL 2 PROCESS FLOWS

Level 2 process flows are provided to illustrate more detailed relationships between data products and processes used in carrying out the payload integration process. The Level 2 Process Flows are segregated by major integration functions to clarify dependencies and relationships between data products and processes.

### SIPOC FLOW DIAGRAMS

SUPPLIER, INPUT, PROCESS, OUTPUT, CUSTOMER (SIPOC) flow diagrams are used to simply define relationships between data providers, the inputs necessary to carry out required processes, the process carried out in producing required output, and the customer of the output (the actual user of the output). SIPOCs are used to ensure that data requested from any supplier is actually used in a process to produce an output that is required.

### STRATEGIC PLANNING

Strategic planning is the long-range planning that occurs in the I-60 to I-36 month time frame.

**TACTICAL PLANNING**

Tactical planning and manifesting is performed for each PP and provides planning for 1 year. Tactical planning and manifesting is a multilateral function, which defines the resources, allocations, research objectives, priorities, and manifests for each increment (expedition). These requirements are documented in the Increment Definition and Requirements Plan (IDRP) Increment Definition and Requirements Document (IDRD) series and its annexes.

**VERIFICATION ANALYSIS DATA ACCEPTABILITY REVIEW**

The Verification Analysis Data Acceptability Review (VADAR) will be conducted between the SSP and the Cargo Element (CE) developers just prior to starting the Verification Loads Analysis (VLA). The VADAR will be scheduled after all CE models have been received and validated. Specific cargo bay configurations, math models, forcing functions, CE data, analysis methods, and response data recoveries that are planned for the VLA will be clearly identified by the Support Contractor (SC). Each CE developer shall either concur with the SC provided data or provide updated data prior to or during the VADAR. After completion of this review, formal authorization will be provided to begin the VLA.

**APPENDIX E**  
**OPEN WORK**

### APPENDIX E - OPEN WORK

Table E-1 lists the specific To Be Determined (TBD) items in the document that are not yet known. The TBD is inserted as a placeholder wherever the required data is needed and is formatted in bold type within brackets. The TBD item is numbered based on the section where the first occurrence of the item is located as the first digit and a consecutive number as the second digit (i.e., **<TBD 4-1>** is the first undetermined item assigned in Section 4 of the document). As each TBD is solved, the updated text is inserted in each place that the TBD appears in the document and the item is removed from this table. As new TBD items are assigned, they will be added to this list in accordance with the above described numbering scheme. Original TBDs will not be renumbered.

**TABLE E-1 TO BE DETERMINED ITEMS**

TBD	Section	Description

Table E-2 lists the specific To Be Resolved (TBR) issues in the document that are not yet known. The TBR is inserted as a placeholder wherever the required data is needed and is formatted in bold type within brackets. The TBR issue is numbered based on the section where the first occurrence of the issue is located as the first digit and a consecutive number as the second digit (i.e., **<TBR 4-1>** is the first unresolved issue assigned in Section 4 of the document). As each TBR is resolved, the updated text is inserted in each place that the TBR appears in the document and the issue is removed from this table. As new TBR issues are assigned, they will be added to this list in accordance with the above described numbering scheme. Original TBRs will not be renumbered.

**TABLE E-2 TO BE RESOLVED ISSUES**

TBR	Section	Description