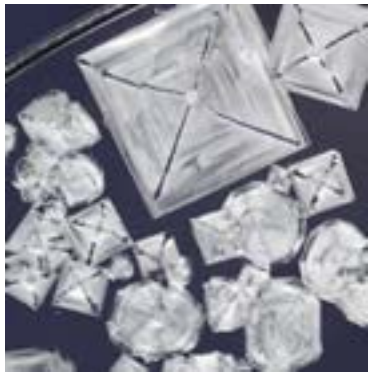
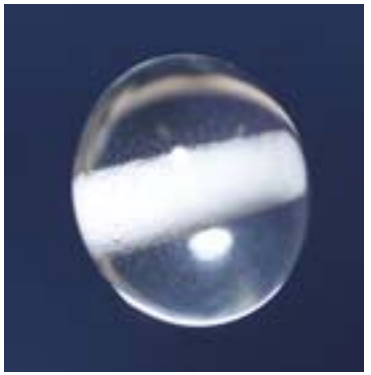
INTERNATIONAL SPACE STATION


Agenda

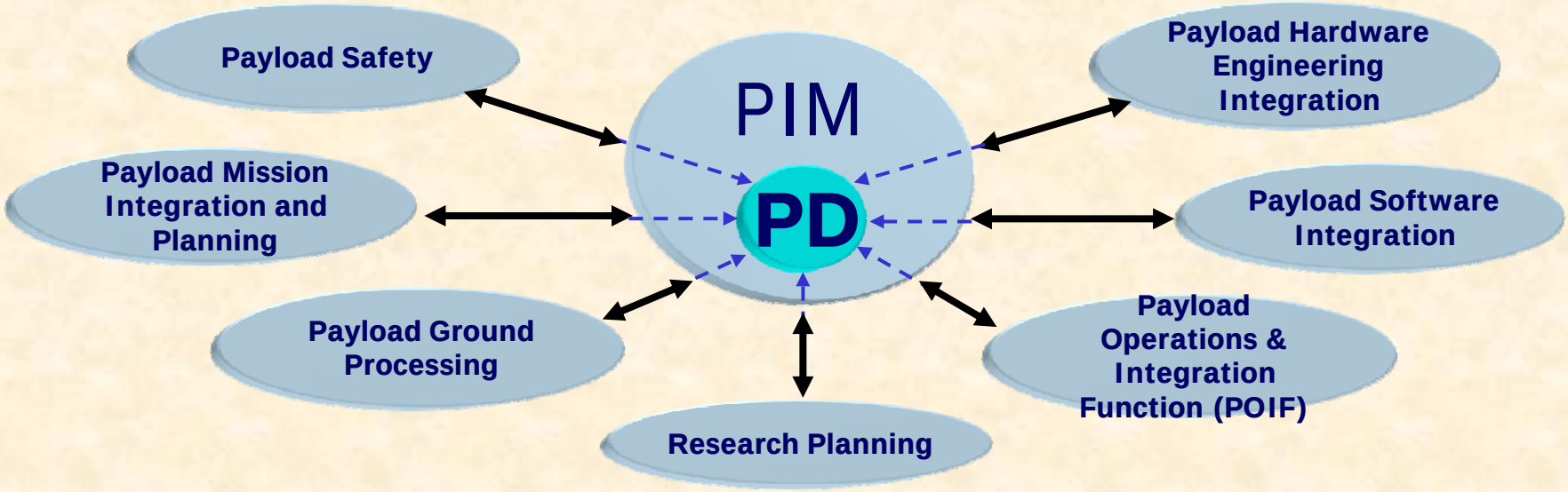
- Introduction
- Payload Integration Manager (PIM)
- ISS Payload Integration Process
- Integration Timeframes
  - Strategic, Tactical, and Operations
- Documentation
  - Joint Agreements, Integration Products
- Getting Manifested!
- Payload Tactical Plan
- Change Evaluation Process
- Summary

Introduction

This briefing provides a basic understanding of the ISS Payload Integration Process, including ISS-provided support to the payload and payload-provided data for the ISS

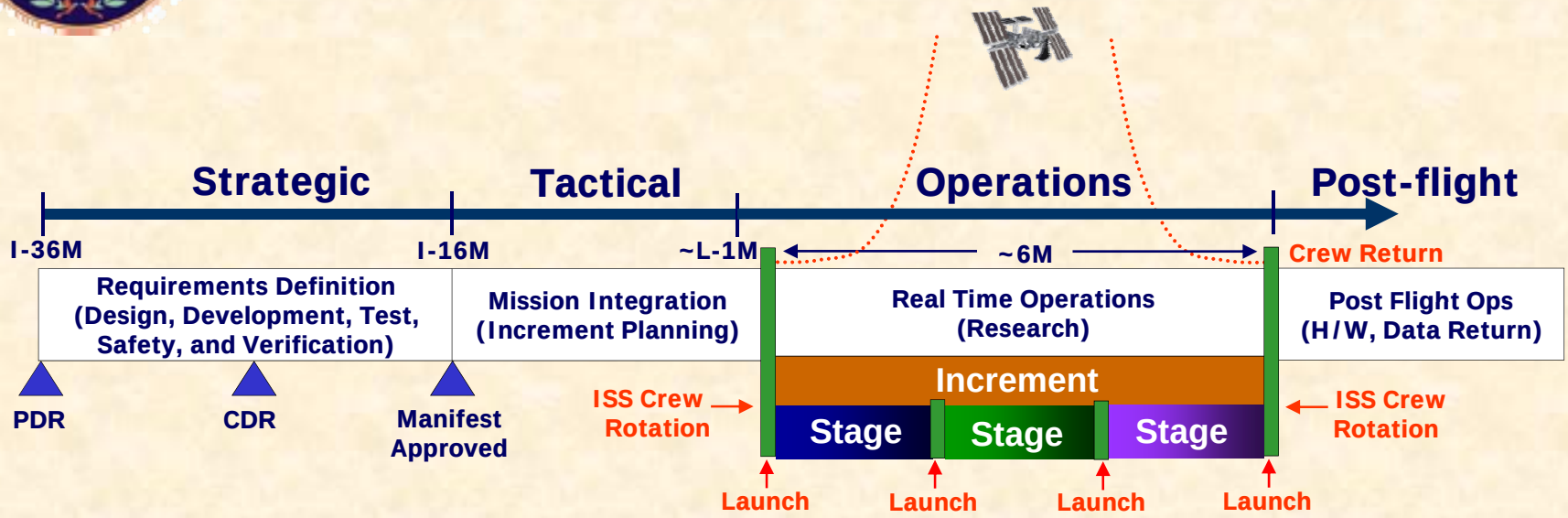
Payload Integration Manager

- NASA Payload Integration Manager (PIM)
  - Functions as the Payload Developer's primary interface to the ISS Program
  - Serves as payload advocate – but also protects ISS Program Requirements



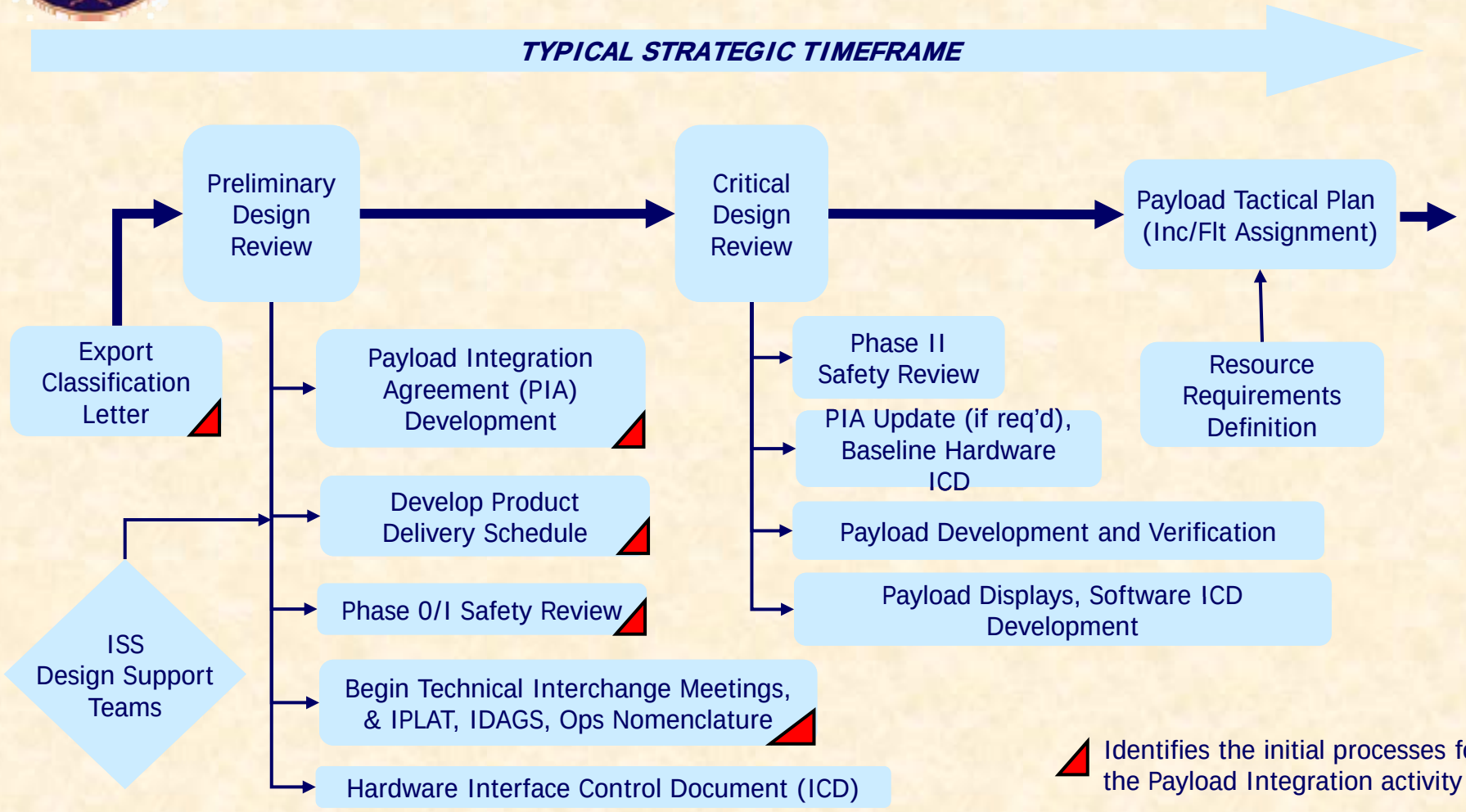
  - Ensures payload requirements are accurately defined and documented
  - Facilitates payload integration product development, delivery schedules, and communications with the ISS Program

ISS Payload Integration Process

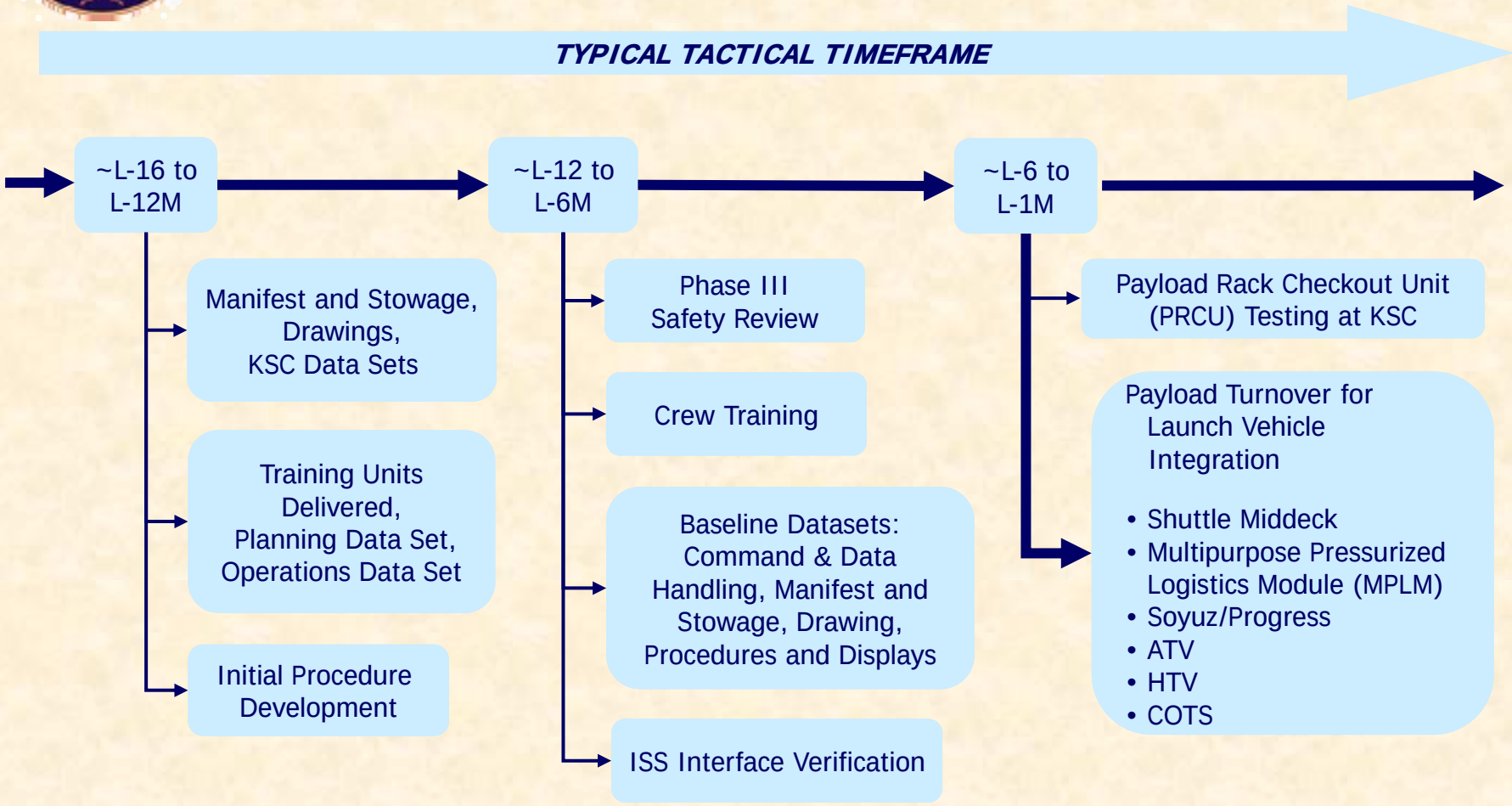


- **NASA PIMs provide integration leadership during all phases of the payload's life cycle**
  - **Strategic** – ISS integration requirements, products, and schedule development to ensure that an ISS compatible payload is built; support manifest process (payload data collection and feasibility assessments)
  - **Tactical** – represent PD interests to Increment and Flight-specific teams to ensure that integration and operations requirements are addressed; provide oversight for payload CoFR and verification submittals
  - **Operations** – assist with operations issue resolution between the PD and the Increment Payload Manager; maintains payload insight; and coordinates payload resupply or return requirements; assure payload CoFR and verification submittals during payload lifetime on-orbit
  - **Post-flight** – coordinate vehicle deintegration requirements; return of payload material from the landing site to the PD; and Lessons Learned submittals

Strategic Timeframe Overview



Tactical Timeframe Overview



Note: EXPRESS Sub-rack payloads will have a compressed integration cycle.

Operations Timeframe Overview

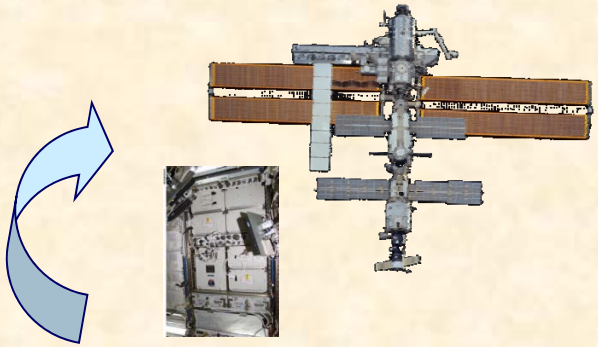
TYPICAL OPERATIONS TIMEFRAME

~L+2 days up through 6 months or more on-orbit

Certification of Flight Readiness → Launch → On-Orbit Operations → Landing → Post-Landing Payload Processing

- CoFR documentation addresses both hardware launch and Stage operations

- Hardware De-integration
- Sample Return



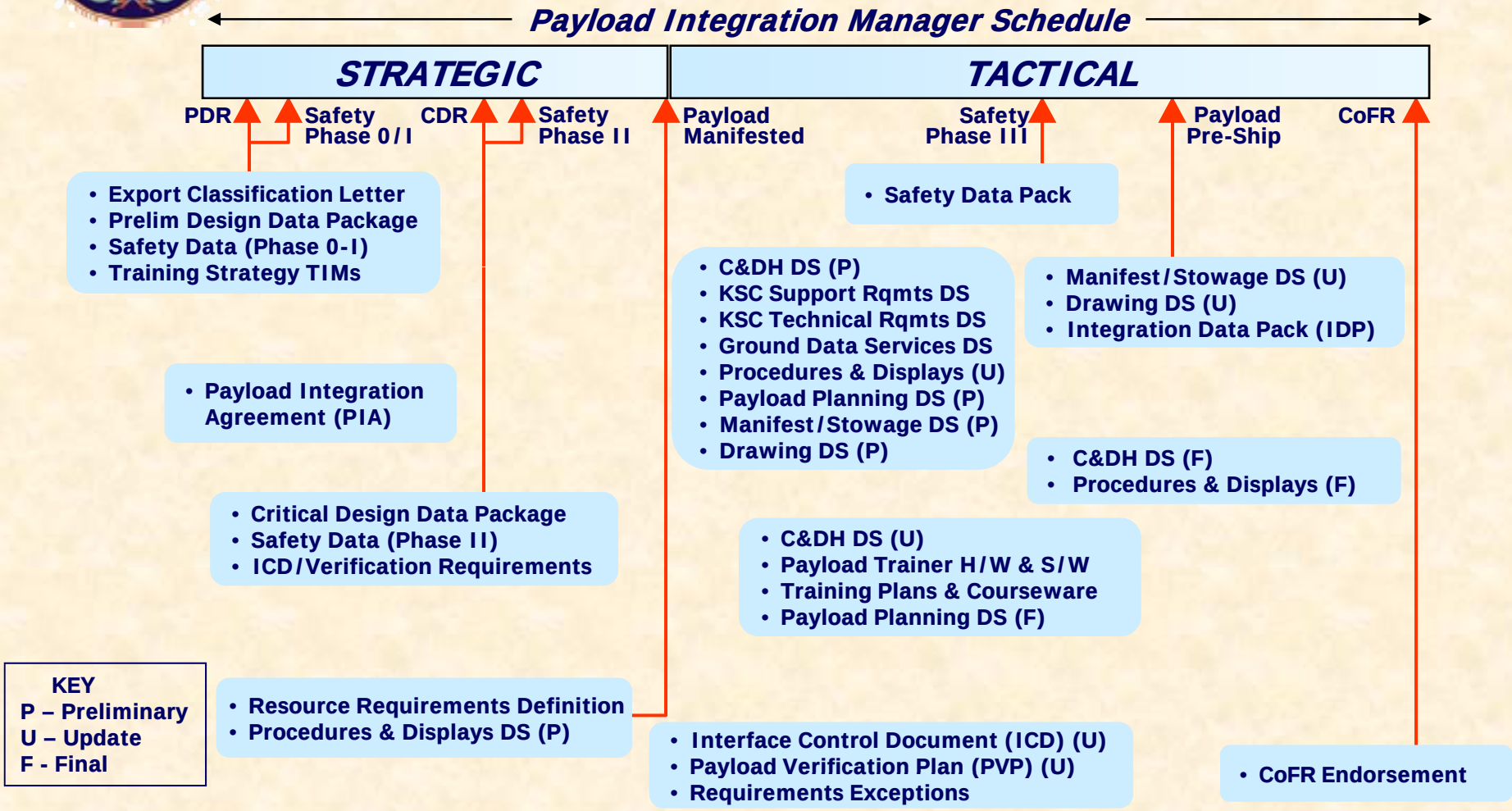
Requirements Documentation and Verification Paperwork

Joint Agreements

Negotiated Agreements	*What they do for the Payload Developer*
Strategic — Unique PIA	Documents joint agreements to manage and execute roles and responsibilities for payload integration.
Strategic — PIM Schedule	Documents negotiated product and hardware delivery dates.
Strategic — Payload Unique ICD/ Verification Requirements	Defines payload hardware and software interfaces with ISS. Details interface verification requirements.
Tactical — Payload Safety Data Package	Documents payload hazards, hazard controls, and hazard control verification.
Tactical — Payload Tactical Plan	Documents detailed payload resource requirements.
Tactical — Payload Unique Data Sets	Document detailed payload requirements for technical disciplines:

- Payload Training
- Payload Operations
- EVA/EVR
- Ground Data Services
- KSC Support Requirements
- Payload Procedures and Displays
- Payload Planning Requirements
- KSC Technical Requirements
- Manifest and Stowage
- Command and Data Handling
- Payload Configuration and Drawings

Integration Products



Getting Manifested!

Research Planning Working Group (RPWG)

Increment-specific Research Plan

ISS Payloads Office Feasibility Assessments
(Mission Integration)

Payload Tactical Plan (PTP)

ISS Payloads Control Board / Multilateral Payloads Control Board

~ Increment minus 12 months

Payload Tactical Plan – IDRD Annex 5

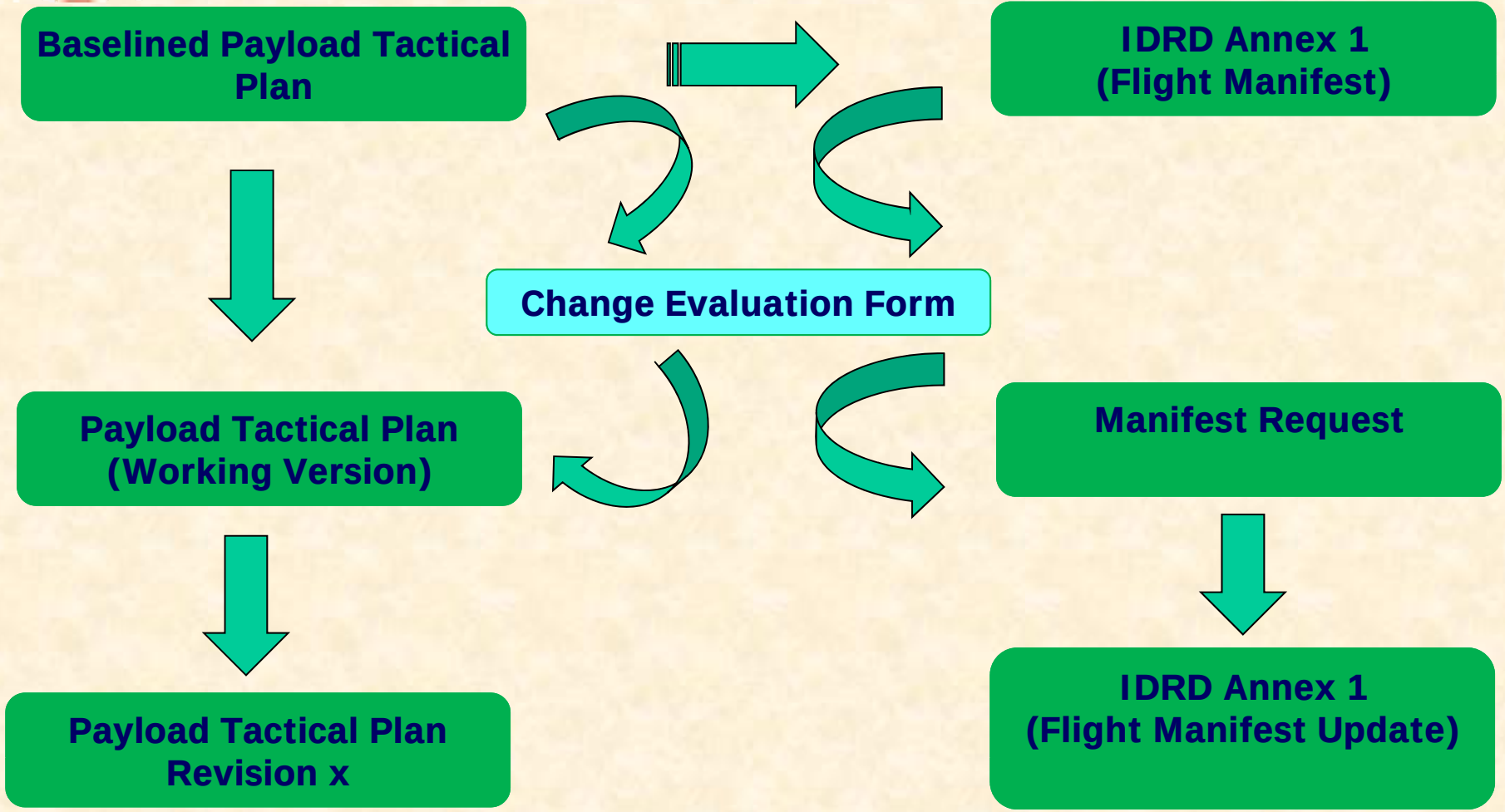
- **Payload Tactical Plan – IDRD Annex 5**
  - **Purpose:**

    This document provides the integrated ascent, descent, and on-orbit resource requirements, research objectives , utilization priorities and on-orbit payload topologies of the utilization complement for a given set of Increments.

  - **The Payload Tactical Plan is used as a top level requirements document to define resource requirements which can then be flowed to downstream payload documentation (e.g. Hardware and Software ICDs, Procedures, Planning Data, Stage Analysis, etc.)**

  - **The Payload Tactical Plan is also used to communicate utilization resource requirements to the other ISS offices (e.g. Mission Integration, Vehicle Office, MOD, etc.)**

Change Evaluation Form Process



Summary

- Our job is to increase the potential of Mission success for ISS payloads

Clearly defining and communicating requirements and expectations

leads to

Safe payload operations and successful research

resulting in

Maximum Science Return

ISS Payload Integration

Back-up Charts

ISS Payload Integration
Acronyms and Terms

ATV - Automated Transfer Vehicle
AWG - Acoustics Working Group
CDR - Critical Design Review
CoFR - Certification of Flight Readiness
C&DH - Command and Data Handling
DS - Data Set
EDMS - Electronic Data Management System
EEE - Electrical, Electronic, and Electromechanical
ExPRESS - Expedite the Processing of Experiments to Space Station
FLT - Flight
GSRP - Ground Safety Review Panel
HFIT - Human Factors Integration Team
H/W - Hardware
HTV-IIA - JAXA launch vehicle
ICD - Interface Control Document
IDP - Integration Data Pack
Inc - Increment
IP - Internet Protocol
IPLAT - ISS Payload Label Approval Team
ISS - International Space Station
JSC - Johnson Space Center
KSC - Kennedy Space Center
L-6 - Launch minus *(month or day)*
MPCB - Multilateral Payload Control Board
MPLM - Multipurpose Pressurized Logistics Module
MSFC - Marshall Space Flight Center
NPOCB - NASA Payload Operations Control Board
NSTS - National Space Transportation System
OpNom - Operations Nomenclature
PARC - Payload Activity Requirements Coordinator
PCB - Payload Control Board
PD - Payload Developer
PDL - Payload Data Library
PDR - Preliminary Design Review
PECP - Payload Engineering Control Panel
PIA - Payload Integration Agreement
PIM - Payload Integration Manager
PIMS - Payload Information Management System
PMIT - Payload Mission Integration Team
PODF - Payload Operations Data File
POIC - Payload Operations Integration Center
POIF - Payload Operations Integration Function
POIWG - Payload Operations Integration Working Group
PSCP - Payload Software Control Panel
PSRP - Payload Safety Review Panel
PVP - Payload Verification Plan
RPWG - Research Planning Working Group
SAR - System Acceptance Review
SR&QA - Safety Requirements and Quality Assurance
S/W - Software
TIM - Technical Interchange Meeting
TReK - Telescience Resource Kit
User-ID - User-identification
URC - User Requirements Collection
US PODFCB - US Payload Operations Data File Control Board
VPN - Virtual Private Network
IDRD- Increment Definition and Requirements Document

I-36M - Increment minus 36 months
L-6M - Launch minus 6 months
Increment - ISS period supporting crew rotation. The duration of an Increment is the time period from the launch of a designated Expedition crew to the undocking of the return vehicle for that Expedition crew.
Questionnaire - Web-based software data entry tool used to collect payload resource requirements in support of the RPWG manifesting process
Stage - ISS timeframe between manned vehicle dockings