



Payload Topology Forum

IVA Payload Placement Process and Timeline

Bryan Griffith/OM7
Jesus Suarez/OP
John Bussell/Boeing



Agenda



- **Purpose:**

The purpose of this presentation is to brief the payload integration panel on the IVA Payloads Topology Assessment (TA) and Placement Study (PS) process and expedited timeline.

- **Select the appropriate box below:**

- Request for Technical Concurrence
- Request for Partial Implementation
- Request for Full/Final Implementation
- Information Only
- Management Direction
- Response to an Action Item

- **Agenda:**

- Background
- Payload Placement Studies
- IVA Payload Placement Process Flow
- Nominal Process Timeline
- Expedited Process Timeline for PAM
- Summary



Background



- The Payload Topology Forum works under the direction of the OM7 Vehicle Configuration, Topology and Robotics Integration (VCTRI) Office to:
 - Optimize internal payload locations (including rack, sub-rack, and aisle-deployed payloads)
 - Efficiently utilize resources
 - Maximize science and research opportunities
- The IVA Payloads Team develops two types of products depending on the vehicle deployment location and the needs of the payload customer:
 - Topology Assessments (TA)
 - Placement Studies (PS)



Topology Assessments



Topology Assessments are analyses typically used to determine the feasibility of a payload location. A Topology Assessment is performed when:

- a payload is early in its development
- the PD may be exploring multiple locations
- the PD needs preliminary work to aid in development
- or, the payload is located within an IP's allocation

A Topology assessment does not:

- Assess cable lengths
- Seek approval for GGR&C violations
- Define Guidelines & Constraints (GLCs) for POI

- Topology Assessments are typically presented to PTF and published to Topology Website ~45 calendar days (6-7 weeks) from request



Payload Placement Studies



Payload Placement Studies are used to generate operational products for payloads in US modules.

A Placement Study does provide:

- Recommended cable lengths
- Resolution of any GGR&C violations through MIOCB
- Includes Operational Guidelines and Constraints to support real-time on-orbit operations needed by POIC at L-12 weeks (L-3m)
- Individual placement studies are rolled into the increment payload topology, which is captured in an ORBIT CEF

- Placement Studies are not performed for:
 - Facility internal payloads (*MSG, LSG, etc.*) *EXCEPT EXPRESS/WORF*
 - Payloads deployed within IP allocations (COL/JEM aisle or non-NASA racks)

Analysis is typically presented to PTF and published to EDMS ~15-16 weeks (~4 months) from request, although Board resolution of GGR&C exceptions or deviations can require up to 9 months to complete.



Payload Placement Studies



The placement studies evaluate the placement of payloads based on:

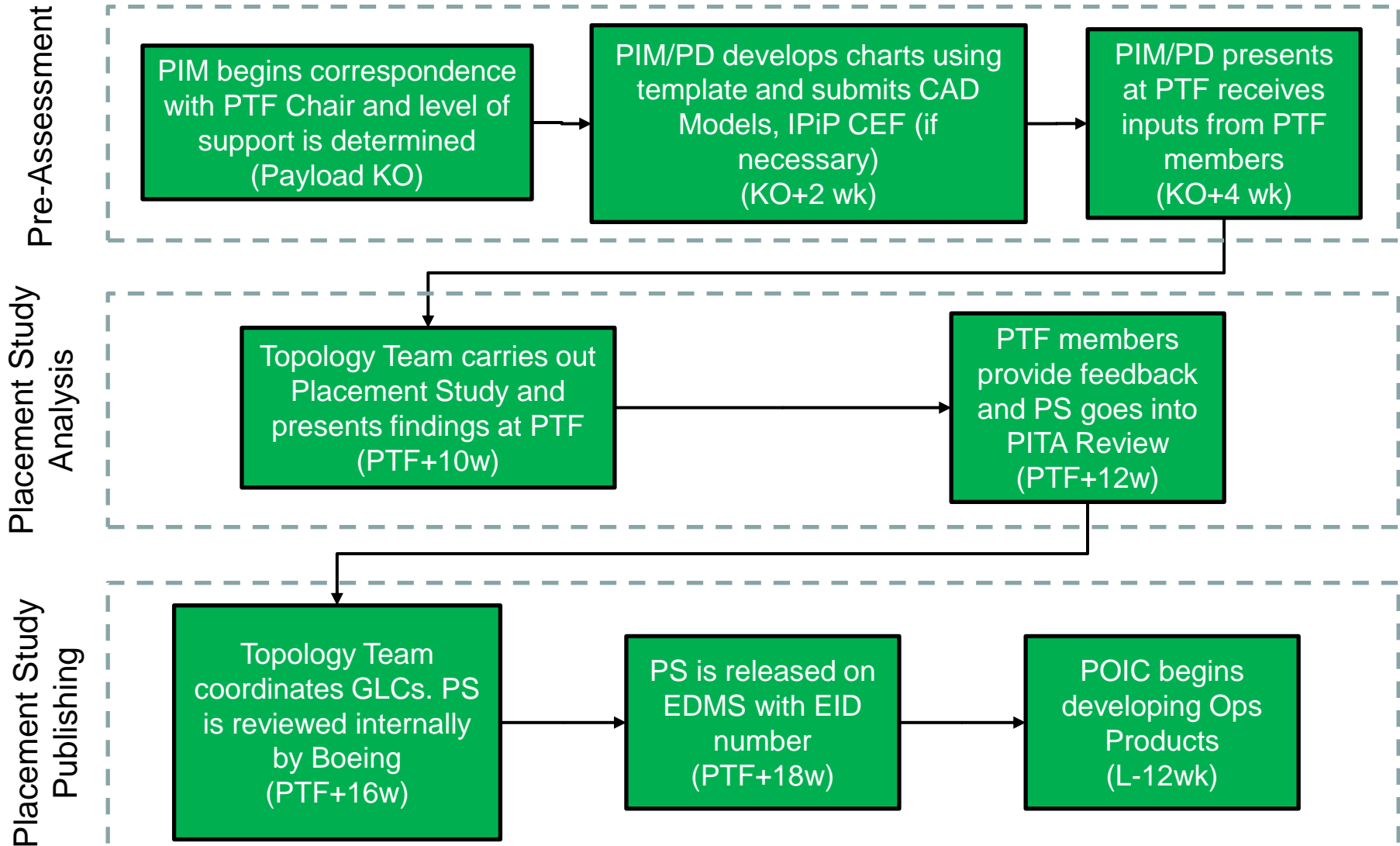
- *Protrusions and obstructions*
- *Physical interface*
- *Resource requirements (power, data, thermal, fluids, gases, etc.)*
- *ECLSS, thermal, and cooling*
- *Microgravity and vibration*
- *Crew safety, health, time, ergonomics, and operational efficiency*
- *Other issues that impact, or are affected by, the placement or operation of the payload.*
- *Power connections for the payload coordinated with IPIP, PLUTO, and/or EXPRESS as required*

The placement studies adhere to the established PTF priorities:

- *Safety (crew, vehicle, and payload hardware)*
- *Science objectives*
- *Payload requirements for operation*
- *Generic Groundrules, Requirements, and Constraints (GGR&C)*
- *Consumables and resources (availability and resource margins)*
- *Habitability (crew and equipment)*
- *Maximize operational flexibility*



Placement Study Process Flow





Expedited Timeline for PAM Placement Studies



The IV Payloads team has created the following ‘Expedited Process’ in support of PAM flights for lower complexity payloads:

- NLT L-6m: OZ defines PAM P/L complement
 - Pre-Assessment
 - Topology lead determines whether PS is needed
- NLT L-18w: PIM/PD submits PS request at PTF
 - PD/PIM Presentation
- NLT L-13w: IVA Payloads team presents results at PTF and PS is released into PITA
- NLT L-12w: PITA Review complete; GLCs provided to PIO Book Mgr; Inputs due for POIC Procedure Development
- NLT L-9w: EID release cycle complete; Formal delivery to EDMS
- NLT L-8w: GLC release cycle complete; GLCs released in ORBIT
- L-3w: Ops Procedure Baseline/SORR

Note:

PAM investigations using the Expedited Timeline should not need GGR&C violation approvals from MIOCB.



Summary



- The Payload Topology Forum (PTF) produces 2 primary products to help optimize internal payload locations: Topology Assessments and Placement Studies
- Topology Assessments are quick-look type analyses to aid in development of a payload, selection between multiple worksites, or for IP areas of responsibility. OZ must request placement in an IP area of responsibility via CEF and proper forums.
- Placement Studies not only determine a location for the payload within the USOS, but provide for coordination of GGR&C violations, determination of required cable lengths, and definition of GLCs for POI.
- The nominal PS template protects for ~18 weeks to ensure thorough analysis, stakeholder review, Generic Ground Rule & Constraint (GGR&C) violation approvals, and documentation of payload Guidelines & Constraints (GLCs)
- An expedited process is now available for PAM payloads. This process assumes low to medium complexity and no GGR&C violations.
- IVA Payloads ability to conduct simultaneous requests is limited; therefore, study requests are needed as early as possible to ensure full manifest can be worked and Ops Products can be developed.



Backup



Back up-cont.



- Websites
 - [IVA Payloads](#) and [Payload Topology Forum](#) Websites
 - [ORBIT](#):
 - Research Investigation & Facility Database (RIFD)
 - Change Evaluation Form (CEF) Tracking & Integration (CETI)
 - Payload Integration Tasks & Assignments (PITA)
 - Guidelines and Constraints (GLC)