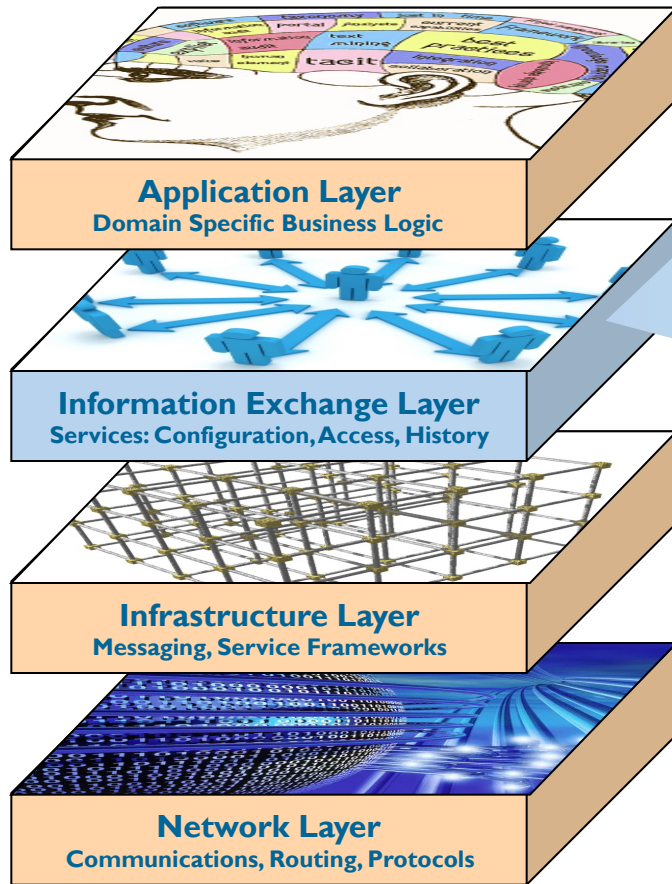


Call for Interest in Mission Planning Services Standardisation

Spring CCSDS Technical Meeting, Darmstadt
18 April 2012









CCSDS Mission Operations (MO) Services

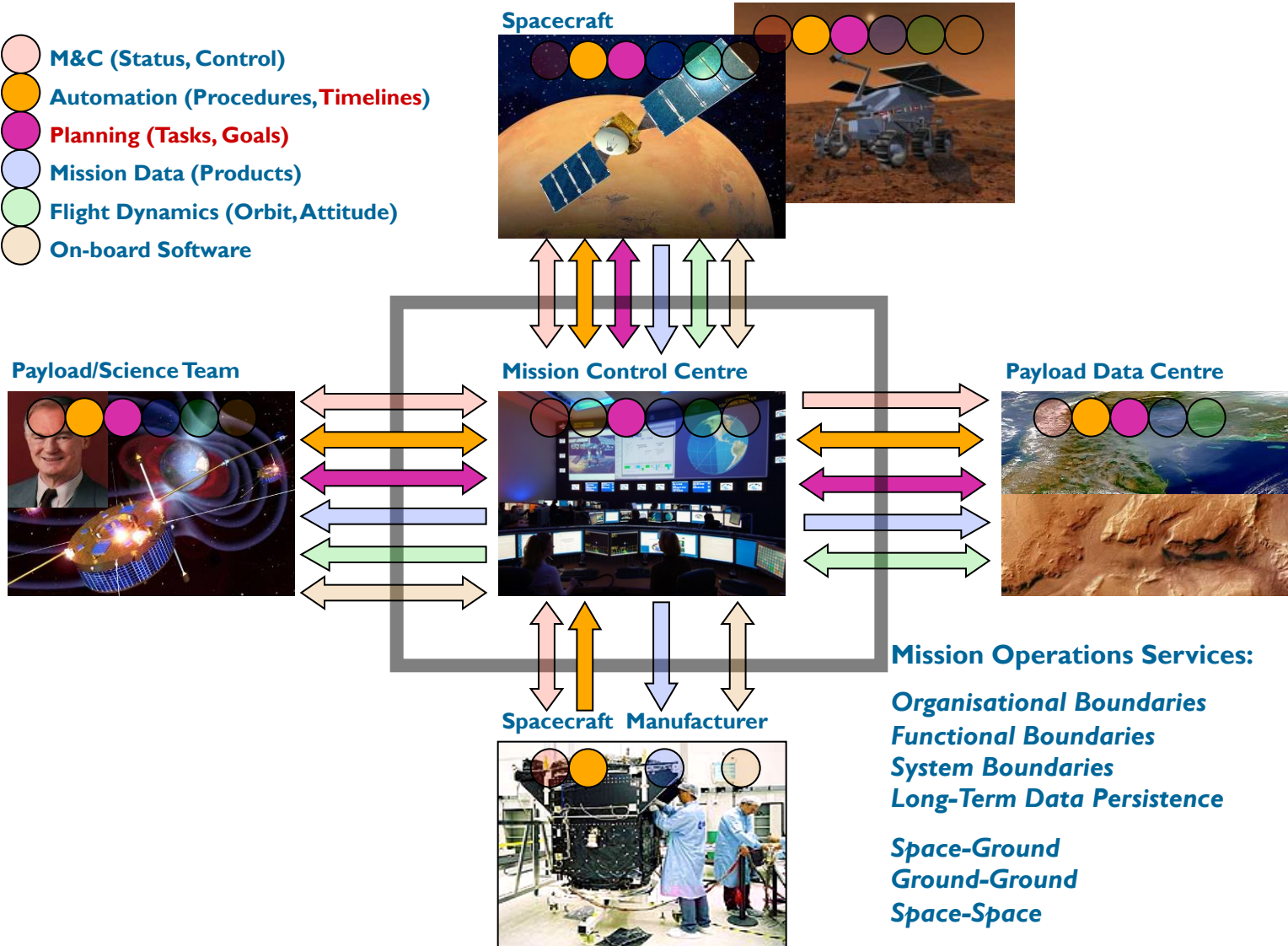


CCSDS MO Services:

- **Mission Operations Domain**
- **Application Level End-to-End Services**
- **Meaningful Information Exchange**
- **Distributed Systems (Space & Ground)**
- **Interoperable**
 - » **Between Agencies/Operators**
 - » **Between Systems**
 - » **Open Data / History**
- **Technology Agnostic**
- **Extensible Framework**

Distributable Functions expose potential MO Services

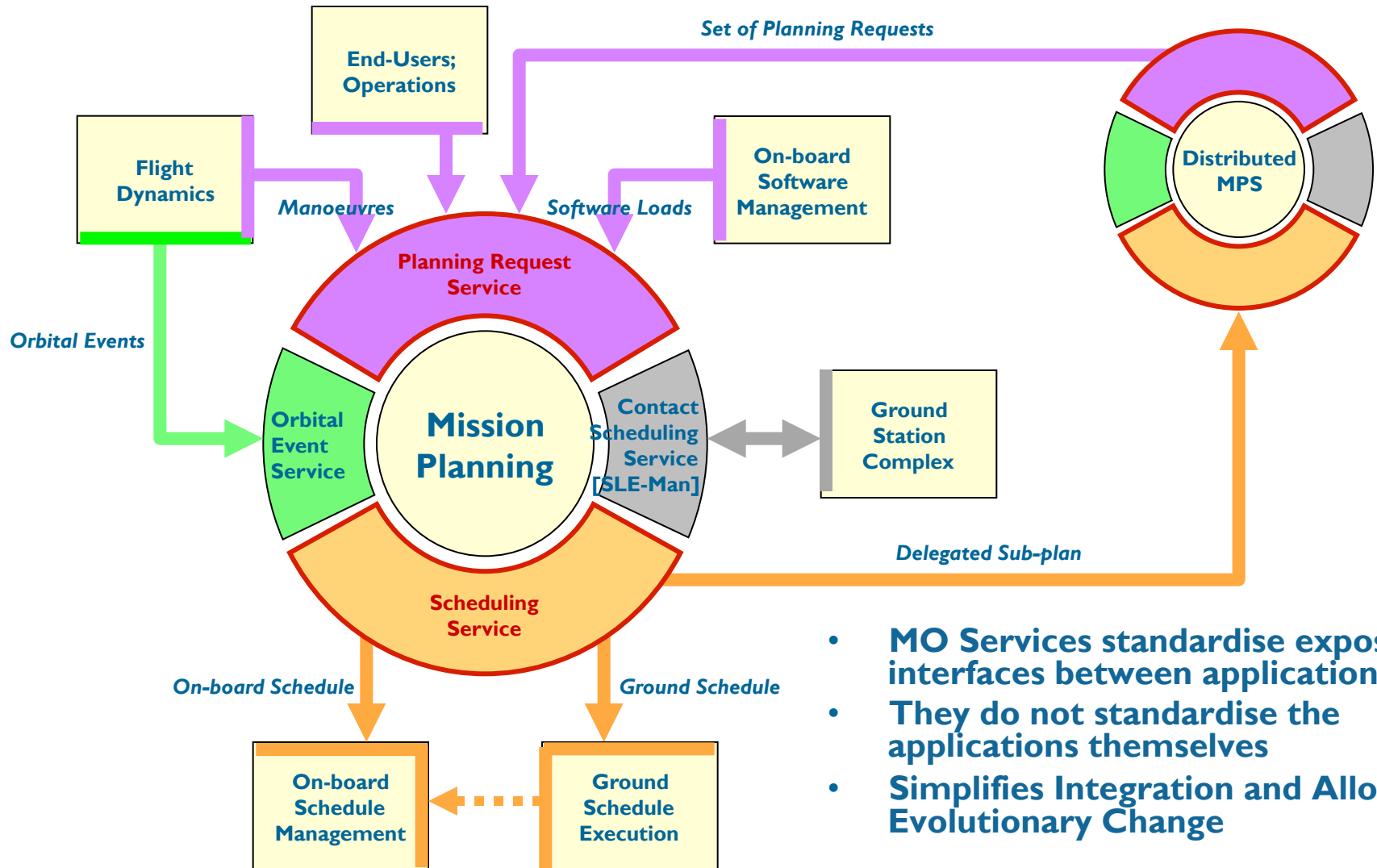
-  M&C (Status, Control)
-  Automation (Procedures, Timelines)
-  Planning (Tasks, Goals)
-  Mission Data (Products)
-  Flight Dynamics (Orbit, Attitude)
-  On-board Software



Benefits of Standard Mission Planning Services

- **Interoperable Interface between:**
 - » **PIs, Users, Operating Agencies, Spacecraft**
 - » **Allows each to Develop/Integrate own Multi-mission Systems**
 - » **Common Service layer supports rapid Mission Integration**
 - » **One Adapter for all Missions, not many bespoke interfaces**
- **Common Concepts across Missions / Mission Types**
 - » **Goals, Tasks, Constraints**
 - » **Time-based, Position-based, Event-based**
 - » **Repetitive Operations**
 - » **Discrete and Multi-part (Serial or Survey) Operations**
- **Services define both Information Exchanged (Static) and Interaction Protocol (Dynamic) [not just a data format]**
 - » **Set of Standard Operations**
 - » **Provides Status Feedback to Initiator**
 - » **Potential to Record Service History**

Potential MO Mission Planning Services Scope

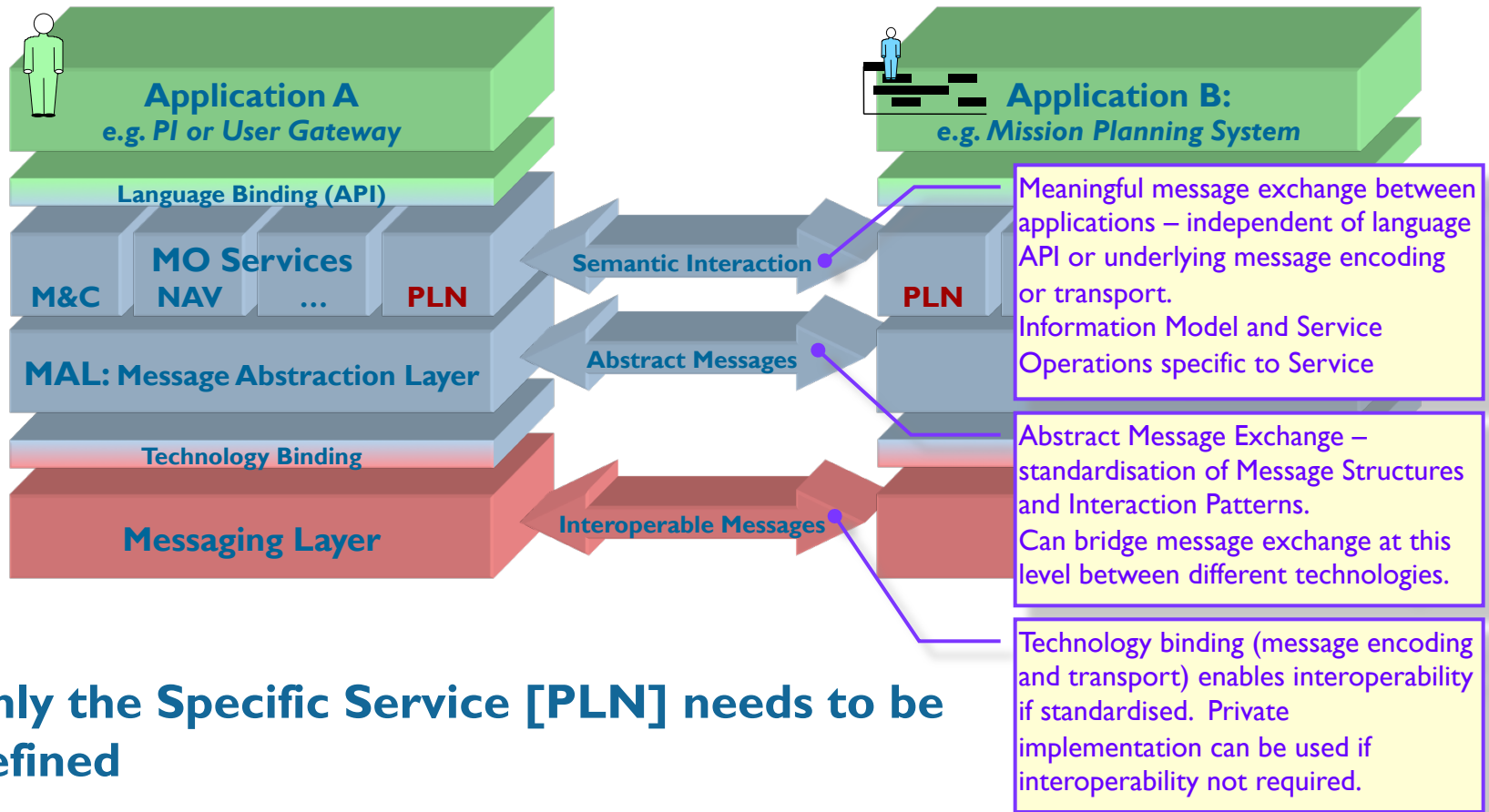


- **MO Services standardise exposed interfaces between applications**
- **They do not standardise the applications themselves**
- **Simplifies Integration and Allows for Evolutionary Change**

CCSDS Mission Operations (MO) Services

- **Spacecraft Monitoring & Control (SM&C) Working Group**
 - » Part of CCSDS MOIMS Area, Established 2003
 - » Active Support from Multiple Agencies
 - » Published Specifications for MO Service “Framework”
 - › Supports Definition of MO Services
 - › Allows Common Binding of Services to multiple Transport and Encoding Technologies (Technology Neutral Specification)
 - › Allows Common API Specification for target languages
 - › Provides extensible “Template” Service
 - » Now working on Core Monitoring & Control Services
- **Specification of other MO Services requires Specialists**
 - » Navigation [Flight Dynamics] Services → Navigation WG
 - » Mission Planning Services → No Existing Group
- **Proposed Meeting Planned for Spring 2012 CCSDS Technical Meeting to consider potential specification of MO Mission Planning Services**

MO Service Framework



- **Only the Specific Service [PLN] needs to be Defined**
- **Language and Technology Bindings specified in terms of MAL apply to all MO Services**

Specific MO Service Definition

- **Requires:**
 - » **Definition of Information Model (Service Objects)**
 - » **Definition of Service Operations (mapped to Interaction Patterns)**
 - » **Service Configuration (Object Definitions) [for Service Deployment]**

- **Does not Require:**
 - » **Message Encoding/Binding to Messaging Technology**
Standard Technology Binding applies to all MO Services
 - » **Specific Definition of API**
Standard Language Transform applies to all MO Services
 - » **Definition of Service Discovery, Login, Authentication, etc.**
Covered by MO Common Service Specifications
 - » **Specification of dedicated Service History Model**
Covered by MO Common Object Model

MO Planning Services

- **Opportunity to Define**
- **Potential to Standardise**
- **MO Provides Existing Standardisation Framework**

- **What is a Planning Request?**
 - » **Task or Goal Oriented**
 - » **One-off, Repetitive, or Series**
 - » **Scoped by Time-window; Position/Area; Resource Availability**

- **What is a Plan / Schedule?**
 - » **Operations; Events; Visibility/Contact; Resources; Configuration;**
 - » **Timeline**
 - » **Position Based Schedule**
 - » **To-do List**
 - » **Standing-Orders:**
 - › **Repeat Pattern/Cycle of Operations (Time or Position based)**
 - › **Rules (based on Time, Event, Condition)**

- **What other Services would an MPS Use/Provide?**
 - » **Orbital Events**
 - » **Resource Availability**
 - » **Automation**

Further Reading

- **Mission Operations Services Concept. Green Book. Issue 3. December 2010**
 - » <http://public.ccsds.org/publications/archive/520x0g3.pdf>
- **Mission Operations Reference Model. Magenta Book. Issue 1. July 2010**
 - » <http://public.ccsds.org/publications/archive/520x1m1.pdf>
- **Mission Operations Message Abstraction Layer. Blue Book. Issue 1. October 2010**
 - » <http://public.ccsds.org/publications/archive/521x0b1.pdf>

How Can I Attend?

- **When:** Wed 18 April 2012 from 13:30 to 17:30
- **Where:** Darmstadt, Germany (venue to be confirmed)
- **How:** Register on-line (no cost) for “Call for Interest for Mission Planning Service Standardisation” session of the SM&C working group at the 2012 Spring CCSDS Technical Meetings at
 - » <http://public.ccsds.org/meetings/default.aspx>
- **Preliminary agenda**
 - » Mission Operations Presentation from CCSDS/SM&C
 - » Selected presentations from planning community
 - » Discussion
- **Do you like the idea and want to contribute?**
 - » Ideas? Alternative approaches? Inputs to the discussion? Relevant presentations you would like to deliver? (due to time constraints we cannot guarantee that all material will be presented)
 - » Please send any proposal to Mario.Merri@esa.int

**Please spread the word in the
planning community**

SEE YOU IN DARMSADT!