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MISSION PLANNING TOOL

Complete space mission lifecycle in a single interface

Today's complex missions require a non-traditional planning capability that can scale and expand to meet the emerging requirements — from the first day of the concept to last disposition of assets. The L3Harris Mission Planning Tool (MPT) provides this capability.

DESIGN AND DETAILS

MPT is a modular space mission planning software framework designed to plan, simulate and track mission success from inception to execution with user-specified levels of detail and plug and play capability with external tools. It is designed to aid mission planners by coordinating daily activities through a single user interface.

MPT's client/server architecture combines a Windows Presentation Foundation thick client (for enhanced visualization) with a Linux based, containerized set of services and external tools on the server side for enhanced performance, scalability and extensibility. MPT is designed to scale from a single client/mission on a laptop, to multiple clients supporting multiple missions using a cluster of servers.

PLANNING AROUND ACTIVITY DECOMPOSITION

MPT's hierarchical framework supports a user-defined level of complexity at the Mission, Plan and Event level:

Mission: The highest level of planning. A mission uses common hardware models (resources), objectives and other metadata across all plans within that mission. Each mission is a separate set of data.

Plan: A set of specific activity details that cover some, or all, of the mission's timespan broken down into events. Plans are separate from one another and can be compared, split or merged.

Event: A single activity and the associated details. Events can be broken into smaller, more-detailed events based on planning needs.

Data Visualization

The MPT timeline manager display interface (above) is one of a number of specialized reports applicable to specific circumstances with highly formatted data.

BENEFITS

- Extensible mod/sim interface supports complex mission planning and analysis
- Plan details down to operator commands for maximum accuracy
- Resource states managed over the entire plan support complex constraint checking
- Integrated archive function ties mission artifacts to the executed plan for greater data access
- Modular Open System Architecture facilitates integration of external tools
- Detailed behavioral, temporal and spatial views tied together through a unified interface
- Concept to disposal mission planning managed from a single tool for full-lifecycle mission support

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ARCHITECTURE OVERVIEW

Each event contains a complex set of data that defines, bounds and constrains the who, what, where, when, how and why to support automated validation, execution, and verification of that event. This data includes:

Metadata: Defines the basic information about the event: Its name, description start/stop time and relationship to other events.

Resources: Models of physical items and their properties that are tracked in the plan. Examples include spacecraft with orbit vector property, battery with power property and operator crew with hours worked.

Budgets: Metrics used to allot consumable properties on some resources used during the event, like 10 kilograms of fuel mass over a maneuver.

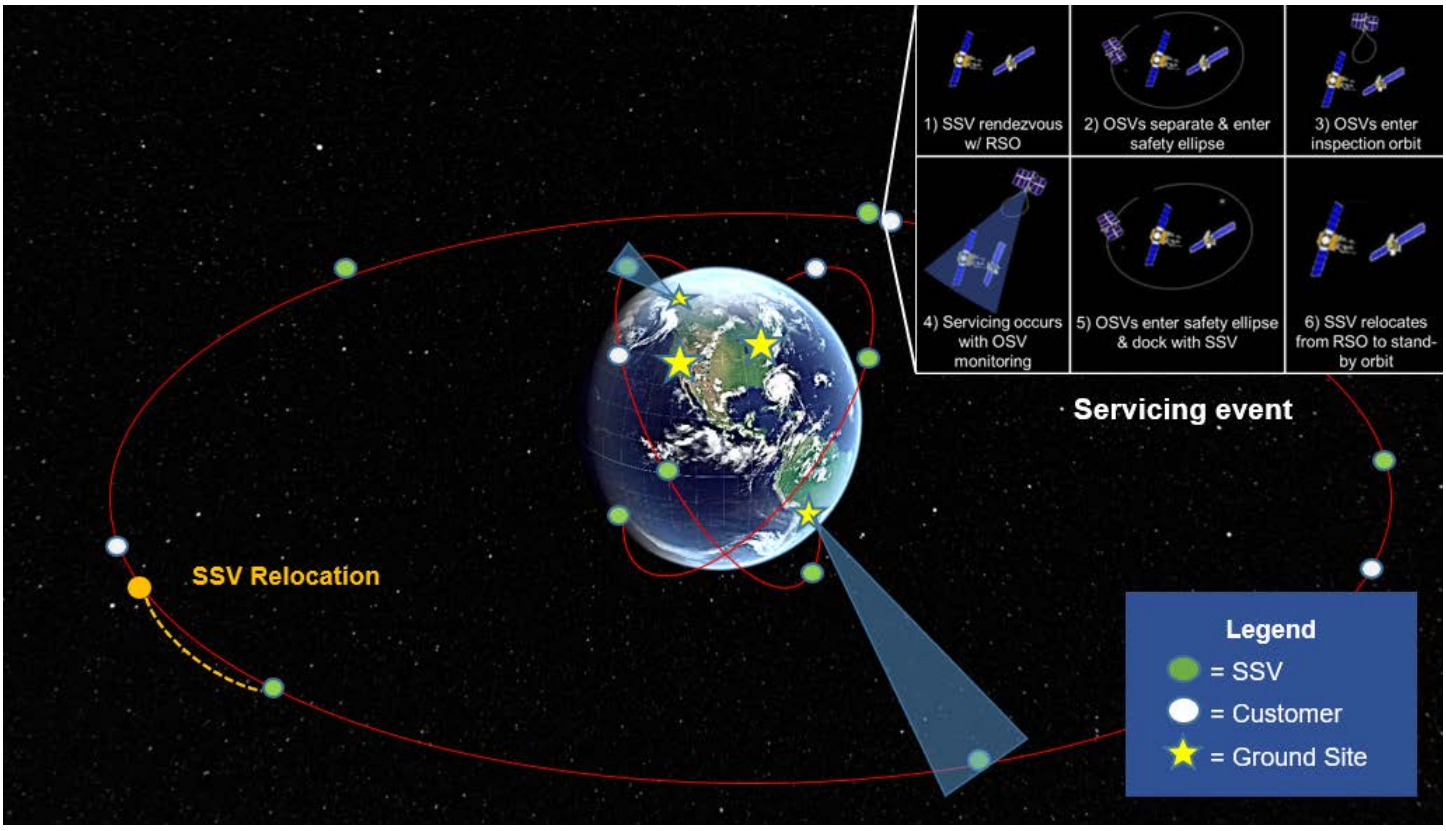
Operations: Scripts that connect to external simulation modeling tools which calculate resource properties over the event.

Constraints: Limitations placed on resource properties. For example, "Sensor pointing has a Sun keep out of XX degrees."

Objectives: Shows the mapping of what mission objectives this event is meant to satisfy. Allows the planners to verify that the planned mission satisfies all end-user objectives.

Events can be decomposed to the nth level. The decomposition should go down to the level at which an appropriate operation can be used to simulate the desired behaviors with operator scripts or commands. The organization and decomposition of events is flexible, allowing separate missions to each implement their own standards.

Augmented Situational Awareness Satellite (ASAS)



To guide MPT development, L3Harris created the ASAS design reference mission. The hypothetical commercially owned fleet of on-orbit satellite servicing vehicles (SSVs) that have deployable observing satellite vehicles (OSVs). It consists of 10 SSVs, 23 OSVs, 29 servicing missions, 18 ground stations, 10 decommissions, three launches and one mission control center.

L3Harris Technologies is an agile global aerospace and defense technology innovator, delivering end-to-end solutions that meet customers' mission-critical needs. The company provides advanced defense and commercial technologies across air, land, sea, space and cyber domains.

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