

Operations Planning Tool

A Collaborative Platform for Operations Planning & Reporting



Overview

OPT provides an efficient and centralised way to manage the planning and execution of the use of complex shared systems.

Additionally, the tool allows to maximise system utilisation by providing a streamlined, and coherent way of coordinating objectives and planning operations.

In particular, the tool supports the following features and functionalities:

- **Requirements** gathering
- **Objectives** coordination
- **Planning** Function
- **Facility/equipment Life Cycle** Management
- **Central Repository** for System Operations Integration data
- **Reporting** on status of objectives achieved and operations performed

Philosophy

OPT enables a number of stakeholders to coordinate and plan the use of a shared system.

Each potential user of the system can create descriptions of their intended use and the capabilities required. The OPT tool integrates the intended uses, assess feasibility and supports human intervention to resolve conflicting use.

OPT supports distributed decision making by the stakeholders.

Architecture

OPT can be used to plan individual stakeholders operations which may then be shared and integrated with other stakeholders. The tool can be deployed as a single central tool or at multiple locations which are coordinated with the central tool.

Collaboration

OPT enables the exchange of Planning Models between stakeholders and users.

The *Central Tool* aggregates the Planning Models stemming from the users. Stakeholders then integrate the individual Planning Models in a shared timeline so as to avoid conflicts on resource and scheduling before sharing the results with other stakeholders and users.

Database

OPT includes a database centralising the collection of information covering a wide spectrum of elements related to objectives, facilities, equipment and resources needed to operate the system.

Planning Model Builder

The *Planning Model Builder* is at the core of OPT.

It offers an exhaustive way to design and characterise an operation.

An interactive timeline allows planners to intuitively drag tasks from a list representing different activities. The timeline can be inspected at different scales, from minutes to months.

Users can create templates of Planning Models in order to facilitate the repetition of similar activities. Furthermore, *Snippets* of Planning Models can be stored in a private or public library and reused with any Planning Model.

Planning Models can be snapshot and versioned. Users have the possibility to inspect the difference between versions and roll them back.

The life cycle of a Planning Model can be customised to reflect the internal processes of the stakeholders' organisation.

APPLICATIONS

- Semi-automated and supervised systems planning
- Aviation maintenance operations planning
- Space systems operations planning
- Maritime and subsea operations coordination and planning
- Shared scientific research infrastructure operations coordination and planning
- Nuclear industry operations planning and analysis

SERVICES AVAILABLE

- OPT set up and configuration for various applications
- Activity requirements gathering
- De-conflicting of plans
- Budgeting and tracking of resources
- Reporting
- Document Management

For more information please visit:
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ABOUT SPACE APPLICATIONS SERVICES

Space Applications Services NV/SA is an independent Belgian company founded in 1987, with a subsidiary in Houston, USA.

Our aim is to research and develop innovative systems, solutions and products and provide services to the aerospace and security markets and related industries.

Our activities cover manned and unmanned spacecraft, launch/re-entry vehicles, control centres, robotics and a wide range of information systems.

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Metadata

Any task on the timeline can be characterised with a wide set of metadata tailored to the task types (e.g. 'Manual activity', 'Robotic Activity').

For any task, planners can indicate the usage of resources such as *Operator Time*, *Hardware*, or *Equipment* utilisation, which can subsequently be tracked.

Temporal Constraints

The Planning Model Builder offers an advanced capability for defining *Temporal Constraints*, where users can indicate the period in which tasks should occur based on their predecessor's completion status.

These Temporal Constraints can be defined at multiple levels such as between two tasks of the same Planning Model, or between a task and an external event or a task of another Planning Model.

At any moment, the whole timeline can be automatically reorganised to respect the temporal constraints and their slacks, and a notification is displayed if some of the constraints cannot be satisfied.

Integration Schedule

The Integration Schedule is a GMT-based timeline that allows planners to define the administrative steps running upstream and/or in parallel to the execution of an activity plan.

In the Integration Schedule, a user can add and nest tasks and their related metadata to characterise events such as a *Design Review* or an *Acceptance Review* for specific equipment or operation.

Document Manager

Users have the possibility to attach documents to many entities of the

application, such as a project, an operation, or a task in the timeline.

Each document can be versioned and completed with metadata.

The *Document Manager* is backed by an *Alfresco* instance which guarantees robust storage and access to all the documents.

GMT Timeline

A *Global GMT Timeline* provides the user the possibility to visualise at a glance all the planning periods, personnel shifts, major events and Planning Models on a unique timeline.

Other custom timelines can be associated and synchronised with the *Global GMT Timeline*, such as the built-in '*Stakeholder calendar*' which displays custom events of the Stakeholders using the tool.

All the Planning Models that have been linked to a specific GMT event are then translated from *relative time* to GMT and can be visualised in the *Global GMT Timeline*.

Exploded View

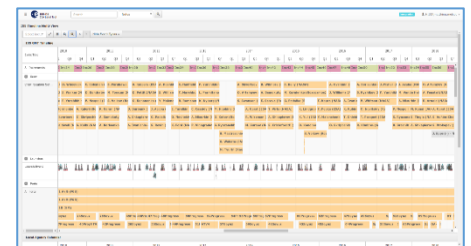
The *Exploded View* provides a centralised way to de-conflict the tasks of different Planning Models occurring in the same time frame.

A user can select a timeframe and visualise all the tasks happening during this period. Any task can be moved and saved to a new position in order to balance the usage of resources such as *Operator Availability* or *Equipment Availability*.

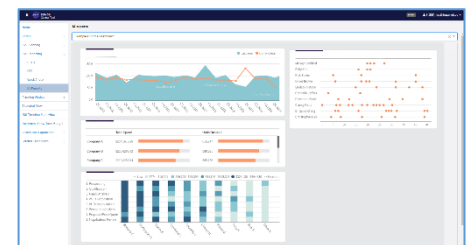
The *Exploded View* provides the users with the possibility to visualise the *Temporal Constraints* links between the different elements of the Planning Models, as well as the internal Temporal Constraints.



Planning Model Builder



GMT Timeline



Business Intelligence Integration

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Resource budgeting

Users can define the budget allocated for a specific resource such as hours needed to operate equipment, the volume of storage or data communications.

Analysis based on the budget vs usage in Planning Models can then be run in an associated *Business Intelligence tool*.

Technology aided decision making

As a central repository for operation information and ancillary data, OPT provides the big picture of multiple operations running in a highly constrained environment.

It allows to identify the best window to run an operation, by systematically assessing the feasibility of a plan against subsystem availability and overall resource needs, helping stakeholders in their decisions to optimise the usage of the system being operated.

External Service Fetching

OPT can be connected to external sources of information so that the database is synchronised with the latest updates of specific information. For instance, system configuration, personnel complement. OPT can be automatically updated by fetching this information from an external plan.

Business Intelligence

OPT provides an exhaustive API that can be used by external services such as Business Intelligence third-party applications.

The tool also provides embedding capabilities for reports generated by such Business Intelligence tools as *Tableau*, *Microsoft BI*, or *Dundas*.

This allows users to build reports for example "resource consumption over

time" in the BI Tool and embed them seamlessly in OPT.

Application to the International Space Station

OPT has been applied to planning research activities on the International Space Station, where ESA, NASA, and other space agencies each plan their intended use of the facilities, equipment and resources in a shared and collaborative manner.

For this application objectives, from *Organisations*, *Participants*, *Crew Members*, *Vehicles* or *Flight Events* are identified and operations of *Programs*, *Projects*, *Investigations*, and *Experiments* are planned. Users can precisely characterise each of these operations with a set of metadata. Furthermore, the tool also offers those performing real-time operations the facility to log the achievement of planned operations during an experiment's execution.

Upcoming features

New features are also coming soon:

- OPT will allow users to build a consolidated list of Hardware and Software items, and to manage their configurations.
- A "what-if" analysis capability will also provide the possibility to visualise the results of a planning when some GMT events are shifted along the timeline.

Future features

- Resource use billing
- Highlighting utilisation opportunities and underused or available resources.

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