TPAC Schedule Recovery

Overview

TPAC Schedule Recovery is a software component that can analyse schedule disruptions and generate a range of solutions to get the operation back on schedule. TPAC Schedule Recovery considers fleet, crew assignments and passenger loads in both its cost model and the optimisation process to ensure that solutions are viable and complete. Legality, feasibility, and company constraints can be configured.

TPAC Schedule Recovery is typically integrated with Operations Control systems as a software component. Operations controllers specify problems for TPAC Schedule Recovery from within their Operations Control system, and TPAC Schedule Recovery enables those problems to be analysed and solved and for the solutions to be imported back into the host Operations Control system.

What is Schedule Recovery?

Schedule Recovery is the process of

- Recognising when the operation has been disrupted (actual performance has deviated from the plan)
- Identifying problems caused by the disruption (e.g.. knock-on effects, immediate and subsequent rule violations)
- Finding candidate solutions to the problems
- Analysing candidate solutions with a view to getting back on plan
- Resolving the disruption

TPAC Schedule Recovery supports this process, providing problem identification and cost estimation, optimised solution generation and solution analysis capabilities.

Feature Summary

TPAC Schedule Recovery provides:

- Straightforward specification of what problems to address
- A range of solutions to each problem, allowing the operator to analyse and compare solutions
- Powerful charting facilities to allow relative merits of solutions to be compared
- Full change descriptions of proposed solutions with cost breakdowns
- A comparison mechanism of users' manual solutions to optimal solutions
- Flexible run configuration options to specify broadly the type of solution being sought if required

When producing solutions, TPAC Schedule Recovery considers:

- Sector transposition
- Sector moves (to spare aircraft)
- Vehicle subtype changes
- Vehicle configuration changes
- Sector re-timing
- Sector cancellation
- Crew operating and duty limitations
- Crew connections
- Reserve crew for broken crew patterns including positioning
- Passenger connections
- Passenger reaccommodation
- Flight diversions
- Ferry sectors (positioning sectors)
- Port closures (full and partial)
- Port curfews
- Port slot constraints
- Terminal/Concourse constraints
- Program flow

TPAC Schedule Recovery Usage Overview

TPAC Schedule Recovery principally provides two modes of operation - to analyse solutions that an operations controller might make manually, or to provide solutions to operational problems. The following sections describe each of these in more detail.

Analysing Manually Created Solutions

TPAC Schedule Recovery can be used to analyse manually created equipment solutions that have been created by operators in response to disruption.

TPAC Schedule Recovery assumes that manually created solutions will only include changes to equipment schedules, and not include changes to passenger or crew bookings. In order to provide a realistic cost of changes, TPAC Schedule Recovery first cleans up the manual solution by performing passenger reaccommodation and basic crew repair through positioning and reserve crew utilisation. It then analyses the solution, applying its cost model to estimate the cost of the disruption and the solution.

The operator is then presented with a breakdown of the disruption, changes made, problems that remain, and cost estimates for each item. This function is designed to operate very quickly, allowing the cost function to be applied and manual solutions to be adjusted interactively.

Solving a Disruption

Solutions to disruptions can be requested by marking the problem to be solved in the Operations Control system, and requesting solutions.

The problem to be solved might consist of:

- Delayed sectors
- Unservicable vehicles
- Closed ports
- Knock-on effects from any of the above problems

The user marks the problem(s) to be solved within the Operations Control system, typically by selecting the problem on a Vehicle Gantt. TPAC Schedule Recovery is informed of the problem definition using the API. The user then initiates the solve process by opening the solve window (shown below), adjusting any parameters if required, and clicking OK.

TPAC Schedule Recovery finds a range of solutions within the specified time limit, and alerts the user when the solutions are ready. The solutions are listed in the results screen, shown below. A range of key statistics are available to compare the solutions, and each statistic can be plotted to obtain an overview of how the solutions compare.

The user can request details of a particular solution, including cost summary information, what changes are involved in the solution, what the passenger and crew impact of the disruption and this solution are, and what equipment problems remain, if any. The following screenshot shows a listing of required solution changes for a particular solution.

The crew impact for the same solution is shown below.

Once the user has decided which solution is most appropriate, the solution can be applied. The solution is imported into the Operations Control system using the API, at which point the user can make any further manual changes as required.

Applied solutions can also be un-applied, allowing users to preview the effect of a particular solution in the Operations Control system as part of the decision process.

Technical Overview

Architecture

TPAC Schedule Recovery is provided as a component that can be integrated with host Operations Control systems. There are two parts to the component:

- The optimiser back-end, which is a standalone program that implements the core functionality.

  It retrieves data from the Operations Control System (OCS) using a Service Provider Interface (SPI), which must be implemented by the OCS' vendor. Typically the SPI

implementation will connect to the OCS' database to retrieve required data.

- The controller, which provides the user interface to the TPAC Schedule Recovery system. The controller is provided as a library which can be linked with the host OCS front-end. The library provides an API through which the OCS can access TPAC Schedule Recovery functionality.

  The controller connects to the optimiser back-end using HTTP over TCP/IP when solution costing or generation is required.

Supported Platforms

Supported platforms for TPAC Schedule Recovery are described below. A range of other platforms are available upon request.

TPAC Schedule Recovery Optimisation Back-end

Table 1. TPAC Schedule Recovery Optimisation Back-end Supported Platforms

Type of application	Native application
Required hardware	Server
Operating System	Linux (RHEL 4), Solaris 8
Memory	512MB minimum
Disk space	80MB for full installation

TPAC Schedule Recovery Controller User Interface

Table 2. TPAC Schedule Recovery Controller Supported Platforms

Type of application	Native library
Required hardware	Workstation
Operating System	Solaris 8
Host application	X/Motif 1.2
Memory	64MB minimum
Disk space	20MB for component libraries

Glossary

Glossary Of Terms

API

Application Program Interface. A interface provided by TPAC Schedule Recovery to a third party so a client application can use its features.

HTTP

Hypertext Transport Protocol. A world standard communication protocol.

OCS

: Operations Control System. The airline operations system that an airline uses to control the aircraft schedule

SPI

: Service Provider interface. An interface supplied by a third party to provide information to TPAC Schedule Recovery.

TCP/IP

: Transmission Control Protocol over Internet Protocol. The world standard communications protocol.

Further Information

You may wish to look at the PDF version of this document.