NetLine/Ops ++ Optimizer Suite

A component of

IOCC
Integrated Operations
Control Center Platform

NetLine/Ops ++ *Solver xOPT*
NetLine/Ops ++ *Tail xOPT*

Are you looking for fast and intelligent operations recovery solutions that are cost-efficient at the same time? Our advanced operations optimizer will help to boost your tail assignment and disruptions recovery performance significantly.

> NetLine

NetLine is one of the world's leading software solutions for the airline industry. This integrated, modular product line provides optimal support for the entire process of planning and controlling airline resources.

NetLine products:

- NetLine/Market
  The market analysis solution
- NetLine/Plan
  The network planning solution
- NetLine/Sched
  The schedule management solution
- NetLine/Crew
  The crew management solution
- **NetLine/Ops ++**
  The operations control solution
- NetLine/Hub
  The hub management solution
- NetLine/Load
  The weight & balance solution

As operational disruption costs are important cost drivers within an airline, efficient tail assignment and quick disruptions recovery are important factors to consider. By using state-of-the-art scenario and Optimizer technology, NetLine/Ops ++ xOPT Suite helps you to produce fast and intelligent solutions.

Features:

- Creation of disruption recovery scenarios
- Flexible "on-the-fly" parameterization
- Customized reporting of your key performance indicators for the solutions
- Highly flexible configuration via rule language and property sets

Benefits:

- Save operational costs due to advanced optimization techniques
- Minimize flight delays, cancellations, ferry flights and aircraft or equipment changes
- Improve your passenger and crew connex rate
- Evaluate different cost, rule and operational scenarios
- Reduce manpower and lead time through automated solution support

NetLine/Ops ++ *Solver xOPT* –
## Manage flight schedule disruptions quickly and efficiently

As on-time departures are a key success factor in the airline business, gaining control over schedule recovery is becoming more and more essential for airlines. Our powerful schedule recovery tool will be your airline's key to success. On the day of operations the main concerns are a safe and on-time flight, and cost-efficient operation. Each airline should be able to resolve flight schedule deviations as quickly and with as little impact as possible to get the customer from A to B as punctually as possible.

NetLine/Ops ++ *Solver xOPT* will enable you to recover from schedule disruptions – no matter what size they are – in a fast, legally compliant and cost-efficient manner. The solver's holistic approach achieves significant savings in disruption-related costs. Based on the original tail assignment and maintenance plan it generates revised aircraft rotations by finding the optimal operational solution (e.g. delays, equipment changes) for any schedule deviation. Moreover, by utilizing data about the disruptions, constraints,

and aircraft, this powerful tool reschedules flights in the aftermath of any irregular operation. NetLine/Ops ++ *Solver xOPT* generates solutions that respect all maintenance constraints and other user-defined limitations (e.g. airport opening hours, aircraft restrictions). This means that all aircraft are routed to planned maintenance checks in due time. This optimizer can propagate delays along crew connections, thus supporting anticipatory recovery and minimizing the impact of irregular operations.
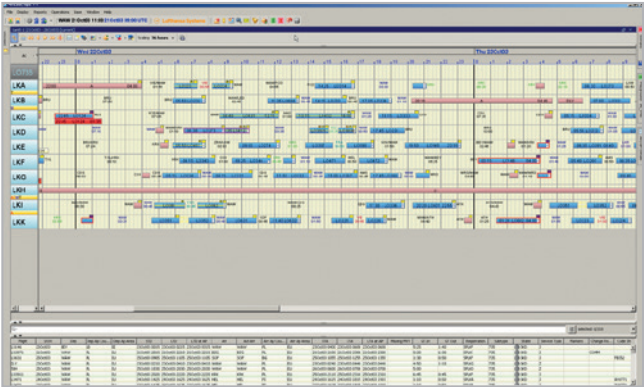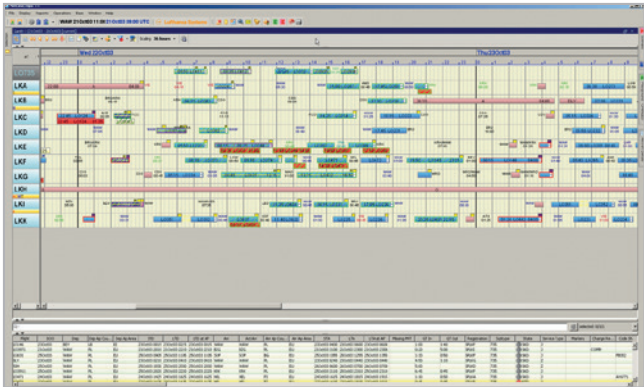

Standard solution
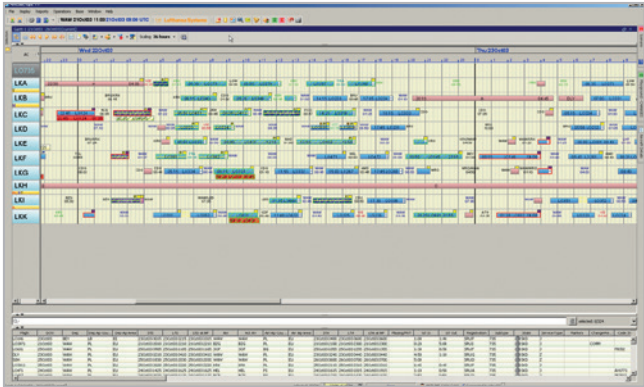
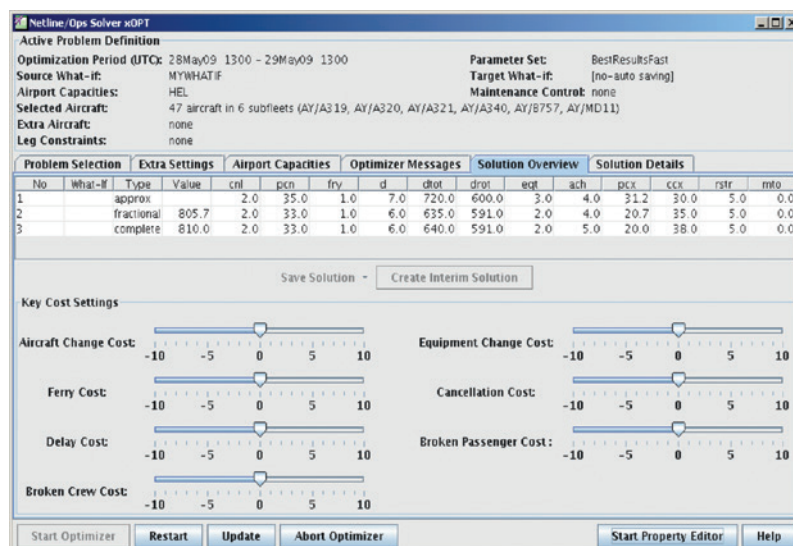
Standard solution – 6 ferries, few delays
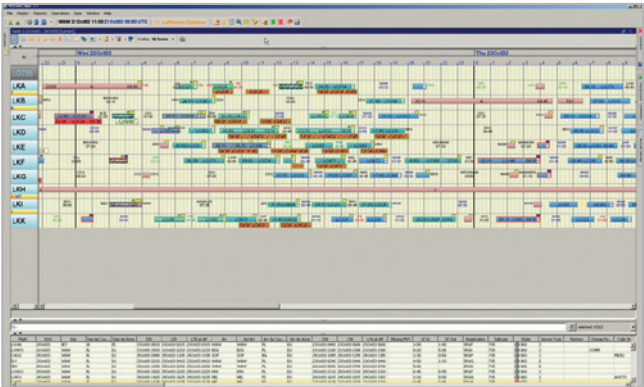
Solution with high ferry costs – 4 ferries, many delays

Solution with high ferry and low cancel costs – 3 ferries, 6 CNL, few delays

NetLine/Ops Solver xOPT

Active Problem Definition

Optimization Period (UTC): 28May09 1300 – 29May09 1300
Source What-if: MYWHATIF
Airport Capacities: HEL
Selected Aircraft: 47 aircraft in 6 subfleets (AY/A319, AY/A320, AY/A321, AY/A340, AY/B757, AY/MD11)
Extra Aircraft: none
Leg Constraints: none

Parameter Set: BestResultsFast
Target What-if: [no-auto saving]
Maintenance Control: none

| Problem Selection | Extra Settings | Airport Capacities | Optimizer Messages | Solution Overview | Solution Details |

No	What-if	Type	Value	cnl	pcn	fry	d	dtot	drot	eqt	ach	pcx	ccx	rstr	mto
1		approx		2.0	35.0	1.0	7.0	720.0	600.0	3.0	4.0	31.2	30.0	5.0	0.0
2		fractional	805.7	2.0	33.0	1.0	6.0	635.0	591.0	2.0	4.0	20.7	35.0	5.0	0.0
3		complete	810.0	2.0	33.0	1.0	6.0	640.0	591.0	2.0	5.0	20.0	38.0	5.0	0.0

Save Solution – | Create Interim Solution

Key Cost Settings

Aircraft Change Cost: -10 -5 0 5 10
Equipment Change Cost: -10 -5 0 5 10
Ferry Cost: -10 -5 0 5 10
Cancellation Cost: -10 -5 0 5 10
Delay Cost: -10 -5 0 5 10
Broken Passenger Cost: -10 -5 0 5 10
Broken Crew Cost: -10 -5 0 5 10

Start Optimizer | Restart | Update | Abort Optimizer | Start Property Editor | Help

NetLine/Ops ++ Solver xOPT cockpit

NetLine/Ops ++ *Solver xOPT* enables you to adjust the solution by tuning different parameters while the optimizer is running. It helps you to evaluate and also pre-plan different scenarios (e.g. airport closure due to strike), thus solving or even avoiding schedule deviations. NetLine/Ops ++ *Solver xOPT* enables you to define what to take into account for the optimization run simply by selecting a time frame, the aircraft affected and considered for the recovery solution. Disruptions such as delays and AOGs are entered directly in the graphical interface of NetLine/ Ops ++. Additional information such as airport capacity reductions can be added in a solver-specific graphical user interface. Parameter settings give you direct influence on the optimization. You can store them for different needs, helping

you to adapt quickly to changes in business requirements by flexibly defining the parameters (e.g. detailed cost set-up, tuning delay generation/ferry generation).

Benefits:
- Getting automatically back on track
- Minimizes disruption costs through cost-efficient schedule recovery
- Supports customer loyalty by minimizing delays
- Delivers a legal solution that takes maintenance feasibility into account
- Decision support with scenario technology
- Get the costs of a solution calculated from NetLine/Ops ++ *MoneyMachine*

You can easily tune key cost settings (e.g. ferry costs, delay costs) to control the over-

all solution, whereas the adjustment of leg constraints allows you to restrict the solution to an individual leg. During optimization you get fast feedback through partial solutions to control the direction of the run. This enables you to detect constraint configurations that are potentially too restrictive and to react by adapting the key cost settings and leg constraints.

Each recovery solution delivers a comprehensive statistics report. Various filters and sorting criteria allow you to analyze and evaluate the details of the schedule recovery solution before publication. In addition, these reports provide perfect support for your internal reporting as they contain information on Key Performance Indicators (e.g. number of cancelled legs, delays, ferries, broken pax connex).

NetLine/Ops ++ *Tail xOPT* – Make sure the right aircraft is at the right place at the right time!

Tail assignment assigns legs to specific aircraft. The focus is therefore on making assignments that consider all maintenance constraints. Moreover, aircraft rotations should be cost-efficient and robust on the day of operations. NetLine/Ops ++ *Tail xOPT* will help you to maximize the efficiency of your tail assignment process, ensuring that all aircraft are routed to planned maintenance checks on time and all aircraft restrictions (e.g. APU in-op) are taken into consideration. The powerful tool also makes tail assignment more cost-effi-

cient. Auto-generated maintenance planning for smaller recurrent checks ensures that your aircraft utilization is maximized right up to the date of the planned check – saving up to 5 % maintenance costs. This optimizer helps you to prevent operational damage by generating more robust rotations on the day of operations (e.g. by creating operational buffers). The automated support enables you to simulate scenarios and react quickly to changing business requirements with tail assignment solutions across several subfleets.

By choosing a certain time frame along with fleet and parameter settings, you have a direct influence on the optimization routine and therefore on its results. You can store different parameter settings for different business needs. NetLine/Ops ++ *Tail xOPT* thus allows you to adapt quickly to changes in business needs by flexibly defining parameters (e.g. to set up an equipment change, ferries, etc.).

NetLine/Ops ++ *Tail xOPT* generates an assignment that respects all maintenance

constraints and other user-defined planning limitations (e.g. airport, aircraft restrictions). NetLine/Ops ++ *Tail xOPT* allows you to flexibly define the target range for maintenance due rules, resulting in a more even distribution of maintenance checks and thus guaranteeing greater robustness in your aircraft rotations. For small recurrent line maintenance checks, NetLine/Ops ++ *Tail xOPT* can automatically insert check events into rotations so that due rules are satisfied. The user defines which check type should be auto-generated, the check duration, time frame, and airports and where the checks should be generated. By simply defining the given number of parallel checks per maintenance station, rotation planning becomes more flexible, as there is no determination about which check should be done for which aircraft at which airport. This leads to higher-quality solutions.

Benefits:
- Cuts maintenance costs by up to 5 % through increased aircraft utilization
- Creates legal rotations through integrated maintenance feasibility
- Prevents operational disruptions through more robust aircraft rotations
- Helps to choose the best solution through extensive statistics reporting
- Provides flexibility through automated solution support
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NetLine/Ops ++ *Solver xOPT and Tail xOPT* requirements
NetLine/Ops ++
- UNIX server (LINUX, fast multicore CPU recommended)
- Oracle database

IOCC
**Integrated Operations Control Center Platform**

This solution is a component of the Integrated Operations Control Center Platform (IOCC).

It is the first fully-integrated IT platform able to control and monitor all aspects of airline operations, including schedule management, operations control, crew management, flight planning and weight & balance. Because of the synergies the IOCC Platform generates, it offers airlines much greater economic benefits than stand-alone systems. Learn more about our platform and visit us at **www.IOCC.LHsystems.com**.

Components of the IOCC Platform:

IOCC/Sched

IOCC/Ops ++
NetLine/Ops ++

IOCC/Crew

IOCC/Flight

IOCC/Load
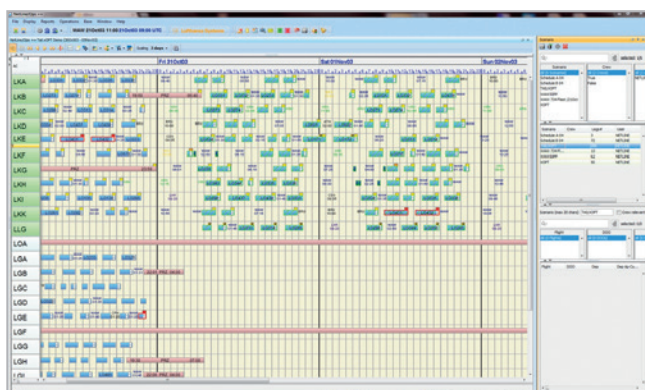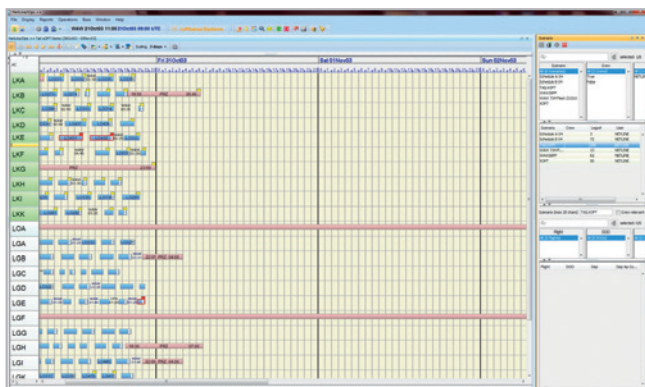
Overview tail assignment process with NetLine/Ops ++ Tail xOPT