



## NAVION

### Oil Tanker Scheduling



The world has an unquenchable thirst for crude oil. From it is made a vast array of products upon which most of us depend. In meeting this dependency, oil companies have searched the remotest regions of the planet, finding petroleum both on land and beneath the oceans. In the North Sea, where one of the largest reserves has been under production for decades, the Norwegian offshore shipping company Navion serves 25 oil fields with a fleet of 17 tankers. These vessels battle some of the roughest weather in taking oil aboard and carrying it to ports in northwest Europe. Keeping these vessels in operation involves a scheduling system that is both reliable in assigning ships and versatile in accommodating changes in operation and delays resulting from weather and unscheduled maintenance.

This is why Cap Gemini, Europe's largest computer services company, used ILOG Solver and ILOG Views in building Navion's scheduling system. With the two ILOG components, the system fully optimizes the company's tanker scheduling in an interactive visual environment that allows for rapid replanning when unforeseen events occur.

*"It would be impossible to obtain the same ratio of utilization without the ILOG-based optimization application. Our system had to be flexible to adapt to the changing trade regulations and constraints. The ILOG Solver-based application is very flexible and open."*

■ **Stein Rynning**  
**Navion Senior Vice President**

## Navion

A Norwegian offshore shipping company, Navion was established in September 1997, when it was spun off from the Shipping and Maritime Technology department of Statoil. Statoil owns 80% and Rasmussens Rederi, a Norwegian company, owns the remaining 20%. Navion has a mixed fleet of about 50 vessels that are either owned or chartered by the company. The fleet comprises offshore-loading oil tankers, oil tankers, product tankers, floating production vessels (FPSO), drill ships, and gas and methanol carriers. The company offers a broad range of services for transporting crude oil, gas and refined petroleum products. The offshore loading of crude oil is the company's core business.

## About ILOG

ILOG is a leading provider of advanced C, C++ and Java software components for graphics and resource optimization.

ILOG products deliver high performance data visualization for user interfaces; integer, linear and constraint solvers for resource optimization, scheduling, logistics and planning applications; dynamic rule systems for intelligent agents and real-time data flow control; and components for integrating modules with real-time and relational data sources.

ILOG was founded in 1987, and now employs approximately 400 people in seven countries.

Visit [www.ilog.com](http://www.ilog.com) for additional information.

*ILOG is a registered trademark of ILOG.*

*The ILOG Views graphical user interface of the tanker scheduling system*

## Getting the oil to market

Loading crude oil offshore requires specially equipped tankers. They must be able to tap into a loading system in a way that allows them to take on oil safely in heavy seas. To accomplish this maneuver, special equipment is used and a special scheduler employed to keep the tankers in full operation.

ILOG Solver, with its C++ optimization engine, serves Navion by generating schedules that account for thousands of constraints. Embedded in the system, the engine not only matches tankers to facilities but applies parameters that include labor laws, shipping regulations and refinery production schedules. The application also prioritizes orders to meet contractual obligations, minimize port duties and manage ship rescheduling. Such scheduling fully employs the powerful processing built into the system's ILOG optimization software.

Greatly extending the system's strength is its ILOG Views-based graphical user interface. The GUI enables Navion planners to quickly and easily refine schedules and model the shipping operation in determining ways to improve its profitability. Furthermore, being made of modular C++ components, the system can be readily updated to stay abreast of changes in the operation.

## Project

The scheduling system took three people one year to develop. The prototype was put in place in February 1996, and after two months of testing, the system was placed in full operation in May 1996. It is currently run on a PC using Windows NT.

## Benefits

The scheduling system has allowed Navion to increase its fleet while maintaining a utilization ratio of 85% – and in many cases 90% – by ensuring the best possible vessel allocation and turnaround time. The system generates in a few minutes schedules that in the past took planners hours to create manually. The system allows the company to model its operation in real time, enabling it to spot deficiencies and develop more accurately plans for extending the operation.