NAPA-DSME Power®
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With Napa Group since 2006

Computer Engineering, B.Sc.
Manager,
NAPA for Operations
NAPA Korea
Todays story:

• NAPA Company
• History of NAPA-DSME Power® solution.
• What is NAPA-DSME Power® solution.
• SEEMP and NAPA-DSME Power® solution.
• EEOI and NAPA-DSME Power® solution.
• System components
• NAPA-DSME Power® solution Voyage Process.
• Successful Story of NAPA-DSME Power® solution.

Main office located in Helsinki, Finland

Subsidiaries
• NAPA for Operations in Helsinki, Finland
• NAPA Japan in Kobe, Japan
• NAPA Korea in Busan, Korea
• NAPA India in Bangalore, India
• NAPA Romania in Galati, Romania
• NAPA USA in Florida, USA

Representation offices
– Shanghai, China
– Genoa, Italy
– Singapore (to be opened soon)
NAPA Facts and Figures

- Established in 1989
- 150 employees
- 700 customers
- 1400 installations onboard
- 95% of the world’s fleet built by NAPA’s customers
NAPA - world leader in ship software

NAPA Group

NAPA for Design
95% of all new ships in the world designed with NAPA

NAPA for Operations
Over 1400 installations onboard vessels
Worldwide Network
History of

NAPA-DSME Power® solution.
Development Timeline

- Engine modes and optimised speed per leg 1993
  First ship in operation: GTS Finnjet
- First GUI for NAPA Power 1995
  First ship with new GUI: MS Silja Europa
- RCCL fleet implementation 1998
  2nd generation GUI: MS Grandeur of the Seas
- Interfaces to navigation and automation systems 2001
- Weather forecasts via internet 2002
- Satellite based hi-resolution daily sea current forecast 2005
- Seakeeping module implemented 2005
- Route optimization 2006
• Speed pilot module 2007
• Fully integrated API solution with Sperry ECDIS 2008
• Adaptive (self calibrating) functionality 2009
• Major GUI update 2010
• NAPA-DSME Power® 2010
• Integration with all other NfO components 2011
• OptiFloat (optimum trim and floating position) module 2011
• Real Time Monitoring application 2011
• SPA JIP Performance index and wave resistance method 2011
What is, NAPA-DSME Power® solution.
**NAPA-DSME Power®** provides a total solution for the **planning**, monitoring and follow-up of operations. This includes voyage and trim optimization, real time monitoring of emissions and fuel consumption, and analysis of hull condition and overall technical performance of the fleet.

**NAPA-DSME Power®** consists of following modules:

- Loading Computer for cargo and ballast planning
- Optifloat for optimum trim, draft and ballast planning
- Voyage Optimization for voyage optimization and weather routing
- Real Time Monitoring for monitoring various types of data onboard the vessel, such as optimum trim, fuel consumption, engine data etc
- Voyage Reporting for collecting and recording data
- NAPA Office for report distribution, follow up and data analysis
Plan
- Optimize Speed & Route

Departure from Port
- Loading Computer
- Optimum trim

Monitor
- Real Time Monitoring for Increasing Awareness
- Reporting platform
  - Voyage reports

Arrival to Port
- Monitor fleet Performance, Consumption & Emmissions

Follow-up
- Plan
- Monitor
- Complete
NAPA-DSME Power® Loading Computer

Key Benefits

- Extremely accurate 3D calculation engine is based on sophisticated ship design mathematics
- Ship safety is constantly monitored and warnings are provided if limits are exceeded
- Unrivalled damage stability and decision support capabilities
- Enables maximum cargo intake
- Approved by all Class societies
- Customizable
NAPA-DSME Power® Optifloat - Trim optimisation

Key Benefits

- Easy - integrated into the Loading Computer
- Safe - stability and strength always checked
- Fast
- Accurate
- Use it when planning and steaming
- Includes both trim and displacement
- Reduced fuel consumption and emissions in everyday operation
- Based on Model test or CFD calculations, Static/Dynamic
NAPA-DSME Power® Voyage Optimization

Key Benefits

- Optimizing Route and Speed using NAPA 3D model
- Re-optimizing during voyage
- Tool for the Officers onboard to easily do route and speed optimization
- Weather, wind, waves, currents come automatically by email into the software
- Use as weather viewer
- Reduced fuel consumption and emissions in everyday operation
- Use as tool for Virtual Arrival
Planning & optimizing

- Weather forecast (wind & waves)
- Sea current forecast
- Voyage route
- ETD & ETA
- Ship condition
- Engine & fuel condition
- Water depths

Voyage Optimization

- Optimized voyage plan
- Route boundaries
- Wind & wave limits
NAPA-DSME Power® Real Time Monitoring

Key Benefits

- Any data, anywhere
- Real time monitoring of the data you want
- Traffic lights and graphs
- Dynamic alarm limits
- Baseline comparison
- Follow up for example ETA in the mess room or engine temperatures in the Ch/Eng office
- Real time calculation of EEOI (Energy Efficiency Operational Indicator)
- Touch screen compatible
- Easy to customize onboard
NAPA-DSME Power® Voyage Reporting

From this

Key Benefits

- Easy to use, always Readable
- Decrease workload - most reports are done automatically from logbook and automation data
- All data can be manually corrected if needed
- Built in error checking to ensure reports contain correct data
- Standardized reports for the fleet
- Extensive automation interface possibilities
- Tamper proof, rigorous backup system
- Automatic replication to office

To this
### VOYAGE DATA

<table>
<thead>
<tr>
<th>From</th>
<th>To</th>
<th>Speed</th>
<th>Departure</th>
<th>Start of sea pass...</th>
<th>End of sea passage</th>
<th>Arrival</th>
<th>Distance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Southampton</td>
<td>New York</td>
<td></td>
<td>2011-01-29 16:...</td>
<td>2011-01-29 18:...</td>
<td>2011-02-08 07:...</td>
<td>2011-02-08 08:...</td>
<td>3762.0</td>
</tr>
</tbody>
</table>

**Total:** 3762.0

### Unapproved entries

<table>
<thead>
<tr>
<th>Time</th>
<th>Name</th>
<th>Summary</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mar 08 14:00 UTC+2</td>
<td></td>
<td>New FO properties: Reference density (15°C) 970.0 kg/m³, Sulphur content 3.40 %</td>
</tr>
<tr>
<td>Mar 08 13:00 UTC+1</td>
<td></td>
<td>New time zone: 2.0 h (lat 38° 26.6′ N, lon 027° 08.8′ E)</td>
</tr>
<tr>
<td>Mar 08 12:00 UTC+1</td>
<td></td>
<td>New FO properties: Reference density (15°C) 970.0 kg/m³, Sulphur content 3.40 %</td>
</tr>
<tr>
<td>Mar 08 11:00 UTC</td>
<td></td>
<td>New time zone: 1.0 h (lat 38° 26.6′ N, lon 027° 08.8′ E)</td>
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<tr>
<td>Mar 08 10:00 UTC</td>
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<td>Mar 03 23:40 UTC</td>
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<tr>
<td>Feb 21 13:31 UTC</td>
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<tr>
<td>Feb 08 08:00 UTC</td>
<td></td>
<td>Leg from Southampton to New York, distance (GPS) 3762.0 NM, distance (Log) 3762.0 NM, duration 236.0...</td>
</tr>
<tr>
<td>Feb 01 16:15 UTC</td>
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<td>New FO properties: Reference density (15°C) 990.0 kg/m³, Sulphur content 3.50 %</td>
</tr>
</tbody>
</table>
NAPA-DSME Power® Office

- Instant access to information
- Deviation notifications
- Benchmarking
- Save fuel
- Reduce emissions
- Reduce workload
• Operational possibilities
  – Voyage reporting
    • automatic voyage reports from vessels
    • e.g. Anchor up to All fast follow up
  – Fuel consumption
  – Fuel bunkering follow up
  – Emission reporting
• Cargo operations follow up
  – Cargo reports
  – Exact times for demurrage calculations
  – Manifold backpressure follow up
  – Etc
How to connect to SEEMP
NAPA-DSME Power® solution.
• Ship Energy Efficiency Management Plan (SEEMP) a framework for vessels to address energy efficient operations

• Encourages monitoring performance and improvements

• Parameters consist of planning, implementation, monitoring, self-improvement

  - IMO MEPC 61
  - MARPOL Annex VI Reg. 29 (2011. 7)
  - Strong recommendation from Oil Major (EXXON...)
  - IMO GUIDELINE (IMO MEPC.1/Circ.683)
Max cargo
Optimum trim

Departure from port

Arrival in port

Plan

Optimize Speed & Route

Monitor

Real Time Monitoring for Increasing Awareness

Reporting platform - Voyage reports

Follow up

Monitor fleet Performance, Consumption & Emissions

Feedback
EEOI

NAPA-DSME Power® solution.
• Energy Efficiency Operational Indicator
  • Indicator of CO2 emission levels during ship operation based on IMO guidelines (MEPC.1/Circ.684)
  • Not mandatory, but is related to EEDI (Energy efficiency design index), which will most likely become mandatory soon.
  • Can be used to compare ships within same class with each other.
  • $\text{EEOI} = \frac{\text{CO2 emissions (kg)}}{\text{transportation work (ton miles)}}$
• When ship is sailing, the **NAPA-DSME Power®** system calculates continuously the EEOI value.

• Based on last 10 minute emissions and transport work.
  – Payload: from loading computer
  – Distance: from online
  – CO2: consumption from flow meters multiplied by CO2 factor
  – In voyage report, the voyage overall EEOI for voyage is calculated.
System components

NAPA-DSME Power® solution.
Date/Time/Location
Speed over ground
Course over ground
Water Depth
Water speed
Wind Speed/Direction

Optimum Float position from Loading Computer

VO, RTM, VR of NAPA-DSME Power®

Weather information

Flowmeter
Propeller RPM
Propeller Power
Propeller shaft torque
Voyage Process with the NAPA-DSME Power® solution.
PLANNING
In port - before departure

Voyage Reporting:
- Check that Fuel Oil Properties data is entered and contains valid values.
- Enter new entry if needed.

Loading Computer:
- Plan the departure loading condition.
- Use Optifloat function to make sure that trim and draft are optimal.
- Save the loading condition "As Official" loading condition.

Voyage Optimization:
- Plan the voyage and optimize it for best speed profile and route.

MONITORING
During the voyage

Voyage Optimization:
- Use the Monitoring function to monitor progress on the voyage.
- Re-plan or Re-optimize the remaining passage at any time, at least on a daily basis after receiving the latest weather update.

Real Time Monitoring:
- Use RTM for displaying accurate real time data about ship's performance and condition.

FOLLOW-UP
After arrival

Voyage Optimization
- Send voyage report data to Voyage Reporting

Voyage Reporting
- Check the voyage report data and edit manually if needed, or enter additional voyage report data.
Successful story

NAPA-DSME Power® solution.
NAPA-DSME Power®
Current Situation

First vessel

Second vessel
Benefits for Customers

• Reduced fuel and energy consumption
• Increased safety
• Efficient control of the fleet
• Easy follow-up of time-chartered ships
• Automatic distribution of data between ship and shore
• Reduced workload with electronic logbooks
• Fullfill SEEMP solution
NAPA-DSME Power® system was applied to DSME Smart Ship.