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CARRIER AND VESSEL SOLUTIONS

BLUETRACKER ONE

Bluetracker One is a vessel & fleet collaboration platform to monitor, report and analyze the vessel performance and emission compliance. It helps ship owners and managers to reduce fuel oil and GHG emissions.

The special feature of the software lies in its data integration and collaboration capabilities. On the one hand, Bluetracker One aggregates ship data equally from manual reporting as well as automatic data sources and is therefore able to integrate data from existing third-party systems.

While on the other hand, Bluetracker One reports and processes information in a manner that enables it to be easily shared with other stakeholders from the maritime network.

Performance | The conversion of raw data into valuable information to improve the overall understanding of the ship's performance (i.e. hull degradation), thus enabling users to precisely extrapolate optimization and efficiency increasing measures.

Compliance | Bluetracker One offers dedicated emission compliance modules, which are developed in a manner consistent with the existing and future regulations of IMO, European Union as well as regional authorities.

Collaboration | Bluetracker One modules promote an efficient collaboration on an internal level as well as within the maritime network. Furthermore, the system is so flexible that it can integrate data from third parties via API, for example ranging from weather data to existing report data.

BENEFITS

- ✓ **Bluetracker One converts manually reported and automatically generated vessel data into valuable information**
- ✓ **Integration of existing reporting, measured and third party data sources such as AIS, weather via API for further analysis**
- ✓ **Harmonization of data from different ships**
- ✓ **Strong data quality concept that is based on a plausibility check for all incoming data**
- ✓ **Automated generation of emission compliance reports and submission to external authorities**

CARRIER AND VESSEL SOLUTIONS

FEATURES

Bluetracker One is a cloud-based fleet & vessel collaboration and analysis platform, which also provides further optional modules from the areas of vessel performance, emission compliance and collaboration, in addition to its core functions.

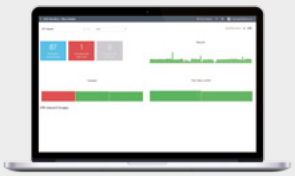
VESSEL PERFORMANCE

- Analyze fleet performance based on validated data sets
- Foresee hull cleaning and analyze hull performance according to ISO 19030
- Monitor engine performance by comparing actual SFOC with
- Monitoring and analysing of the vessel's lube oil consumption
- KPI score card reference data

Hull Survey: Observe your speed loss and predict hull cleaning appointments with the Hull Monitor.

EMISSION COMPLIANCE

- Fulfill current and upcoming regulations
- Automated generation of annual MRV reports
- Connected to your verifier
- IMO DCS compatible
- Focus on upcoming regulations
- EEOI ranking of vessel classes available
- IMO DCS and EU MRV modules are certified by DNVGL and Verifavia



MRV Module: Daily live dashboard shows the fleet's status with regard to MRV compliance.

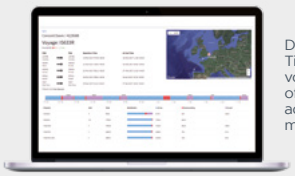
COLLABORATION

- Integration of any third-party reporting data via standardized API
- Easy to share with other departments – advanced user management
- Collaborate on charter party monitoring with charterers via Charter Monitor

Charter Monitor: Track and share your speed consumption curve with charterers and use the collaborative function to manage your charter parties

OPS VISIBILITY

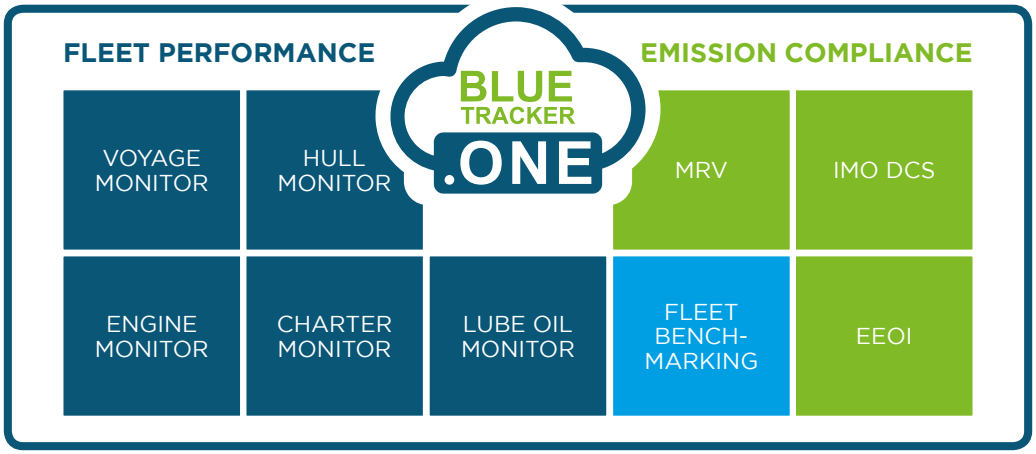
- Integration of any third-party reporting data via standardized API
- Advanced User Management - easy to manage the accessibility of different features and ships
- Collaborate on charter party monitoring with charterers via Charter Monitor



Data Manager: Timeline of each voyage and distribution of most important values according to vessel's maneuvering status.

BLUETRACKER ONE AT A GLANCE

Bluetracker One is able to integrate either manual reported or collected data by sensors from ship operations as well as data from third party systems for further monitoring and analysis. Regardless of the data source, Bluetracker One can be subscribed to as SAAS and is available as a standardized API for the integration of reporting and automatically generated data. For on-board data collection, Bluetracker offers a manual reporting tool as well as sensor-driven data collection.



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PREPARING YOUR VESSEL FOR THE FUTURE

Modifications to a vessel's design, such as lengthening or changing the lashing pattern, are proven efficient measures to improve a vessel's attractiveness for potential customers and increase the ship's competitiveness. Yet modifications like these entail quite an investment and they must be verified for their technical feasibility.

Navis offers dedicated modification and upgrade services with its MACS3 consultancy services. We at Navis have a long history of providing calculation services tailored to our customers' requirements as part of due diligence for planned modifications and upgrades.

Our exceptional team of naval architects and marine engineers supports a wide range of projects involving various types of vessels. This service focuses on increasing cargo intake and/or optimizing a vessel's energy efficiency and performance.

Whether the modification is for a newbuilding in the drawing and design phase or for an upgrade to an existing vessel, all calculations and analyses draw on the ship's profile data and enable the current structural status of the vessel to be compared with planned measurements.

BENEFITS

- ✓ MACS3 consultancy services for checking the technical feasibility of planned vessel design modifications and upgrades
- ✓ Wider range of calculation services to increase the vessel's commercial and/or performance efficiency
- ✓ Consideration of all standard and current lashing rules issued by the major classification societies including BV, LR, DNVGL and ABS
- ✓ Suitable for all types of vessels
- ✓ Calculations based on the vessel's profile data

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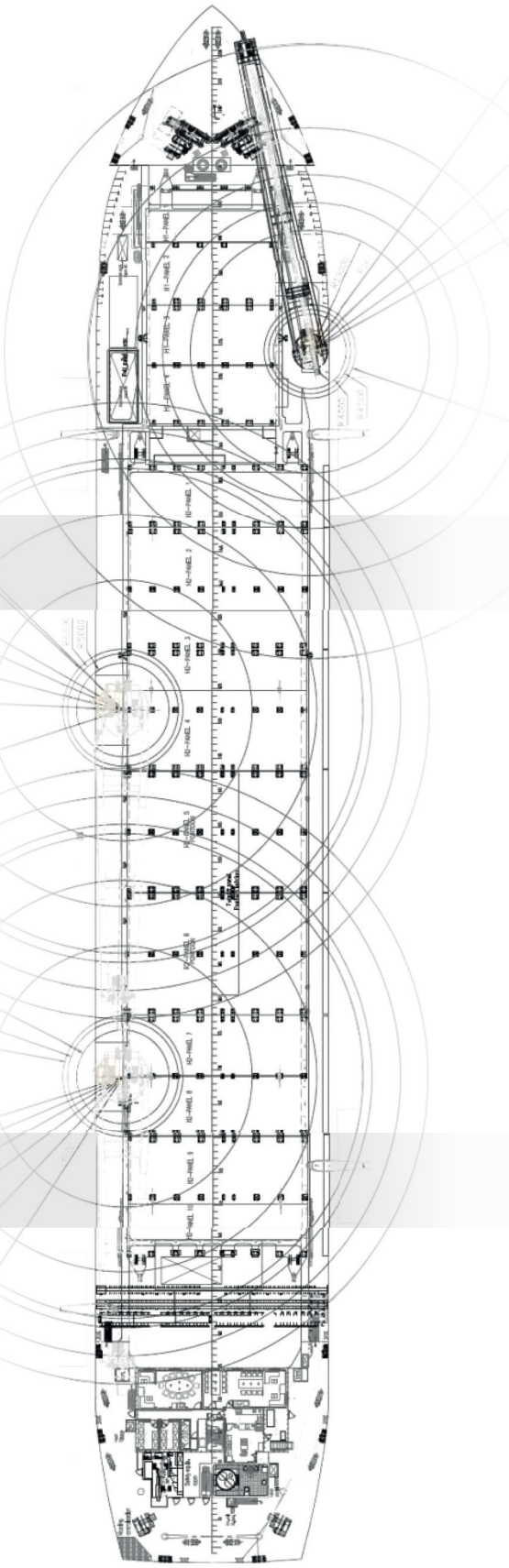
CARRIER AND VESSEL SOLUTIONS

SCOPE OF SERVICE

Our naval architects and MACS3 experts can prepare a broad range of calculations for planned vessel modifications, including:

- ✓ Lengthening
- ✓ Structural modification – e.g., layout of super structure
- ✓ Operational range extension
- ✓ Tonnage
- ✓ Relocation of tanks
- ✓ Simulation of different lashing patterns
- ✓ Simulation of various arrangements for lashing bridges
- ✓ Change from lash gap to ISO gap enabling Russian or mix stowage on the vessel (greater flexibility)
- ✓ Meeting class requirements



REQUIREMENTS

MACS3 consultancy services require:

- ✓ MACS3 profile is necessary to compare the vessel's current structural status with the planned modification and upgrade measurements.
- ✓ Alternatively, a new vessel profile needs to be created in MACS3.
- ✓ Data relevant to stability and strength, including, for example, hydrostatics, stability cross curves, bonjean data, GA, etc. and in accordance with planned modifications
- ✓ Detailed briefing about the planned modification measurement
- ✓ MACS3 knowledge and shipbuilding basics are helpful but not necessary

» **Once all the required data is available, we can deliver the calculations at the desired date. We can also expedite delivery at an additional charge.**

REFERENCES

The onboard loading computer MACS3 is in use on a wide range of container vessels, multipurpose vessels, bulk carriers and as well on tanker vessels, roro vessels and passenger vessels.

Established since 1984, the ship library includes approximately 5,000 ship profiles. For the container vessel segment MACS3 holds a share of approximately 65%.

Meanwhile maritime colleges and universities worldwide teach the future nautical officers with MACS3 loading computer.

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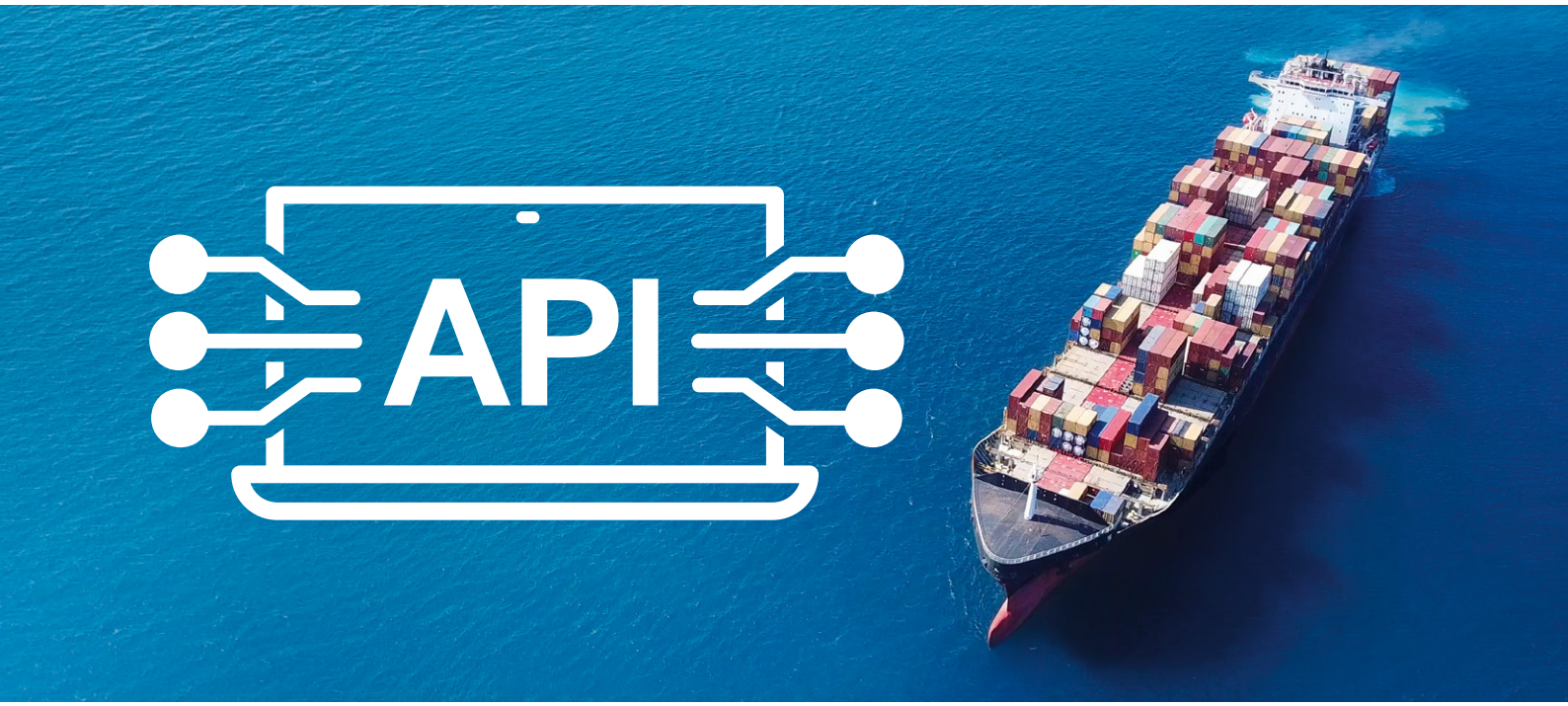

MACS3 CONNECTED API SERVICES

When key calculation results of loading computers such as stability are available independent of its on-board version, new use cases and analytics become feasible. MACS3 Connected API Services enables accessibility of ship-specific loading computer calculation results in the cloud.

MACS3 Connected API Services is a cloud-based data service. It provides a RESTful API to seamlessly integrate valuable ship-specific calculation results into IT environments and internal processes.

As result, it reduces manual- and paperwork and mitigates errors caused by transferring different media.

As of now, MACS3 Connected provides API services that allow direct access to ship-specific loading computer calculation results such as:

Stability & Strength – all relevant stability and strength calculations based on class-approved vessel profile

Lashing – lashing calculations, including all the latest regulations by all major classification societies

Dangerous Goods (DG) – DG calculations according to the vessel's Document of Compliance (DoC) and/or the DG segregation check

Condition Check - evaluation of specific loading condition calculations

MACS3 Connected API Services assists ship owners, ship managers, ocean carriers, port authorities, coast guards and 3rd party vendors in making processes more effective.

BENEFITS

- ✓ Available for stability & strength, lashing, DG and condition check
- ✓ RESTful API
- ✓ Standard response format JSON
- ✓ Reliable, scalable and secure global cloud infrastructure
- ✓ .net SDK available on nuget
- ✓ SDK source code available on GitHub

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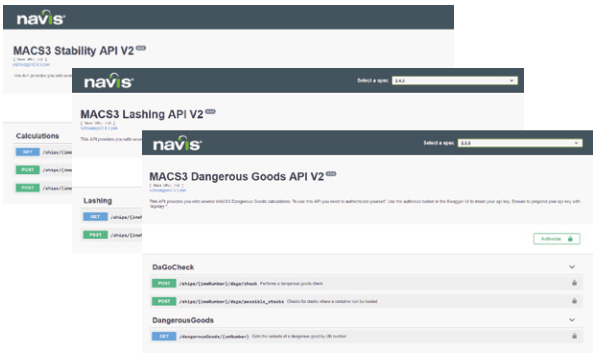
CARRIER AND VESSEL SOLUTIONS

FEATURES

- Based on RESTful APIs
- Service documentation based on Swagger, an open source and professional toolset that simplifies API development for users
- Using packet manager nuget to distribute SDKs for integration into your application

Requirements

- MACS3 Connected account for your company



Picture Credit: MACS3 Connected API Services for Stability, Lashing and DG

PACKAGING

Subscription

- Monthly fee based on a daily quota (number of calls per day)

Scope of Service

- Maintenance of MACS3 calculation engine
- First level technical support for API services
- Globally distributed cluster to provide low latency responses and highest availability

MACS3 CONNECTED - ALL SERVICES AT A GLANCE

MACS3 CONNECTED WEB APP

LOADING CONDITIONS
- Fleet Overview
- Condition Viewer

CARGO ANALYSIS
- Container Search

MACS3 CONNECTED API SERVICES
- Stability
- Dangerous Goods
- Lashing
- Condition Check

MACS3 LOADING COMPUTER

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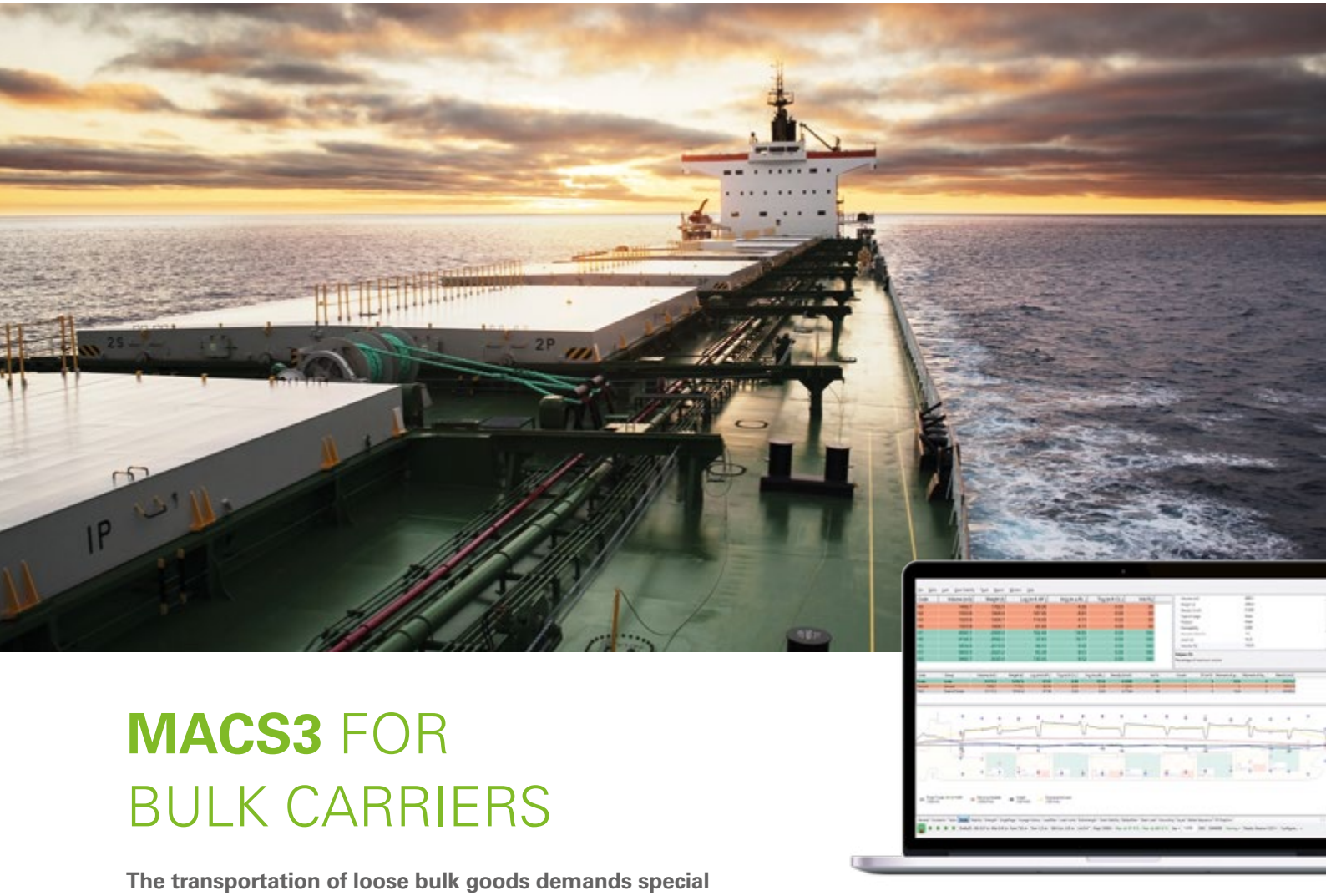

MACS3 FOR BULK CARRIERS

The transportation of loose bulk goods demands special safety requirements of a loading computer, particularly when the cargo to be transported is hazardous or varies in type.

Thanks to intelligent module collaboration, the bulk-carrier-specific MACS3 loading computer can be used to optimally load and unload varying solid-bulk cargoes with consideration for hatch cover handling and safely transport the cargo. Such solid bulk cargo includes ore, coal, grain, steel coil and logs or cargo falling under the IMSBC code category risk group C like nickel ore, iron ore fines or bauxite.

SAFETY | The high-end onboard MACS3 loading computer not only handles a wide range of calculations related to hydrostatics, intact stability, longitudinal and local strength, it also offers guidance on loading sequences and stowage, ballast-water distribution, stability and grounding scenarios.

CERTIFICATES | The MACS3 is approved by the world's leading classification societies. Both ship crews and planners can rely on the instrument to help them adhere to current IMO regulations, obtain regular updates on dangerous goods, and take early steps to adopt new rules such as the IMO polar code.

BENEFITS

- ✓ Approved by all major classification societies in terms of stability, intact and damage strength
- ✓ Dangerous-goods checks according to IMDG and IMSBC code to identify potential loading conflicts
- ✓ Simulation of loading/unloading sequences
- ✓ Two- and three-dimensional images of various vessel and cargo views
- ✓ Integrated dry-bulk stowage functionality
- ✓ Compliance with IMO polar code

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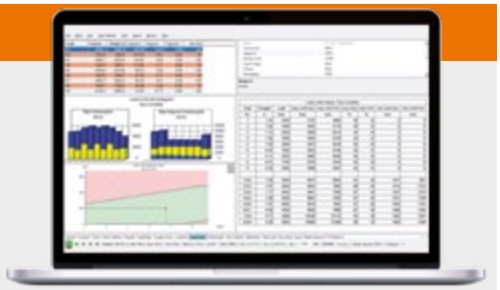
CARRIER AND VESSEL SOLUTIONS

FEATURES

MACS3 for bulk carriers addresses the special requirements of dry bulk by providing various ship-type-specific modules.

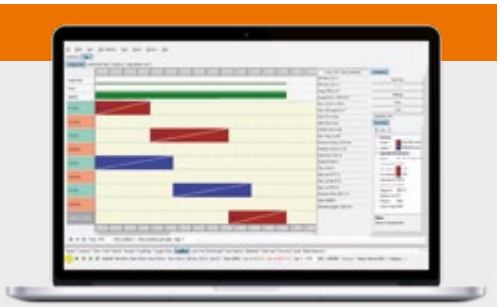
BASIC



The module Bulklim shows loading limits for holds due to local strength

- **MACS3.net** includes the vessel's graphical tank plans; shows current conditions; optimizes trim, heeling, stability and stress, loading conditions, and calculations; and saves and retrieves loading conditions. It also provides online help, user warning points and an interface to tank automation systems to establish a connection between the tank measuring system and tank levels.
- Thanks to an **NMEA interface**, standardized stability and strength of the current loading conditions can be sent to other on-board systems.
- **Two-way interface** is available for the hull stress monitoring system HMS to send and receive strength limits and calculated strength analyses.
- **Draft survey** including deadload calculation enables a comparison between the initial and final condition of the load.

ADD-ON MODULES



The module Loadman enables planning of loading and unloading sequences in the port

- **Bulk strength** calculates longitudinal strength in flooded conditions according to IACS requirements UR Z11, S17 and S25. Each hold is assumed to be damaged. The respective loading situation is checked with regard to strength limit value.
- **Grain** examines grain stability in light of the special requirements of the IMO Grain Code. This module includes completion of the "Grain Stability Calculation Form" required when loading bulk grain in the US, Canada and Australia. It also ensures intermediate arrival reports meeting ports' special requirements for safe carriage.
- **Loadman** precalculates loading and unloading sequences and simulates loading and discharging operations in time. A loading/unloading plan can be automatically created as a printable PDF file. The optimization of the total cargo distribution is integrated with respect to GM, stability, stress.
- **Bulklim** ensures load limits set by classification societies for double-bottom vessels are not exceeded.
- **Dangerous goods for bulk carriers** employs IMSBC code, DOC and company-specific rules and includes emergency schedules as well as firefighting and safety plans.
- **Mix stow** supports designing, loading and discharging all kinds of general cargo using a 3-D vessel profile that continuously takes into account several loading-condition checks. It also includes a special steel-coil planning tool to manage position and weight of coils as well as dunnage and functions for stowing timber on deck.
- **Hatchcover** module allows the cargo hold to be shared by vertical bulkheads and horizontal intermediate-deck paneling.
- **Ballastman** provides the means to plan and supervise the process of ballast-water exchange while at the same time ensuring the continual stability and strength of the vessel. The module generates a ballast-water exchange report.

REFERENCES

The onboard loading computer MACS3 is in use on a wide range of container vessels, multipurpose vessels and bulk carriers as well as on tanker vessels, roro vessels and passenger vessels.

Established in 1984, the ship library includes more than 5,000 ship profiles. For the container vessel segment, MACS3 holds a share of approximately 65%.

In addition, maritime collages and universities worldwide teach future nautical officers with the MACS3 loading computer.

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MACS3 CONNECTED

One of the answers to future requirements for safe, environmentally-friendly and efficient vessel and cargo operations is applying digital technologies to every part of every vessel to generate comprehensive information on a vessel and its cargo's performance.

The web-based MACS3 Connected is an unique approach to providing results for dedicated loading computer calculations such as stability, strengths, bending moments, lashing, as well as cargo-related information regarding reefer and dangerous goods (DG) and hazardous materials in the cloud.

Whether in cases of emergency, claim management or cargo performance, the visibility of current loading conditions, their historical consideration in connection with ship data from the vessel profile, stability and stress, etc. enable a new and unique dimension of cargo and vessel performance - for ship owners, technical managers, liner operators as well as for port authorities.

MACS3 Connected can be used for all types of vessels. The Navis vessel library contains more than 6,000 vessel profiles, which MACS3 Connected has access to.

Furthermore, MACS3 Connected enables manufacturer-independent availability of stability, lashing and dangerous goods calculations via API services.

BENEFITS

- ✓ Central and real-time availability of MACS3 loading condition-related information
- ✓ Enables a joint cargo and vessel performance analysis
- ✓ Availability of comprehensive lashing calculations according to the latest updates of major classification societies' regulations
- ✓ API Services for lashing, stability and DG
- ✓ Supports information sharing with relevant stakeholders of cargo operations

CARRIER AND VESSEL SOLUTIONS

USE CASES

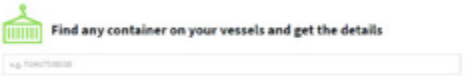
MACS3 Connected is the platform for cargo performance that hosts various use cases.
As of now the following use cases are available:

EMERGENCY RESPONSE

- ✓ Anytime availibility of fleet-wide loading conditions
- ✓ Immediate glimpse at cargo details for all stakeholders
- ✓ Visibility of emergency schedules (EmS) as per IMDG code
- ✓ Collaboration and download functionality
- ✓ Unlimited users

CONTAINER CLAIM MANAGEMENT

- ✓ Search functionality with container number
- ✓ Providing a historical container movement report of all voyages on vessels of your fleet
- ✓ Visibility of container type and cargo details



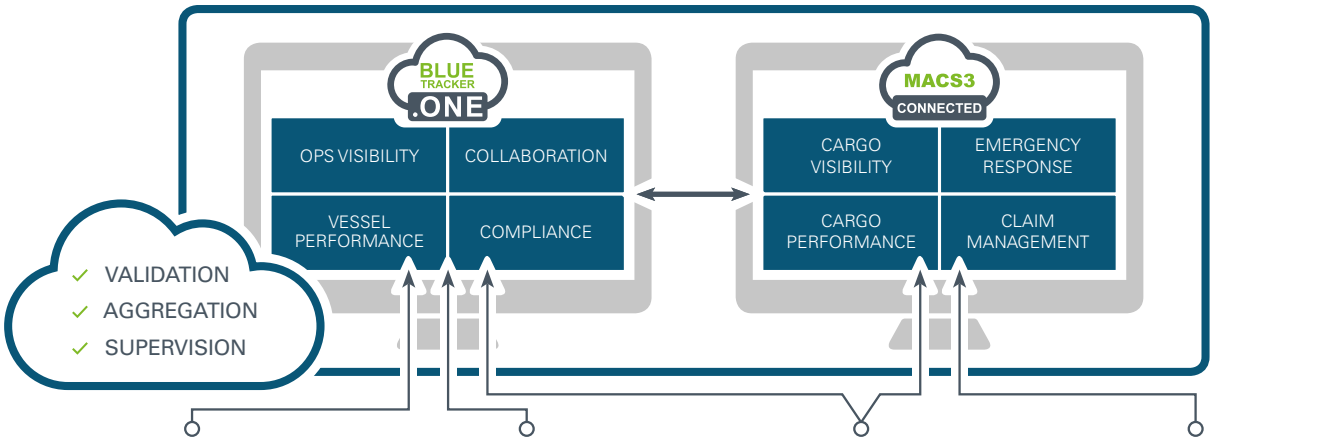
DG CHECK FOR EDI

- ✓ Drag & drop the EDI file for DG check regarding potential DG conflicts in accordance with IMDG code
- ✓ Utilize MACS3 API services to gain a detailed analysis of DG calculation results

CARGO KPI & STRESS ANALYSIS

- ✓ Ability to analyze the historical cargo & vessel data with regard to stress and stability
- ✓ Ability to analyze the historical cargo utilization per vessel

VESSEL & CARGO PERFORMANCE ECOSYSTEM



BLUETRACKER AUTOMATIC / MDE	BLUETRACKER REPORTING	CUSTOM INTEGRATION	MACS3
✓ Sample data source	✓ Report data source	✓ API	✓ Cargo data source

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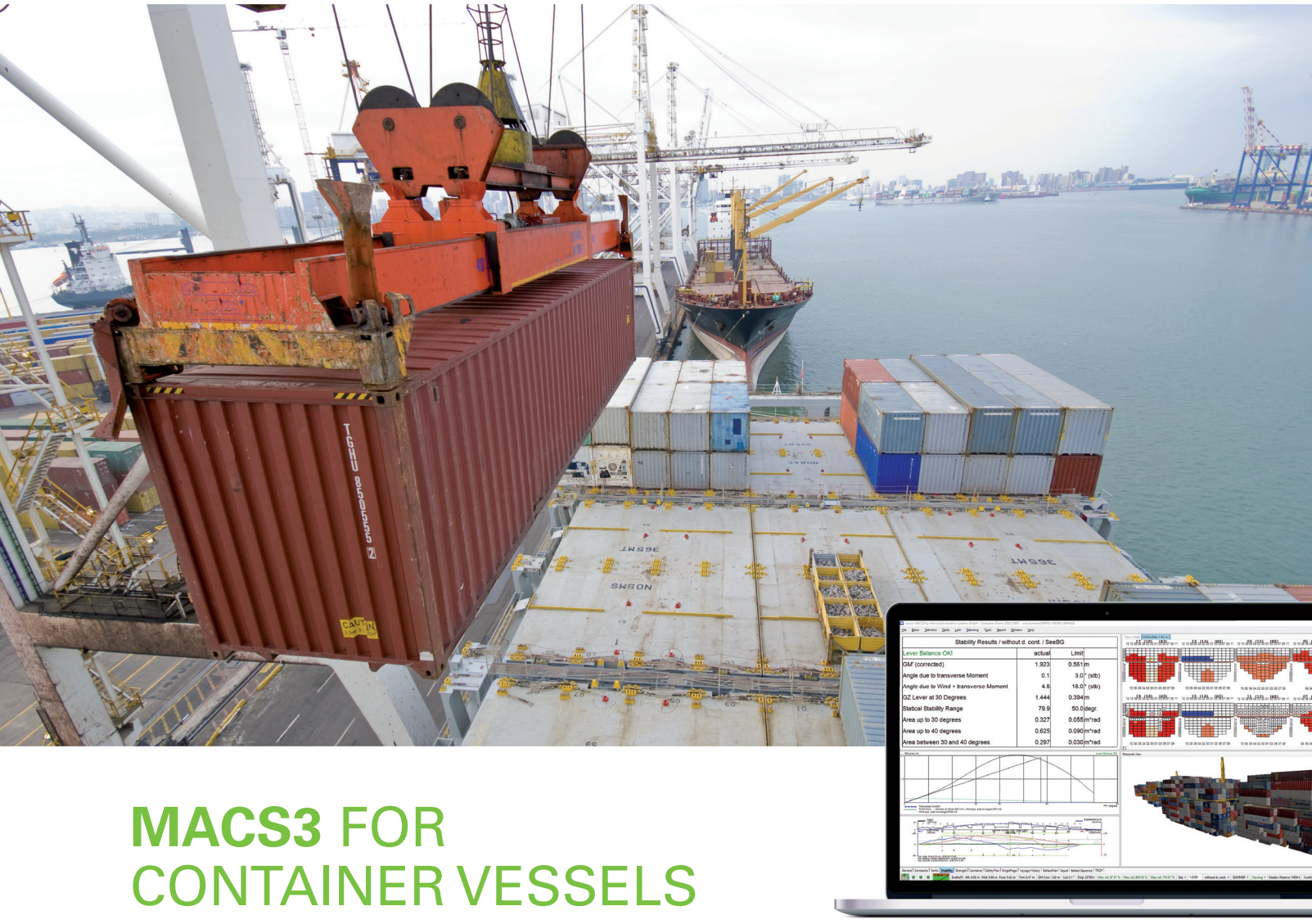

MACS3 FOR CONTAINER VESSELS

The MACS3 loading computer is a graphic-oriented application that performs all required calculations for the transport of containerized cargo. It is available in an onboard and an office version, with both approved by all major classification societies.

Safety | The onboard MACS3 loading computer not only handles a wide range of calculations related to hydrostatics, intact stability and longitudinal strength; the high-end instrument also offers advice on loading and stowage, ballast water distribution and exchange, damage stability, grounding scenarios and trim optimization.

Certificates | MACS3 is approved by the world's leading classification societies. Furthermore, ship crews and planners can both rely on the loading computer's adherence to current IMO regulations, regular updates on dangerous goods, ship-specific lashing rules and early implementation of new rules.

Variety of Features | MACS3 offers a rich variety of features that range from reading Baplie files (versions 1.x-3.1) to carrying out various condition checks e.g. for the lashing, visibility line, stability stress and dangerous goods including proposals for problem solving.These features also include customizable two- and three-dimensional graphic visualizations as well as report functions for all calculations and lists.

Combining the onboard loading computer MACS3 with the office-based stowage planning software StowMan ensures seamless, time-saving integration of all necessary cargo and vessel information during the planning process.

BENEFITS AT A GLANCE

- ✓ Type approval from all major classification societies for intact stability, intact strength and lashing calculations
- ✓ Two- and three-dimensional visualization of various vessel and cargo views
- ✓ Dangerous-goods checks in according to IMDG, DOC and company rules
- ✓ Facilitation of trim optimization by ballast water operations
- ✓ Various condition checks, including proposals for problem solving
- ✓ Various customizable reports comprising all available container data, e.g., IMDG cargo as list or as a graphic image in the form of arbitrary bay plans

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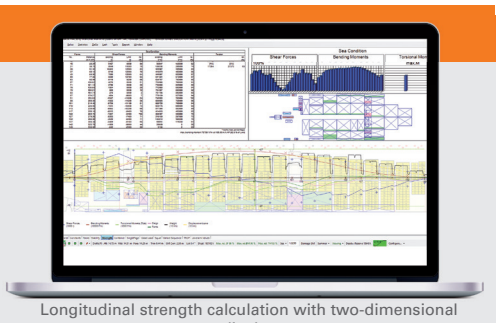
FEATURES

Besides the basic functionality module MACS3.net, MACS3 for container vessels includes various additional modules:

BASIC

- **MACS3.net** includes graphical tank plans of the vessel indicating the current conditions of trim, heeling, stability and stress, user warning points and the tank online interface to tank automation systems.



Longitudinal strength calculation with two-dimensional display

ADD-ON MODULES

- **BELCO** container module enhances fast and easy container management and features the following:

  Data includes container information (size, type, weight, port of loading/discharge, operator, etc.), full EDIFACTS support, UN/LOCODE database, port rotation with date/time and quay, and statistics such as result table with unrestricted selection of criteria.

  Cargo handling includes efficient loading, discharging, modifying and exchange of containers; visual editing of reefer positions and hot areas; loading and discharge list; plan and fully functional layer view; hatch cover handling; symbolic presentation of the pier; result table with unrestricted selection of criteria; several undo steps; break-bulk handling.

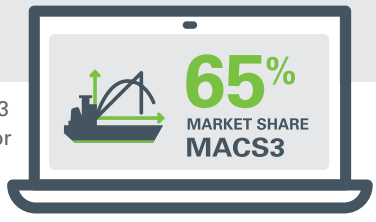
  Visibility and condition checks covers visibility (IMO and Panama) check with blind sectors, easy check of critical conditions at a glance (stack weights, flying containers, reefer positions, hatch cover clearance, type, UN/LOCODE, oversized, handling instructions, container numbers).

Trim calculation

- **Sealash** includes route- and weather-specific calculations and lash optimizations. Lashing forces are calculated according to major classification-societies rules. It generates various reports such as inventory list, lash forces by bay, stack and tier. Lashings can automatically be applied according to the cargo-securing manual.
- **Dangerous goods** checks the fulfillment of stowage and segregation requirements and includes emergency schedules as well as firefighting and safety plans according the latest IMDG code.
- **Stowage planning** includes import and export of ASCII or XLS files and manual planning functionalities.
- **Verified gross mass** (VGM) is also a check that is carried out.
- **Tank online** periodically reads tank filling levels and temperatures into MACS3. It relieves the user of having to manually enter the values needed for the stability and strength calculations. Drafts, trim and heeling can also be read online and compared with the MACS3 calculations. Connecting to over 25 different makers, „Tank online“ is available for all major onboard measurement systems.
- **Ballastman** supports in the planning and supervising of ballast water exchange by, for instance, generating an appropriate ballast water exchange report.
- **Residual strength** calculations can be made.
- **Mooring** consists of customizable piers including vessels.
- **Grounding** module calculates the effect of grounding considering different situations.
- **TROP** trim optimization module saves fuel by optimizing tanks and cargo-weight distribution.

REFERENCES

Market share: Established in 1994, the ship library includes more than 4,500 ship profiles. MACS3 holds a share of approximately 65% for the container vessel segment. MACS3 is also available for multipurpose vessels and bulk carriers as well as for tanker, offshore and roro vessels.



Educational software: The MACS3 loading computer software has been in use for training purposes since 1999. Initially only available to German naval schools, it is now also deployed at European and Chinese maritime universities.

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MACS3 FOR MULTI-PURPOSE CARGO SHIPS

The variety of cargo types and the dynamically adjustable design of cargo hatches of a multipurpose vessel (MPV) pose special challenges for a loading computer.

Thanks to intelligent module collaboration, the MPV-specific MACS3 loading computer can be used to optimally load, unload and safely transport complex containerized and non-containerized break bulk, grain, roro loads and project cargo on board a multipurpose carrier in consideration of customizable tween decks and hatch cover handling.

Safety: The onboard MACS3 loading computer does not just cover a wide range of calculations related to hydrostatics, intact stability and longitudinal strength. The high-end instrument also offers advice on loading and stowage, ballast water distribution, ballast water exchange, damage stability and grounding scenarios.

Certificates: MACS3 is approved by the world's leading classification societies. Ship crews and planners can rely on adherence of current IMO regulations, regular updates regarding dangerous goods, ship-specific lashing rules and the early adoption of new rules such as the IMO polar code.

Stowage: Due to the integrated mixstow module, the loading computer facilitates the best possible utilization of the vessel. Two- and three-dimensional visualizations of ships and their cargo also make it easier to optimally load them. Using the trop module for trim optimization, the planner is able to increase the ship's utilization by stowing cargo instead of ballast water and assist to reduce fuel consumption.

BENEFITS AT A GLANCE

- ✓ Approved by all major classification societies for stability, intact and damage strength and lashing calculations
- ✓ Dangerous goods checks regarding the IMDG and IMSBC code indicating potential loading conflicts
- ✓ Simulation of cargo operations: loading/ unloading sequences, operations of onboard cranes
- ✓ Two-and three-dimensional visualization of various vessel/cargo views
- ✓ Integrated containerized, non-containerized and bulk stowage functionality
- ✓ Trim optimization produced by the cargo itself and not ballast water
- ✓ Service support: remote trouble shooting
- ✓ Compliance with the IMO polar code

CARRIER SOLUTIONS

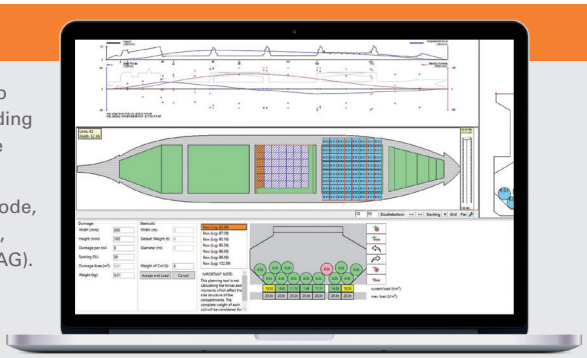
FEATURES

MACS3 for MPV reflects the large range of different cargo and the special design of MPV vessels by providing various ship-type-specific modules

BASIC

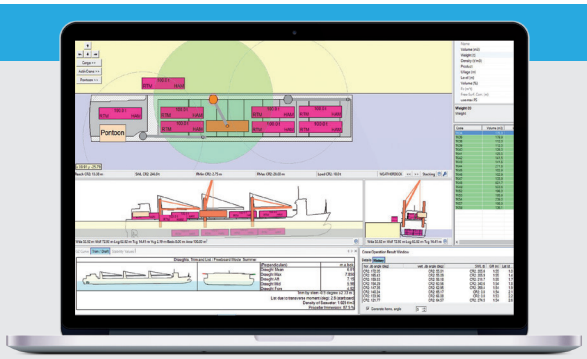
- **MACS3.net** includes graphical tank plans of the vessel, showing current conditions of trim, heeling, stability and stress, loading conditions and calculations saving and retrieving of loading conditions, user warning points and tank online interface to tank automation systems.

ADD-ON MODULES



- **MixStow:** Designing, loading and discharging all kind of general cargo using a 3-D vessel profile, continuously taking into account several loading condition checks. Includes a special steel coil planning tool to manage position and weight of coils as well as necessary dunnage.
- **Dangerous goods** for multipurpose vessels according IMDG, IMSBC code, DOC and company specific rules, includes emergency schedules (EMS), firefighting and safety plans as well as the Medical First Aid Guide (MFAG).
- **Ballastman** for planning and supervising the ballast water exchange
- **Residual strength** estimation of a damaged ship.
- **Mooring** plans on customizable piers including vessels fairleads, winches and mooring line types.
- **Grounding / ungrounding strength** module calculates the effect of grounding in different situations.
- **Cargo securing** lashes non-standardized cargo, calculation acceleration forces according CSS code using advanced calculation method, taking into account wind pressure and sea sloshing as well as opposing forces of friction and lashing.
- **TROP** trim optimization module to save fuel by using optimized tanks and cargo weight distribution.
- **Stowage** module including homogeneous surface cargo by input of a stowing factor, a wide range of information such as type, weight, port of loading/discharge, DG, import of container and non-containerized loading lists, owner, operator and hatch cover handling.

HEAVY LIFT



- **Crane operations** simulate onboard crane operations, including
  - Lifting dual cargo (traverse or pickpoints)
  - Collision check during lifting operations
  - 3-D view of onboard crane operations
  - Easy simulation of heavy lifting due to graphically supported software handling
  - Adjust trim and heel feature to keep the vessel in the allowed trim and heel range during crane operations means of ballast and heeling tanks

REFERENCES

The onboard loading computer MACS3 is being used in a wide range of container vessels, multipurpose vessels, bulk carriers, tanker vessels, offshore vessels, roro vessels and passenger vessels.

Established in 1994, the ship library includes more than 4,500 ship profiles. For the container vessel segment, MACS3 holds a share of approximately 65%. More than 500 multipurpose vessels run their onboard cargo operations with the MPV version of MACS3.

If you have any questions or would like to set up an appointment with one of our sales representatives, please phone or e-mail us:

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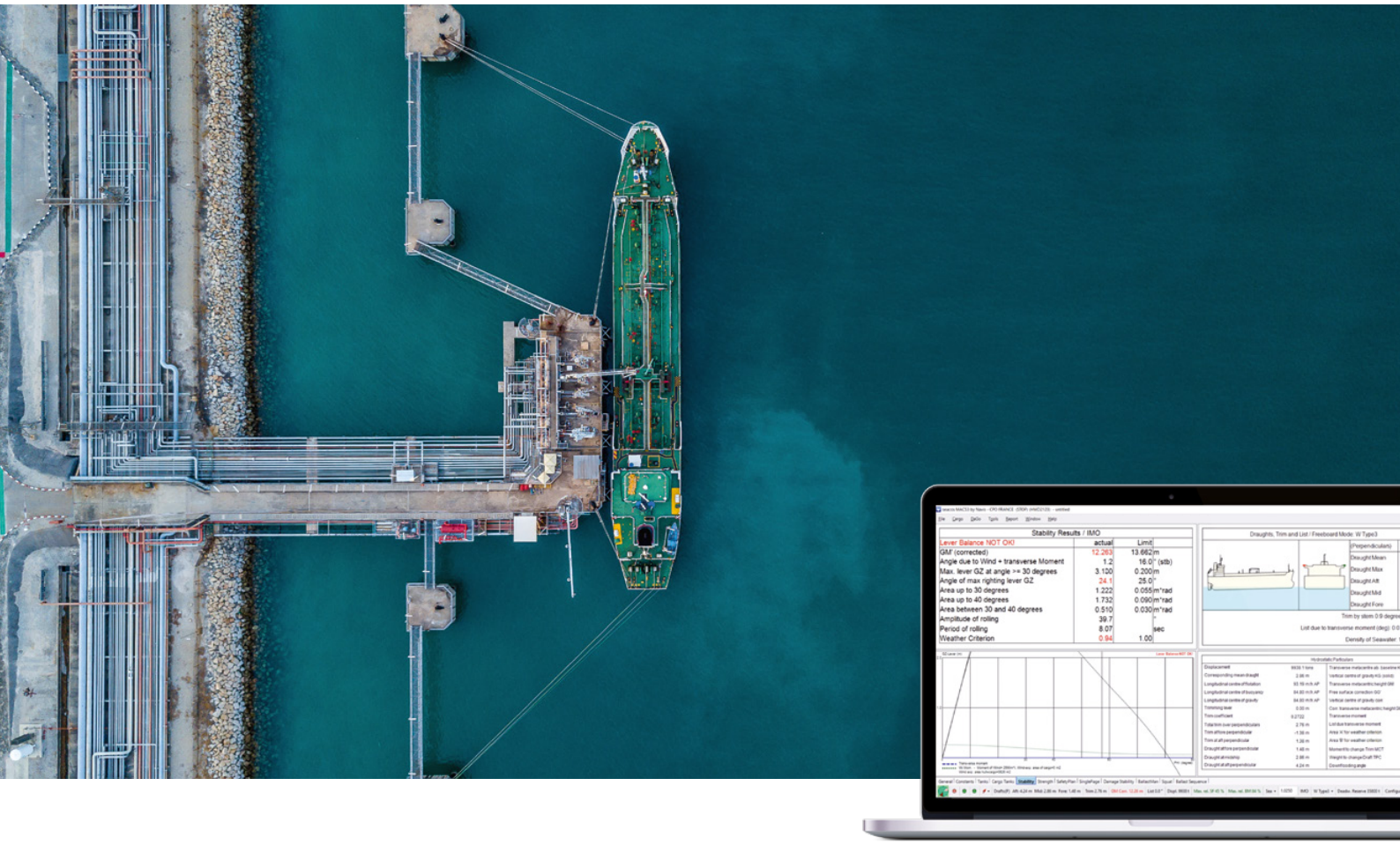
CARRIER AND VESSEL SOLUTIONS



MACS3 For Tanker Vessels

The ocean transport of different types of wet cargo is a high-risk and challenging task for the crew of a tanker vessel. Cargo can become off-spec or react with other types of chemicals or oil products. Careful planning and monitoring of cargo operations is required.

MACS3 loading computer provides reliable stability calculations, enables on-board stowage planning and cargo operation monitoring for all types of liquid cargo to be carried on different types of tanker vessels.

MACS3 considers ship design, special cargo requirements according to IBC code and other international standards and charterer's voyage instructions to ensure that chemicals and oil products are loaded, carried and discharged safely.

MACS3 covers a wide range of calculations related to hydrostatics, intact stability, longitudinal strength, drafts and trim. It is approved by the world's leading classification societies. Ship crews can rely on adherence to the current IMO regulations and regular updates with regards to dangerous goods.

BENEFITS

- MACS3 tanker versions are available for crude oil, product, chemical, LNG and LPG tankers
- Type approval from all major classification societies for intact and damage stability and strength
- Simulation of cargo operations including real-time monitoring of loading, unloading and ballasting sequences
- Various dangerous goods checks according to IMDG, IBC, and CHRIS
- Ullage report with cargo calculation trim, heel and temperature correction by ASTM tables or linear correction
- Blending calculation for crude oil
- Fixed volume and fixed weight mode for loading, unloading or sailing operation
- Last cargo record to keep track of history of cargo per cargo tank
- Various monitoring feature like time remaining for tank filling, critical temperature to overflow etc.

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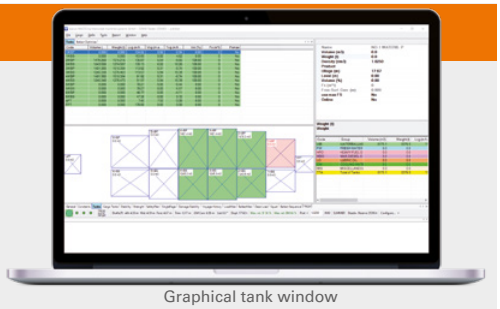
CARRIER AND VESSEL SOLUTIONS

FEATURES

MACS3 for tanker vessels meets the special requirements of various types of tanker vessels by providing various ship-type-specific modules.

MACS3 BASIC



Graphical tank window

- Graphical tank plans of the vessel showing current conditions
- Optimization of trim, heeling, stability and stress for ballast tanks
- Loading conditions and calculations, which can be saved and retrieved
- Provides online help, user warning points and a tank online interface to tank automation systems
- Specific tank window
- Cargo temperature and volume correction factor (ASTM based)
- Cargo accounting by mass flow calculation
- Indication of fixed volume or fixed weight
- Compatible with emergency schedules (EMS)
- Last Cargo provides a cargo history per tank to avoid cargo contamination
- Vessel Experience factor calculates the cumulated deviation of vessel and terminal ullage reports

ADD-ON MODULES

Ullage report

- **Dastyman** provides damage stability calculation according to IMO, MARPOL, IBC, and SOLAS.
- **Loadman** optimizes cargo distribution and simulation of loading and unloading sequences.
- **Ullage / LPG / LNG report** provides precise cargo tank volume data for billing purposes by temperature and density correction based on ASTM tables 54, 6, 23, 24 as well as linear correction. In addition, it includes water dip correction and blending calculation for tankers transporting different sorts of crude oil.
- **Tank Online** includes ullages, temperatures and pressures, etc., in order to enable real-time monitoring of loading and unloading sequences. It also generates pump reports.
- **Dangerous goods** for tanker vessels in accordance with IBC, CHRIS, IGC and IMDG codes includes:
  - DAGO I including cargo segregation check, tank property check against cargo properties, and print-out of cargo specific requirements
  - DAGO II fire fighting and safety plan
  - DAGO III medical first aid guide (MFAG)
  - Company specific rules, includes emergency schedules, firefighting and safety plans

REFERENCES

The onboard loading computer MACS3 is in use on a wide range of container vessels, multipurpose vessels and bulk carriers as well as on tanker vessels, roro vessels and passenger vessels.

Established in 1994, the ship library includes more than 4,500 ship profiles. For the container vessel segment, MACS3 holds a share of approximately 65%. More than 500 vessels run onboard stability calculations and cargo planning with the MACS3 tanker version.

In addition, maritime colleges and universities worldwide teach future nautical officers with the MACS3 loading computer.

If you have any enquiries or would like to set up an appointment with one of our sales representatives, please phone or e-mail us:

+49 461 43041-0 loadingcomputer@navis.com **www.navis.com**