# PIAS

## SOFTWARE FOR NAVAL ARCHITECTS


SARC

MARITIME SOFTWARE AND SERVICES


Courtesy of Royal IHC






# WHAT IS **PIAS?**

**Professional ship design software with modules for modelling of ships, intact stability and damage stability and much, much more. Naval architects around the world use PIAS on a daily basis to create, calculate and analyze ship designs. PIAS assists in all stages of naval architecture: from the first preliminary sketch up to the final design.**

# WHAT CHARACTERIZES **PIAS?**

## What characterizes PIAS?

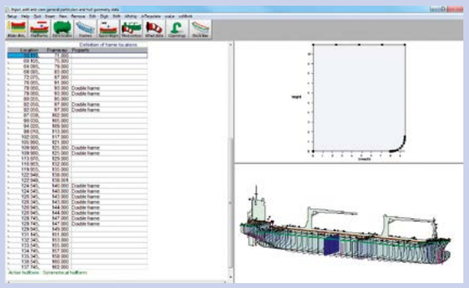
- PIAS is a toolbox for naval architects.
- PIAS is a product of SARC, created by a team of experienced naval architects with hands-on experience.
- PIAS is used by the vast majority of Dutch design offices and yards and many others worldwide.
- PIAS calculations are accepted by all major classification societies.
- PIAS calculations are presented in comprehensive reports.
- PIAS is fully menu-operated, thus reducing the learning curve and errors associated with software using script programming.
- Continuous developments of new methods, modules and options ensure state-of-the-art software.
- PIAS is modular: only purchase the modules as required; additional modules can be provided overnight.
- Frequent updates.
- Unsurpassed support by trained and experienced naval architects.

- PIAS can deal with:
  - single, composed and asymmetric hull forms, catamarans, trimarans, semi-submersibles, and odd shapes.
  - actual CoG of fluids in tanks (for heel and trim),
  - loss of cargo for open hopper vessels,
  - loss of tank contents in damage stability calculations,
  - ducted and controllable pitch propellers,
  - (damage) stability in waves,
  - user-defined and pre-defined stability criteria,
  - etc.



Courtesy of Royal IHC


# WHICH FUNCTIONS ARE AVAILABLE?



## Hull shape modelling

- Input of ordinates, either numerically or by digitizing.
- Import of tables of offsets in various formats.
- Hull surface design by SARC's unique Fairway hull design module.
- Import of geometry from CAD files via Fairway.

## Longitudinal strength

- Shear forces, bending and torsional moments.
- Deflection and deviation.

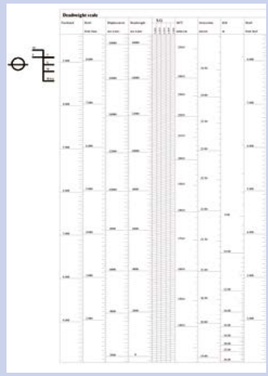


## Tanks, compartments and layout

- Integrated tank, compartment, bulkhead, deck and piping modelling.
- Configurable tank sounding /pressure/ullage/ correction tables.

## Intact stability

- Integrated management of loading conditions.
- GUI-based definition of tank filling, containers and other types of cargo.
- Actual and allowable grain heeling moments.
- Inclining experiment report with inclinometer option.
- Checks of GZ curves against stability criteria.
- Tables and diagrams of maximum allowable VCG' / minimum required G'M.
- Stability calculations in "frozen waves".





## Damage stability

- Easy definition of damage cases.
- Progressive flooding via 'critical points'.
- Intermediate stages of flooding.
- Checks of GZ curves against stability criteria.
- Tables of allowable VCG'.
- Floodable lengths.
- Probabilistic damage stability SOLAS/SPS/ DR67&68.
- RoRo stab 90+50 (Stockholm agreement).

## Stability criteria

- Input of criteria using a wide range of variables.
- Predefined sets of standard criteria, and the flexibility to use any combination of non-standard criteria.
- Distinct sets of criteria for intact stability and final or intermediate stages of flooding.
- Maximum allowable anchor chain forces for AHTS's.

## Speed and power predictions

- Resistance predictions according to Holtrop & Mennen, Savitsky, van Oortmersen, Hollenbach and others.
- Propeller calculation and optimization for B-series, ducted (Ka and Kd series) and controllable pitch propellers.

## Report generation

- Direct, formatted output on Windows devices.
- Integral output (of formatted text and graphs) to Word and Excel.
- Graphs exportable to EPS or DXF.

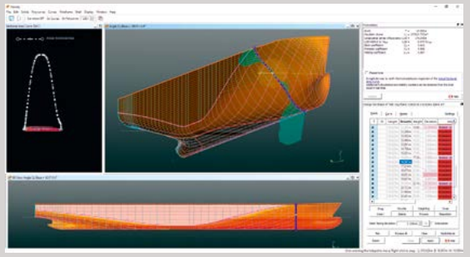
# MODULES

## PIAS' FAIRWAY MODULE

***For ship hull design***

### What does Fairway do?

- Fairway is software for design, fairing, manipulation of ship hull forms and conversions of models from other design software.
- Using Fairway is much like drafting a lines plan on paper, only better.



### How does Fairway work?

- The hull surface is shaped through lines that lie on the surface.
- 3D surface geometry is automatically created on basis of these lines.
- User has full control over line geometry, via coordinates of points, defined tangents, line types, etc.
- Contains versatile fairing options, recreating the use of spline and battens, with user-defined accuracy and stiffness of the spline.
- Changes in line geometry are automatically included in connected lines.
- New lines, following the surface, can be added by the push of a button.

### Why is Fairway better than NURBS surface modellers?

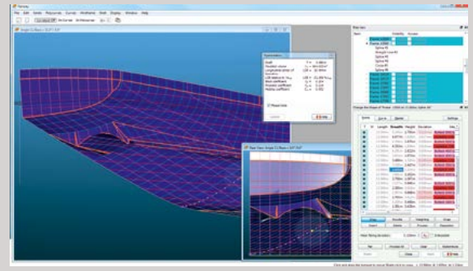
- Fairway offers direct control over hull coordinates, as opposed to indirect control via 'network control points', 'vertices', 'nodes', 'master lines' and other artificial phenomenae associated with NURBS surfaces.
- Ship hulls generally require an irregular network of lines to describe them: It will take multiple NURBS surfaces to model even the simplest of ships. Thus, the designer is burdened with manipulation, selection and modification of multiple separate surfaces. In Fairway, the network is just a result of the design process, not the governing principle.

### What is Fairway used for?

- Hull form design, starting with a basic shape or a previously defined hull form.
- Hull design guided by a designed sectional area curve, to meet preset hull parameters.
- Design modification at any design stage.
- Hull form transformation and scaling.
- Completion of partial lines plans.
- Shell plate expansions of developable and double curved plates including templates.
- Manipulations on multiple solids for hull, superstructures, bow thrusters, etc.
- Fairing with user-defined accuracy, up to and beyond production tolerances.
- Export of hull form data to downstream, engineering software, Finite Element, CFD, DXF, IGES, VRML, tables of offsets, etc.
- Generation of lines plans and tactile scale models (Rapid Prototyping, 3D printing).
- Import of DXF and IGES wire frame models, as well as IGES NURBS surface models.

### Which tools are available in Fairway?

- Views on frames, waterlines and buttocks at any design stage.
- Rendered graphics.
- Generation of frames, buttocks, waterlines and diagonals on user-defined positions.
- Projection of curved lines onto defined models.
- A library of simple curve elements.
- User-defined geometric relations between lines to define bottom rake, fixed shear strake height, etc.
- Hydrostatic analysis, and a direct link to all PIAS' modules for further more complex analyses.
- Automatic modification of the hull to fit developable plates.
- An expandable library of hull models that may be used as start-off for new projects.
- Scaling, frame shifting, 'point-based deformations'.

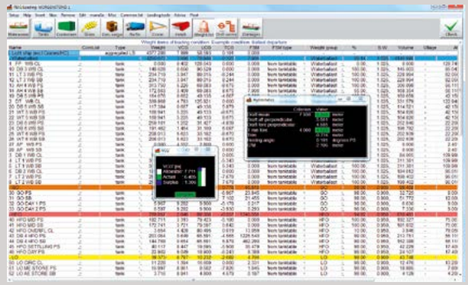


# PIAS' LOADING MODULE

***For intact and damage stability and longitudinal strength***

## What is Loading designed for?

- For integrated management of loading conditions, tank fillings and cargo loads.
- For fast, intuitive and easy determination and assessment of load cases.
- To be identical to and compatible with SARC's LOCOPIAS on-board loading software, so that the same options and results are guaranteed in both the design and the operational phase of the vessel.



## Which tools are present in Loading?

- GUI-based definition of tank filling, containers, grain and other types of cargo.
- Computation of intact stability, and verification against stability requirements.
- Large number of pre-programmed standard stability criteria for intact and damage stability, and configurable requirements for specific criteria.
- Effects of grain moments, and loss of crane load.
- Maximum allowable VCG.
- Computation of shear forces, bending moments and damage stability and verification against criteria.
- The Ballast advice option for automatic determination of optimal quantity and distribution of ballast water.
- Specific GUI's for loading of tanks, containers, grain and crane operations.
- Polar diagram or allowable chain forces for anchor handlers.

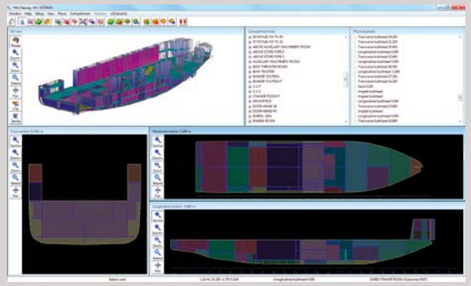
# MODULES

# PIAS' LAYOUT MODULE

***For design of the internal geometry of ships.***

## What is Layout designed for?

- Design and utilization of internal geometry, that means for bulkheads, decks, tanks and compartments.
- To offer the ship designer a versatile tool which manages spaces (compartments), planes (bulkheads and decks) and addresses the duality between them.



## Which tools are present in Layout?

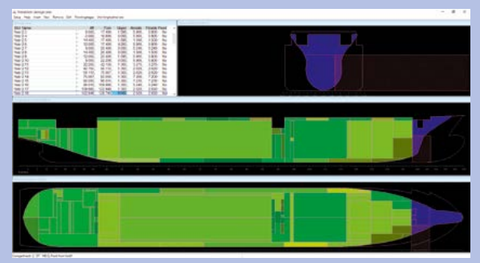
- Tank modelling and visualization.
- Automatic generation of spaces between bulkheads and decks.
- Tank definitions relate to the defined hull, so changes in the hull are automatically reflected in the compartments.
- Modelling of sounding pipes, pressure gauges and overfill sensors.
- Tank sounding or ullage tables, tank pressure tables, trim correction tables, and more.
- Integrated piping system design and modelling.

## Which interfacing and collaboration options are supported by Layout?

- Composition of subdivision plan - to be used as framework for general arrangement and tank plans - and export to DXF or EPS formats.
- Instantaneous exchange of model data with CADMATIC hull.

# PIAS' PROBDAM MODULE

***For computation and optimization of probabilistic damage stability***



## What is Probdam designed for?

- To offer the ship designer the shortest way from ship design to probabilistic damage stability results.
- To rely on conventional naval architectural entities, instead of theoretical, artificial constructs.

## Which tools are available in Probdam?

- Automated generation of damage cases.
- Four different computation methods, to suit different needs for different purposes.
- Automated determination of damage boundaries.
- Automated calculation of attained index.
- Optimization of VCG' values to meet required subdivision index R exactly.
- Multiple settings and calculation schemes to comply with authorities' preferences.

PIAS menu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