



# PRINCIPIA - AVPRO

Development of AVPRO, an application for design of a ship structure.

## MISSION

- Provide Operational maintenance of the AVPRO application;
- Improve and ameliorate the AVPRO software.

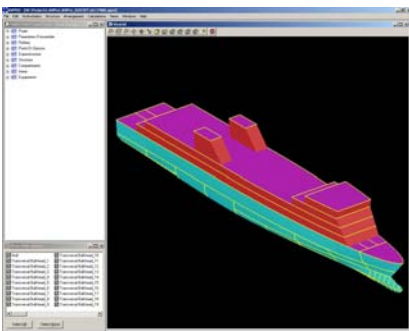
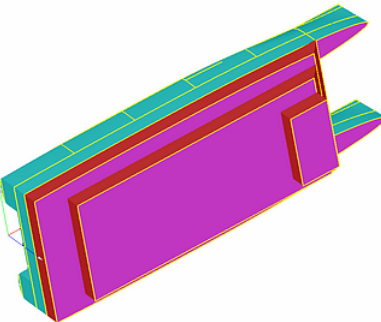
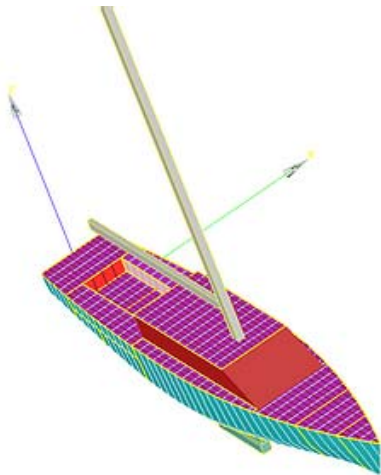
## SOLUTION

- Corrective maintenance of the application through correction of its bugs without modification of functional specifications;
- Evolutionary maintenance. In the framework of this service some new features of the application have been implemented such as:
  - 3D viewer visualization basing on Open CASCADE Technology,
  - Internal ship structure modeling (decks, bulkheads, superstructures, stiffeners etc),
  - Boolean operations on meshes implementation for volumes modeling,
  - Multihull development, etc.

## RESULTS

- Proficiency with AVPRO software since 2004
- Maintenance of the AVPRO software since 2004
- More than 50 evolutional improvements processed since 2004 in the framework of the application maintenance. The most important ones are:
  - Integration of Open CASCADE Technology 3D viewer into the application,
  - Parametric modeling of hull surface
  - Implementation of internal ship structure modeling (decks, bulkheads, superstructures, equipment, stiffeners etc),
  - Multihull ships modeling support,
  - Structural and Stability computations.

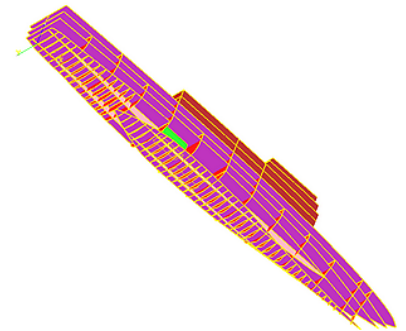
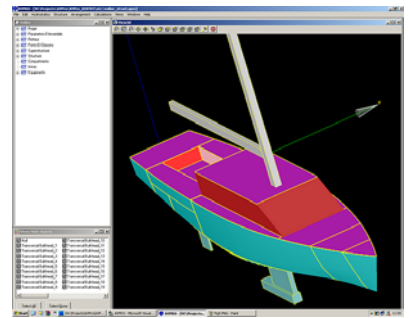
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## FACT FILE

- PRINCIPIA is a scientific engineering firm providing services to major operators, construction and service companies primarily involved in hi-tech production. Its main activity is to identify and provide a solution to industrial problems based on the expertise in mechanical and thermal fields and its extensive knowledge of many industrial sectors.
- PRINCIPIA implements both numerical modeling and physical testing as a solution provider. In the domain of Software Engineering PRINCIPIA also actively cooperates with OPEN CASCADE specialized in the integration of numerical simulation applications.
- PRINCIPIA is certified in accordance with ISO 9001 Ed. 2000 since June 25, 2004, covering the following services: "Scientific and industrial Studies in the fields of Energy, Naval Industry, Offshore, Transport and Aerospace".
- Over the last 10 years, PRINCIPIA has succeeded in maintaining a multi-sector activity (marine, oil & gas, nuclear and other), ensuring a regular growth despite sectoral fluctuation and deriving benefits in expertise, including for its clients.
- PRINCIPIA's achievements in calculation of surface stability and analysis of mechanical resistance in "strong" fluid-structure coupling resulted from the stability of research teams and their experience gained throughout many years of R&D to develop and implement numerical simulation methods specifically required by the shipbuilding industry.
- Today PRINCIPIA could be considered to be the French leader in the domain of scientific naval engineering.
- Its main clients are DCNS, DGA (SPN, DCE), GDF, TOTAL, SBM, SAIPEM, etc.



## MORE ABOUT THE PROJECT

AVPRO software is designed to model a ship structure from scratch. PRINCIPIA have been developing and maintaining AVPRO software during many years. Since 2004, the development is performed in cooperation with OPEN CASCADE.

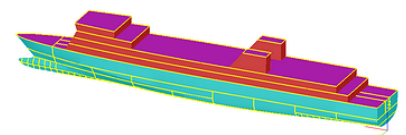
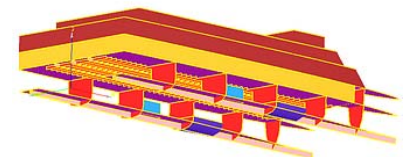
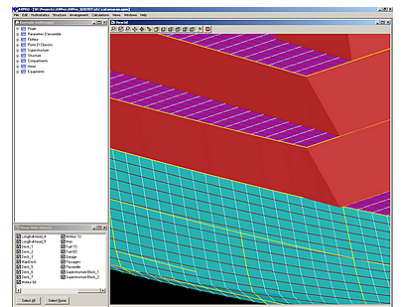
OPEN CASCADE invested the following parts of Open CASCADE Technology into the framework of this project:

- OCCT Kernel,
- 3D AIS viewer,
- OMF including Boolean operations on meshes.

Basing on these technologies many significant improvements have been made by OPEN CASCADE. These advancements make AVPRO more and more attractive to the users. It is confirmed by references of PRINCIPIA customers that use this software.

AVPRO is a tool that provides the following services:

- Ship hull and internal structure design and modeling, multihull support,
- Visualization of the created structure in the 3D viewer,
- Computation of parameters for the structure (center of gravity, total ship weight, waterline etc.)
- Calculation of static equilibrium and analysis of structural stability
- Export the hull to the DIODORE hydrodynamic code



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