



# BEINGRID

BUSINESS EXPERIMENT FACT SHEET

BUSINESS EXPERIMENTS IN GRID

## OPTOCAD - Computational Fluid Dynamics Automatic Design Optimisation & Computer Aid Design

*Computational Fluid Dynamics (CFD) has reached high levels of acceptance in industry as a valid design tool thanks to the introduction of new software, the improvement of existing software and the rapid development in hardware. The significant demand of computational resources in the CFD application area and the increasing interest from Original Equipment Manufacturers (OEMs) to combine CFD and advanced optimization techniques at various design stages forced the introduction of Grid technologies to the CFD application process. The “gridification” of the current CFD techniques will allow the end-user to reduce the cost and extend their computational as well as their business capabilities.*

### Objectives

The objectives of this business experiment (BE) are:

- To analyze the requirements for grid-enabling the application of CFD
- To provide the Grid middleware and migrate the CFD application into this new computational, data intensive and collaborative platform
- To evaluate the impact of the utilization of Grid technologies in the application domain of CFDs.
- The reduction in the CFD solving times required for large models, by providing the ability to perform parallel computations by accessing extensive hardware resources via Grid technologies
- Improvements in the results from the automatic optimization process, through the performance of large number of design evaluations in short periods of time by accessing extensive hardware resources via Grid technologies
- Improvements in the set up times, through the provision of remote access to clients via Grid technologies to facilitate the definition of the optimization process, allowing the client to employ their own commercial tools while performing all CFD runs on the Grid.

### Activities

The activities of this BE are categorized based on the different tasks and important thematic areas. Initially a requirements' capturing and analysis process is followed, on which system design will be based. In parallel, the business model is identified and an initial business plan is produced. Implementation and integration of the system then will take place, which is followed by testing and validation of the system compared to the identified needs and expectations. Although every task is addressed separately having its own importance, the successful completion of the BE will be greatly influenced by their efficient interaction.



Dissemination of the BE results will be published in selected journals and international scientific journals, presented to international conferences and workshops, advertised in newsletters from known commercial vendors and visits to existing and potential customers. Its contribution to the BEinGRID repository will include specific Use Cases, identification of specific roles and resources of the developed CFD solution, CFD Application Workflows, Wrappers for all “gridified” applications and a Web Portal.

### Industrial sectors

- **Aerospace and automobile industry.** The CFD and CAD methodology finds great success in simulation and modelling of aircrafts, cars or other relevant procedures.

### Added-value for industry

Many small national and multinational companies that include the use of CAD/CFD within their business processes exist. The common practice for such a company is to purchase and use an integrated solution for this purpose. The current trends in the worldwide market require the purchase of high-end computer workstations to provide the needed huge amount of computational resources. The companies that are involved in the CFD domain would benefit from the solution provided by this BE, by:

- Having the opportunity to use independently the design in comparison to a workstation based scheme (in which a license for each workstation would be necessary)
- Setting new flexible financial policies for the renewal of the corporate hardware infrastructure
- Optimizing the utilization of the existing hardware resources.

### Partners



NTUA, Greece  
[www.ntua.gr](http://www.ntua.gr)



ICON CG Ltd, London, UK  
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