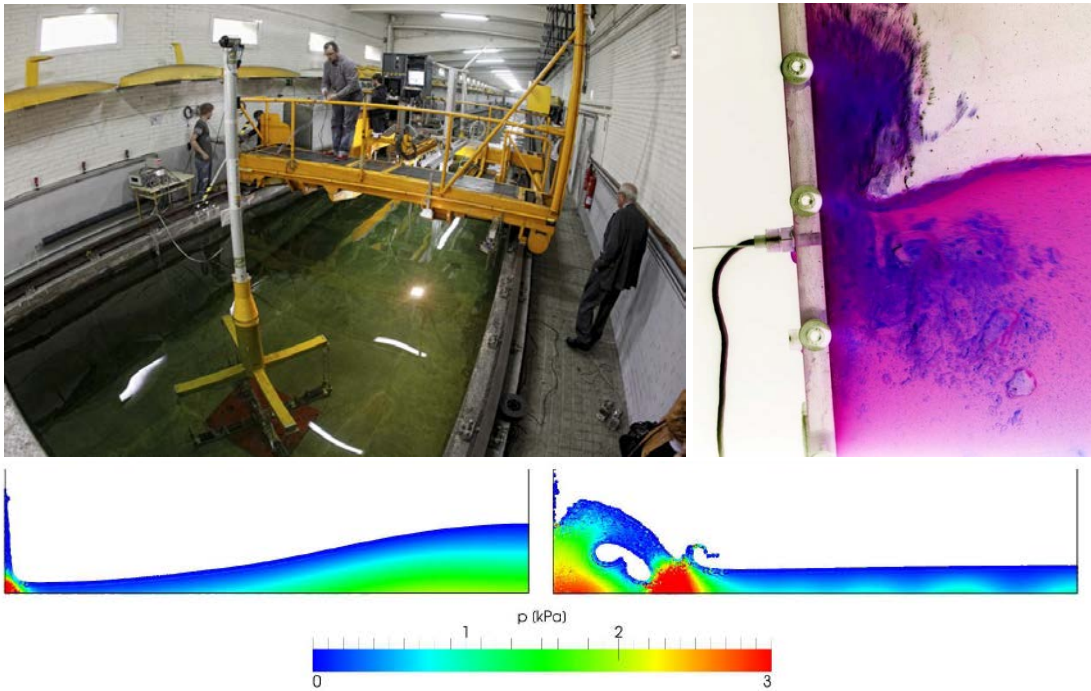


## MODEL BASIN RESEARCH GROUP (CEHINAV-UPM)

<http://canal.etsin.upm.es>

### ACTIVITIES PORTFOLIO (updated 2018/01)



### UPM & CEHINAV DESCRIPTION

Technical University of Madrid (UPM) is the oldest and largest Spanish technical university, with more than 4.000 faculty members, around 38.000 undergraduate students and 6.000 postgraduates in 21 faculties. UPM researchers have large expertise in research projects participation both at national and international level. The presence of UPM in the international R&D arena is ensured by its consistent participation in various EU programmes. UPM has been recognized as the Spanish University with the largest number of projects approved in EU-FP7.

CEHINAV Research Group has been created around the model basin facilities of Naval Architecture Department of UPM and it covers both experimental and numerical aspects of the Hydrodynamic field.

### CONTACT

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Patricia Alcanda-Sesmero (R&D Manager): [p.alcanda@upm.es](mailto:p.alcanda@upm.es), +3491676262.

## RESEARCH GROUP PERSONNEL

Coordinator: Antonio Souto Iglesias (Naval Architect, PhD, professor)  
+ 8 full time academics (1 full professor, 5 professors, 2 associate professor)  
+ 1 full time PhD researcher  
+ 5 full time PhD students  
+ 1 technician  
+ 1 R&D manager.

## FACILITIES

1. Model basin; Length: 100m; Width: 3.8m; Depth: 2.2 m.
2. Towing carriage: Max. Speed: 3.5 m/s.
3. Wave Generator (deep water conditions,  $T \leq 1.7s$ ,  $H \leq 0.35m$ ,  $\lambda \leq 4.5m$ ).
4. Linear actuator for damping and added masses measurement.
5. Optical tracking tools for motion recording - OptiTrack.
6. Milling facilities, 5 axis.
7. Models up to 500kg (L x 2.03 x 1.40m)
8. Fully equipped single degree of freedom angular motion sloshing rig (up to 150 kg models).
9. PIV System (Particle Image Velocimetry)
10. Dambreak Lab.



## SIMULATION

1. Seakeeping Codes: WAMIT, SeaFEM, ANSYS-Aqwa, Fluent, HydroSTAR
2. CFD: Star-CCM+, Open-FOAM, XFlow
3. In-house codes: GPU SPH 3D for sloshing type simulations, panel method for bulbous bow optimization.

## SCIENTIFIC SKILLS

1. Towing tests: Ship resistance.
2. Wave (seakeeping) tests for renewable energy devices, including wind turbine platforms.
3. Model construction and instrumentation.
4. Antiroll tank design, test and modeling / Sloshing tests.

5. Particle methods SPH codes development.
6. CFD codes use and development, including Open-FOAM.
7. Seakeeping and mooring modelling.
8. Ship hull CFD optimization expertise.
9. Ship techno-economic model life time assessment tool development expertise.
10. Ship hull experimental optimization expertise.
11. Propeller performance experimental assessment expertise.
12. Software on demand regarding previous items.
13. Efficiency improvements (quality and economic) in model scale tests.
14. Optimization & exploitation of maritime and port infrastructures.
15. Non-intrusive instrumentation for monitoring port infrastructures development.

## CONTRIBUTION TO A POTENTIAL PROPOSAL

1. Regular partner and WP/task leader.
2. Tasks related to scientific skills
3. Contacts with third parties in industrial sector (fishing industry, maritime, renewables, etc..) /potential partners.
4. Capabilities to organize enjoyable kick-off and progress meetings.

## PREVIOUS RELEVANT INDUSTRY AND RESEARCH PROJECTS

### European Projects

1. ARCWIND: Adaptation and implementation of floating wind energy conversion technology for the Atlantic region, European Commission, Interreg Atlantic Area. 2018-2020. (Partner).
2. DEMOGRAVI3, Demonstration of the GRAVI3 technology – innovative gravity foundation for offshore wind, European Commission, H2020, 2016-2019 (Partner).
3. IMAGE, Innovative Methodologies and technologies for reducing Aircraft noise Generation and Emission, European Commission, H2020, 2016-2018 (Partner).
4. AQUO, Achieve QUIeter Oceans by shipping noise footprint reduction, European Commission, FP7, 2012-2014 (Subcontractor).
5. EU-CARGOXPRESS, Greening of surface transport through an innovative and competitive CARGO-VESSEL, European Commission, FP7, 2009-2012 (Partner).
6. SUPERPROP, Superior Life Operation of Ship Propellers, European Commission, FP6, 2005-2008 (Coordinator).

### Other Private and National Public Projects

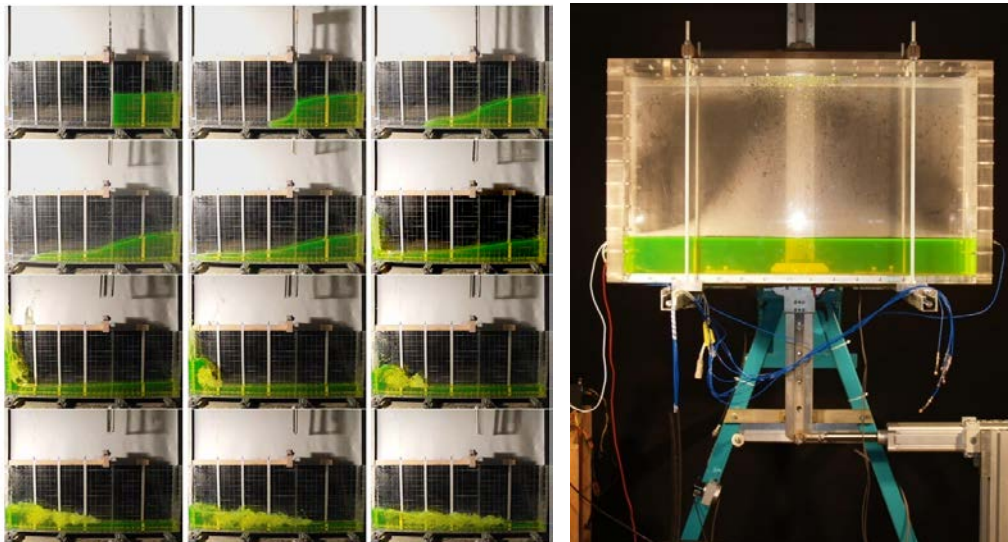
1. Optimization of liquid gas transport for LNG vessels by fluid structure interaction studies (OPTITRANS), (ref. TRA2013-41096-P). Funded in Spanish R+D National Plan 2013 call, 2014-2016.
2. Numerical and experimental characterization of fluid-dynamic loads in LNG transport (LNG), (ref. TRA2010-16988). Funded in Spanish R+D National Plan 2010 call, 2011-2013.
3. Modeling of fluid structure interaction in sloshing flows with application to lead fast reactors (LFR). Ingeniería IDOM Internacional S.A., 2012-2014.
4. Hydrodynamic numerical studies for offshore wind platforms. SENER, 2013.

5. Dynamic study of flexible cylinders in the presence of flow such as raisers, overhead and tendons, CENER, Rovira i Virgili University, 2012
6. Sloshing in Floating LNG carriers: computational modeling. 2011-2012. REPSOL
7. Ocean Líder, CENIT / ACCIONA ENERGIA + IBERDROLA, 2010-. FOWT TLP testing.
8. AZIMUT: Offshore Wind Energy 2020, CENIT / ACCIONA ENERGIA, 2010. Forced motion tests.
9. Hydrodynamic testing of a model rotor of a device for harnessing energy from currents, SOERMAR, 2010.
10. Hydrodynamic testing of an ocean buoy (Canary Islands Oceanic Platform CONSORTIUM, PLOCAN) 2010.

## PUBLICATIONS

Ocean Engineering, Journal of Ship Research, Journal of Marine Science and Technology, Journal of Fluid Mechanics, Computer Physics Communications, Experiments in Fluids, Physical Review E., AIAA journal, Physics of fluids, Journal of Fluids and Structures, etc...

Visit <http://www.citeulike.org/group/16865/> for recent publications.



## TRAINING

1. GIE: UPM Educational Innovation Group in CFDs
2. Simulation related Courses (Star-CCM+, XFlow , GID, PYTHON, MATLAB, Open-FOAM)
3. Other courses (fluid mechanics, statistics, project management, water waves, numerical analysis, etc.)
4. Promotion of PhD during project development for Industry partners staff.