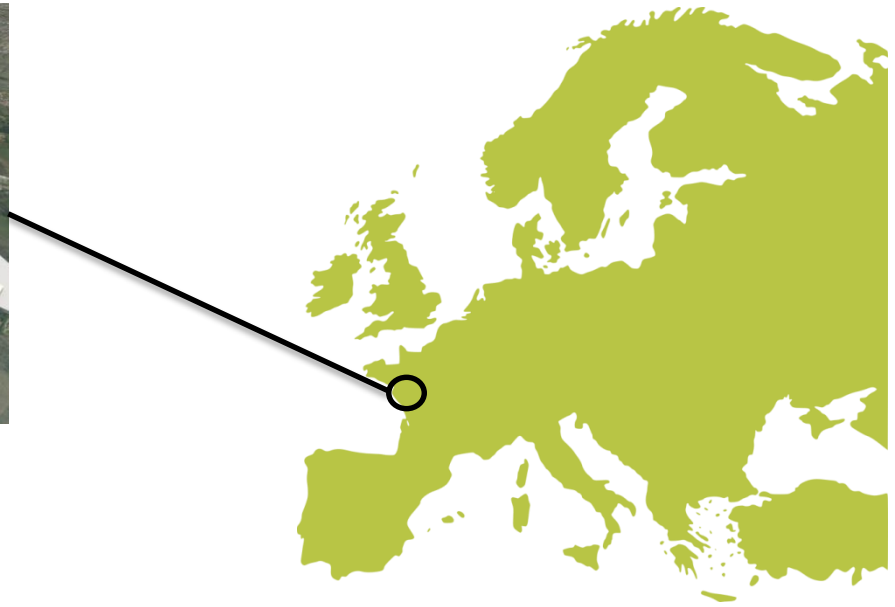
JULES VERNE MANUFACTURING VALLEY
THE FRENCH INDUSTRIAL PLACE TO BE
SINCE 2005

EMC2

IRT JULES VERNE

A Mutualised Research Centre for Advanced Manufacturing

Jules Verne Manufacturing Valley : French initiative for an open innovation ecosystem devoted to advanced manufacturing



EMC2

fab make

IRT JULES VERNE

Technocampus Composites
Innovative manufacturing for composite structures

- A technological cluster => **300 members**
- A research center => **100 researchers**
- Technological platforms => **60 000 m²**
- A FabLab => **80 makers**

A Technological Research Centre in the field of Manufacturing

3 key programs

INTEGRATED PRODUCT/PROCESS DESIGN	Structure modelling and simulation – Design and control of structure in severe environment – Modelling and simulation of processes
INNOVATIVE PROCESSES	Metallic and Composite production processes - Assembly processes - Functionalized tools - Process monitoring – Recycling
ADAPTIVE AND SMART MANUFACTURING SYSTEMS	Advanced robotics for industrial processes – Industrial service cobotics – Virtual and Augmented reality – Production management

4 strategic sectors

AERONAUTICS

AUTOMOTIVE

SHIPBUILDING

ENERGY

4 technological platforms

Composites

Composite parts/structures manufacturing

Ocean

Metallic parts/structures manufacturing

Acoustic

NDTs - Monitoring

Smart Factory

Pilot production lines

Technological Research Centre in the field of Manufacturing

Driving some R&D projects through a PPP with Industrials Members and Academics

20 M€ operational budget

75+ engineers and researchers

Deep cooperation with leading French universities and research structures

Technological road map

12 Emerging technologies

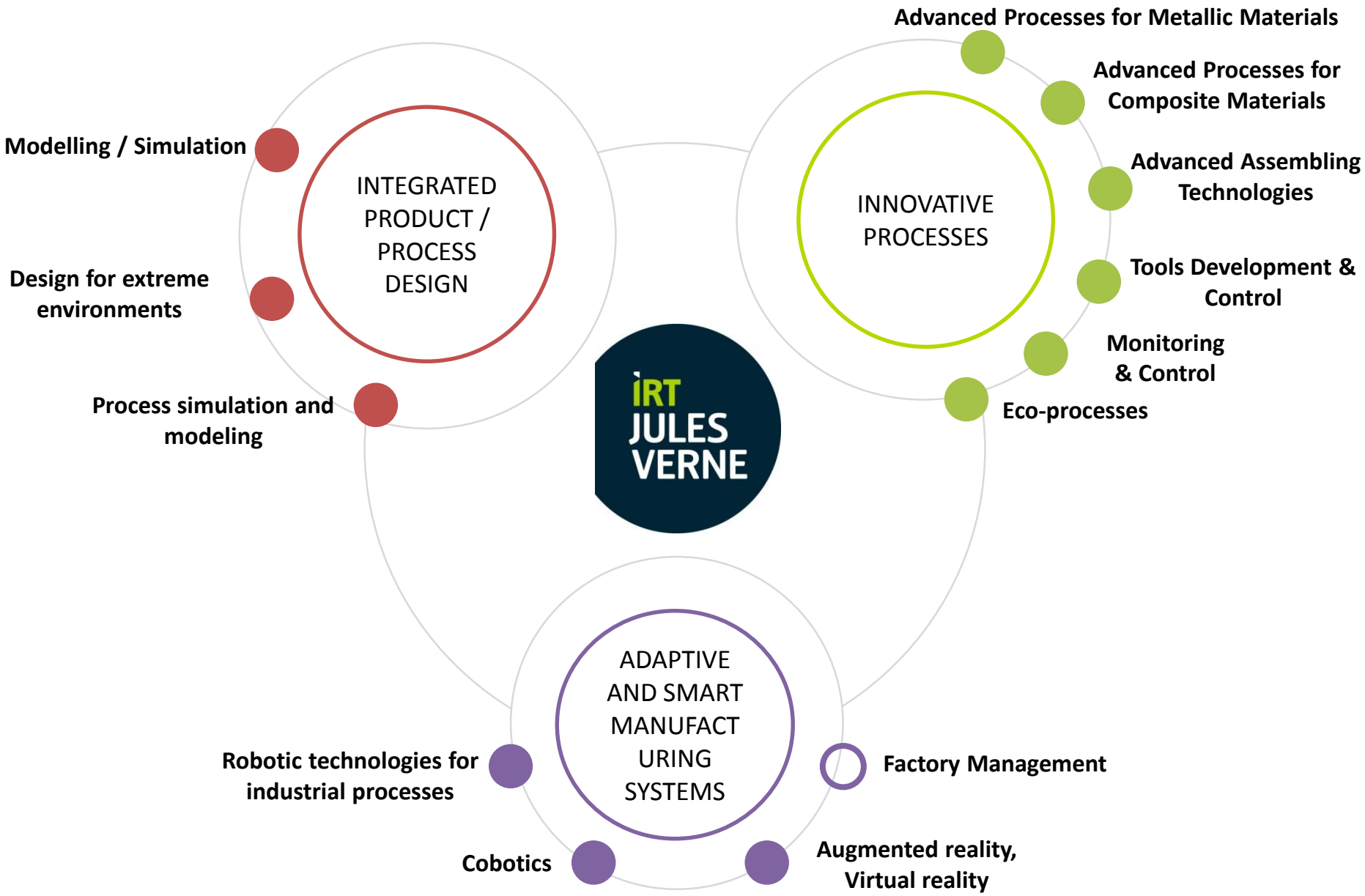
Emerging Technologies	Functional materials
	Metal, alloys, and superalloys
	Digital simulation of assembly processes
	Failsafe engineering
	Virtual reality for conception, production and training
	Industrial robots
	Self-adaptive systems in production
	Diagnosis tools for predictive maintenance / telemaintenance / telesurveillance
	Life cycle mastery
	Energy consumption control
	Industrialization of big structures (in particular through Factory of the Future)
	Advanced technologies of production and industrialization for energy production, storage and recovery.

Technological road map

12 Technologies of Excellence

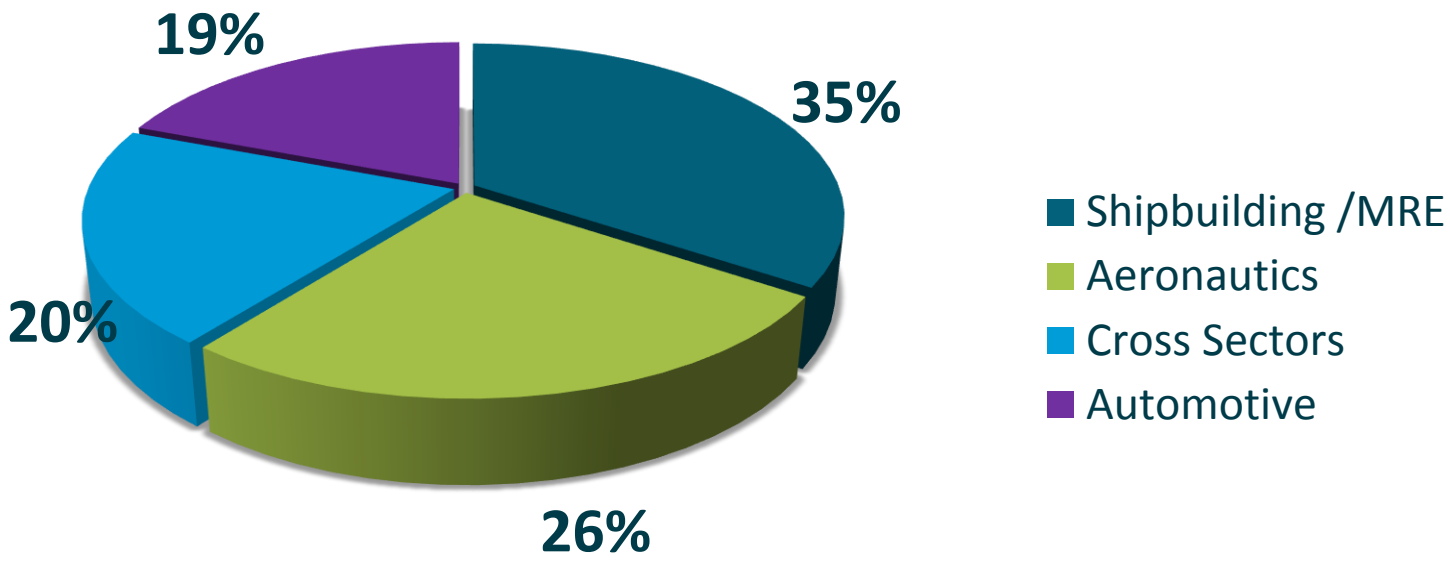
Technologies of excellence	Thermoplastic composites
	Direct production of metallic and polymer items
	Digital simulation of production processes and life cycle stages
	Advanced welding processes
	Multi-material assembly processes
	Processes for thermoset composites application
	Processes for thermoplastic composites application
	Nondestructive testing and structural health assessment
	Fluid-structures interaction
	Durability of materials and structures
	Clean processes for surface preparation and finishing
	Acoustics and vibrations

Technological Road Map



The Results : 44 R&D projects launched since mid-2012

44 projects	51 M€	8 M€
• At least 2 industrials members	• Budget	• Mutualized Equipments



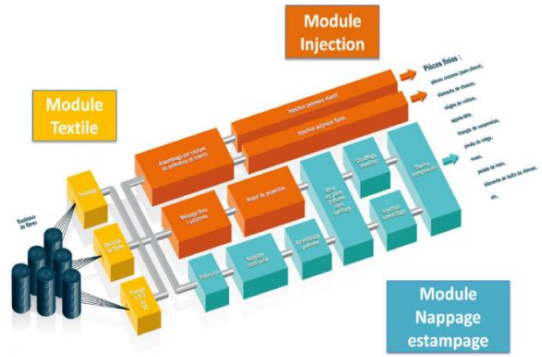
With dedicated mutualized facilities

ROBOFIN
Industrial demonstrator to develop robotic solutions for finishing operations (trimming, drilling and surface preparation) for composite and metal structures elements.

Robot Kuka KR 500 + rail 18 meters – in place June 2013

CELLULE HF
Production Cell for metal parts thermoforming .
Titanium and Aluminium alloys.

Press superplastic forming (SPF) and hot forming (HF) - June 2014
SPF 1000 – FCC 500
Temperature 950 °C
Heating platens 2500 x 1500 mm



NATIONAL PILOTE COMPOSITE HIGH-CADENCE LINE
Pilote line for research on composite parts manufacturing and multi-materials ranging from fiber to finished product to achieve the targets : cost <-> weight <-> quality for automotive Industry

Modules IRT : fiber projection and Fluid RTM – end 2014
Partnership with CETIM

Shipbuilding and MRE projects' examples

HYSMAR

Hydrodynamics of large maritime Structures

Objectives

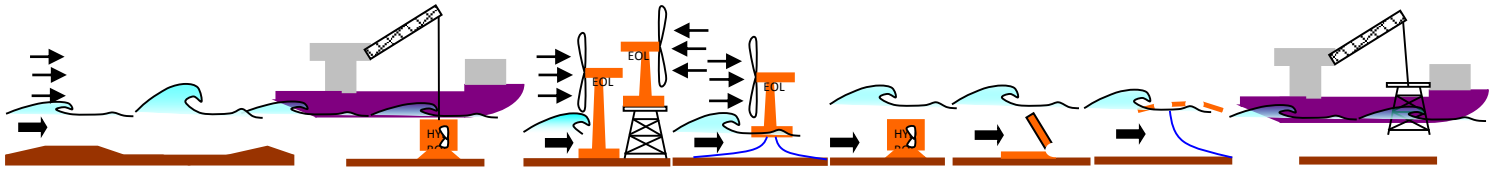
To develop digital simulation capacities **to design and to optimize the conception of offshore structures for Marine Renewable Energies** (Windmills – floating or grounded – Tidal turbines, Wave turbines…)

Industrial Partners

IRT JV, ALSTOM, BUREAU VERITAS, DCNS, HYDROCEAN, STX

Duration / Budget

3 years / 1,436 M€



CHARMAN

Autonomous multifunction robot for shipbuilding applications

Objectives

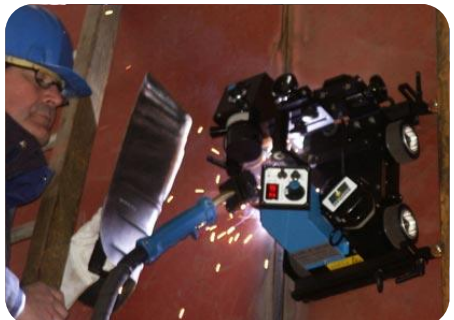
Development of an **autonomous** multi-function **trolley** which would allow to free ship manufacturers from costly means of access for **welding operations**
→ Demonstration on industrial prototype

Industrial Partners

IRT JV, STX, DCNS, SERVISOUD, BUREAU VERITAS

Duration / Budget

2 years / 728 K€



Shipbuilding and MRE projects' examples

SAMCOM

SYSTÈMES ANTENNAIRES EN MATÉRIAUX COMPOSITES

▶ Résoudre la problématique liée à la nécessité d'installer un nombre croissant d'antennes de communication dans des environnements restreints sur des véhicules maritimes : encombrement, gênes physiques, maîtrise des diagrammes de rayonnement, compatibilité électromagnétique. Mise en œuvre de solutions innovantes au niveau des matériaux, des concepts et des outils de modélisation.

PROJET EN COURS

Début de projet

▶ 2011

Financement État FUI 9 (2009)

▶ 1,28 M d'euros

Montant du projet

▶ 3,7 M d'euros

Consortium

▶ DCNS, Thalès, Plastima, CEMCAT, CERPEM, IETR

Territoires

▶ Nantes, PACA

Shipbuilding and MRE projects' examples

GENESIS

NAVIRE DE CROISIÈRE NOUVELLE GÉNÉRATION POST PANAMAX DE TRÈS GRANDE TAILLE

▶ Ce projet de grands paquebots de destination vise principalement à réduire les émissions atmosphériques des nouveaux paquebots de grandes tailles de : moins 10% de CO_2 ; et de moins de 97% de SOX. Par ailleurs, les innovations sur les procédés de conception et de réalisation (via la réalité virtuelle et la réalité augmentée) permettront d'accroître la compétitivité de la filière navale française.

PROJET EN COURS

Démarrage

▶ Fin 2012 - Résultats attendus : fin 2016

Financement État

▶ PIA 15,7 M d'euros (subventions et avances remboursables)

Montant du projet

▶ 115,6 M d'euros

Consortium

▶ STX France, Clarte

Territoire

▶ Saint-Nazaire

Shipbuilding and MRE projects' examples

HYPERWIND

SURVEILLANCE GLOBALE DU PARC ÉOLIEN

▸ Consiste à développer un système de surveillance globale pour turbines d'éoliennes Offshore et On Shore.

PROJET EN COURS

Début du projet

▸ 2013 - Résultats attendus : 2016

Financement État FUI 16 - (2013)

▸ 582 000 euros

Montant du projet

▸ 3,63 M d'euros

Consortium

▸ Netwind, Kéops automation, Airbus défense and space SAS, Armines (Ecole des Mines), Météodyn, Université de Nantes

Territoires

▸ Pays de Loire - Ile de France

Shipbuilding and MRE projects' examples

ORCA

DÉMONSTRATEUR D'HYDROLIENNE À ÉCHELLE 1 À PAIMPOL BRÉHAT

/// Hydrolienne immergée en 2012

▶ Réalisation d'hydroliennes de grande puissance. A terme proposer des fermes hydroliennes d'une puissance supérieure à 100 MW.

PROJET EN COURS

Date début du projet

▶ 2011 - Résultats attendus : 2016

Montant total du projet

▶ 27,9 M d'euros

Participation État (IA)

▶ 8,2 M d'euros

Consortium

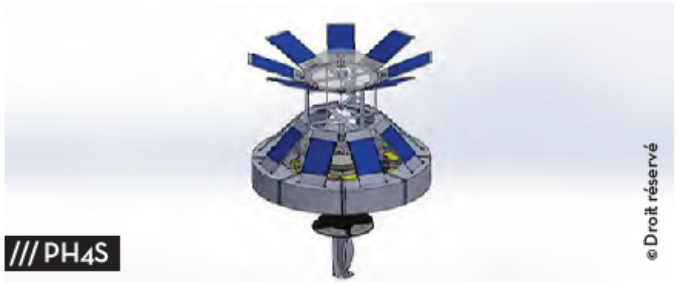
▶ Alstom France, EDF, Nexans, Sector Stat-marine, STX France Solutions, CETIM, École Centrale de Nantes, ENSAM, Ifremer t, INP, IUEM AMURE, IUEM LEMAR

Territoires

▶ Nantes, Brest, Lorient, Toulouse, Seynes-sur-mer, Chambéry

Shipbuilding and MRE projects' examples

PH4S



▶ Solution de production d'électricité par combinaison d'énergies marines renouvelables : pilote hybride de production d'énergie à partir des quatre sources EMR : vent, houle, courant et soleil.

PROJET EN COURS

Date de labellisation

▶ Décembre 2013

Budget*

▶ 1 011 K d'euros

Consortium

▶ Geps techno, Mecasoud, STX France solutions, Icam, Ifremer

Territoires

▶ Saint Nazaire, Brest, Carquefou

Technocampus Ocean, a mutualized technological platform dedicated to Shipbuilding and MRE

16.000 m² - Opening July 2015

A Technological Road Map in accordance with global shipbuilding /MRE sector

3 key programs

INTEGRATED PRODUCT/PROCESS DESIGN	Numerical Basin **to reduce the cost** of Basin Trials and optimize Life Cycle Cost
INNOVATIVE PROCESSES	New Welding and Assembling Processes **to reduce weight**
ADAPTIVE AND SMART MANUFACTURING SYSTEMS	Robots, Cobots and Virtual reality **to prepare the Factory of the Future**

H2020 – Calls :

- **ICT**
- **Mobility for Growth**
- **Factory of the Future**

SHIPBUILDING

ENERGY

IRT Jules Verne, active on networking

❑ Horizon 2020 through Waterborne Assets

- Member of WATERBORNE TP
- Member of the PPP Vessel of the Future, involved in several technical arena which in perfect accordance with IRT Jules Verne Technological Road Map :
  - TA1 : Energy Efficiency
  - TA2 : Hull/Water interactions
  - TA4 : Material Design and products
- Member of Blue Growth WG to support the MRE thematics

❑ Other actions towards Horizon 2020

- French National Contact Point in NCP1 Program
- Member of EFFRA, EARPA, EU Robotics,
- Several EU projects submit (NMP / ICT)
- KIC

IRT Jules Verne, active on networking

❑ Other International cooperation

- Collaboration agreement with the Fraunhofer Lightweight Construction Alliance (DE)
- Ongoing partnerships with JAPAN - National Composite Center and CANADA – CRIAQ
- MOU with Berkeley Energy and Climate Institute (BECI)

❑ French National Committee for Marine & Shipbuilding Industry

- Member of GICAN,
- And Participating to the elaboration of the R&D roadmap of the Sector
- Member of Maritime Expertise Engineering and Testing
- Involved in Government Plan for « Factory of the Future » including some specific working groups for « **Shipyard of the Future** » together with DCNS and STX

❑ Other French National Sectors Committee

- Member of GIFAS (Aeronautics), PFA (Automotive)

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SINCE 2005

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Thank you

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