



I4MS

ICT INNOVATION
FOR MANUFACTURING SMEs

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SME's World

I4MS

- High tech SMEs want to/must innovate
- SMEs need a market window of opportunity
- SMEs must be connected along the value chain
- SMEs often operate in the wake of the big ones
- SME schemes must be quick and dynamic
- SMEs need much more than €s:
 - ✓ **access to technology & competences**
 - ✓ **access to infrastructures**
 - ✓ **access to new markets**
 - ✓ **on an EU-scale across sectors and regions**
 - ✓ **through networks of competence centres**

I4MS´ Target

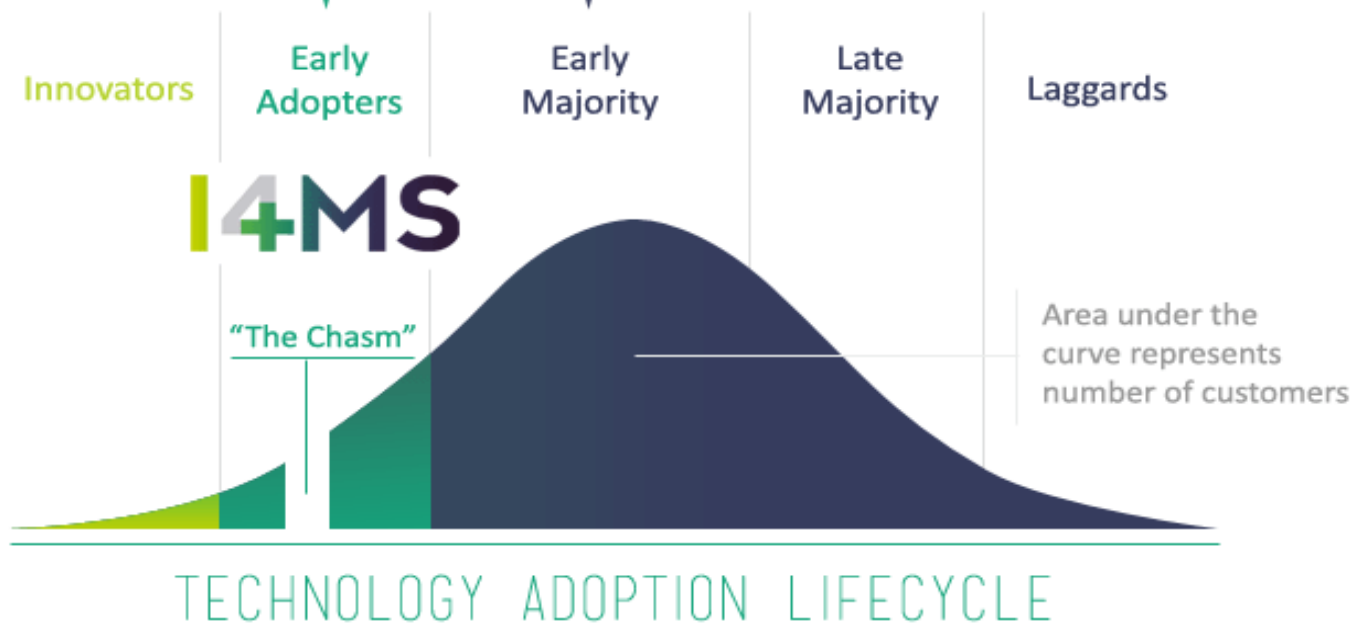
I4MS

Primary targets of I4MS:

- Support technology suppliers in crossing “the chasm” / “valley of death”
- Support users gaining competitive advantage through early technology adoption

Secondary target of I4MS:

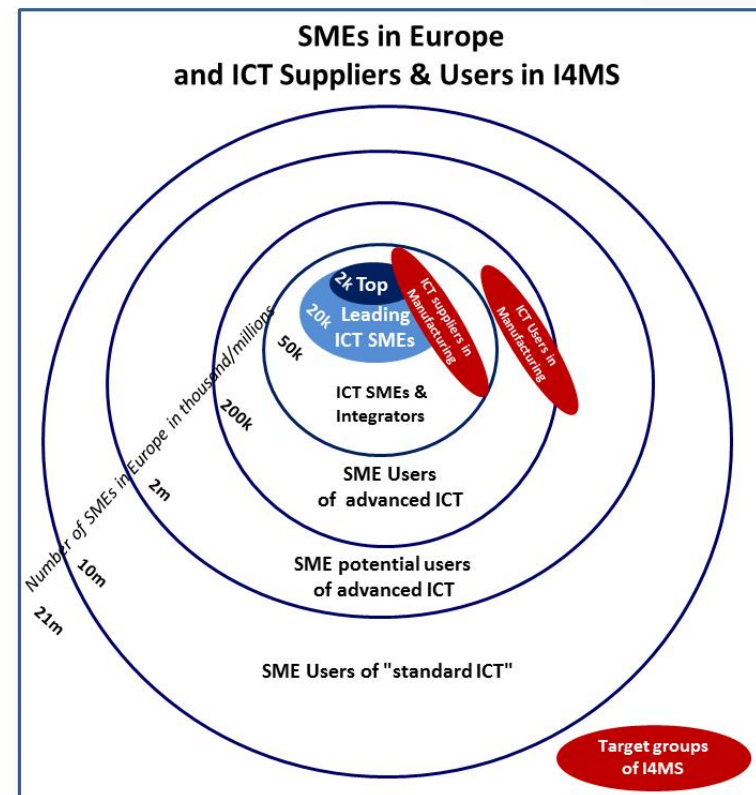
- Stimulate the replication potential through disseminating best practices



Source: Wikipedia

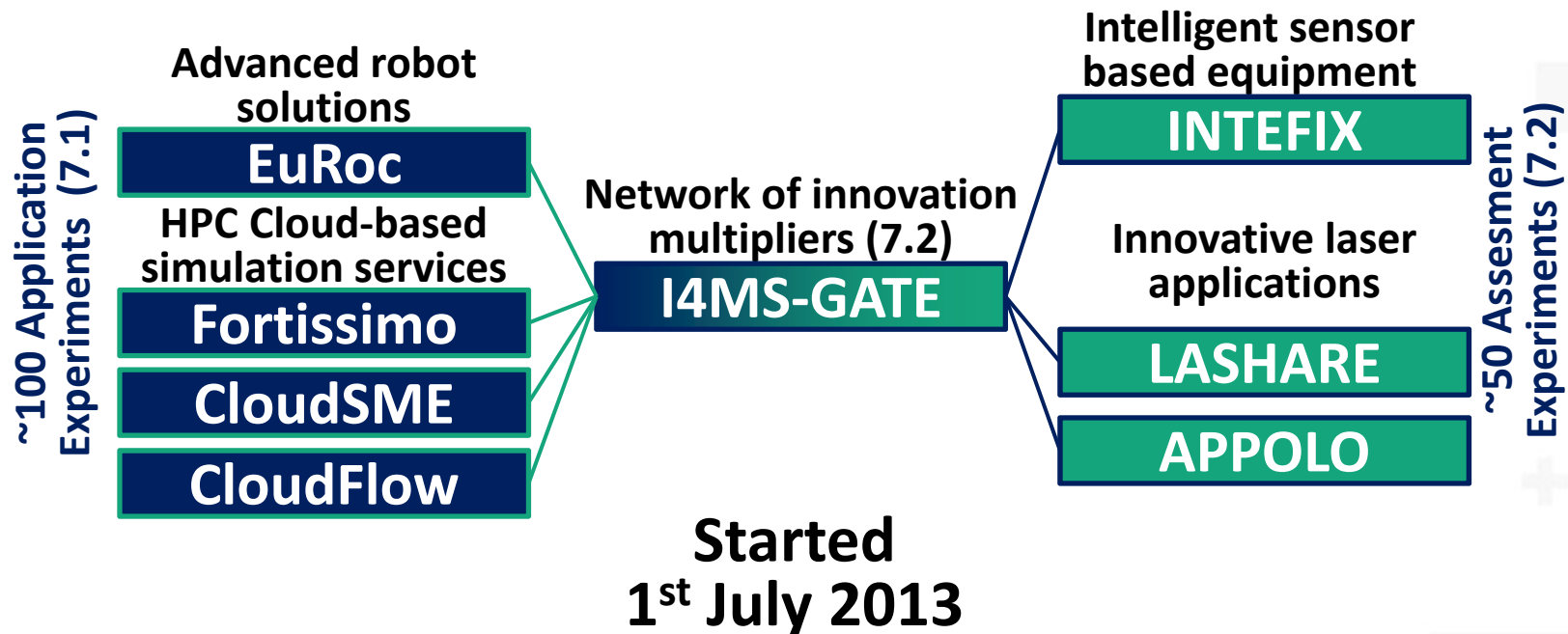
I4MS Ecosystem

- Key role of SMEs in value chains: users and suppliers
- SME need more than €s: access to competences and networks across Europe
- Different ICT technologies:
 - **HPC-Cloud based Simulation**
 - **Robotics**
 - **Sensor & Laser applications**
- Major implementation means:
 - **Application experiments**
 - **Assessment experiments**
- Clustered around **networks of competence centres**
- Collaboration in a **network of innovation multipliers**



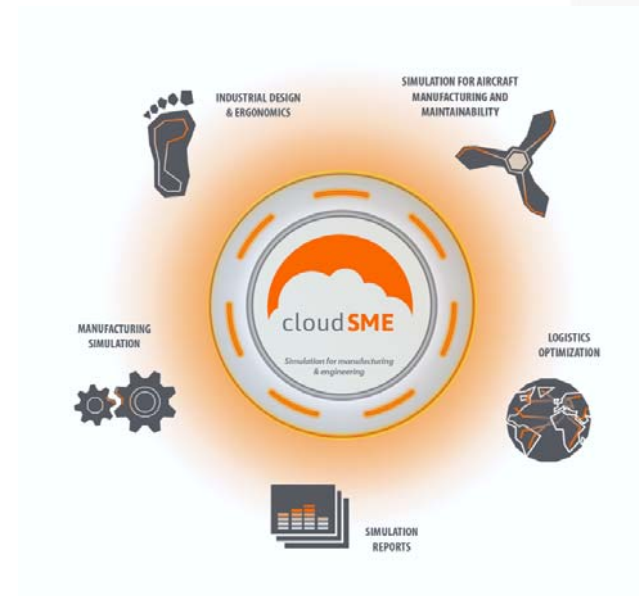
Projects involved

- Key role of SMEs in value chains: users and suppliers
- Clustered around networks of competence centres
- Open Calls for experiments during course of projects



Cloud-based, one-stop-shop solution providing a scalable platform for small or larger scale **simulations**, and enable the wider take-up of simulation technologies in manufacturing and engineering SME's.

- * **Simulation platform** that allows seamless access to multiple heterogeneous cloud resources and provides a high level of abstraction to users when accessing these resources for simulations in a one-stop-shop solution.
- * **Platform as a Service (PaaS)** solution to build customised cloud applications
- * Enable simulation software providers to offer **Software as a Service (SaaS)** simulation solutions
- * Enable SMEs in the manufacturing and engineering domain to **access** simulation services
- * **Seamless access to HPC** resources in order to speed up the simulations on-demand
- * **Define generic** and **concrete business** models for SMEs in the manufacturing/engineering sector to facilitate the take-up of cloud-based simulation solutions



Coordinator:

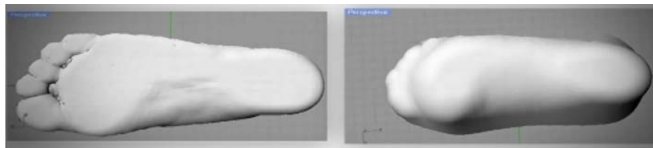
UNIVERSITY OF
WESTMINSTER

3D SCAN INSOLE DESIGNER

- PC SW simulation used in the design of tailored insoles.
- Migration to a cloud ubiquitous platform will help in the internationalization of the company and in the availability of computing resources for tailored design to increase production.
- Simulation helps in:



- Detection of wrongly scanned areas without points or too few points
- Screening of flat areas in the foot profile due to an incorrect scan process
- Detection of painful or unpleasant contact areas of the foot with the insole



2MoRO's BFly®

- Comparison between aircraft in-service data with design data and limits set by manufacturers to offer other valuable services:
- 2MoRO will translate several services available on BFly® as a set of interoperable cloud-based services (SaaS) that can be potentially deployed as a dedicated solution (PaaS)



- Benefits for:
 - Simulation software providers: offering results of data-mining and calculation (statistical or comparative) in real-time or in timely manner as resources are shared.
 - Aircraft manufacturers: more services, less investment. Optimised business process and knowledge management.

Computational Cloud services and workflows for Agile Engineering SMEs

- CloudFlow enables engineers to access services on the Cloud spanning domains such as
 - CAD,
 - CAM,
 - CAE (CFD),
 - systems and
 - PLM,
- combines them to integrated **workflows**
- leveraging HPC resources.

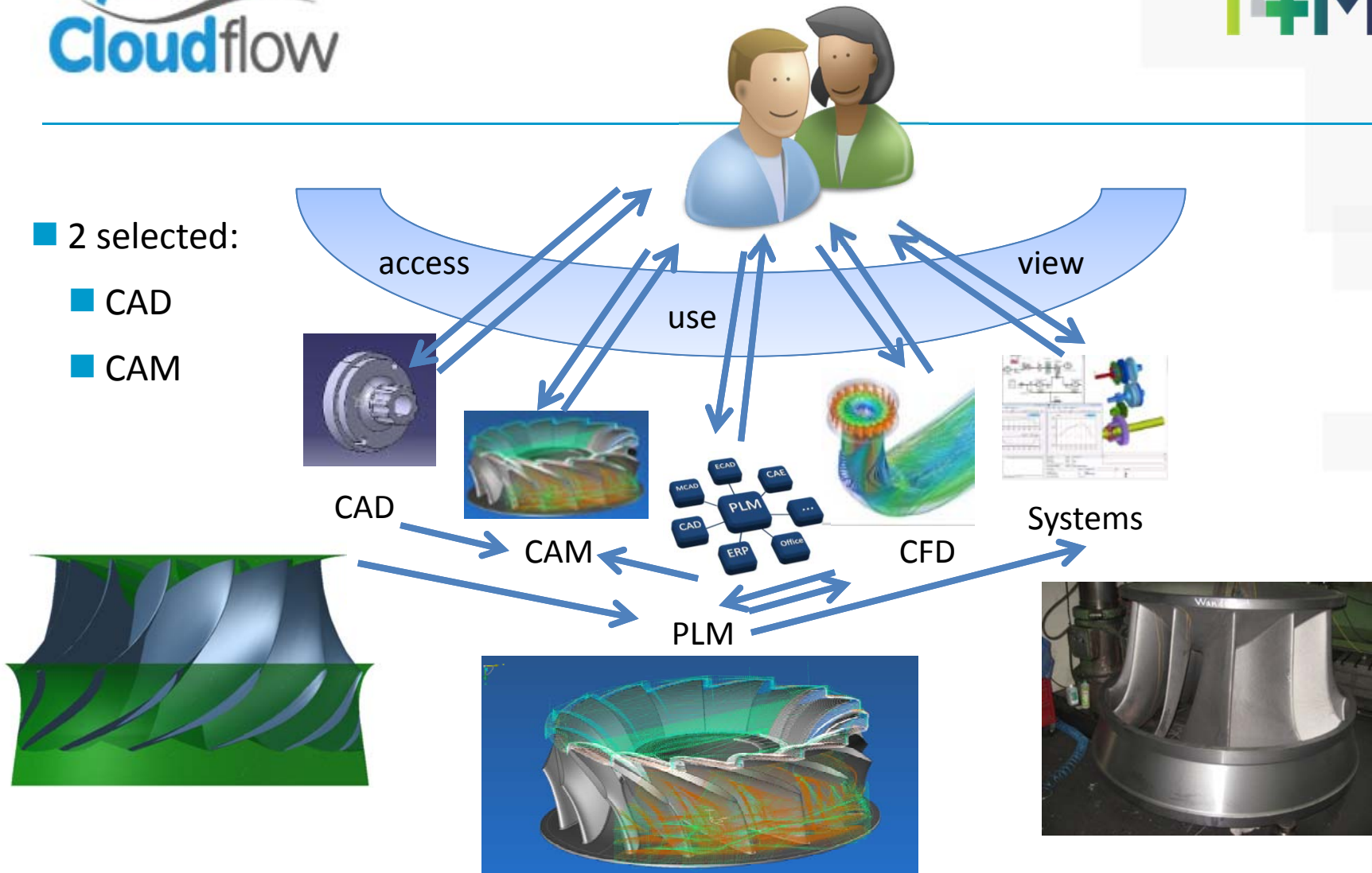
Coordinator:



■ 2 selected:

■ CAD

■ CAM





FORTISSIMO

I4MS

- Building Cloud of HPC Resources to solve SMEs' business challenges
- Complementing generic SME initiatives in FP7 with specific support to deliver economic growth through modeling and simulation
- Focus on problem solving – not technical development
- Bring together all of the players in a marketplace
- €22m costs, €16m EC funding, 45 partners growing to 90+ over the 3 year duration, 6 HPC Cloud provides

Coordinator:



<http://www.fortissimo-project.eu/>



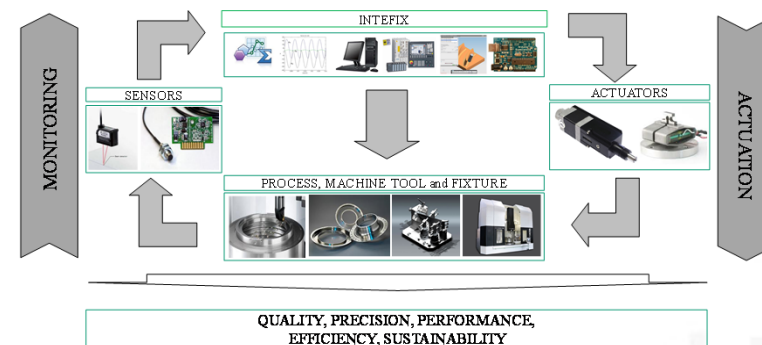
- Increase the performance of the machining processes \Rightarrow intelligent fixtures
- Control and adapt the behaviour of the fixture \Rightarrow development of smart fixtures
- Establish fixture design methodologies for different process limitations

SCENARIO 1: VIBRATION

SCENARIO 2: DEFORMATION

SCENARIO 3: POSITIONING

- Monitoring, control and adaptation of the process \Rightarrow modify the fixture's behaviour and include process-systems interactions \Rightarrow Improvement of precision, quality and time/cost
- Based on state of the art sensors and actuators, with suitable/ad-hoc control algorithms.
- Requirements:
 - Configurable (Modular, reuse of components...)
 - Fast (Automation, data management...)
 - Accurate (Adaptability to forces, deflections...)
 - Durable (self control for wear...)



Coordinator:

IK4  **TEKNIKER**
Research Alliance

VIBRATIONS – Turbine Case

- Vibrations come from:
 - Low stiffness
 - Changes in geometry
 - Process and clamping forces
- Solution:
 - Smart fixtures: sensors+actuators+control
 - Vibration detection (sensors)
 - Changes in the dynamic behaviour (actuators): variable clamping force and position, added mass/damping/stiffness

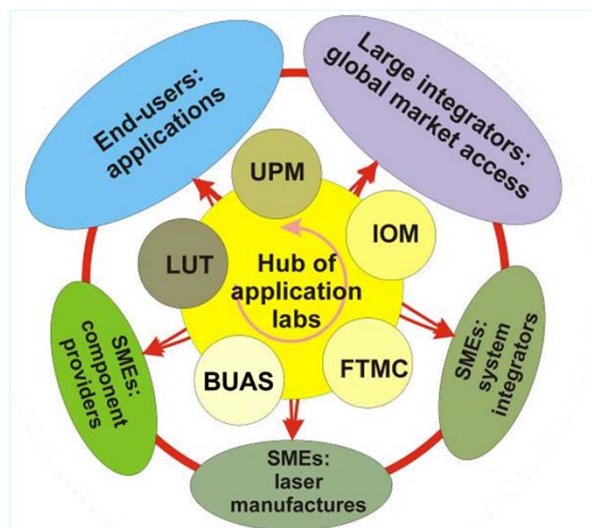


DEFORMATIONS – Structural part

- Distortions come from:
 - Residual stress + Material removal
 - Slender shape
 - Clamping forces
- Solution:
 - Intelligent clamps: sensors+actuators+control
 - Force measurement (sensors)
 - Change position and clamping force (actuators)
 - Machining steps: clamp in pre-distorted shape



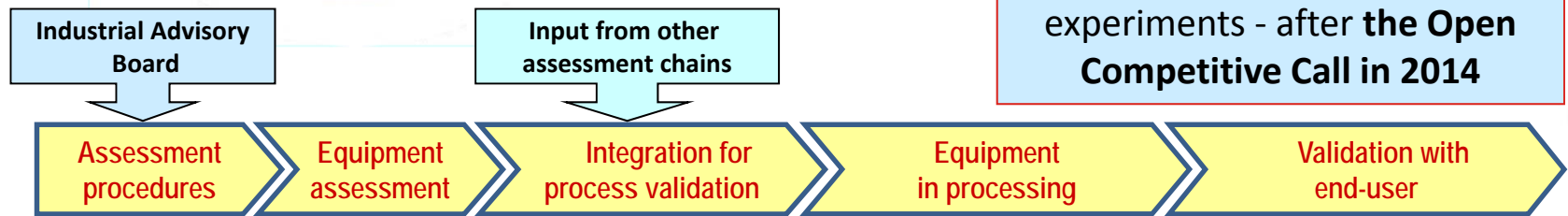
Goal of APPOLO: establish and coordinate connections between **end-users** with demand for laser technologies, knowledge accumulated in **application laboratories** of research institutes and universities and **laser equipment manufacturers** in order to **facilitate** faster **validation** of process feasibility and **adaptation** or **customization** of technology & equipment for manufacturing conditions



Core of the consortium – **laser application laboratories:**

- around Europe;
- connected to a virtual hub, in order to
- accumulate knowledge and infrastructure
- promote the easy-to-access environment
- develop and validate of laser-based technologies in **8+ equipment assessment value chains**

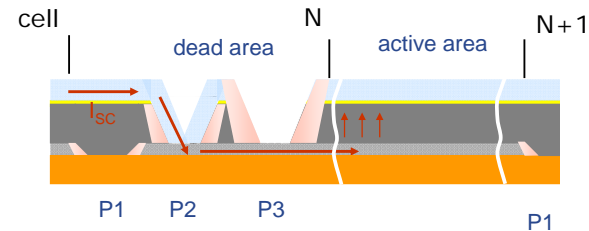
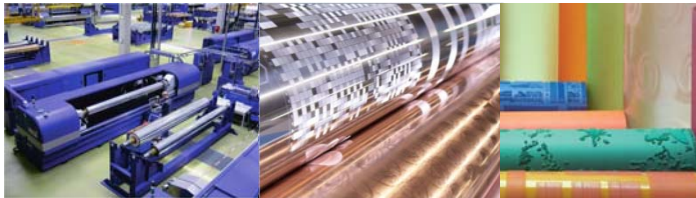
New partners & assessment experiments - after the **Open Competitive Call in 2014**



Coordinator:



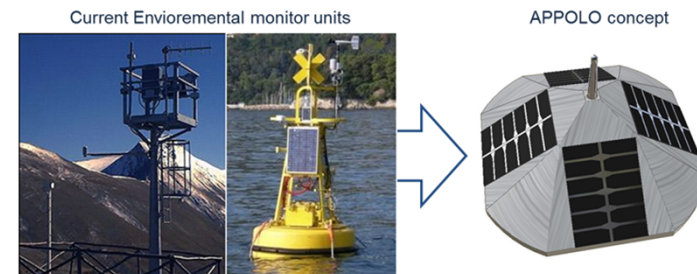
■ Thin film CIGS solar cell scribing with picosecond lasers



■ Laser patterning and direct writing for flexible 3D electronics



■ Laser surface texturing



■ Parallel activities on sensing and monitoring techniques for processing and validation

Mission

- LASHARE aims to **share laser expertise** to accelerate innovation for manufacturing SME's **through Laser based Equipment Assessment (LEA)**

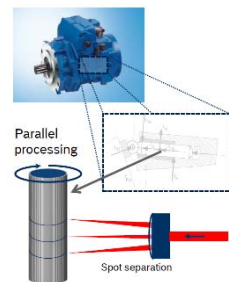
Objectives

- Support 14 SME's from the supplier side to advance their lab-demonstrated laser based equipment towards robust solutions
- Focus the laser based equipment towards the assessment criteria and the market demand defined by the 14 industrial users
- Provide an independent source of information on laser based equipment and its integration into manufacturing environments
- Support another 10 – 12 LEA's in a second set of assessments through an Open Call (approx. Q3/2014)

Coordinator:  **Fraunhofer**
ILT

PARROT - Parallel multi-beam ablation of rotationally symmetric work pieces

- Modify the surface microstructure to achieve new properties
- Develop industrially robust diffractive optical elements and optics to split the laser beam into multiple spots
- Increase manufacturing efficiency by parallel processing



Supplier



User



Research Partner



FLAT – Plug in laser diode module for warm sheet metal forming

- Integrate a vibration resistant laser diode module directly into a sheet forming machine
- Deliver up to 1kW@1cm² using direct regular water cooling for operation from 10 to 40°C
- Reduce forces in roll forming by 50%
- Implement a totally spring-back-free process with 100% geometric certainty after forming

Supplier



User



Research Partner



I4MS Community

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Linked in



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I4MS

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