LASHARE
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LASHARE – Innovation for manufacturing SME's through Laser-based Equipment Assessment

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LASHARE
Mission and Objectives

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)

LASHARE – Innovation for manufacturing SME's through Laser-based Equipment Assessment

LASHARE – Vision and Overview

LASHARE Assessment Framework

Laser-based equipment

- Accelerate technological development
- Orient towards market needs
- Validate in real world scenario

Market

- Increase transparency of cost and properties
- Establish relevant criteria

LASHARE – Vision and Overview

Laser-based Equipment Assessments (LEAs)

Suppliers

- Advance in Technology Readiness Level TRL 4,5 → 7,8
- Realise demand oriented and robust product

Users

- Secure the expected return on invest
- Foster European manufacturing

LASHARE – Vision and Overview
Dissemination

LASHARE Competence Centers (LCC)

- Serve as entry point for external suppliers, users and interest groups
- Offer an objective source of information

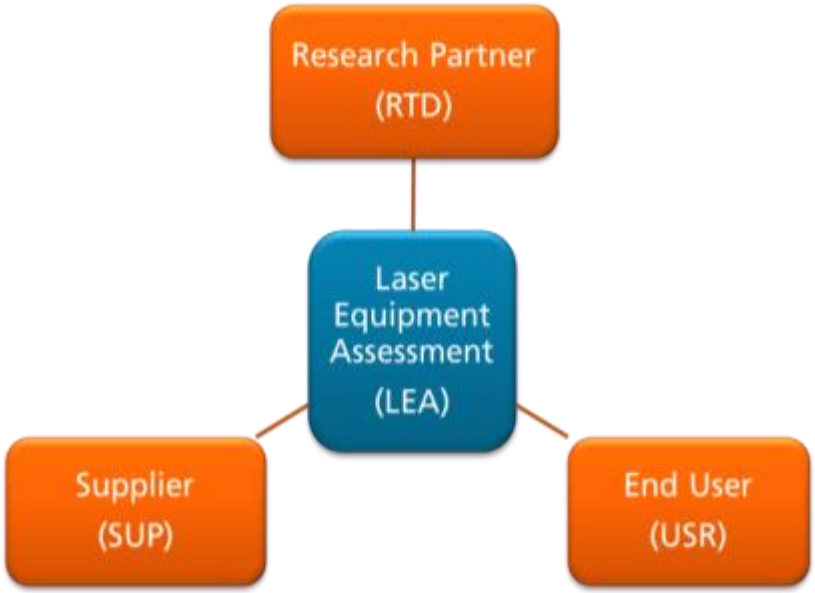
Online Media

- Attract external interest groups such as suppliers, users and associations
- Provide information
- Interact with European ICT platform „I4MS"

LASHARE – Vision and Overview

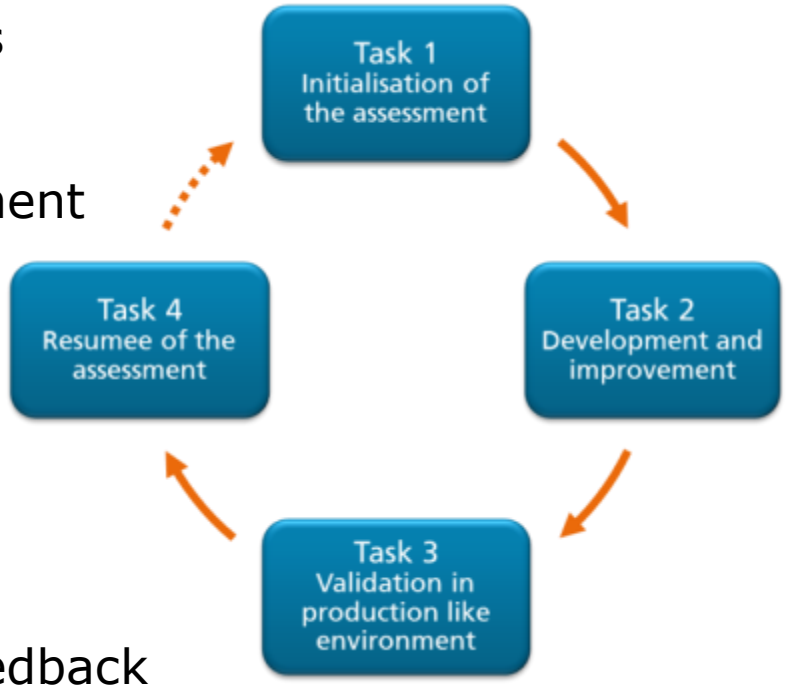
Roles in Laser-based Equipment Assessments (LEAs)

- Supplier (SUP)
  - SME company providing a laser based equipment
- End User (USR)
  - Industrial company using laser-based equipment for manufacturing
- Research Partner (RTD)
  - Research institution providing scientific support for development of laser-based equipment



LASHARE – Vision and Overview
Phases of the Assessment Circle

- Task 1 – Initialisation
  - Defintion of demand and objectives
  - Development plan
- Task 2 – Development and Improvement
  - Implementation
- Task 3 – Validation
  - Evaluation of objectives in a production like environment
- Task 4 – Resumee
  - Evaluation of achievements and feedback to the methodology

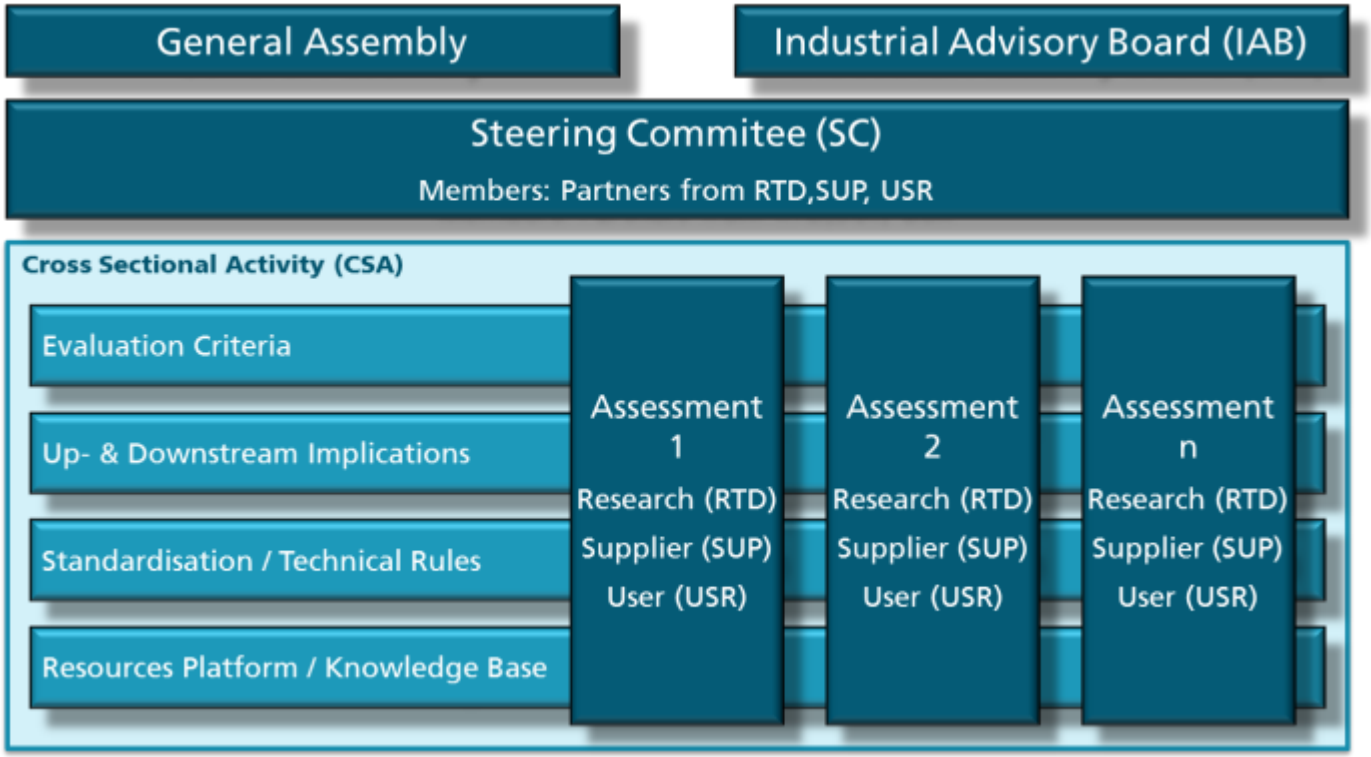


LASHARE – Vision and Overview
Laser-based Equipment Assessmets (LEAs)

Acronym	LEA	Title
ALPS	301	Vision based laser cutting for patterned fabrics
FLAT	302	Plug in laser diode module for warm sheet metal forming
LASPRO	303	Laser beam profiler for online characterization of spot properties
TEETO	304	Compact sub nanosecond laser source for thin film processing
FCPS	305	Laser system for flexible CIGS photovoltaic scribing
CUDE	306	Direct diode laser system for cutting of mild and stainless steel
MOBILLAS	307	Mobile laser system for on site material processing
TWOMICRO	308	Two micron laser source for light weight materials and medical sector
HELIDRILL	309	Helical laser drilling system for micro vents and conducts
LAP3D	310	Laser processing system for stitching structured patterns on large 3D parts
FEMPAR	311	Deep engraving system for coining dies with femtosecond laser
NEXTCUT	312	Multi wavelength diode laser source for cutting applications
PARROT	313	Parallel multi beam ablation of rotationally symmetric work pieces
INCLAD	314	Inside cladding system with integrated process monitoring

LASHARE – Vision and Overview

Linking Assessments on Project Level



LASHARE – Innovation for manufacturing SME's through Laser-based Equipment Assessment

LASHARE – Consortium

Partners at a glance

LASHARE
Laser-based Equipment Assessments (LEA)

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LASHARE WP301 – APLS
Laser-based Equipment Assessment (LEA)

ALPS - Vision based laser cutting for patterned fabrics

- Develop fixing system for laser cutting of light deformable fabrics adaptive to different materials with inhomogeneous properties
- Invent a model based vision system for fast pattern learning to locate and cut with sub-mm accuracy without prior marking on fabric
- Increase cutting performance and overall throughput for all relevant batch sizes

Manual and automated cutting

Motivs to be detected and cut

Supplier

SIMAUPRO

User

Selmark lingerie

Research Partner

aimen CENTRO TECNOLÓGICO

LASHARE WP302 – FLAT
Laser-based Equipment Assessment (LEA)

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 40ºC
- Reduce forces in roll forming by 50%
- Implement a totally spring-back-free process with 100% geometric certainty after forming

Laser diode stack

Roll forming machine

Supplier monocrom

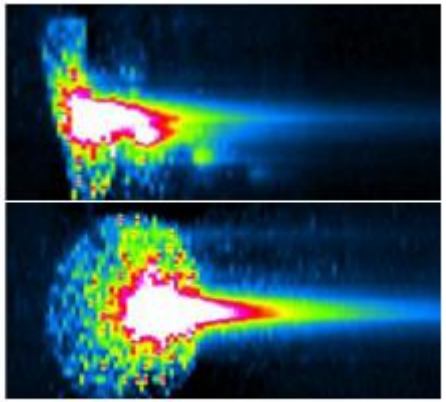
User Johnson Controls

Research Partner aimen CENTRO TECNOLÓGICO

LASHARE WP303 – LASPRO
Laser-based Equipment Assessment (LEA)

LAPSRO - Laser beam profiler for online characterization of spot properties

- Monitor the IR emission of the weld pool with a repetition rate of 10 kHz
- Provide a tool for online detection of process instabilities in laser beam welding
- Enable closed loop control of the laser welding process



Defocused (above) / Focused (below) laser beam images obtained with a low cost uncooled 32x32 IR array manufactured by NIT

Application and principle of multi beam processing

Supplier

NIT New Infrared Technologies

User

FIAT CRF CENTRO RICERCHE FIAT

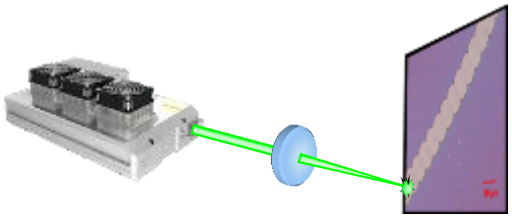
Research Partner

aimen CENTRO TECNOLÓGICO

LASHARE WP304 – TEETO
Laser-based Equipment Assessment (LEA)

TEETO - Compact sub nanosecond laser source for thin film processing

- Provide a price competetive long term stable laser source
- Enhance productivity by an increase of 30% in average power
- Implement a top hat energy distribution for thin film processing



Laser source for thin film processing
With top hat energy distribution

Supplier

User

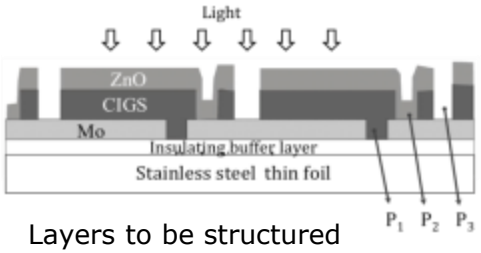
Research Partner

LASHARE WP305 – FCPS
Laser-based Equipment Assessment (LEA)

FCPS - Laser system for flexible CIGS photovoltaic scribing

- Provide a process for the scribing (P1) of the molybdenum layer, without changing the underlying insulating layer
- Enable structuring of CIGS (P2), parallel to (P1), without affecting the molybdenum layer, allow parallel removal of TCO (P3) without sacrificing other layers
- The three scribing are characterized by an amplitude <50µm and 2m/s processing speed

Manufacturing system for CIGS scribing



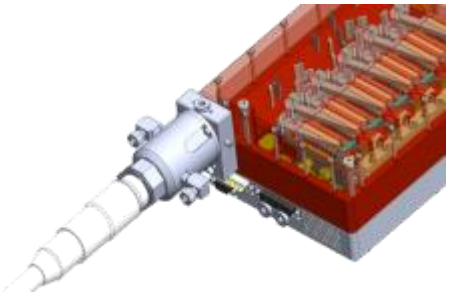
Layers to be structured in three different steps

Supplier **User** **Research Partner**

LASHARE WP306 – CUDE
Laser-based Equipment Assessment (LEA)

CUDE - Direct diode laser system for cutting of mild and stainless steel

- Pump a 9xx nm diode laser system to robustly deliver 1kW at 7.5 mm*mrad
- Provide optical and electrical interfacing for industrial application in the area of cutting
- Demonstrate diode laser cutting of mild steel up to 6 mm, stainless steel up to 4 mm, and aluminium up to 3 mm



Diode laser module from prototype to rack version

Supplier

directphotonics

User

Prima Power

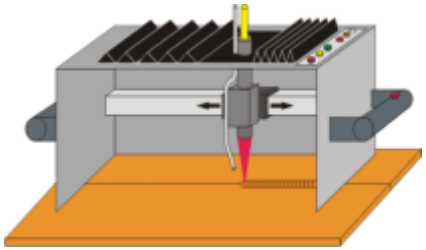
Research Partner

LZH
LASER ZENTRUM HANNOVER e.V.

LASHARE WP307 – MOBILLAS
Laser-based Equipment Assessment (LEA)

MOBILLAS - Mobile laser system for on site material processing

- Provide a fully integrated and portable laser system for on site cutting and welding
- Allow mobile and safe operation in the field such as in ship yards
- Develop a system with minimal training requirements applicable to large structure manufacturing with thick materials



Application and principle of multi beam processing

Supplier

SET

User

ALS MARINE CONSULTANTS LTD

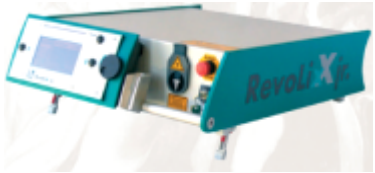
Research Partner

LZH
LASER ZENTRUM HANNOVER e.V.

LASHARE WP308 – TWOMICRO
Laser-based Equipment Assessment (LEA)

TWOMICRO - Two micron laser source for light weight materials and medical sector

- Provide a 2 micron laser source with power and beam profile stability
- Feed 200 Watts of stable power into a 125µm fibre
- Demonstrate reproducibility of scribed grooves and other processes with the new laser source



Laser processing systems

Supplier

PRIMES

LISA LASER PRODUCTS THE 3micron COMPANY

User

trotec laser. marking cutting engraving

Research Partner

LZH LASER ZENTRUM HANNOVER e.V.

LASHARE WP309 – HELIDRILL
Laser-based Equipment Assessment (LEA)

HELIDRILL - Helical laser drilling system for micro vents and conducts

- Build a high performance control system with automatic beam calibration for different hole geometries
- Support interfacing to diverse shop floor environments with control protocols and standard laser coupling
- Provide easy to use user interface (UI) with process monitoring capabilities for reliable processing

Model of the integrated drilling optics

Supplier

S&F Systemtechnik GmbH

User

P&G
BRAUN
Oral-B

Research Partner

Fraunhofer ILT

LASHARE WP310 – LAP3D
Laser-based Equipment Assessment (LEA)

LAP3D - Laser processing system for stitching structured patterns on large 3D parts

- Develop a system to process 3D workpiece with a large working area
- Implement a machanooptical solution to allow surface curvatures of up to 270º reducing distortion
- Realise a structuring rate of 400mm/s for a 3D system based on an improved and precise control software using inputs from different CAD sources.

Sample dash board application

Supplier rofin ROFIN-BAASEL ESPAÑA

User MAIER

Research Partner Centro tecnológico CARTIF, Fraunhofer ILT

LASHARE WP311 – FEMPAR
Laser-based Equipment Assessment (LEA)

FEMPAR - Deep engraving system for coining dies with femtosecond laser

- Provide a robust laser source with improved performances 40µJ 50W
- Develop solutions to improve the engraving process speed and quality
- Remove the "step effect" from superposition of slices and the "weaving effect"
- Obtain frosting effects on the surface

Laser source and coining die

Supplier

Amplitude SYSTEMES

User

MONNAIE DE PARIS

Research Partner

ALPhA NOV
Centre Technologique Optique et Lasers

LASHARE WP312 – NEXTCUT
Laser-based Equipment Assessment (LEA)

NEXTCUT - Multi wavelength diode laser source for cutting applications

- Combine up to four wavelengths from 808nm to 980nm in one laser system to deliver 2kW of continuous power
- Develop a suitable integrated beam delivery and beam shaping optics with a fibre of 200µm core diameter and NA of 0,2
- Provide a diode laser solution with 20mm mrad suitable for cutting

Image courtesy of LIMO

Rack with the laser source and complementary systems

Supplier LIMO Lissotschenko Mikrooptik

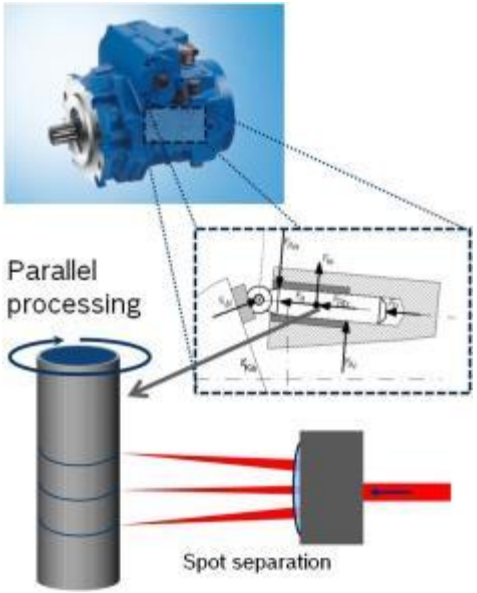
User EWF European Federation for Welding, Joining and Cutting; LASER EXPERTISE

Research Partner TWI

LASHARE WP313 – PARROT
Laser-based Equipment Assessment (LEA)

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



Application and principle of multi beam processing

Supplier

HOLO/OR

User

BOSCH

Research Partner

Fraunhofer ILT

LASHARE WP314 – INCLAD
Laser-based Equipment Assessment (LEA)

INCLAD - Inside cladding system with integrated process monitoring

- Increase robustness of the beam guiding system against backscattering and powder contamination
- Implement an imaging system for coaxial remote monitoring of the melt pool
- Develop process charts to enable reviewing the course of the manufacturing process

Images of the IPO optics for cladding

Supplier

IPG LASERTECHNIK GMBH

User

SULZER

Sulzer Metco

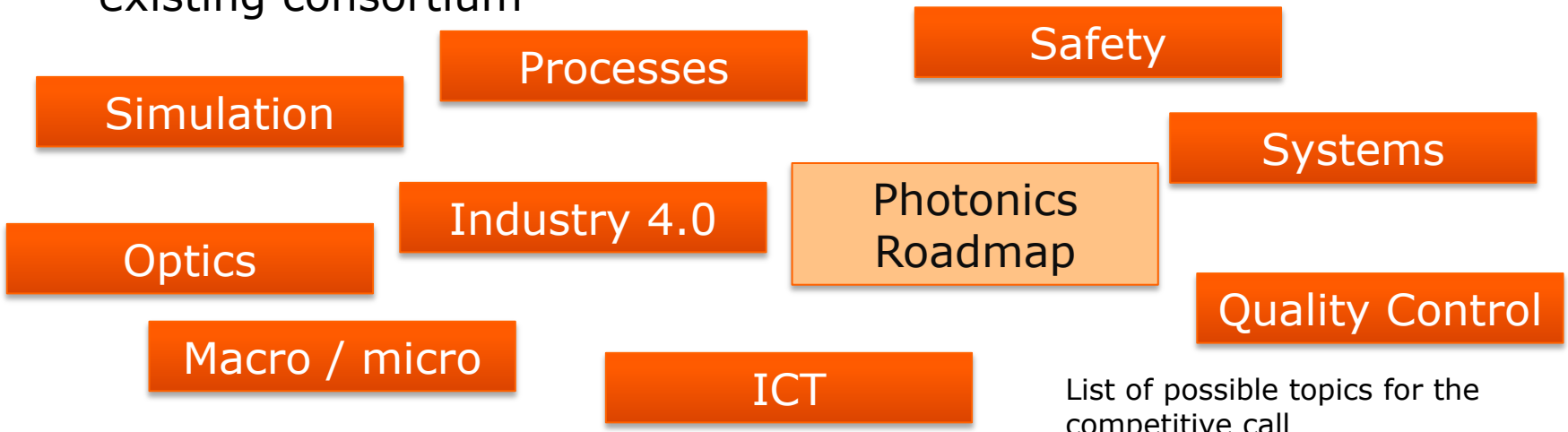
Research Partner

Fraunhofer ILT

LASHARE – Innovation for manufacturing SME's through Laser-based Equipment Assessment

LASHARE – Competitive Call
Topics and Budget

- Set of up to 12 new Laser-based Equipment Assessments (LEA's)
  - Topics published through a call for proposals in 2014/2015
  - Tentative start of new LEA's 01.09.2015
  - Support by one research partner (RTD)
  - Team of one supplier (SUP) and one user (USR) entering the existing consortium



List of possible topics for the competitive call

LASHARE – Innovation for manufacturing SME's through Laser-based Equipment Assessment

LASHARE – Updates and News
Cooperation in ICT for Manufacturing SME's

I4MS Gate

- Assistance for exchange with innovation platforms across Europe
- Provision of access to interest groups from other sectors
- Infrastructure for exchange between I4MS projects

LASHARE – Updates and News
Accessing resources online

Current channels

- Web site on public level
  - Access to public information about the project and the LEA's
  - News about advances and events

Future resources

- Option to register for additional resources (to be established)
  - Provision of training material via iApp
  - Forum for discussions and exchange through social networks

Web site

iApp for e-Learning

LASHARE – Updates and News
Accessing resources online

Get involved.

Visit us at **www.lashare.eu**