FLANDERS MAKE

JOINING FORCES FOR A NEXT GENERATION MANUFACTURING INDUSTRY IN FLANDERS

Economic trade mission of the Grand Duchy of Luxembourg to Flanders
24th November 2016
EcoMechatronics: smart machines, new applications
FLEMISH INDUSTRY
MOTOR OF THE ECONOMY

▲ 15% of the total added value in Flanders
▲ 80% Flemish export
▲ 80% private R&D spending in Flanders
▲ Higher productivity growth (Belgium 1995-)
   
   Industry: +2.02% annually
   Economy: +0.76% annually

▲ Indirect job creation
▲ High and low-skilled employment
Megatrends and manufacturing

▲ changing demographics (growing world population, ageing societies, increasing urbanisation)
▲ globalisation and future markets
▲ scarcity of resources (energy, water, other commodities)
▲ the challenge of climate change (increasing CO2, global warming, ecosystem at risk)
▲ dynamic technology and innovation (ICT and virtualisation, technology diffusion, the age of life science, ubiquitous connectivity, sensing and digitalisation)
▲ global knowledge society (know-how base, gender gap, war for talent, multiplication of data and information)
▲ mass customisation (personalised customisation)
How to maintain/increase our manufacturing capacity

ECOSYSTEM, HOLISTIC APPROACH OF MANUFACTURING IN FLANDERS

Continuous product innovation

Continuous process innovation

Continuous knowledge development
Mission Flanders Make

To strengthen the long-term international competitiveness of the Flemish manufacturing industry by carrying out excellent, industry-driven, pre-competitive research in the domains of

▲ Mechatronics
▲ Product development methods
▲ Advanced manufacturing technologies

Aiming at product & process innovation for the vehicles, machines and factories of the future
What: Valley of death in Research & Innovation
Crossing the Valley of Death

Bridging the “Valleys of Death”

R&D Test Beds

Ideally suited for high-complexity, multi-disciplinary, long-time horizon challenges that span the fundamental to applied R&D

Demonstration and Deployment Test Beds

Market needs & competitive pressure focus R&D on near-term solutions

Emphasis on early discovery; focus on solutions with smaller technical complexity

Fraction of Institutions’ Effort & Competence

Basic Science Understanding how the world works

Basic Science To advance applications

Applied Science

Engineering

Serial Production

FLANDERS MAKE
MANUFACTURING INNOVATION NETWORK
Flanders Make focus: industrial orientation and valorisation of research

- A strong international network
- Excellent technological research
- State-of-the-art research infrastructure

Joining forces, growing stronger!
Flanders Make
Flanders Make: strategic priorities

- Autonomous & green vehicles
- Smart interconnected machines
- Agile production

Technology competences

Infrastructure based services
Research programs

- Clean energy-efficient motion systems
- Smart monitoring systems
- Autonomous systems
- Intelligent product design methods
- Smart and lightweight structures
- Additive manufacturing for serial production
- Manufacturing for high precision components
- Agile & human-centered production and robotic systems
Flanders Make: first year achievements

△ Broad network incl. 80 members companies

△ Team of 400 top researchers

△ >30 new research projects since mid 2014

△ with >35 large companies & SME’s

△ focus on collaboration/open innovation

△ € 50 million research investment
COOPERATIONS POSSIBILITIES & INNOVATION RESULTS
Cooperation possibilities

- Bi-lateral contracts with Industry
- Use of FM infrastructure for testing and validation
- Contract research using Flanders Make competences
- Government funded
- Contract research within R&D projects
- Flanders Make funded
- ICON projects (generic problems with valorisation on industrial cases)
- SBO projects (user group participation, use case contribution)
Cooperation possibilities

- Bi-lateral contracts with Industry
- Use of FM infrastructure for testing
- Contract research using Flanders Make network competences
Cooperation possibilities

- Bi-lateral contracts with Industry
- Use of FM infrastructure for testing

Battery testing

Environmental & vibration testing
Valorisation results

Backfoam concept: 300% increase in stiffness/weight

Improved yarn insertion detection

Optimal gearshift control
Valorisation results

Optimal compressor configuration tool

Energy efficient control of hybrid drivetrain: 17% fuel reduction

Autarkic valve for air ducts

Design & control of print feeder
Design For Manufacturing (production of components) and Assembly (assembly components)

- This allows to:
  - Recognize manufacturability and assembly issues early – during conceptual phase
  - Shorter time to market
  - Reduce costs and improve quality through design leverage
Results: industry case

number of changed drawings after launch related to manufacturing and assembly issues

total number of initial drawings
INDUSTRY 4.0 @ FLANDERS MAKE
The 4th Industrial Revolution - “Industry 4.0”

1st
1782
Steam engine
GB

1913
Industrialization
US

1954
Electronic Automation
US/EU

2015
Smart Automation
EU

Drivers
Quality of life
Engineering Sciences

Mobility
Conveyor belt

ICT

μ-electronics

Computer, NC, PLC

4th

2nd

3rd

Power generation
Mechanical automation

GB

US

1913

US/EU

EU

ICT
Everything gets smart(ER)

- Smart phones
- Smart Homes
- Smart Cars
- Smart Factories
How to cope with trends and challenges? Sustainable growth

- Technology & Process Innovation
- Organisational development
- Human capital development
- Customer experience management

Flanders Make
Industry 4.0
"It is not the strongest of the species that survives, nor the most intelligent that survives. It is the one that is most adaptable to change".

Charles Darwin
FROM INDUSTRY 3.0 TO INDUSTRY 4.0

Industry 3.0: Automatisation

*Use of electronics and IT in production environment for further automisation*

- Standardized products
- Batch production
- Periodic production planning
- Periodic market predictions based on high-level data
- Random quality checks and control
- Periodic reprogramming of machines
- Computer Aided Design (CAD) used for the design of factories

Industry 4.0: Digitisation

*Autonomous production at the highest level of granularity*

- Individual production
- Custom made products
- Continuous adaptation of production
- Real-time prediction based on all available data
- Permanent quality control of all products
- Continuous learning of machines
- Complete virtual simulation of factories
WHY INDUSTRY 4.0? CHALLENGES

▲Flexible and efficient, aimed at customer specific manufacturing with lotsize 1 (at series cost)
▲More focus on customer requirements
▲New revenue form services and new business models
▲Flexible cooperation in production networks
▲Quality improvement
▲Reduction of cost of quality (first time right)
▲Shorter leadtimes
▲Higher flexibility
▲Lower total cost (by elimination/reduction/...
THE TECHNOLOGICAL DRIVERS BEHIND INDUSTRY 4.0

▲ Cyber Physical Systems

▲ Internet of things, services and people (IOT)

▲ Virtualisation
SMART MACHINES
SMART PRODUCTION SYSTEM (PLUG AND PLAY)

No need for upwards communication
WORK 4.0
WORK 4.0

- **Man as CPS** - Human-centered production systems

- **People skills**, life long learning and education (technology acceptance and work design)

- **New employment relations**
CONCLUSION: THE FUTURE OF MANUFACTURING

▲ The manufacturing industry matters!
▲ Flanders Make, a catalyst in the transformation of the manufacturing industry in Flanders
▲ The future is in high specialization, open innovation and becoming smarter, greener, faster and highly interconnected (industry 4.0)
▲ Flanders can be world class in specialised technologies and in innovation-driven B2B niche markets
THANK YOU