



FLANDERS  
**MAKE**

DRIVING INNOVATION IN MANUFACTURING



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*“We create effective innovation ecosystems, consisting of businesses, university research teams and employees of Flanders Make. We aim to help companies seize the opportunities offered by Industry 4.0 and boost our industry’s international competitive position.”*

Urbain Vandeurzen  
Chairman of the Board of Directors



*“Together we create added value for the industry and provide support for Industry 4.0, including projects based on artificial intelligence solutions and digital transformation.”*

We are living in exciting times. It wasn't that long ago when sensor-based, 'intelligent' devices were a rarity. Today we see them everywhere. This is just one example of how quickly technology and industrial sectors evolve. I'm willing to bet that when we look back on this period we will view it as one of the most innovative in history.

Flanders Make is right at the centre of it all. What's more, we are directly involved in shaping this new and remarkable future. We have over 500 specialist researchers working on specific, industrial applications for large and small businesses in the industry.

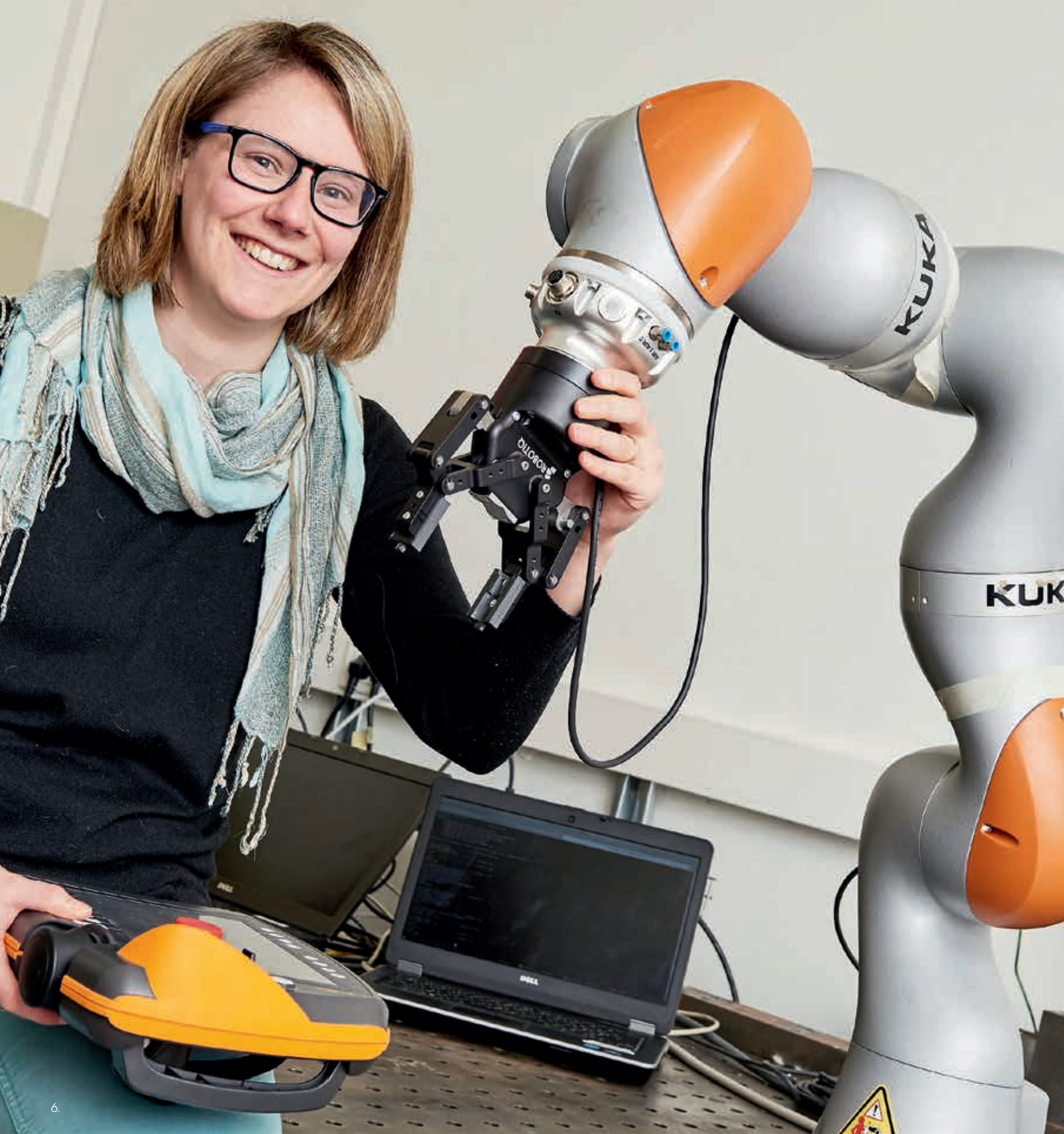
Our services don't stop at research. We help industry to achieve digital transformation and incorporate crucial technologies such as artificial intelligence. This enables them to develop new products, improve existing ones and to optimise production systems. Working together ensures we make a real difference. Our activities ensure that the industry can become more competitive. It is partly due to these Industry 4.0 innovations that companies in Flanders can continue to exist and thrive in today's ultra-competitive globalised marketplace.

This is how we contribute to ensuring the region remains competitive on a global level, and continues to appeal to ambitious first-class talent at home and abroad.

Read the stories in this brochure and you'll see why the Flanders Make approach works. More and more companies are finding their way to us. We write new success stories every year, with projects that help everyone move forward: businesses, employees and society as a whole.

We'd be thrilled to write a success story with you too. Do you have specific plans, or an idea you'd like to explore with us? Feel free to discuss it with our specialists. They would be delighted to get the ball rolling and turn your challenge into an opportunity to claim competitive advantage.

Dirk Torfs  
CEO Flanders Make



# DRIVEN BY THREE MAJOR MARKET TRENDS.

Flanders Make identifies **three market trends** to which we can respond with our research.

In doing so we boost the long-term, international competitiveness of the Flemish industry.

- 1. SMART, INTERCONNECTED PRODUCTS AND PRODUCTION SYSTEMS**
- 2. CUSTOMISED PRODUCTION AT THE COST PRICE OF SERIAL PRODUCTION**
- 3. SUSTAINABLE PRODUCTION CENTRED ON HUMAN NEEDS**

# FOUR COMPETENCE DOMAINS FOR SUCCESSFUL DIGITAL TRANSFORMATION.

Our industry focuses on two key areas: production and product development. To devise the best solutions it is vital that companies improve both elements, as a permanent focus on innovation in these areas is the only way they can hope to remain competitive.

Flanders Make focuses on **four domains** in which we cluster our competences.

## DECISION & CONTROL

**Mass production is giving way to customised production.**

Production environments must be able to produce in a highly modular fashion, at the lowest possible operational cost and without any machine downtime.

Customers expect zero-defect products and total flexibility. Moreover, systems are becoming increasingly autonomous. Examples include fruit-picking robots, autonomous vehicles in logistics, unmanned patrol boats, and many others.

Sensors play a major role in these areas. However, it doesn't end with measuring. Data must be interpreted and applied in robust, self-learning measuring and knowledge instruments to improve mechatronic systems. Artificial intelligence plays a major role in these areas. This is the only way in which we will be able to develop intelligent products and highly effective production environments – smart products and smart factories that are characteristic of Industry 4.0 – necessary to remain competitive in Flanders.



## DESIGN & OPTIMISATION

Demand for customised production is rising dramatically, and introducing a single product to market is no longer enough. Using model-based design methods and supporting software, **we help developers improve the increasingly-complex design process.** An entire product family is expected from the outset. This is only possible if the design process is aligned accordingly, right from the very first phase. After all, the further you are into the design process, the more expensive and time-consuming it is to implement any changes.

Specific tools give designers near-instant insight into the different possible concepts and optimal design choices. We also offer support for production environments, in which we take the impact of production on the design into account.



## MOTION PRODUCTS

Many companies in Flanders work around products with a motion component such as vehicles and machines. We apply this competence to help them **develop new 'future-proof' products which are smart, automatically adapt to the environment to provide optimal performance, and use digital, Industry 4.0 technology.**

The focus is on the architecture and the validation of systems, as well as the combination of autonomy and automation (autonomation) for professional applications. For businesses, this leads to improved, better-performing products that last longer and deliver better quality.



## FLEXIBLE ASSEMBLY

We support businesses in their digital transformation to become **'factories for the future'**. To satisfy increasing demand for quality, personalised products at the cost price of mass production, and taking into account high wage costs as well as the ageing population in Western Europe, we're focused on getting smart machines and people to work together. To achieve this, we perform research into flexible assembly units that can cope with multiple product variations.

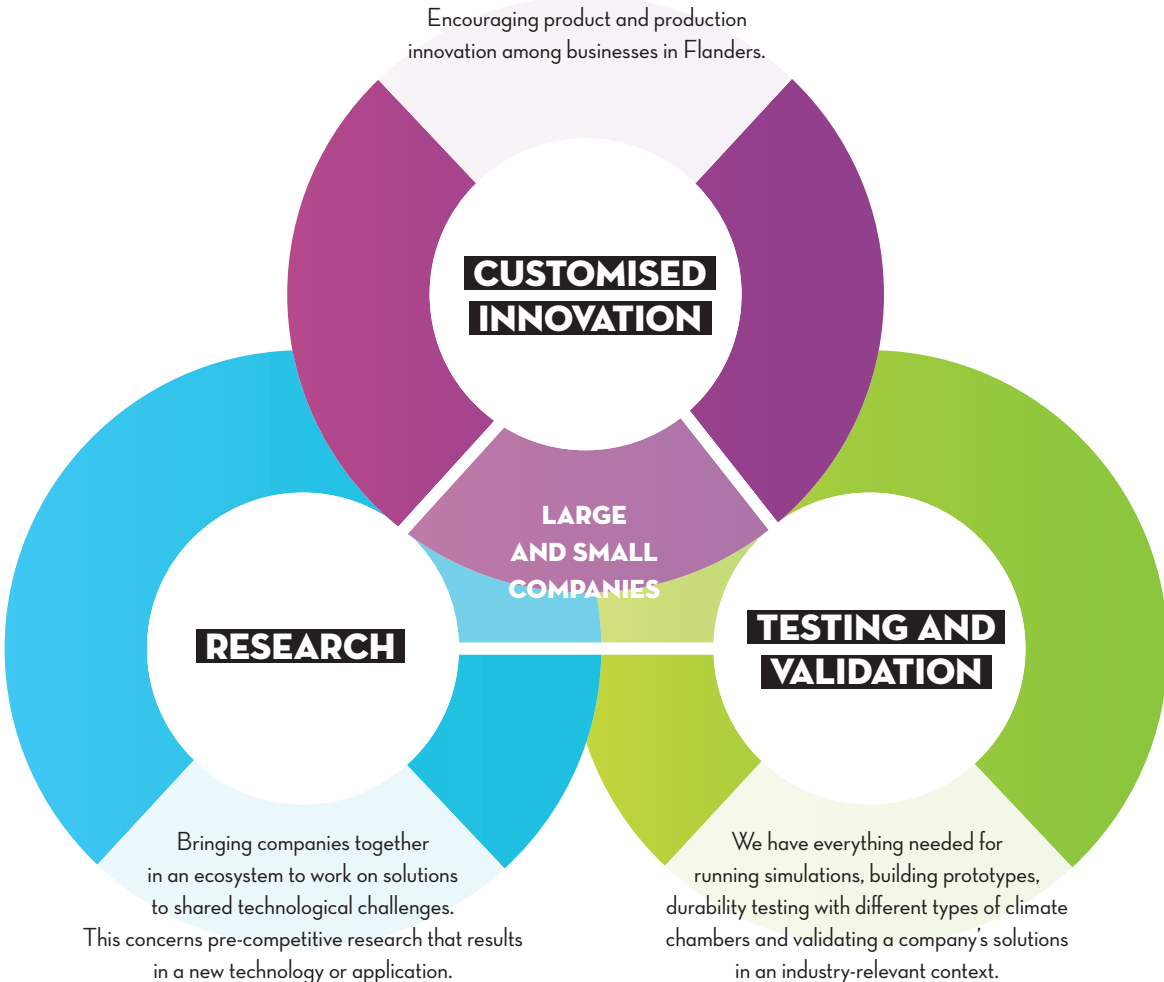
People continue to play a key role in the modern production environment, but are supported by robots for specific tasks. This interaction is a must for any factory that wants to survive tomorrow and ensure the work continues to be manageable.



# THE QUICKEST ROUTE TO GREATER INNOVATION AND COMPETITIVE ADVANTAGE FOR LARGE AND SMALL BUSINESSES.

## SOLUTION-ORIENTED AND INDUSTRY-DRIVEN RESEARCH

Based on the needs of industry and long-term trends, Flanders Make helps companies develop technology to be and remain pioneers in their market. We do this using industry-driven research, which can then be extensively tested and validated in our own high-tech research infrastructure. This is how we translate research into specific applications. We do this for large and small businesses with a passion for innovation.





# 1. CUSTOMISED INNOVATION

We help companies to develop technological solutions, from the moment that an idea is beginning to take shape, right up to its launch into a fully functional product or production process. We also help them to optimise their existing products and production processes.

## Feasibility studies

We establish the advantages and disadvantages of applying a certain innovative technology in the company. When doing so we examine any potential drawbacks, which supporting technology or knowledge is still lacking in the company, and how we can provide a solution.

## Support for product design

We provide product developers with methods and supporting software to simplify their design process in terms of functionality, efficiency, price, manufacturability, and so on.

## Optimising production processes

We support companies as they seek to respond to demand for more customised products, for example by helping them design an assembly area in the most economical manner. We also offer help in the choice, installation and application of sensors to optimise production.

## Advice and implementation of new technology in production environments

We support businesses in boosting their competitiveness by using new technology, such as artificial intelligence, digital work orders, robots, cobots and/or virtual and augmented reality.

## 2. RESEARCH

New technologies, such as artificial intelligence and augmented or virtual reality are emerging at an ever-increasing speed. We therefore bring companies together in an ecosystem to work on solutions to shared technological challenges. This concerns pre-competitive research that results in a new technology or application. Once the project has been completed, every company can start working with the results and translate them into a specific product or production innovation.

**The three main types of research set up by Flanders Make are:**

**Contract research**, on demand and customised, for businesses to improve their products and production processes.

**Strategic Basic Research (SBR)** is challenging and innovative research with a clear focus on product development or production process innovation. Through the user group, companies can follow up the project for four years and submit cases to validate the results. As such, they are the co-creators of the technology of tomorrow.

**Industrial applied research (ICON or interdisciplinary collaborative research)**, in which we bring knowledge closer to the market and translate it into specific products or production processes within companies. These are two-year projects working on medium-term applications. Companies actively help to apply the results within their own area of expertise.

**Other research:**

**Collective research and knowledge distribution, living labs and development projects**

Our aim is to use these projects to accelerate the introduction of technology and knowledge in companies.

**International research**

Flanders Make is a partner in several interregional and European research projects. This gives us the opportunity to jointly shape a strong, prosperous and competitive European innovation landscape in which companies can grow. Most of these projects also invite companies to participate.

**Digital Innovation Hubs (DIH)**

Flanders Make is part of a European network of digital innovation hubs. These innovation hubs are funded by regional, national or European initiatives and aim to accelerate the digital transformation of industry in general and of SMEs in particular. Through Flanders Make companies obtain access to a European network.

## 3. TESTING AND VALIDATION

Our Flemish industry is in full transition. Flanders Make strives to provide companies with optimal support in this process. That is why we invest in high-tech infrastructure, which companies can use to test and validate their production processes, vehicles, machines, or the components within them.

Here are some examples:

**Production**

- Testing and validation of cobotics and robotics technology, augmented reality and virtual reality, etc.
- Testing and validation of joining techniques

**Machines**

- Mechanical durability tests on components and systems
- Testing and validation of drivetrains
- Hardware-in-the-loop tests for drivetrains
- Testing the energy efficiency of bearings

**Vehicles**

- Mechanical durability tests on components and systems
- Hardware-in-the-loop tests for drivetrains
- Testing and validation of drive systems
- Battery tests for electric vehicles
- Durability tests

[www.flandersmake.be/en/our-services/testing-and-validation](http://www.flandersmake.be/en/our-services/testing-and-validation)







# EXPLORE THE SUCCESS STORIES OF FLANDERS MAKE.

Flanders Make's ambitious approach results in many success stories. Large companies and SMEs alike have performed research with us in recent years. Our work with them provided them with new insights and knowledge that contributed to their company's digital transformation. This in turn enabled them to position their business even more effectively in an increasingly competitive industry.

[www.flandersmake.be/en/cases](http://www.flandersmake.be/en/cases)

Scan this code and discover the variety of real cases in diverse sectors that Flanders Make recently accomplished with its partners.

Each and every one is a success story that derives its value from the practical applicability of the research performed.

SCAN THE  
QR CODE



# “WE BUNDLE FORCES TO BE ABLE TO MAKE A DIFFERENCE IN TERMS OF INNOVATION.”

- Tom Coen, CEO, Octinion -

Since 2009, Octinion, a commercial R&D company, has mainly operated in the farming and food sector and helps companies innovate in a way that is as cost-efficient as possible. CEO Tom Coen: “The cooperation with Flanders Make is extremely important in the proof-of-concept phase of our projects.”

“Octinion has been collaborating with Flanders Make to develop a strawberry-picking robot. To do so, we had to draw up a map of the (3D) world around the robot, so that it can remember where the ripe strawberries are hanging, among other things.”

“This research builds on a previous project involving alternative positioning systems. We were now looking for equally accurate, but cheaper positioning systems that could also work indoors.”

“The collaboration with Flanders Make was vital in the process of examining different possible concepts to achieve it. We will continue to invest heavily in creating innovative products in the future, for third parties as well as our own development. Consequently there are a number of other projects in the pipeline. In any case, we will bundle forces with Flanders Make in many projects, to make a difference in terms of innovation by considering and comparing a number of technologies to solve a particular problem.”

[www.flandersmake.be/en/cases/octinion-strawberry-picking-robot](http://www.flandersmake.be/en/cases/octinion-strawberry-picking-robot)



*“The collaboration with Flanders Make was vital for examining different concepts and weighing up a number of technologies.”*

View the full report about Octinion via the QR link:

SCAN THE QR CODE





# “THE SOFTWARE TOOL IS THE NEXT STEP IN REYNAERS ALUMINIUM’S DIGITAL TRANSFORMATION.”

- Paul Vanneste - Product Manager Automation & Industry 4.0, Reynaers Aluminium -

To Reynaers Aluminium, European market leader in the development and sales of innovative and sustainable aluminium solutions, not only is it important to introduce quality systems to the market, but also to ensure they are easy to construct. Therefore, they support their manufacturers in optimising the production and assembly processes for their windows, doors, sunscreens and more.

Flanders Make applied the historical data to develop a software tool manufacturers can use to compile the ideal machine portfolio for a specific customer request. Lead time and production costs are weighed against the machine investment and man-hours in order to assess the investment objectively.

“We can use the tool not only to design a completely new shop floor, but to also identify bottlenecks in an existing production process”, explains Paul Vanneste from Reynaers Aluminium. “If, for example, one machine is systematically overused it creates queues, which means the entire production process is subject to delays. On the other hand, a new machine represents a significant investment. We use the tool to help our manufacturers take a well-thought-out decision.”

*“The added value of the close cooperation with Flanders Make results in the ideal research partners and knowledge sharing.”*

Read the full article about Reynaers Aluminium’s software tool via the QR link:



[www.flandersmake.be/en/cases/reynaers-aluminium-modelbased-design](http://www.flandersmake.be/en/cases/reynaers-aluminium-modelbased-design)

# “WITH OPERATOR-SPECIFIC INSTRUCTIONS WE CAN ALIGN OUR ASSEMBLY ENVIRONMENT MORE EFFECTIVELY WITH DEMAND FOR FASTER, MORE COMPLEX AND VARIED PRODUCTION.”

- Tom Lambrecht, Vehicle Assembly & Workanalysis Specialist, CNHi -

Nowadays, more customised products are expected with ever-shorter delivery times. This puts pressure on human operators. Therefore CNHi and Flanders Make examined how personalised information could be communicated to the operator more effectively.

CNHi Zedelgem focuses on designing, producing and selling specialist agricultural machinery. Tom Lambrecht, the company's Vehicle Assembly & Workanalysis Specialist, reveals how the collaboration with Flanders Make came about. "At CNHi we have to respond rapidly to market demands and customer requirements, which are becoming increasingly specific. Here's an example: due to the large number of variants, the broad range of options and country-dependent legislation, the vast majority of our machines are unique."

Together with Flanders Make, CNHi examined how it could deliver machine-specific information to the right operator at the right time. Therefore, a pilot project is currently underway in the pre-assembly line of the engine, with operator-specific instructions supplied via tablets and smart wearables such as Google Glasses.

"After the test phase the system will be rolled out to include other pre-assembly zones. Digital instructions are available precisely when the operator needs them. This enables us to support the operator more effectively in his/her job and reduce cases of human error as well as to implement design modifications faster. On the one hand this should lead to improved product quality with lower costs, and a more flexible assembly on the other. Improved support for the operator should ensure their job continues to be manageable, despite the ever-increasing complexity and variability of the machines."

[www.flandersmake.be/en/cases/CNHi-operator-support](http://www.flandersmake.be/en/cases/CNHi-operator-support)



*“Together with Flanders Make we examined how personalised information could be communicated to the operator more effectively.”*

View the full report about CNHi via the QR link:





# “WE BASED THE STUDY ON OUR SPECIFIC NEEDS, AND ARRIVED AT A MODEL THAT ENSURES WE CAN REMAIN COMPETITIVE IN THE FUTURE.”

- Miguel Dhaens - Engineering Manager Global Research, Tenneco Automotive -

Tenneco Automotive develops and produces shock absorbers for virtually all makes of car. For its semi-active shock absorber it was looking for a way to convert some of the energy the shock absorber usually wastes into usable energy.

“When a car drives over the road surface, the shock absorber ensures that the operation of the springs is absorbed. This delivers enhanced ride comfort”, explains Miguel Dhaens, Engineering Manager Global Research at Tenneco. “Our semi-active suspension goes a step further by moving against the vibrations. You could say it provides a counterweight. This requires power, however. A lot of kinetic energy is released from the shocks that are absorbed. Therefore, in association with Flanders Make, we searched for a way to store this released energy.”

“In order to quickly compare and evaluate different concepts, Tenneco and Flanders Make jointly developed a model-based design tool to optimally model the energy conversion and storage in the shock absorber. We based it on our specific mechanical and electrical requirements, such as several typical road profiles and comfort requirements.”

“The energy storage solutions were implemented and tested in a prototype. An efficiency of 48% was demonstrated when converting the energy through the movement of the shock absorber.”

[www.flandersmake.be/en/cases/tenneco-energy-harvesting](http://www.flandersmake.be/en/cases/tenneco-energy-harvesting)

“Together with Flanders Make we developed a design tool which demonstrated an efficiency of 48%.”

View the full report about Tenneco via the QR link:

SCAN THE QR CODE



# PEOPLE MAKE FLANDERS MAKE.

We don't achieve growth, optimise systems and processes and develop new products on our own. The greatest strength of Flanders Make lies in cooperating and communicating with the 500 specialists in our organisation. This is something you will notice in your very first discussion with our project leaders and researchers. We listen carefully, and soon come up with specific proposals that give you insight into the possibilities for your business.

## WHETHER YOUR COMPANY IS LARGE OR SMALL, THE PROJECT LONG OR SHORT-TERM

at Flanders Make we will put together a team and competences tailored to your project. The communication lines are open and short, so that you are perfectly up-to-date on the progress at all times. Moreover, results are always reported in a transparent manner.

## INTERESTED IN COLLABORATING?

Don't hesitate to contact us and find out how Flanders Make can help you to transform your business. We would be delighted to hear your story and about your ambitions.

info@flandersmake.be | +32 11 790 590

## PIONEER IN EUROPE.

Flanders Make is a partner in a dozen European research projects. This enables us to build on a strong, prosperous and competitive European innovation landscape, in which businesses can grow.



# FLANDERS MAKE

DRIVING INNOVATION IN MANUFACTURING

Flanders Make consists of three co-creations centres  
and labs at the five Flemish universities:

**Co-creation centre for machine development**

Gaston Geenslaan 8  
3001 Heverlee

**Co-creation centre for the vehicle industry**

Oude Diestersebaan 133  
3920 Lommel

**Co-creation centre  
for Industry 4.0 production**

Marksesteenweg 58  
8500 Kortrijk

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