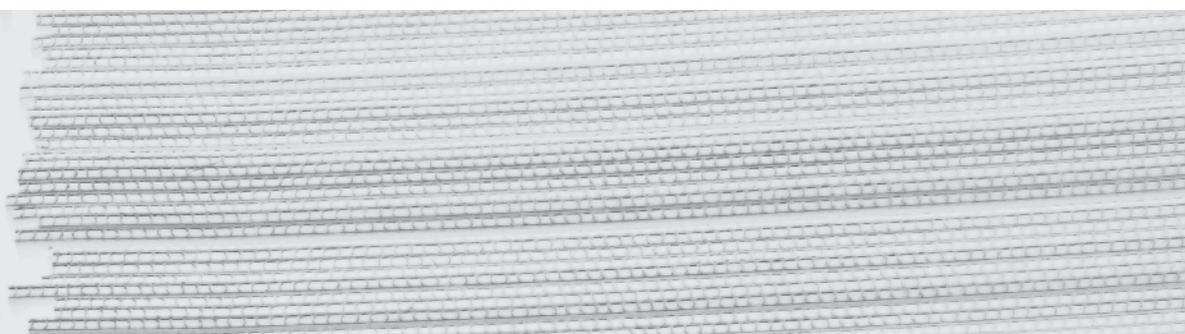
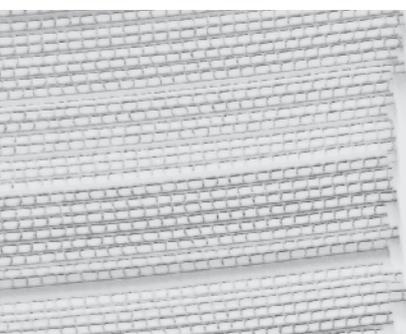
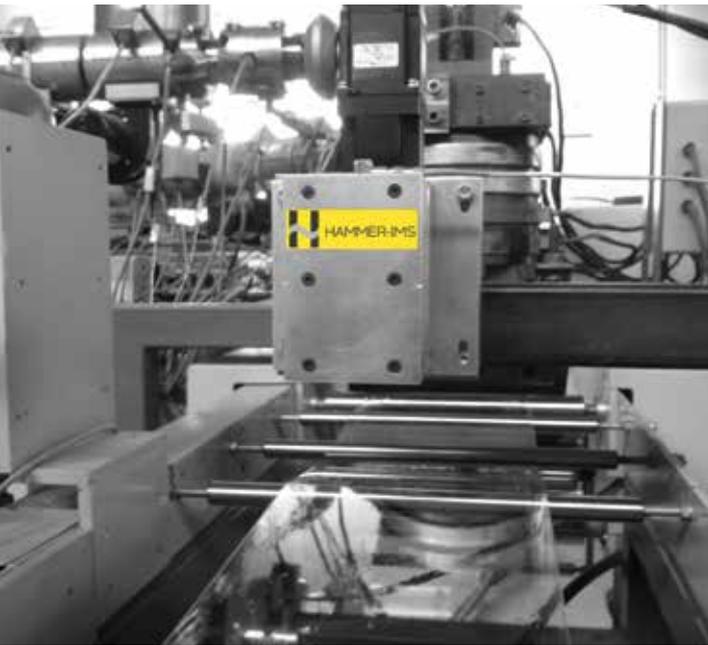




HAMMER-IMS

Case study

Revolutionary non-nuclear measuring alternative for plastics processors



Hammer-IMS is a spin-off from the internationally renowned research laboratory ESAT - MICAS of KU Leuven. General manager Noël Deferm and technical & product manager Tom Redant started their company after 8 years of research at the university. Based on millimeter waves, Deferm and Redant developed new systems for measuring material parameters such as thickness and weight in production lines. Their revolutionary measuring solutions have been performing trial runs at international paper producers and manufacturers of plastic sheets and films, composites, textile, glass wool and other materials. Hammer-IMS offers a secure, ecologic and easy-to-install alternative for today's nuclear measuring equipment.



General manager Noël Deferm and technical & product manager Tom Redant

From research to business

Before starting Hammer-IMS, Noël Deferm and Tom Redant worked for years as doctoral researchers in the ESAT - MICAS research group of KU Leuven. Noël specialised in the high-frequency technology itself. Tom developed methods to retrieve useful dimensional information from the environment. They discovered that the electromagnetic waves slow down when penetrating materials such as paper and plastic. Through accurate time measurements, they succeeded in measuring the thickness or the basis-weight of a range of materials.

Multidisciplinary engineering excellence enabled Noël and Tom to realise economically-viable precision and robustness levels for their millimeter wave technology, which they branded under the name of M-Rays. They acquired significant funding and started off with their own company Hammer-IMS. Hammer-IMS is located on the Corda Campus in Hasselt, Belgium. A few weeks later, Hammer-IMS was featured as a news item on the national Belgian business TV channel 'Kanaal Z'.

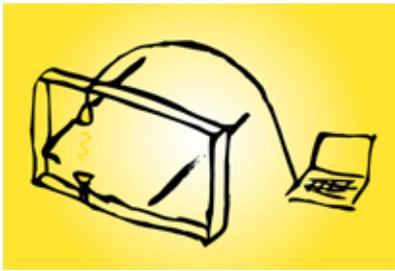


The revolutionary measuring solutions of Hammer-IMS have been performing trial runs at international paper producers and manufacturers of plastic sheets and foils, composites, textile, glass wool and other materials. The engineering team has been extended and new distributorships are being established in a number of countries across Europe.

M-Rays: X-Rays without the 'X'

Hammer-IMS supplies contactless measurement systems for measuring thickness, weight and anomalies of flat structures in production lines, based on the disruptive technology of millimeter waves. It is no coincidence that we named the technology 'M-Rays.' This clearly differentiates our technology from X-Rays, typically an unclean and expensive technology. The high-frequency electromagnetic M-Ray technology is Hammer-IMS's answer to outdated radioactive and nuclear measurement technology. The pure electronic nature of the technology makes it clean, robust, scalable, long-lasting and future-proof. For the development of its M-Rays transmitters and receivers as well as other electronic circuitry, Hammer-IMS collaborates with specialised electronic suppliers.

M-Rays wave measurements are favourable in situations where conventional technologies such as optical technologies, nuclear or radioactive radiation, ultrasound waves, inductive or capacitive measurement systems fail, are undesirable or provide an unreliable output. The modular and robust Hammer-IMS systems offer up to micron-level

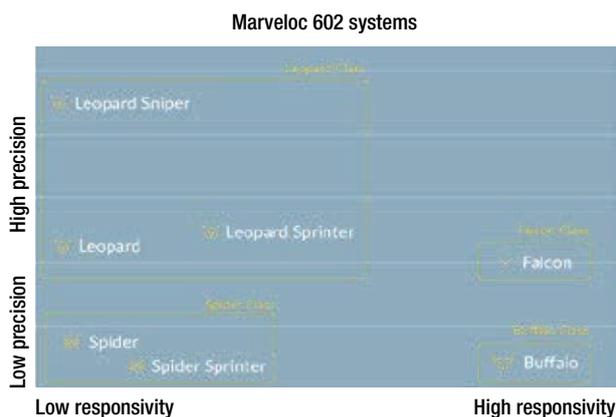


accuracy on industrial in-line production machines. At Hammer-IMS, we introduced a new name for millimeter waves: 'M-Rays'.

Packaged M-Ray systems

By controlling ever higher frequencies, Hammer-IMS succeeds in measuring materials faster and more accurately on the assembly line. This is good news for manufacturers with the ambition to equip their production lines with faster and more accurately quality control. In the meantime Hammer-IMS has developed a commercial portfolio of robust measuring solutions.

The Marveloc 602 family of measuring units (Falcon – Leopard – Buffalo – Spider) currently contains entry-level variants complemented with higher-performance measuring systems offering augmented measuring accuracy and/or speed.



Integrated turn-key solutions

Hammer-IMS integrates its Marveloc 602 measuring units into state-of-the-art solutions for inline measurement. Combined with our CURTAIN multi-head product, the turn-key industrial solution executes fast profile measurement in cross-machine direction. With the CURTAIN frame traveling back and forth, the system is able to measure the thicknesses of sheets or films passing through the gap over the complete width of the material. Its multi-sensor approach is a clear differentiator compared to conventional methods.

Sheet and film manufacturers can decide on the length of the CURTAIN frame and the number of integrated measuring units. This way, the solution supports high-width production and situations where quick feedback is required. The system measures the thickness deviation over the entire sheet or film

“The ambition is making our M-Rays measuring technology the golden standard in our target application domains.”

Noël Deferm

width, allowing to detect different types of production flaws. In case of plastic extrusion, for example, local deviations may correspond to an individual screwing bolt of the extrusion die.

The synergy between our Marveloc 602 measuring units and our CURTAIN frame technology enables us to propose integrated turnkey solutions for various measurement tasks:

- **PET thickness measurement**

Measuring the thickness of extruded PET is important for both PET-extruding companies and thermoformers. The solution provides accurate performance up to PET thicknesses of a few centimeters and works with any colour additives. The solution is suitable for yield maximisation and quality control for PET extruders as well as input control for PET thermoformers.

- **Plastic construction sheet thickness measurement**

Regardless whether you produce PE, PP, plexiglass or PC ... contactless thickness profile measurement fits all plastic sheets for construction purposes. It is applicable in high-temperature conditions close to the extrusion die for quick feedback, thereby reducing material waste.

- **Combined foam thickness & basis weight measurement**

Foam extrusion faces challenges for both thickness & basis-weight measurement. Hammer-IMS solutions support the simultaneous measurement of both thickness and basis-weight by combining M-Rays with conventional sensing technology. The solutions are available both before and after cross-linking.

Trade fairs across Europe

This year we have exhibited on the Kunststoffen 2016 trade show in Eindhoven. But the big blast will be on K-Messe. In Düsseldorf we will introduce and demonstrate our CURTAIN multi-head industrial turn-key solution executing fast profile measurement in cross-machine direction. In the build-up of K-Messe, EPPM magazine published a Hammer-IMS feature – introducing our enabling measuring solutions to plastic processors in Europe and beyond. “In the future, we will continue to invest resources in perfecting our technology, which is patent pending, and aligning it better with market requirements,” concludes Noël Deferm. “We are also busy differentiating our offering further toward new markets, including composites, textile and glass wool. Ultimately we have the ambition to gradually make our millimeter waves based measuring technology the golden standard in our target application domains.”



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The data as listed above is non-binding. Contact us to obtain a dedicated technical datasheet, a feasibility analysis for your industrial case, or to get in touch with our preferred integrators.

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