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EDITORIAL

Monique

In the Belgian space community the name “Monique” sounds like a bell. “What says Monique about this plan? Is Monique aware of your project? Monique has done it again in Paris.”

For years Monique Wagner was the driving and steering force of the space department within the federal science policy office. In her own inimitable way she was crucial in redesigning the space policy in Belgium out of this crucial position. A larger number of participants, more emphasis on commercial aspects, an equal partition of investments between big and small and between North and South. These are a few of the policy options, which were implemented with strength due to her.

Within ESA she ensured that Belgium, the big small member state, received what it deserved. Within Belgium she also had to convince several governments to continue to play a leading role within this major European project. She always did so with much diplomacy but also with Luxembourg determination.

At the start of VRI some eyebrows were raised within the competent government circles. There were doubts about our objectives and our usefulness. But both Monique and VRI played with the cards on the table. Not always without wrinkles on the water, but very soon Monique became a direct but very correct partner.

We hope she feels the same about VRI.

Monique is now retired. VRI thanks her warmly. Together with her we made the Flemish space industries a growth sector. At the same time we would like to thank all the employees of the space unit within Belspo. This small department does miracles. VRI just hopes that the policy makers within the federal government will soon take the necessary decisions to guarantee continuity at the same high level. They owe this to Monique. Thank you Monique.

Dirk Breyngaert, president
Hans Bracquené

NEWTEC CELEBRATES 25 YEARS OF INNOVATION



'Shaping the future of satellite communications' is not just a slogan for Newtec. It has been the company's daily practice for over a quarter of a century. Newtec wants to be a learning organisation in every possible way, combining a pioneering spirit with technical excellence and marketplace savvy.

Since its inception in 1985, Newtec has established a strong track record and reputation. It now has nine commercial offices, research and development centres and its own production facility, all spread over five continents. Filling these offices and facilities are close to 300 employees, working with three product lines and over 50 different products.

Newtec Cy was founded by two engineers with a vision: Dirk Breyngaert and Jean-Marie Maes. Their vision has produced a pioneering satcom company working at the top of its field globally. In its first ten years, Newtec worked exclusively on R&D and projects for the European Space Agency (ESA). Today, the company's relationship with ESA remains strong and R&D is still very much alive at Newtec. With its ambitious



Left to right: Jean-Marie Maes (founder of Newtec); Serge Van Herck (since 2006 CEO of Newtec) and Dirk Breyngaert (founder of Newtec).

R&D reinvestment policy, Newtec is recognised as a forerunner in several innovative satellite communication technologies, which have been published as industry standards (DVB, DVB-S2, DVB RCS and iSatTV Cenelec pr EN50478).

In 1994, as the European satcom market was deregulated and opened up, Newtec realised there was an opportunity to lever its strong technological know-how, and subsequently started its own product development strategy. As early as 1996, Newtec began successfully selling DVB satellite communications equipment. Newtec America was founded in 1997, marking the start of the company's internationalisation process. In 2001, Newtec Asia-Pacific was launched in Singapore and since then, Newtec offices have opened in China, the Middle East, South America and Germany to serve customers around the globe.

Newtec has also broadened its portfolio through acquisitions: Teamtec, a Belgian production facility for the production and integration of satcom equipment, was acquired in 2002. Its central location in Europe guarantees fast worldwide shipment by air and sea; Tellitec, a Berlin-based software company specialising in IP over satellite software solutions, was added to the Newtec group in 2004 to further integrate the worlds of satcom and IP, with a special focus on IP acceleration, data security and network reliability. The most recent acquisition took place in 2007 with TurboConcept, a top French provider of intellectual property cores for turbo and LDPC codes, important building blocks for the DVB-S2 standard. Since February 2008 both Teamtec and Tellitec have been integrated into the single legal entity Newtec Cy N.V. Still a fully private company with Belgian shareholders, Newtec is today a multinational organisation with strong European roots.

On the awards front, Newtec received the World Teleport Association's 'Technology of the Year Award' for its FlexACM® solution, and at the international tradeshow IBC'09 in Amsterdam, Newtec's MENOS (Multimedia Exchange Network Over Satellite) won the prestigious "IBC Innovation Award for Content Delivery" as well as the "IBC Judge's Prize" for the most influential project of the year for the Arab States Broadcasting Union (ASBU), Arabsat and Newtec. These awards are an acknowledgement by the entire broadcast industry and confirm the vision of Newtec, justifying all the effort and enthusiasm of everyone involved.

With the mission statement, 'To shape the future of satellite communications', Newtec aims to remain at the top of its game, helping customers realise their business objectives by providing them with new business capabilities, by expanding their market reach, and by enabling them to reduce their operational expenses.

Newtec plays a crucial role in the satellite communications industry around the globe. There are more than 2 billion people watching TV images every day thanks to Newtec products and the company is proud to be the European market leader for Internet Broadband over Satellite.

What about the future? Serge Van Herck, CEO Newtec, enthuses: "The next few years are set to be exciting for Newtec as the number of TV channels, satellite broadband consumers and the IP traffic worldwide are expected to see continued growth. Broadcasters look forward to drive increasing end-to-end efficiency across their infrastructure."

"As the deadline for switchover from analogue approaches, digital terrestrial TV and mobile TV are expected to see further growth as well. Also, the increasing need of countries to close the digital divide, combined with the availability of Ka-band satellites, will see further potential for double digit growth for the coming years," Van Herck continued.

From its office around the world, Newtec's passionate and dedicated team serves the company's customers, helping them to shape the future of satellite communications.

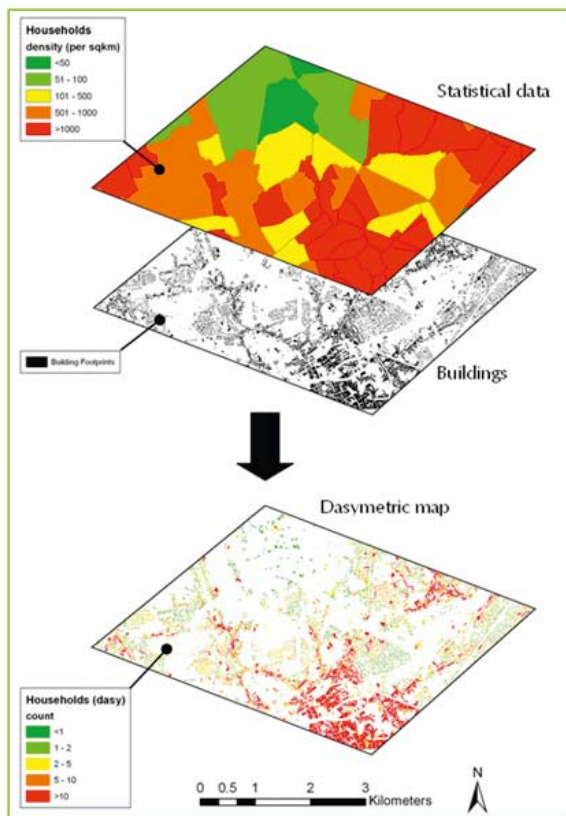
VAE PROJECT EOMARK ADDRESSING NEW AND EVOLVING OPPORTUNITIES FOR EO-BASED INFORMATION SERVICES IN THE GEO-MARKETING AND RETAIL BUSINESS SECTOR



In response to a need to enhance the existing geo-marketing services portfolio with the contribution of Earth Observation (EO) images, ESA awarded a contract under the name Value Added Element (VAE) to GIM for the development of those services. GIM is one of the top ranked private companies in terms of turnover in the EO activities in Belgium.

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The first of the four suggested geo-marketing services concerns dasymetric population and purchasing power products with enhanced geographical detail compared to the current product offering. This technique of spatially redistributing statistical data based on the land cover of the area will be applied with low, high and very high resolution land cover maps. The second service corresponds to



Service 1

© GIM

improved geo-demographic segmentations by offering relevant indicators on the urban land use like the presence of agglomerations, city centres, small urban housing areas, etc. The goal of the third service is to extend existing street segmentations by adding relevant information on the richness of the neighbourhood. In this instance focus is on the extraction of building typologies (detached housing, residential, etc.) and other relevant wealth indicators such as the presence of swimming pools and the size of the garden. This information is derived from very high resolution satellite images. The last service is rich urban maps, offering 3-D city maps at the individual building level which are used to update census data based on the usage and volume of the buildings.

By means of EO-based information extraction and service provision GIM and its partner Epsilon will be able to deliver improved informa-

tion content by using objective physico-morphological information extracted from EO imagery, uniform cross-boundary data, improved spatial resolution and a better control on the update frequency. It has been agreed in collaboration with the Downstream Partners to test the proposed services on a number of areas of interest such as: Belgium (border region, NUTS 3 regions, and various

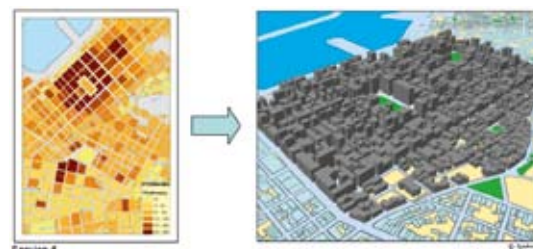
municipalities), France (border region, Grand Lyon, Lyon municipality and Lille), Belo Horizonte (Brazil), Morocco, Moscow (Russia), Patras (Greece), Milton Keynes (UK) and Bournemouth (UK).

The Downstream Partners are represented by customer organisations of the geo-marketing sector such as MB-Research (Germany) specialised in EU wide purchasing power indicators, Pitney Bowes Business Insight (UK and France), specialist of location intelligence services with 1000+ employees, Experian (Belgium), a global information services company, the Mellon Group (Greece) and organisations of the direct marketing sector such as Bisnode Group (represented by Bisnode Sweden), a global leader in business & market information services.

The Downstream Partners all expressed a clear interest in the proposed services and confirmed that the offer corresponds to the current and future market needs. Additionally, for emerging markets characterised by a lack of accurate statistical data, the market potential is enormous.

The proposed service offering has been approved by ESA in January 2010 during a Service Readiness Review Meeting. The services are being prototyped by GIM and Epsilon and will be tested by the Downstream Partners over the first half of 2010.

VAE is an element of the ESA Earth Observation Envelope Program (EOEP-3). It follows on from its predecessor (EOMD) and maintains focus on the needs of the EO service industry. VAE is starting now its new activities over the financing period of the next 5 years (2008-2012).



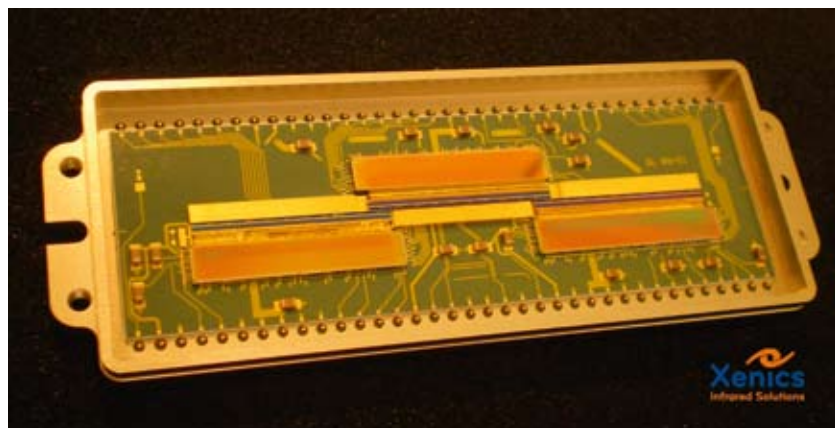
Service 4

SENSORS FOR REMOTE SENSING BY XENICS



The main activities of Xenics are the design and manufacture of linear arrays, FPA and cameras for the Short Wavelength range (SWIR), based on InGaAs detectors. Exactly this wavelength band is of high interest in the remote sensing of vegetation properties. The water (vapor) content of the atmosphere causes a strong absorption at $1.45 \mu\text{m}$, but above this absorption peak, the reflectance in the $[1.5 - 1.7 \mu\text{m}]$ band is very interesting

to determine the liquid water content in the plants and for the identification of tree types and plant conditions. For the more Mediterranean area the SWIR band is also important to detect wild fire affected areas and even for the detection of active fires.



Photograph of the long linear array Engineering model. In the middle the sensor line, composed of 3 overlapping sensors is visible. Each sensor line is connected to its own readout circuit. The sensor line is prepared on a dedicated submount to guarantee the alignment requirements for the sensor.

In most cases, there is a drive to very long linear arrays, which are geometrically matched to very long linear arrays in the visible and NIR wavelengths range. This means that a pitch of app $25 \mu\text{m}$ is solicited, which is double the size of the VNIR sensor, and a sensor line length in the range of 35 or 70 mm. Taking into account that most InGaAs detectors are manufactured on 3 or 4 inch wafers, the arrays are taking a large part – if not the full wafer diameter. Additionally it is required that – at least – the pixels in the central part are defect free and fulfilling all electro-optical properties. In order to keep the manufacturing and flight cost within acceptable limits, most often butted array solutions, consisting of smaller sub-arrays, are preferred.

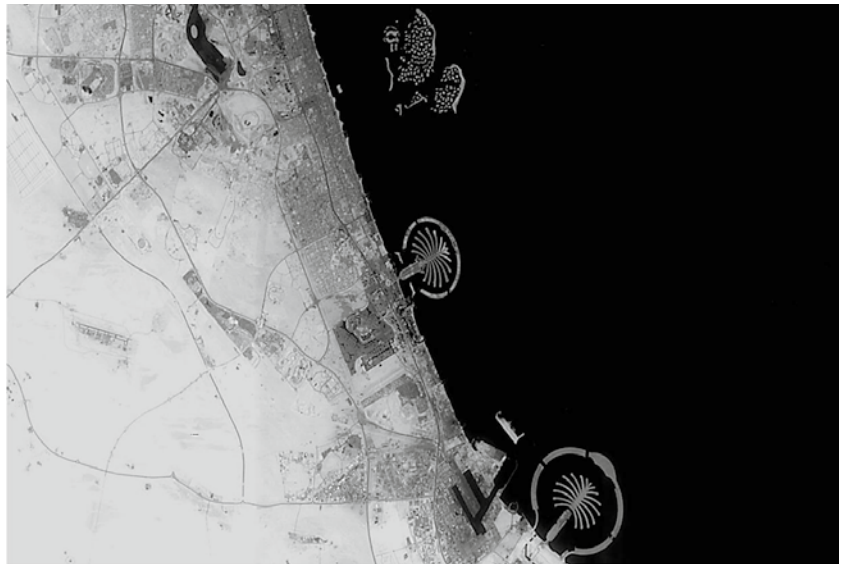
In 2005-2006, Xenics has worked on a long linear array with 1500 pixels on a $25 \mu\text{m}$ pitch for the Egyptian experimental remote sensing satellite Egypsat-1. This array was composed of 3 sensors with 512 pixels each, which were optically butted together by means of a stack of 2 beam splitting cubes. This educational satellite, which was jointly built by the Ukrainian and Egyptian scientists and engineers, was launched in 2007

as a secondary payload on board of a Dnepr launcher from Baikonour. The SWIR IREI instrument was performing well and has taken some nice pictures from the wildland around the Mediterranean and the Arabic peninsula (see picture).

Since 2007 Xenics is involved in 2 important developments for ESA. The first development is the delivery of the Visible, NIR and SWIR linear arrays for the MSI instrument on board of ESAs corner stone mission Earthcare. The main goal of this instrument is to provide information about the horizontal cloud cover, cloud type as well as aerosol optical properties and densities above the ocean. Each linear array contains a linear array of 512 pixels, surrounded by 2 multiplexers with 512 inputs. After an extensive engineering phase, Xenics is presently evaluating the pre-qualification devices and manufacturing the qualification models. Each device type will undergo an extensive qualification cycle, including thermal and mechanical shock testing, life time testing as well as radiation testing. Recent measurements prove that the arrays are fulfilling the electro-optical requirements and are 40% better than the noise requirement.

As a by-product Xenics is also delivering the readout circuits for the micro-bolometer detectors on board of the BBR instrument on board of the same satellite

In parallel Xenics is working on the development of a very long linear array for the SWIR channel of Proba-V. This image sensor of 2708 pixels is composed of 3 mechanically butted arrays, with 1024 pixels each. The detector lines are spaced by less than 1.5 mm and have app. 90 pixels in the overlap area to guarantee the full coverage of the swath under all flight conditions (see picture). 3 such arrays will be integrated in the Proba-V instrument, 1 behind each of the TMA telescopes. In this project Xenics is also providing the detector proximity



Photograph of the long linear array Engineering model. In the middle the sensor line, composed of 3 overlapping sensors is visible. Each sensor line is connected to its own readout circuit. The sensor line is prepared on a dedicated submount to guarantee the alignment requirements for the sensor.

electronics to OIP, the instrument prime. The engineering models of the mechanically butted array are presently under test.

The participation in all this programs shows clearly that InGaAs detectors are the prime choice of the remote sensing community for SWIR imaging and especially for vegetation studies. Recent tests, executed by SSTL and ESA, have also proven the reliability of this material and – most important – room temperature operation for wavelengths up to 1.7 μm .

SEPTENTRIO ANNOUNCES ASTERX3™, MOST COMPACT GPS/GLONASS/GALILEO RECEIVER ON THE MARKET

Septentrio announces AsteRx3™, a compact multi-frequency GPS/GLONASS/GALILEO and COMPASS-ready receiver. AsteRx3™ is specially designed for integration in demanding precision positioning, navigation and automation applications such as land and maritime survey, machine control, UAV payloads, and many others, and provides excellent preparation for reaping the benefits of all modernized GNSS signals.

Providing simultaneous access to legacy and modernized GPS, GLONASS and GALILEO signals on L1, L2, L5, E5a, E5b and E5 AltBOC, AsteRx3™ is the most compact and future-proof OEM receiver on the market. A range of innovative features, collectively known as GNSS+™ is introduced. ATrack+, Septentrio's patented Galileo AltBOC tracking, provides spectacularly low noise tracking and multipath resistance for Galileo's most advanced signal. LOCK+ tracking guarantees exceptional tracking stability under high vibration conditions. The advanced multipath mitigation algorithm APME has been extended for use with the modernized signals, and provides the best multipath mitigation, especially for the predominant and harmful short-delay multipath. AIM+, Septentrio's Advanced Interference Mitigation technology, protects receivers against in-band interference, and allows users to identify the interference in a "spectrum plot" view. These innovative tracking algorithms are complemented with RTK+ for extended RTK baselines over 50 km as well as faster initialization.

With the evolution of GNSS systems, more and more users demand the possibility to prepare for the benefits these new signals and systems bring. "AsteRx3™ exploits the capabilities of



these signals with the latest ASIC technology. As AsteRx3™ is one hundred percent plug-compatible with AsteRx2™ and AsteRx2e™, the AsteRx family is ideal for system integrators to build solutions which perform optimally with signals available today, which can be migrated to new signals and systems seamlessly tomorrow."

Septentrio will start shipping AsteRx3™ in the first quarter of 2010.

Septentrio Satellite Navigation NV designs, manufactures, markets and supports high-end OEM GNSS receivers for demanding professional navigation, positioning and timing applications. Septentrio has an international team of experts in all areas of satellite navigation receiver design and applications.

For more information about Septentrio, please visit www.septentrio.com.