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VRI Vlaamse Ruimtevaartindustrie Flemish Space Industries

NEWSLETTER

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EDITORIAL

Frank De Winne has landed. It was safer to wait after a successful landing to write this editorial. Maybe we don't realize it anymore, but a space flight remains a very risky event with the landing of the capsule as one of the most critical moments. But Frank's mission was a success. Within our small space community Frank is a pioneer and an excellent ambassador on whom we can always count. Consider our important industrial participation in his mission as a minimal return for his contributions. But for us it is above all a proof of what space stands: industry, researchers and astronauts are complementary.

In the mean time PROBA 2 is operational. The launch was also flawless and the satellite will become an important tool for the scientists who developed the experiments on board.

The VRI members see space mainly economically: for us it is a market offering enormous possibilities because it gives answers to many social needs. To strengthen our position on this market we need a strong technological basis in which our research institutes play an important role. Scientific experiments and technological demonstration flights are a third element and are therefore necessary links to make our own developments successful. This value chain makes space a unique experience for everyone involved.

Frank De Winne is without doubt not only our ambassador, but also our partner.

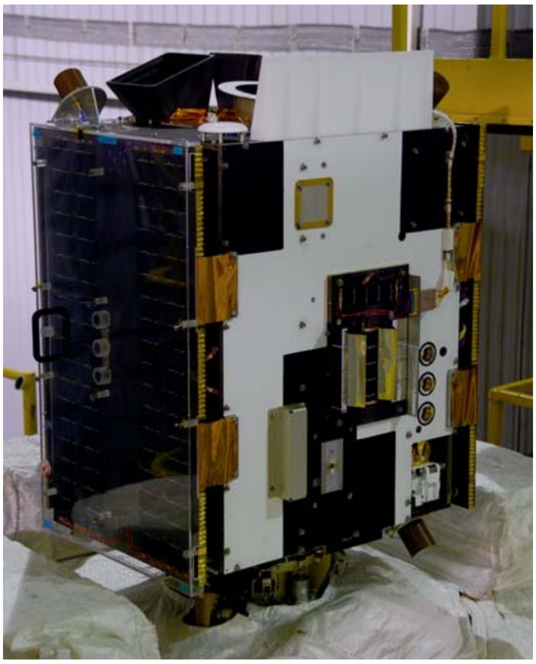
Dirk Breynaert, president

PROBA 2 INSTRUMENTS SWITCHED ON

Now, three weeks after its successful launch on 2nd November, the PROBA 2 satellite is in perfect health. All subunits and instruments that have been switched on are operating normally.

PROBA 2 is the second in the PROBA (Project for Onboard Autonomy) series of satellites, built by VERHAERT SPACE, providing low-cost flight testing opportunities to European industry. Although PROBA 2 is a small satellite, it incorporates a total of 17 new technologies and four scientific experiments that will focus on solar and space weather.

After the launch of the PROBA 2, the first contact with the satellite was realized in Redu, the ESA ground station operated by a joint venture of VERHAERT SPACE and SES Astra. This first contact confirmed that the satellite was in excellent shape. Since then, the VERHAERT team has been checking the stability and health of the spacecraft.



The health check started with the switch-on of the most critical subsystems, including the on-board computer developed by VERHAERT SPACE and the attitude and orbit control units. These units allow to "steer" the satellite and to point it towards its target, the main target being the sun. The two main instruments are indeed intended to observe the sun and its environment. 'Sun Watcher using APS detectors and image Processing' (SWAP) observes the Sun's million-degree coronas as they extend far out into space while the 'Lyman Alpha Radiometer' (LYRA) monitors solar UV radiation on a continuous basis.

Now that the satellite is stabilized in solar observation mode – the main mode of its working life, the two main instruments have been switched on and a health check has been performed successfully. Also the other instruments and payloads operate nominally. The data acquisition and processing systems located in Redu are also working well.

With the critical launch and early orbit phase completed, the engineers can now evaluate the quality of the downlinks and start the calibration of the instruments. More elaborate commissioning tests will follow in the mission's second month and after an interruption during the Christmas break it is intended to go to operational mode.

WEAR++: WEARABLE AUGMENTED REALITY IN SPACE

On September 19th Frank De Winne has tested for the First time the WEAR++ system on board of the International Space Station (ISS) during a 2 hours lasting maintenance task. The system guided him during the inspection of a component which is part of the air purification system of the Columbus laboratory. A second session has been executed on November 28th for which the original system was improved based on the lessons learned in the first session.

material without having his attention inferred by written manuals or computer screens. Voice controlled instructions in combination with the fact that the system knows, thanks to the precise location and orientation positioning, where the astronaut is looking at, allow WEAR++ 'just-in-time' (when asked for) and 'just-in-place' (right in front of the eyes) to add context dependant graphical elements to the image seen by the astronaut.
WEAR++ is a demonstrator and the use in a few realistic scenarios by an astronaut allows gathering useful knowledge on the user friendliness and the technical accuracy of the different technologies for use on board on the ISS. This gathered knowledge can be taken into account for the successor of WEAR++.

The complete qualification procedure for the transfer to and the use in the ISS is passed through and includes amongst others a range of qualification tests (analysis of the electromagnetic compatibility, thermal and inflammability analysis, vibration tests, analysis by ESA's medical panel, etc.), the 'Station Development Test Objective' (SDTO) process for acceptance of the project for implementation on board of the ISS, and the Columbus integration process.

On March 17th Frank De Winne participated, together with his Dutch colleague and back-up André Kuipers, in a training with the WEAR++ system in the European Astronaut Centre (EAC) in Cologne, Germany. More recently (September 30th) the Jaxa astronaut Soichi Noguchi was also trained with the WEAR++ system. Planning, integration and on-console monitoring of the WEAR++ sessions takes place in the Columbus Control Centre (Col-CC) in Munich, Germany.

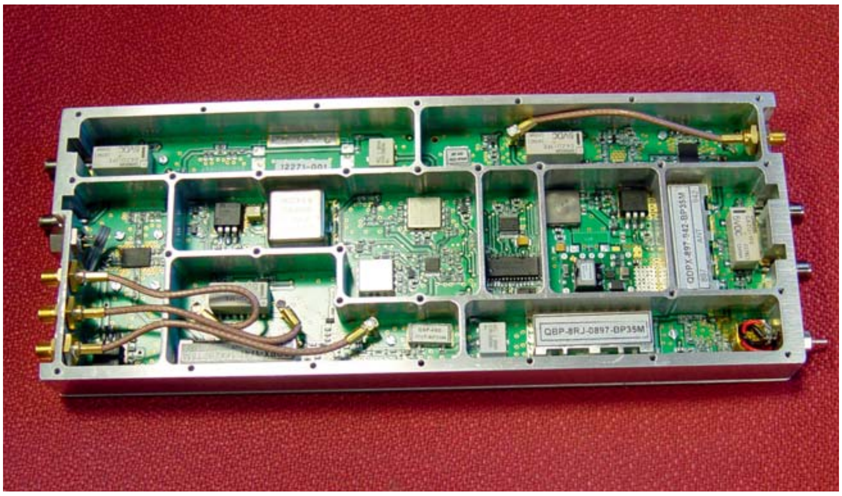
More information on
www.spaceapplications.com

Frank De Winne and André Kuipers training with WEAR++ at EAC. Courtesy of ESA.

ORBAN MICROWAVE PRODUCTS (OMP) IS PARTICIPATING IN THE ESA EXOMARS PROGRAM AS PART OF A PACKAGE TO STUDY THE ROTATIONAL DYNAMICS OF MARS

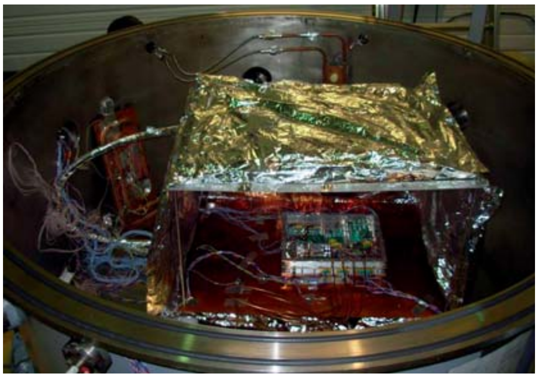
OMP
ORBANMICROWAVE
PRODUCTS

Based on the scientific requirements defined by the Royal Observatory of Belgium (ROB), OMP is developing a coherent X-band transponder (LaRa-Lander Radio Science) that will be used to perform precision Doppler velocimetry experiments using a direct Earth-Mars-Earth radio link with Deep Space Network ground stations. Given the constraints of this mission, LaRa is carefully optimized for mass, size and power consumption.



Converter.

LaRa maintains a full-duplex link where the downlink signal is coherently locked to the received uplink signal. This coherence maintains the precise timing relationship between uplink and downlink signals thereby allowing precise measurements of round-trip phase and frequency shifts. Scientists on the ground extract this phase and frequency information to deduce the relative velocity between the transponder on Mars and the ground station on Earth. By studying the slight variations in Mars' velocity over time, important information can be generated about the nature of the interior of Mars as well as seasonal atmospheric variations.



LaRa being prepared for a thermical vacuum test.

Other than space, our products find application in markets like SatCom, GNSS, avionics, satellite radio, medical and test equipment. OMP develops and builds custom RF & microwave subsystems and antennas in the 1 to 25 GHz range.

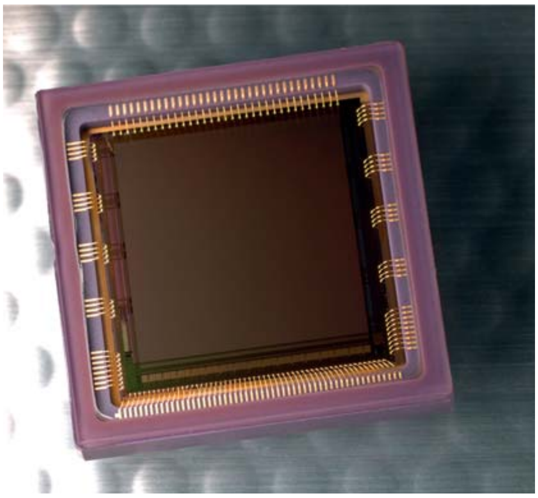
Some recent antenna developments include a range of GNSS antennas covering Galileo, GPS and GLONASS, antenna arrays for L, S, C, and Ka Band, and L and S-Band antennas used in satellite user terminals. We're also working on a range of RF subsystems like frequency up- and downconverters for VHF up to Ka-Band, power amplifiers, low noise amplifiers and a Ka-Band Doppler radar.

More information on our designs can be found on our website www.omp.be.

CMOSIS LAUNCHES THE FIRST STANDARD PRODUCTS

CMOSIS custom solutions for image sensors

On the occasion of the 'Vision 2009' fair in Stuttgart begin November this year, CMOSIS presented its first standard, off-the-shelf CMOS image sensor products.



CMV4000

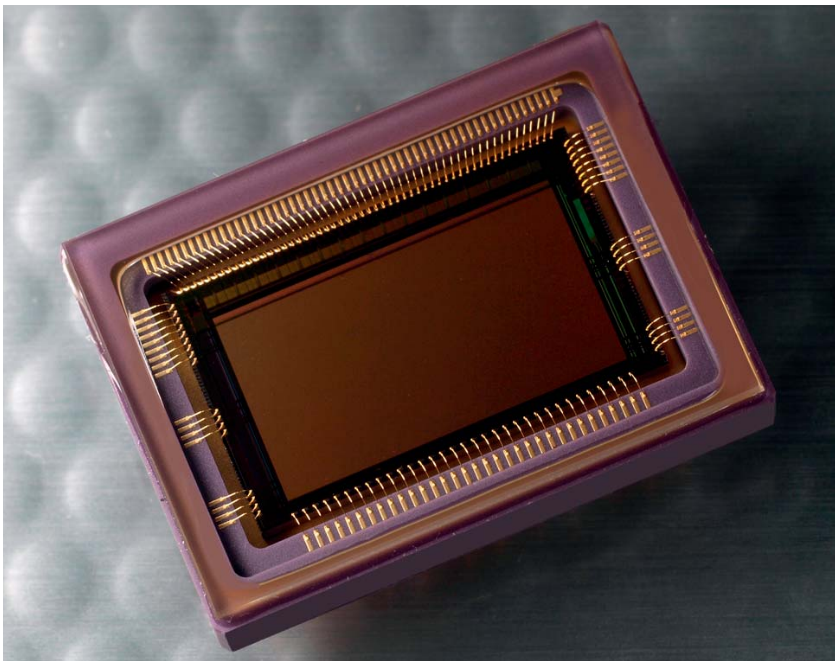
The CMV2000 and CMV4000 are image sensors with resolution of respectively 1088 x 2048 and 2048 x 2048 pixels. Both sensors are based on the same 5,5 µm pixel. This innovative 8-transistor pixel guarantees an excellent image quality in terms of noise, dark current as well as shutter efficiency. The acquired images are of such quality that only the most demanding applications require extended calibrations and corrections. These two image sensors have, opposed to most other CMOS image sensors, a so called synchronous shutter: the start and the end of the integration time is identical for all pixels.

A synchronous shutter with short shutter-time is essential for all applications where the geometrical integrity of the observed objects has to be guaranteed, like for example in automated optical inspection. Moreover the sensors acquire the next image during readout of the previous one.

The shutter efficiency of the innovative pixel amounts to 1 up to 50.000: when the electronic shutter is closed, the pixel only sees 1/50.000 of the light compared with open shutter situation. A high shutter efficiency is of great importance when the integration time is short compared with the readout time and when there is no or little control over the illumination.
Both image sensors perform the conversion from analog to digital image information on chip via a new type column ADC (Analog to Digital Convertor). They have 16 serial lvds (Low Voltage Digital Serial) outputs, each with a 480 Mbits/s data rate. This way the CMV2000 reaches an image frequency of 340 full frames per second and the CMV4000 of 180 full frames per second with 10-bit analog to digital signal conversion.
Via partial read out the image speed can be increased further. Both sensors are electrically and concerning pin configuration completely compatible. They can both be driven and read out with one and the same camera hard- and software.
At this moment only the panchromatic (350 -1100 nm) versions without micro lenses are available. Volume production starts in January 2010. At that time also RGB colour versions and panchromatic versions with micro lenses will be available. In the near future versions with increased NIR (Near InfraRed) sensitivity will be produced. During 2010 the CMV family will be extended with members of higher resolution and data speed.

These specifications, in particular the CMV4000 image sensor, make them also adequate for space applications like planet exploration, earth and sun observation. The 0.18µm CMOS technology in which this sensor is produced, has also a good intrinsic harness radiation. This radiation hardness was already confirmed by tests on small array of representative pixels.

For further information on these products: info@cmosis.com



CMV2000