NEWSLETTER

Technobis Group

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INTRODUCTION

On our first trip this year we joined Photonics West in San Francisco and visited our customers, partners and retailers in the US. After a good week in San Francisco, we traveled to Atlanta. During the visit to Micron Optics, we watched the Breaking News on CNN about a blizzard that was traveling over the east of the US. Wow! That was serious. We were advised to change our travel plans (i.e. not to travel to Detroit, Washington DC and Montreal), so we went straight home to Amsterdam. As we came to understand in the days thereafter, that was a wise decision.

Now, in mid-March, we are joining an exchange mission organized by the Netherlands Aerospace Group. We started in Atlanta again, and we will be traveling to Mesa, Arizona and Fort Worth, Texas later this week. Next week, we will finish the trip in the east of the US and Canada, hoping to start up projects that were delayed and looking for new applications for our high-speed technology.

In the Netherlands, we are optimistic about the recovery after the financial crisis. As a high-tech development company, however, we know any crisis will hit us late, and the recovery in the high-tech industry will be late as well. At present, however, things are looking good for us.

Our equipment has been ready since December 2010 and we are now focusing on the applications and the software for these applications, and things are starting to speed up.

In this newsletter, you will read about some of the new applications, our second flight test were Deminsys successfully reached a Technology Readiness Level of five. You will learn more about our new sales manager, Leen van Toor, who replaced Thomas van Els this past February.

Have fun reading this newsletter.

Pim Kat, CEO

Technobis Group

Technobis Group is a developer and supplier of high-tech instruments and modules for the most dedicated national and international OEM companies.

Technobis Mechatronics (TBM)

Technobis Mechatronics specializes in carrying out complete product development projects, from an initial idea to a successful turnkey product, prototype or series product. Building on over 14 years of experience, we have emerged as a trusted supplier of mechatronic systems in a wide range of markets.

Technobis Fibre Technologies (TFT-FOS)

Technobis Fibre Technologies specializes in the development and supply of total solutions in high-speed, multi-sensor fibre interrogators and sensors.



DISTRIBUTOR IN FOCUS: CHANDLER MONITORING SYSTEMS

Chandler Monitoring Systems (CMS Keith Chandler President/CEO) is an innovative applications company whose goal is to utilize our experience and talent to bring fiber-optic monitoring systems to the forefront of any industry seeking to expand their products and services. We offer the latest proven, state-of-the-art turnkey monitoring systems and solutions to a vast number of industries and applications. Today, you can find widespread Optical Sensing deployments in the structural, civil engineering, transportation, power, aerospace, and security industries.

CMS creates a customized design for each project, utilizing the industry's most efficient, proven, and reliable components and software to create a reliable and competitive system for each company or organization we work with. The information and abilities supplied by the components and equipment in this field far supersede those of conventional sensors.

CMS is currently working with Technobis Fibre Technologies (TFT-FOS) to expand its offerings in the US to include a high-speed offering for such applications as blasting, jet-engine analysis, and other acceleration/ high-frequency applications. The (TFT-FOS) Deminsys System offers a solution for these high-speed applications. Other aspects of the TFT-FOS equipment include the ability to produce mode shapes using 3D graphics, as well as with strain values, which provide a confirmation of data and give the client motion in real time, thereby helping to verify the movements of various types of structures.

CMS offers consulting, design, engineering, integration, installation, and software services to support fiber-optic monitoring systems. The optical sensing industry is a rapidly growing market. CMS addresses three industry needs: Static, Dynamic, and High-Speed monitoring applications. At CMS, our goal for the last four years has been to apply the correct technology for each application.

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HIGH-FREQUENCY OPTICAL SENSING

IHC Hydrohammer specializes in the design and construction of piling equipment used for the foundations of onshore and offshore mega-platforms and installations. Examples include windmill parks and oil platforms at sea, as well as bridges and mega-buildings on shore.

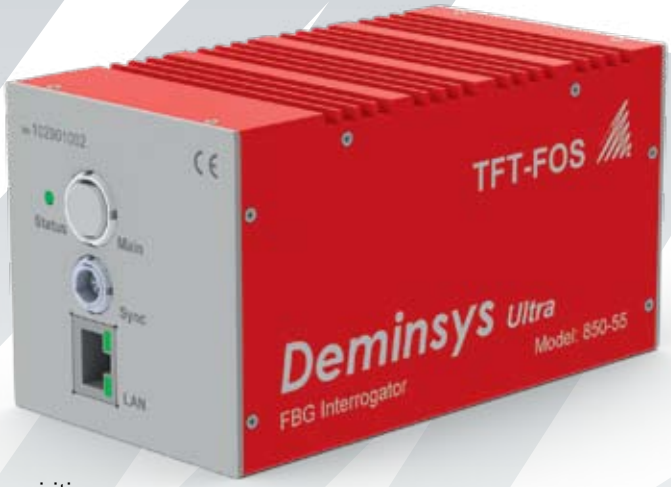
One recent TFT-FOS project involved the driving of massive piles, in cooperation with IHC Hydrohammer. For Hydrohammer, it is interesting to know the optimal combination of pile, hammer weight, and force. This can be explained with a simple example. If you try to drive a steel pile of 1000 kilograms with a regular 1-kilogram hammer, you can imagine what will happen. The pile will not move at all, while the hammer will bounce back with the same speed and force! This is not a good combination! You need to determine the optimal combination of weight and force for every type of pile.

If you need to sink 100 piles, increasing the speed of piling by 10% can result in considerable savings, especially during off-shore work, where every day can cost hundreds of thousands of euros.
In February, TFT-FOS mounted FBG sensors on a 1.2m pole of 5cm-thick steel and connected these sensors to the four-channel Deminsys interrogator. The hydrohammer struck the pile many times, and the Deminsys interrogator showed

and registered the impact on the pile with great precision. These measurements allow us to calculate the optimal combination of weight and force to sink this kind of piles into the ground or seabed.

SUCCESSFUL SECOND FLIGHT TEST

TFT-FOS and the Dutch National Aerospace Laboratory (NLR) made their first successful flight test with the Deminsys C interrogator on 24 October 2008. This first flight was performed with the PH-NLZ test aircraft, a Fairchild Metro II twin turboprop aircraft with pressurized cabin. It demonstrated the initial feasibility (proof-of-concept) of the FBG sensor technology and specifically the Deminsys interrogator for use in an aircraft environment.



The electronics of Deminsys C were redesigned and re-engineered in 2010 in order to move towards the flight-safety standards for in-flight equipment. Prior to the second flight test, an on-site flight-safety check was performed on the ground on site at NLR, and the Deminsys D/Ultra showed full compliance with the flight-safety requirements. Qualifying for this check was a prerequisite for carrying out a second flight test.

After the flight-safety qualification, the flight test was scheduled and, on 30 December 2010, the Ultra finally made its maiden flight on the PH-LAB test aircraft, a Cessna Citation II jet aircraft with pressurized cabin. The aim of this flight was to validate the Deminsys Ultra in-flight against a reference data-acquisition system. Analysis of the in-flight recorded data of both systems demonstrated that the Deminsys successfully reached a Technology Readiness Level of five (TRL 5). According to NASA and ESA definitions, this means, "Component and/or breadboard validated in a relevant environment." The reports from the flight-safety qualification and the TRL5 validation are available on request.

Although it has now successfully met the TRL5 target, TFT-FOS has already set its next goal: "to develop and realize an airworthy system that will be fully usable for fixed and rotary-wing aircraft operation."

This project is sponsored by the province of Noord-Brabant, the province of Zeeland, the department of Economic Affairs, and private investors.

Watch our flight test on YouTube:
www.youtube.com/watch?v=LpZa7mzodSM

Key words:
Deminsys Ultra flight test

NEW FACE AT TECHNOBIS FIBRE TECHNOLOGIES

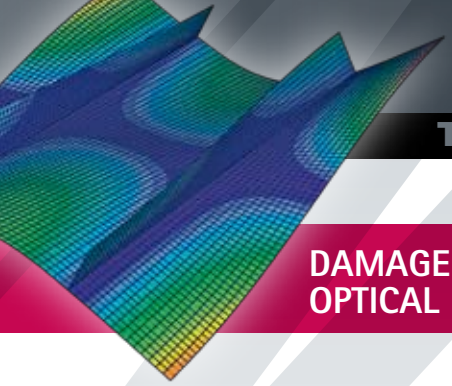
TFT-FOS has appointed Leen van Toor as International Sales Manager. With this appointment, Technobis Fibre Technologies is seeking to strengthen its position in the high-level sector of fiber-optics measurement instruments.

Through his wide range of previous positions in IT project management and sales, Leen van Toor has acquired a wealth of experience in account management. For the past six years, he has been self-employed, working primarily for the EPO (European Patent Office), with its 6,000 employees distributed between Munich and Rijswijk. Before that, he had worked for nine years as an Account Manager for vTA International.

Leen van Toor: "TFT-FOS is a specialist in the high-level sector of the fiber-optics industry, and it has developed a new and unique FBG measurement instrument that is capable of a multitude of new applications. This is exactly where my own interests and strengths lie: in the projection of new applications that will be distinctive for our clients. Moreover, TFT-FOS is a medium-sized company with a wonderful working culture.

Professionalism and quality are major features, and the atmosphere within the company is informal and friendly. For me, all of these characteristics together form a recipe for the perfect new employer."


Leen van Toor



DAMAGE IDENTIFICATION WITH OPTICAL FIBERS IN COMPOSITES

In the past year, considerable effort has been devoted to the application of optical fibers with fiber-Bragg-grating sensors for damage identification in composite structures. This project involves a collaboration between TFT-FOS, the National Aerospace Laboratory (NLR), and the University of Twente.

Aircraft require regular costly inspections in order to guarantee their safety. These inspections currently rely largely on manual, non-destructive methods. During the last century, considerable research was dedicated to developing more automated systems. These systems, known as structural-health monitoring (SHM), consist of a network of sensors for detecting changes in the physical and/or geometric properties of a structure from data gathered in two different states: a reference state (viewed as the undamaged state), and the current state. Changes can be caused by damage present in the structure. SHM techniques can be operated on-line during the flight or off-line on the ground, and they can focus on the global inspection of large surface areas or on the local inspection of highly critical areas (hot spots). The main objectives of SHM are to reduce the cost of ownership and improve the operational availability of the system.

The objective of the project was to examine the vibration-based response characteristics of a structure (e.g. natural frequencies, mode shapes, and modal strain energy) and determine which of these characteristics could serve as a damage indicator in an SHM system based on optical fibers. Several vibration-based damage indicators were evaluated for damage types relevant to aerospace applications, including cracks in aluminum structures and impact damage and stringer debonding in composite structures.

This research focused on a methodology for extracting damage information by comparing the measured response signals on the current state of a structure against an initial (undamaged) state of the structure. In general, four consecutive levels of damage identification can be distinguished, in order of increasing complexity:

1. Determine that damage is present in the structure
2. Determine the location of the damage
3. Quantify the severity of the damage
4. Predict the remaining service life of the structure

In addition to optical fibers, various other sensors are available. Optical fibers have a number of advantages for use in aerospace structures. Most importantly they

- are lightweight
- can withstand harsh environments (e.g. temperature and chemical components)
- are stable and durable over the long term
- are completely passive
- do not interfere with other signals in the aircraft

Numerical results obtained for a cracked aluminum plate and a two-stiffener composite plate with impact damage and stringer debonding have demonstrated the feasibility of detecting and locating various types of damage with a limited number of sensors by means of the change in modal strain energy, yielding a Level 2 structural-health monitoring system. Given a sufficiently large number of sensors, the scope of the damage (Level 3) can be determined as well.

The experimental investigation was performed by the University of Twente on a cantilever composite-beam structure. Dynamic properties, including natural frequencies and strain mode shapes, were obtained by using a forced vibration arrangement including optical-fiber Bragg gratings and by applying Operational Modal Analysis. This work has been extended to the two-stiffener composite plate structure.

MEET US AT:

MAINTENANCE NEXT **Rotterdam, The Netherlands, April 12-14, 2011**

MAINTENANCE NEXT TECHNOLOGIE- EN ONDERHOUDSEXPO 12 ↗ 14 APRIL 2011

LASER WORLD OF PHOTONICS **Munich, Germany, May 23-26, 2011**

LASER World of PHOTONICS

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