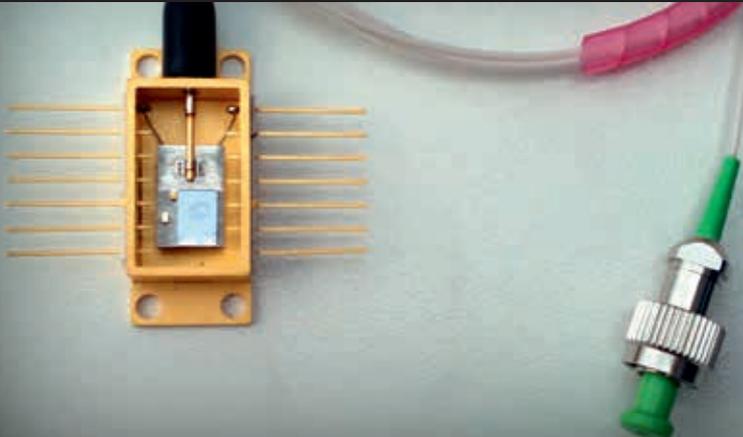


NEWSLETTER

Technobis Group

Number 11
November 2012



CONTENTS

GPICSLab

TFT-FOS goes Japan

Flexible Leg Control

Gator Chip

New face at TFT

Meet us at...

INTRODUCTION

Maybe this isn't the most professional thing to say, but I am pleasantly surprised by the fact that both Technobis Mechatronics and Technobis Fibre Technologies are achieving growth in these tough times. Several years ago, we chose to specialize in both companies and offer our customers a clearer profile of technology and services. It's immensely rewarding to see that our strategy seems to be paying off.

Technobis Mechatronics develops and supplies medical, life science and analyzing instruments in which precision mechanics, motion control, temperature control and photonics play a crucial role. Technobis Fibre Technologies has its own line of fibre-optic instruments and is mostly involved in dedicated R&D for large OEM customers.

At TFT-FOS, after introducing the first interrogator chip in our previous newsletter, we set about creating clearer development profiles for ourselves and our customers. Building on the basic interrogator chip, we have launched four lines of development, each targeting its own end-users while continuing to reinforce the other lines.

We came up with cool names for our projects and systems. The basic chip, used in all development trajectories for our specific end users, is called Gator (short for interrogator). The Gator will focus on further high-speed developments (MHz) with standard resolution and number of sensors. Ladybug is our high resolution system reaching nano strain level, while our

Ant system focuses on large numbers of sensors in one system (2400 sensors). The last development line – known as Falcon – is geared towards reducing the price of a basic interrogator module by achieving an incredibly high level of integration.

With the aim of speeding up developments in the building blocks for application-specific photonic integrated circuits, TFT-FOS and Van Der Hoek Photonics came up with the idea of combining the R&D activities of multiple SME companies in a joint R&D institute called GPICSLab (Generic Photonic Integrated Circuits Laboratories). Read on to find out more about this exciting initiative.

This newsletter also features tidings from Japan, where Rolf visited our reseller. And there's a chance to get to know our latest new employee, Johan.

Have fun reading our news.

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 complete product development projects, from the initial idea to a successful turnkey product, prototype or series product. Building on over fourteen years of experience, we have proved ourselves as an established supplier to mechatronic systems companies in a range of markets.



Technobis Fibre Technologies (TFT-FOS)

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

GPICSLAB

In the coming years the generic foundry approach will cause a revolution in micro and nanophotonics, just like it did in microelectronics thirty years ago. In Europe, three integration technology platforms are actively introducing the generic foundry concept for the major integration technologies in photonics: JePPIX for InP-based monolithic integration, ePIXfab for silicon photonics and TriPleX for low-loss dielectric waveguide technology.

GPICSLab

This article is proud to present GPICSLab, the cooperative research and applications group. The successful management and development of supply chain tasks for the design and production of photonic integrated circuits (PICs) requires a cooperative approach that incorporates the

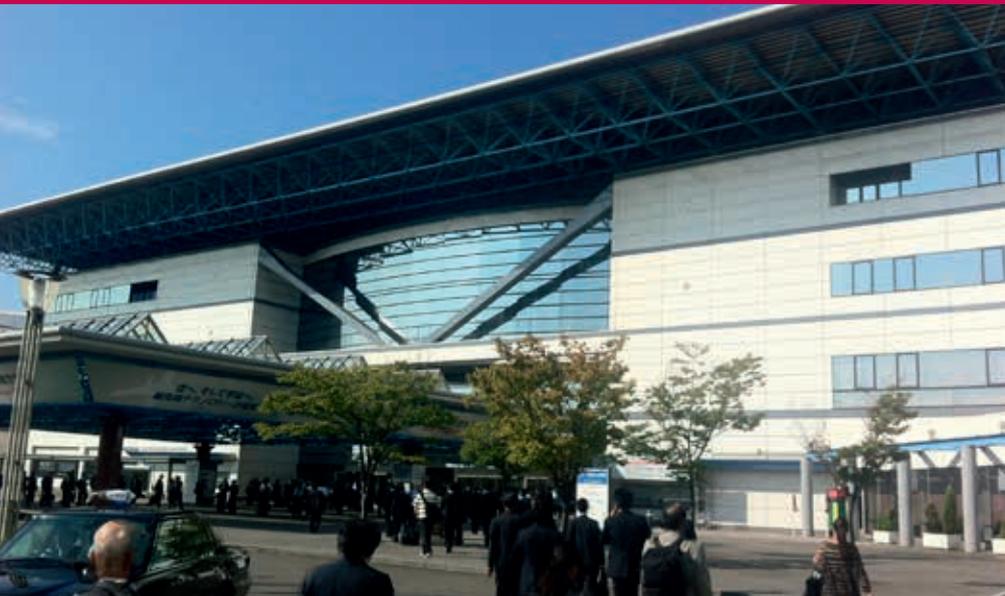
extensive insights found among suppliers, designers, packagers, foundries, etc. with regard to PIC manufacturing and integration of all relevant photonic platforms. GPICSLab aims to meet these requirements by teaming up its members and organizing ways to generate increasing knowledge and expertise.

Mission statement

To increase national and international business through joint research and development by closing the gap between scientific research and high-tech SME companies.

For more information please visit our new website www.gpicslab.nl.

TFT-FOS GOES JAPAN



Every four years, the Japan International Aerospace Exhibition 2012 is held in the Japanese city of Nagoya, from 9-14 October. This year TFT-FOS was represented at the Marubun Cooperation stand as a technology and product supplier.

This is the largest aerospace show in Japan and many major players were present: JAXA, SJAC, Boeing, Bombardier, JAA, Honeywell Aerospace, EADS, Kawasaki-, Mitsubishi-, Fuji Heavy Industries and many more. There were

several foreign pavilions and over 750 exhibitors in total, providing a fantastic opportunity to meet all kinds of aerospace interests.

Together with Marubun's highly skilled employees and several other invited technology suppliers, we were able to provide a very professional presentation that gave visitors an in-depth view of applied fiber-optic sensing technology. One of the highlights was the TFT-FOS

presentation of the first prototype of a photonics integrated circuit (PIC) based interrogator system. Visitors were amazed by the size and performance of this innovation, causing a sensation on the spot.

TFT-FOS is very grateful to Marubun for the opportunity to be part of this impressive exhibition and for introducing us to their sales force. The efforts of last few months promise to result in very interesting future relationships. Until we meet again!

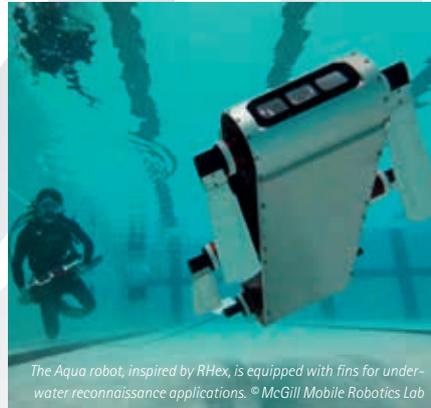


FLEXIBLE LEG CONTROL

Through the centuries, animals have evolved highly sophisticated mobility. Modern ground animals can run, jump, climb trees and swim with great speed and agility by moving their limbs rhythmically. They have adapted to various types of terrain and thrive in almost every environment on the entire dry surface of the earth.

Man came along and invented the wheel, giving rise to a new dawn of technological advances that has resulted in our modern world. Wheels are very successful devices for mobility when the terrain is flat and the surface has been prepared. Yet, they fail dramatically in natural environments where plants, rocks, rivers and other elements abound. In such terrain, legs are still advantageous.

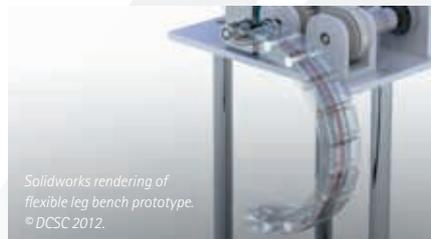
When designing search and rescue ground robotic platforms that need to operate in very rough terrain, wheels are no longer a feasible option and tracks or legs prevail. At the Delft Center for Systems and Control at Delft University of Technology we are interested in the motion control aspects of legged locomotion. Since the morphology of the leg influences its motion and energy efficiency, we have developed a new type of deformable leg that can change its geometry according to the terrain properties. Deformable legs open up a new world of possibilities in terms of mobility, but also introduce a number of challenges for motion control.



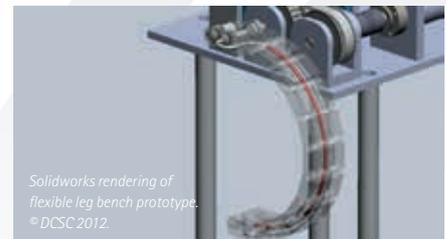
The Aqua robot, inspired by RHex, is equipped with fins for underwater reconnaissance applications. © McGill Mobile Robotics Lab



Flexible leg bench prototype. © DCSC 2012.



Solidworks rendering of flexible leg bench prototype. © DCSC 2012.



Solidworks rendering of flexible leg bench prototype. © DCSC 2012.

Effective control requires good sensors. Sensing the deformation of flexible legs that rotate continuously (as in the case of our search and rescue platform) would be a very challenging problem if we had no access to fibre-optic sensor technology. By embedding an optical fibre with a Bragg grating structure in the flexible leg, we are able to accurately measure the leg deformation in real time. The fibre is coupled to the robot's body through an optical fibre rotation element, resulting in a very simple sensing device that does not require electrical wires or wireless communication devices. This is a great advantage for underwater applications.

Novel, power efficient and lightweight sensing devices enable new robotic designs that push the boundaries of technology. A new revolution in soft and flexible robotics has already started. Fibre-optic sensors will play a major role in this new trend.

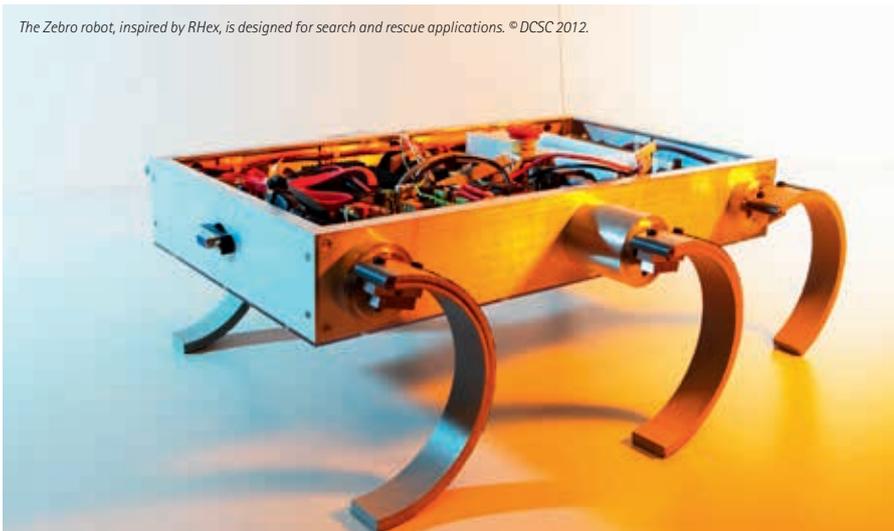
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Information about DCSC:

Delft Center for Systems and Control (DCSC) coordinates the education and research activities in systems and control at Delft University of Technology. DCSC was established in 2003 by merging the systems and control groups of Electrical Engineering, Mechanical Engineering and Applied Physics.

The Zebro robot, inspired by RHex, is designed for search and rescue applications. © DCSC 2012.





GATOR CHIP

In our previous newsletter, we announced our quest to base the next generation of interrogators and other fibre-optic sensing devices on photonic integrated circuits (PIC). As PIC technology advances and market demands become clearer and also more critical with regard to size, cost and performance, TFT-FOS is following up on its mission by defining multiple PIC-based functional targets and components to serve a wide range of market interests. Each target is dedicated to a particular market demand: high resolution, high speed, low costs and an increasing number of sensors for simultaneous readout while retaining high performance. The modular concept enables you to combine targets

to provide the most suitable and effective fibre-optic sensing solution.

The first basic element in this series is the Gator Chip. This is basically an arrayed waveguide grating (AWG) including fibre-to-chip interfacing and electronic bonding capabilities. Right now, several different configurations are being tested and evaluated for performance and integration feasibilities. This Gator Chip will form the basis for the next generation of high-speed interrogator systems for either digital or analog integration. Improved properties such as low power consumption or the compact size of such a system (small as a sugar cube!) make it tremendously user friendly.

NEW FACE AT TFT

I joined TFT-FOS on July 1 to start work on the Fabry-Perot Interferometer (FPI) project. I have a systems and control engineering background and worked for several years as a researcher at the Delft Center for Systems and Control. The topic of my PhD thesis which I am currently finalizing is multi-domain physical modeling and control.



Johan Koopman

Although I trained as a mechanical engineer, I have always been interested in other application areas and physical domains. The aim of the FPI project is to achieve nanometer (and subnanometer) resolution displacement measurements by using interference and fibre optics. Since the project revolves around optics as well as signal processing and electronics design, it gives me an ideal opportunity to take an integrated systems approach to this development.

The potential application areas for the FPI system are extremely interesting and varied: in-orbit astronomy, electron microscopy and lithography. I am looking forward to working at TFT-FOS and tackling the technological challenges involved in taking this system to the next level.

MEET US AT:

PRECISION FAIR 2012

Veldhoven, The Netherlands,
November 28-29, 2012

SPIE PHOTONICS WEST 2013

San Francisco, United States,
February 5-7, 2012

FBG ORDER WEBSITE

Visit our FBG order website and activate your account.
<http://fbg.tft-fos.nl>

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