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EDITORIAL

This issue invites Vladimir Bilik to introduce the origins of S-Team from a spin off to work carried out at the University of Technology in Bratislava following the Czechoslovak velvet revolution.

The 2nd World Congress (2GCMEA) is now only less than six months away and the Microwave Working Group is busy setting up a comprehensive programme of sessions, invited lectures, keynote speakers as well as a usual mix of generic activities and visits. There will also be the opportunity to indulge in a number of outdoor activities such as windsurfing, jet skiing and sailing at Long Beach, the venue of the 2GCMEA.

With the 2GCMEA in mind this edition of the Newsletter also highlights one of the short courses, entitled, "**Fundamental and**

advanced topics in RF and microwave processing" which is organised and presented at Long Beach by members of AMPERE. Student grants to attend the course are available (see below for details).

Finally, this issue launches a new column called "An Afterthought" where members can write short articles on any scientific topic, not necessarily related to RF or microwaves, but preferably to have some distant connection to our area of activity. I start myself with a piece relating to the cosmic microwave background radiation.

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S-TEAM: AN EAST-EUROPEAN STORY



By **Vladimir Bilik**
S-Team
Slovak Republic

History

S-Team is one of a few former Eastern Bloc companies that, starting from scratch, were able to find place alongside their established European partners.

The company, originally of three researchers, was founded in 1990 in the wake of the Czechoslovak "velvet revolution" as a spin-off of Slovak University of Technology in Bratislava, now Slovakia, where the founders-to-be (Jan Bezek and Vladimir Bilik) had been involved in research of scattering parameters measurement based on six-port reflectometer

principle. The name S-Team was actually derived from "S-parameters measurement team", with small allusions to steam as a powerful internal driving force and esteem, hoped to be deserved in some distant future. The logo is an "artful distortion" of the two-port signal-flow graph.

Added to the focused research orientation, a very essential precondition for being able to create a private company soon after the crumbling of the old system, was the nearly decade-long cooperation with industry. The partner was Tesla, the Czech radar manufacturer. In intimate cooperation with their engineers, six-port-based network analyzers, scalar network analyzers and digital sweep generators were developed. In addition to microwaves, skills had to be acquired in many related areas, such as microcomputers and their programming, high-level programming, PCB design, mechanical design, and, not least, organization and business; in



other words, the ability to undergo all the way from a vague starting idea to designing an apparatus down to the last minute details such as, for example, the design and position of a screw (and a user guide). To commemorate the people, one of S-Team autotuners carries the name of the late Tesla group leader Milivoj Stolpa.

After founding S-Team the collaboration continued on the new basis for the following few years, during which the S-Team gradually established contacts and found partners in the West. A helpful hand was offered by several companies, notably Rohde & Schwarz, Tricom and Muegge, who ventured the risk of early stage cooperation and, by their sympathy and support, helped in forming S-Team to the stage it has reached at present. While we still cooperate closely with these companies, S-Team employs six full-time engineers, two technicians, and two administrative staff. We still reside at, and closely cooperate with the university, with some members acting as part-time research fellows.

Activities

One of the first commercially successful products, started in early 1990s, was called InSite (Fig. 1). It was a 5 MHz – 2.7 GHz portable versatile measurement system combining the in-house invented lumped-element six-port vector reflectometer [1], scalar network analyzer, power meter, synthesized signal generator and spectrum analyzer. The unit was controlled via RS232 from an external PC in which a graphical user interface program was running with some specialized routines, such as time domain reflectometry (based on chirp z-transform) and robust automated resonator parameters measurement, based on own methods of least squares fitting of scalar transmission and vector reflection coefficient responses [2], [3]. The main InSite application was testing of antenna installations, base stations and repeaters for mobile phone operators. A modified version has been used in the microwave processing industry as a “cold

measurement” system for the development and testing of components and applicators. Also for communication industry, the compact wide-band log-periodic antenna STA3 was developed (Fig. 2). This is still a very popular compact system.



Fig. 1. InSite multipurpose portable “cold measurement” system.



Fig. 2. Antenna STA3.

The current flagship of the company, “hot measurement” Homer series of high power vector reflectometers and autotuners – automatic impedance matching systems (examples in Fig. 3 and Fig. 4) is also based on the six-port principle. It is operating in various ISM bands and able to cope with many “outrageous” signal waveforms and situations met with in the industry. In creating Homer, the InSite experience was widely exploited, however, to keep pace with ever growing application demands, research and



**2CGMEA AMPERE SHORT COURSE PRESENTED AT THE WORLD
CONGRESS 23 JULY 2012**

**FUNDAMENTAL AND ADVANCED TOPICS IN
RF AND MICROWAVE PROCESSING**



Lecture 1
Prof Juan Monzó-Cabrera

Principles of microwave-heating technology

Main equations
Physical principles
Microwave heating systems and devices
The heat equation
Microwave-assisted drying
Simulations and uniformity indicators
Conclusions



Lecture 2
Prof José Manuel Catalá-Civera

Advanced Microwave Measurements

Introduction to microwave measurements
Dielectric properties measurement
Types of network analyzers
High-power impedance measurement
Frequency measurements
Summary and Conclusions



Lecture 3
Dr Paolo Veronesi

**Design and selection criteria of microwave
applicators**

Introduction and basic concepts
Flowchart for applicator selection/design
Impedance matching and heating
homogeneity
Single feed or multi feed
Pressure windows

Chokes and safety
Examples: continuous drier, traveling wave
applicator, slotted waveguides as feeds
Conclusions



Lecture 4
Prof Vadim Yakovlev

**Modeling and Optimization of Microwave
Applicators**

Introduction-Electromagnetic and coupled
problems
Numerical techniques and modeling tools
Computational strategy for CAD
Optimization of microwave heating
Examples of modeling and optimization
projects
Discussion and Conclusion



Lecture 5
Dr AC (Ricky) Metaxas

Review of Industrial Applications

Introduction
RF Applications
Moisture leveling
Arcing issues
Microwave applications
Conclusions

**GRANTS FOR ATTENDING THE CONFERENCE
AND COURSE**

The Management Committee of AMPERE
invites applications from students to apply for
a grant of 800 euro to attend the 2GCMEA
conference and the short course outlined
above. Applications and details about
eligibility will appear on the AMPERE website
(www.ampereurope.com) in the first week of
March.



C-TECH INNOVATION'S NEW LABORATORIES

The long standing UK based innovation services business celebrated the opening of its new facilities at Capenhurst near Chester UK, in November 2011.

Do browse at www.ctechinnovation.com for more information about the services they provide in the fields of faster heating methods, harnessing natural energy, innovative recycling processes and improved energy efficiency.

EVENTS

Time-domain FEM and Applications

International Workshop on Finite Elements for Microwave Engineering
Estes Park Colorado, USA, 4-6 June, 2012
More information can be found in <http://www.engr.colostate.edu/FEM2012>

IMPI Congress 2012

Bally's, Las Vegas USA, 20-22 June 2012
For more information contact Molly Poisant
Executive Director
molly.poisant@impi.org

GCMEA 2012 MAJIC 2st

Global Congress on Microwave Energy Applications
Long Beach California USA, 23-27 July 2012
Organised by the Microwave Working Group International Committee Chairperson B Krieger
Cober Electronics USA
<http://www.jemea.org/majic2012/>

PIERS 2012

Progress in Electromagnetics Research Symposium (PIERS)
Moscow, Russia, 19-23 August, 2012
<http://piers.org>

Special Session "Microwave Processing of Materials - Recent Advances in Modeling and Experimentation"

Abstract submission deadline: March 20, 2012

For more info, contact Vadim Yakovlev, Session Chair and Organizer
E-mail: vadim@wpi.edu

SCEE 2012

Scientific Computing in Electrical Engineering
ETH, Zürich Switzerland, 11-14 September 2012

Topics

1. Computational Electromagnetics
2. Circuit and Device Modelling & Simulation
3. Coupled Problems
4. Mathematical and Computational Methods

Last SCEE 2010 to browse through <http://sites.onera.fr/SCEE2010/node/1>

14th International AMPERE Conference 2013

The 14th International AMPERE conference on Microwave and High Frequency Heating will be staged during September 2013. Details will be published online in due course www.ampereurope.org



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Association of Microwave Power in Europe for Research and Education (AMPERE Europe)