# WORK-IN-PROGRESS

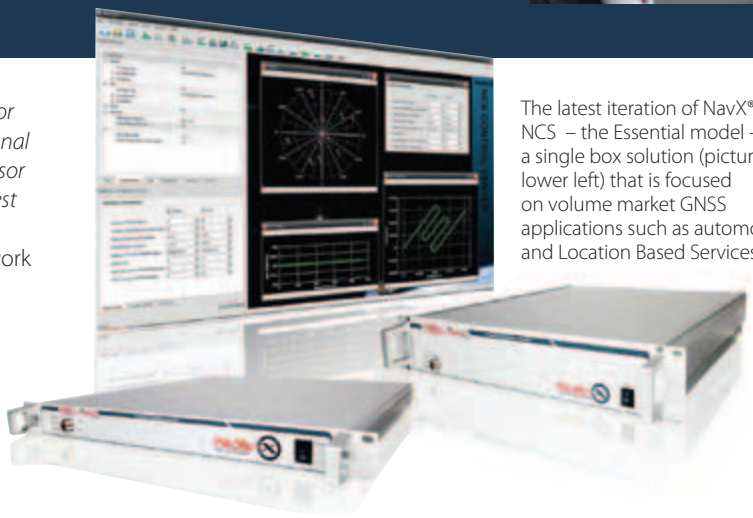
## GUENTER HEINRICHS, HEAD OF CUSTOMER APPLICATIONS & BUSINESS DEVELOPMENT AT MUNICH-BASED IFEN, TALKS TO GEOCONNEXION ABOUT WORK MICROWAVE AND HOW THE TWO COMPANIES ARE COLLABORATING IN THE BURGEONING MARKET FOR GNSS TEST AND SIMULATION SOLUTIONS

**GEO:** *WORK Microwave (www.work-microwave.de) has made a name for itself over a quarter of a century as a developer of 'best in class' Digital Signal Processing test solutions for radio broadcasting, defence-related and sensor measurement applications. Why the move into the GNSS constellation test and simulation market?*
**Guenter Heinrichs (GH):** It was a natural extension of our existing work that commenced, in 1999, with algorithms and prototype integrity test software for EGNOS, the precursor programme to Galileo. It was also the first of many projects in which we collaborated with a near-neighbour, IFEN GmbH (www.ifen.com), the specialist provider of ground-based RF test hardware for navigation satellites and operator of GATE, Germany's Galileo test and development facility in Berchtesgaden (www.gate-testbed.com). This work led on to the Galileo programme itself in which we were involved from the start in assessing, evaluating and simulating the proposed signal structures and characteristics. Based on this, we also started to develop the first Galileo receivers.

**GEO:** *2005 marked another milestone in your evolution of GNSS solutions with the decision to launch commercial products. Can you elaborate?*
**GH:** It was a considered decision to exploit the expertise we had gathered on the European programme and for which we saw growing demand. As a small software-oriented company we obviously had to think carefully as to how best we could satisfy demand on both a technical and customer support level. We quickly came to the conclusion that the mass market was not for us and, instead, elected to satisfy needs in two distinct areas: solutions for the professional GNSS market and for scientific research. The result is an evolving family of L, S, C, X and K-band signal simulators for the former and single/multi-frequency software receivers for the latter. In both areas, we have worked closely with IFEN to develop and deliver complete hardware/software solutions.

**GEO:** *You started shipping the first commercial units to customers in 2008, presumably against strong competition from the market-leader?*
**GH:** It's never easy to compete directly against a much larger, well-established supplier, but we've managed to double our turnover year-on-year and grow our workforce from 9 to 40 over the past decade so we must be doing something right!

**GEO:** *Can you give some idea of the customer base you now serve?*
**GH:** It ranges from developers and manufacturers of GNSS chipsets and survey-grade receivers such as Ashtech who need to test and calibrate their laboratory equipment and production output, to in-vehicle navigation system integrators such as Bosch and Denso, as well as consumer goods manufacturers such as Sony and Panasonic. And, of course, we now provide a second source for governments, NGOs and other long-term users who are considering replacement options for their existing test and simulation equipment. Our first success in this area came last year with the sale of a reference simulator to the Indian Government's Space Applications Centre for development and testing of its IRNSS payload.



The latest iteration of NavX®-NCS – the Essential model – is a single box solution (pictured lower left) that is focused on volume market GNSS applications such as automotive and Location Based Services.

**GEO:** *The relationship between WORK Microwave and IFEN was recently put on a more formal footing with the announcement of a joint venture. Can you explain what this brings to each partner and outline its most recent achievement?*
**GH:** In terms of sales and marketing, it opens up opportunities for both companies, giving WORK Microwave access to IFEN's GNSS sales & marketing know-how and giving IFEN access to our global dealer network for its products, not least in the telecommunications sector where there is growing interest in satellite navigation test solutions.

On the technology front, we've continued to build on the jointly-developed NavX®-NCS, the first commercially-available Galileo/GPS RF navigation constellation simulator covering the E1/L1, L2, E5ab/L5, and E6 frequencies in a single box. The most recent iteration, NavX®-NCS Essential, developed over a 12-month period and launched late last year, allows simultaneous simulation of GPS, GLONASS, SBAS, QZSS and Galileo satellites covering all L1-band operating frequencies, again in a single box. This latest addition to the existing NavX®-NCS Professional and Standard models will not only generate any known signal today, it also has the capability to cope with modulations and signal structures yet to be developed. This model is aimed squarely at those producing consumer and automotive GNSS products that utilise the L1 upper frequency, including those that will make use of China's independent Compass (Beidou-2) constellation.

**GEO:** *How do you see the future panning-out for WORK Microwave?*
**GH:** The intention is to maintain steady growth, build market share, and reinforce the brand as a preferred second source. That's fine for us, because being No.2 means we don't have to keep looking over our shoulder!

**GEO:** *Maybe you have something in the development pipeline that will whet the appetite of readers?*
**GH:** We have applied for a project part-funded by DLR, the German Space Agency, to extend our capability for the automotive market by developing a record-and-replay test system. All being well, we should be in a position to offer this commercially sometime next year.