

Innovation + Communication = INVACOM GLOBAL

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It's not exactly grammatically correct, but INVACOM's name is derived from those two words: Innovation and Communication. The second word is directly connected with satellite communication and the first word, well, that's actually what we wanted to find out. What is so innovative with INVACOM? To learn more, we took a trip to Stevenage in England north of London. Stevenage was at one time the location of England's largest aircraft manufacturer; today you will find a large shopping center much like those you'd find in the USA. In the same area it is also where you will find INVACOM.

The company has been around since the year 2000. It was founded by two Microwave Engineers, Gary Stafford and Dave Smith, who previously worked for Marconi, where they developed LNBs. They recognized the large Direct Broadcast Satellite (DBS) market and decided to take their ideas and further develop them on their own. They picked up a significant investor in Roger Pannell, who, in 1984, literally founded the

company GLOBAL COMMUNICATIONS in his garage; a company, which specializes in the manufacture of satellite accessories. GLOBAL's first successful product in 1984 was a Magic switch that back then was used to switch between polarizations; DiSEQC switches and other products, such as the tvLINK, came later on.

Roger certainly had the ability to look ahead; in the year 2000 he recognized that

▲ **INVACOM** recently moved into this office complex that from the outside looks unremarkable - their previous location, not far from here, had become too small. Jerry Vaughan's Mitsubishi pickup truck sits here in a visitor's parking space. He's a fisherman and often travels to the country with this truck.

the future of individual components would become very critical. The start of a new LNB manufacturer such as INVACOM opened a completely new perspective for him. Roger Pannell has now taken a five year sabbatical, leaving his position in the capable hands of Tony Taylor, the new Managing Director of Global Communications. Roger



▲ A look at the courtyard. The door to the right leads to INVACOM's warehouse. After the merger between INVACOM and GLOBAL COMMUNICATIONS in early 2007, all of their products reach their customers from this warehouse, previously operated by another company.



▲ One of the success products from GLOBAL COMMUNICATIONS, originally an INVACOM partner, and now melded into INVACOM: a DiSEqC switch for a US PayTV provider. 10 million of these components were produced and shipped by June 2005. It is, however, a product without much future: today DiSEqC switches are integrated in combination LNBs.

removed himself from active participation in the company and is currently expending his time and energy with aid projects in Africa. It is an extraordinary gesture from a man who never took his personal success for granted and gives some back in an effort to make the world a better place.

After GLOBAL COMMUNICATIONS entered the picture financially as a part owner of INVACOM, the first product appeared on the market: an LNB especially designed for Channel Master UK.

In 2003 the ownership team expanded even more: Jerry Vaughan took over the

Sales and Marketing Department while John Parfitt manages production.

Jerry Vaughan gave us a few more details: "Today INVACOM has 23 employees of which four are Directors, 10 are Design Engineers, five are in production, two are in the warehouse and logistics and two more in sales and management."

Jerry told us even more, namely the unusual but gratifying increase in sales figures: "In the fiscal year from April 2005 to March 2006 we had sales of 2.1 million Pounds, a year later, that is, up to March 2007 it was 7 million Pounds, by the end of March 2008 we expect it to be 11 million Pounds."

Sales figures that double every year? Can that be? We were skeptical, and this is where Jerry introduced us the innovations at INVACOM: INVACOM developed special LNBs with or without transceiver and also for Ku-band or Ka-band for leading VSAT Network operators world wide.

One model in addition to the LNB, also includes an OMT and wave guide. These systems are proprietary and are only offered by providers in connection with a service package. For INVACOM they are products that significantly increased sales.

On closer inspection we noticed that much of their sales goes to the USA. Jerry analyzed it for us geographically: "In 2007 55% of our sales went to the USA, 30% ended up in Europe and 15% went to Asia."

For 2008 these numbers will spread even further apart: "65% to the USA", Jerry is confident since the majority of the orders are already in place, "15% to Europe and 20% to Asia."

The management at INVACOM is well aware of the dependency on a few large customers and the negative effects this can

have. And that's when the bundled fibre optic cable appeared from behind Jerry's back. Now what could this be all about?

In fact, Jerry next showed us an LNB with a fibre optic connection. Excuse me? A what? Did I wake up in a space ship? Am I still on Earth? Jerry laughed. "One of our founders, Gary Stafford, came up with this idea in early 2007."

The question of whether this is even technically possible was in the meantime answered; the first prototypes already exist. More development work needs to be done but the system should be on the market by the Spring of 2008.

The most significant advantage of a fibre optic system is the extremely small signal loss. At this point in its development, the signal can be split up to 32 times allowing up to 32 users to be connected without the need for any intermediate signal amplification. Even the question 'how long a cable run can you have?' really no longer comes into play: because of the negligible signal loss, cable runs can be quite long.

Andrew, INVACOM's fibre Project Manager, explains the technology: "The two polarization levels are stacked on top of each other, that is, we use a bandwidth of 1 to 5 GHz in the transmission laser in the LNB."

Two-way and four-way splitters are used to distribute the fibre optic signal and special wall plates are used to link the fibre optic cable to a standard satellite receiver. These wall plates convert the receiver's control signals for use in the fibre optic cable.

"Why does this LNB still have an 'F' connector?" we asked innocently enough. "The LNB gets its power through this connector," explains Andrew, "because power can't be delivered via a fibre optic cable." But, of course.

The use of fibre optic cables to carry satellite signals is so new that we never even considered the consequences.

This technology is highly interesting and was conceived with the future in mind. No longer any attenuation: extremely long distances can now be spanned! Star distribution systems are a thing of the past! Fibre optic cables are much thinner than coax cables! If you bundle a number of fiber optic cables together, a large number of satellite signals can thus be accessed.

Much of this is still in the future. One advantage is that pre prepared fibre optic cables can be used. Regardless of how long



▲ Tony Taylor is Managing Director. Tony, who lived for many years in France and Germany and who speaks both languages fluently, is showing us here the Award INVACOM received from ASTRA for the development of the fibre optic technology.

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Indonesian	Indonesia	www.TELE-satellite.com/TELE-satellite-0803/bid/invacom.pdf
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of a cable run is to be the losses are insignificant (0.3db per km), the installer uses cables that already have connectors mounted on each end. Should surplus fibre be left over during installation it can be left coiled in cavity walls floor or roof spaces. Other advantages are that fibre is cheaper than coax, easier to store and lighter to transport.

If this technology catches on, and there's no reason why it shouldn't, then it won't take long before receivers will come with the necessary fibre optic connection for the LNB.

This should all be very thoroughly thought out; what could the consequences of this technology be? What, for example, will become of the looped-through output? And what about two, three, four, five or six receiver systems when it will be so easy for the satellite signal to be multiplied?

TELE-satellite will be reporting on this system in their upcoming 04/2008 issue. Until then, ready-to-use components from the regular manufacturing line will be available. If you want to get a look at this new technology yourself, simply pay a visit to ANGA 2008 -

Jerry Vaughan will be introducing these fibre optic LNBs at the *NEW GLOBAL INVACOM* booth.

Despite this exceptionally new technology, there are still more innovations with Invacom. A high-performance switch will be introduced in an upcoming issue of TELE-satellite and in a subsequent issue a stacker will be highlighted: it will take a polarization level and give it a frequency shift resulting in some interesting possibilities.

INVACOM: this company certainly lives up to its name!



▲ Jerry in his Command Central. The in-house safety people were undoubtedly right in insisting that the laptop be mounted on a pedestal so that the display would be at eye-level for the user. Sue Twomey, in the background, works with Jerry handling marketing and management affairs.



▲ Even the electronics in the LNB is simulated. Adrian Brixton is seen here with a PCB simulator. He designs the circuit concept and then uses the PC to determine if it will function as planned in the real world.



▲ How do you test the concept of your LNB? Today, this is also handled electronically. Chris Timmins demonstrates the "HF Structure Simulator" software: it simulates the behavior of an LNB and its feed. Here, Chris is in the process of optimizing the polarizer of an LNB model. He adjusts a few parameters, simulates a satellite signal and checks for any improvement.



▲ INVACOM products are manufactured in China under constant supervision. Thanks to Skype, this is today no longer a cost issue: INVACOM telephones the manufacturer every morning to discuss the day's production. One Internet server is constantly fed with live production data that INVACOM permanently has at their fingertips. But virtual values must also be checked in the real world. Here we see Andy Bolt checking out the LOF of a recently delivered LNB: everything looks OK, the spektrum analyzer shows a spike at 9.75 GHz; a push of a switch and the spike now sits at 10.6 GHz. Perfect!



Dave Smith is Technical Director and one of the three founders of INVACOM



Gary Stafford, a.k.a. 'the crazy professor', is Managing Director and another founder of INVACOM



John Parfitt is Operating Officer and joined INVACOM in 2003 as a partner. He previously worked for Marconi and Channel Master.



Roger Pannell made their success possible: he invested in INVACOM and later merged his company GLOBAL COMMUNICATIONS with INVACOM. GLOBAL COMMUNICATIONS operates from another location and deals with accessories such as DiSEqC switches. GLOBAL COMMUNICATIONS lists 45 employees, but the warehouse and shipping are managed centrally by INVACOM.



Jerry Vaughan has been an INVACOM partner since 2003. He is a marketing oldtimer with 30 years of experience of which 15 years were with SIS, Hughes Network Systems and Red Wing Satellite Solutions, an uplink provider.

Here INVACOM is constructing the future



Andrew is INVACOM's Fibre Project Manager. He has the stressful job of building a new future: linking the LNB with fibre optic cables.



Mike checks out the prototypes. Here we see a sample product: an artificially produced satellite signal is sent over a 30-meter long fibre optic cable to a converter. He uses a test probe to determine if the original signals arrive at the analyzers within tolerance.



This is what the wall plate prototype looks like: the fibre optic input is on the front while the standard connection for a receiver coax cable is on the back. As you can see, the wall plate needs power. In actual use later, the wall plate will get its power from the satellite receiver's LNB input.



The future has already started and TELE-satellite readers already know more: here is the first prototype of an LNB with a fibre optic connection. The "F" connector is only used to supply the LNB with power.

