



● ● Rowan Gilmore, Managing Director of EM Solutions

EM Solutions is recognised by customers globally for designing and manufacturing differentiated microwave and RF products and systems for satellite and broadband communications. Renowned for technologically-superior design, manufacture, and support of microwave technology, EM Solutions are leaders in supplying next generation high speed communications products that assist in the delivery of real-time voice, data and multimedia anywhere in the world.

Committed to innovation and delivering quality solutions, EM Solutions consists of an agile team of people able to provide superior communication technology quickly and accurately with full design, manufacture, testing and support services available in-house and governed by strict ISO9001 quality practices.

Emerging from its predecessor company MITEC in 1998, EM Solutions produces integrated RF modules such as low noise receivers and solid state high power transmitters for defence and commercial customers, as well as the complex systems in which they are used. These sophisticated systems are used primarily in microwave terrestrial and satellite links, or in other applications such as radar, radio-astronomy, and remote sensing.

# GMC

## Q&A

## Highest level of assured communications ● ●

EM Solutions was established in 1998 to deliver communications solutions for the defence, maritime, broadcast and telecommunications sectors around the world. The company has historically manufactured a wide variety of microwave subsystem products, including block up converters (BUCs) with microwave solid state power amplifiers (SSPAs), filters, Ka-band and X-band LNBs, frequency synthesisers and linearisers. More recently, it has developed high value systems incorporating these products, in particular its multi-satellite communications on the move (COTM) terminals. Amy Saunders spoke with Rowan Gilmore, Managing Director of EM Solutions, about the changing market and key technologies.

### **GMC: Can you provide a brief introduction of your company and its solutions?**

**Rowan Gilmore:** EM Solutions is one of a few businesses around the world that can design and manufacture fully customised and defence-quality radio products in small volumes. Because we have moved up the RF communications value chain over the past twenty years, we are quite vertically integrated and can develop and deliver advanced systems that incorporate many of our own modules and sub-systems.

In addition, we are also able to manufacture electronic systems for third parties on a build-to-print basis. But generally we differentiate most at the top end of the value chain, where we integrate our own terminals and subsystems with a rack of OEM modems and networking gear to provide a complete communications solution. We are still a small business, so highly agile and custom in what we can provide, but have operated successfully for so long and for so many customers that commercial risk is no longer an issue.

### **GMC: Satcom-on-the-move solutions have played a key role in operations around the world in recent years. What can you tell us about your COTM solutions, and what benefits do they deliver compared to competitor offerings?**

**Rowan Gilmore:** Our COTM offerings are intended to provide the highest level of assured satellite communications possible. We do this by designing each of our terminals to work over multiple satellites, in multiple bands, and in some cases with redundant BUCs to remove as many potential points of failure as possible.

In addition, we support the highest availability communications for any terminal on the move, particularly under severe motion. We build the only OTM small terminal that offers closed-loop tracking based on monopulse detection of the satellite signal, which tests have proven provides the most accurate, best in class tracking. We have been told by several customers that our three axis tracking system performs better than any competitor, particularly when the satellite is directly overhead.

Other features such as the linearity of our BUCs, their endurance, and the temperature range that our ambient air heat exchanger provides sweeten the value proposition. And they are ITAR free.

### **GMC: What trends are you observing in the COTM field for government and military applications, and how is EM Solutions addressing these trends?**

**Rowan Gilmore:** Assured communications remains important for defence forces, and we support this through features integral to our terminal. Of course, the trend to higher bit rates continues unabated. A good OTM terminal can support this by providing accurate pointing (high availability), constantly high gain, and better linearity so the BUC can operate at higher average transmit powers. We have comparison data from one network operator who tells us that our terminals are the most data efficient on their network, because our BUCs are far more linear than competitors and can operate with less back-off to provide higher data rates. Superior features such as pointing accuracy and linearity add up to higher data rates in equivalent bandwidths, which over time significantly lowers the operating cost.

Another trend we are hearing more about are higher frequency satellites. Our own work at E-band (where we have built terrestrial networks with our own modem and radio designs) will be invaluable in the future, since we believe the way we

# DEFENCE SATELLITES

Conference and Exhibition

5<sup>th</sup> – 7<sup>th</sup> June 2018

Paris, France

## Confirmed Speakers

- **Pascal Legai**, Director-General, **European Union Satellite Centre**
- **Captain David Moody**, Deputy Head of Space, HQ Joint Forces Command, **Ministry of Defence, United Kingdom**
- **Dr. Christina Giannopapa**, Acting Head of the Political Affairs Office, **European Space Agency (ESA)**
- **Dr. Gregory Edwards**, Director Infrastructure Services, **NATO Communications and Information Agency**
- **Lieutenant General (Ret) Henry de Roquefeuil**, Military Advisor, **Centre National d'Etudes Spatiales (CNES), France**
- **Johan Kohler**, Head of Solar System Science, **Swedish National Space Board**
- **Martin Coleman**, Executive Director, **Satellite IRG**
- **Squadron Leader (ret) Chris, Dunn**, Space Training and Education Consultant, **Defence Consultancy, United Kingdom**
- **Naomi McGill**, Researcher, **King's College London, United Kingdom**

Official  
Partner



## Sponsors and Exhibitors



eutelsat



inmarsat

The mobile satellite company

For more information visit – [www.intelligence-sec.com](http://www.intelligence-sec.com)

Book your place by:

Web: [www.intelligence-sec.com](http://www.intelligence-sec.com) | Email: [events@intelligence-sec.com](mailto:events@intelligence-sec.com) | Tel: +44(0)1582 346706

have implemented the digital coding for long paths with low signal-to-noise ratios will be perfect for satcom and UAV applications.

**GMC: As of March 2017, the Australian Border Force is using Inmarsat's Global Xpress satellite service over EM Solutions' Cobra-class satellite communications terminals. What can you tell us about the solution, and how is it improving the Australian Border Force's day to day capabilities?**

**Rowan Gilmore:** The first series of Cobra terminals was deployed on the ABF's fleet of Cape Class offshore patrol vessels. It was implemented as a dual Ka-band solution to switch from military Ka-band to the commercial Ka-band on demand. This has proven a very versatile solution, since the Inmarsat GX network is instantly available and reconfigurable for unexpected missions or deviations in route. The crew love this solution and use it for both mission purposes and welfare. It has given them communications capabilities they have never enjoyed in the past.

**GMC: Border protection is a key part of every nation's security, and it can be complex to get every aspect adequately-covered. What's your take on the key challenges, and how can countries improve their existing infrastructure?**

**Rowan Gilmore:** The key challenge is one of budget where border forces are being asked to do more. Just as with their use of commercial networks for cellular phones, it makes perfect sense for border forces to adopt COTS dual-use solutions, using existing infrastructure where possible to save capital costs. If



● ● 45cm land mobile Taipan

there is a sunk investment in sovereign defence satellites, these should be used where possible to save operational costs, but fall-back to a commercial solution makes good sense when the defence network is pre-empted or unavailable, since capability can continue undiminished over the commercial service.

**GMC: EM Solutions' Cobra X/Ka tri-band Maritime Terminals are proving popular with the Royal Australian Navy, which has installed two on Cape Class Vessels and ordered more via Raytheon Australia as part of the SEA1654 programme. Can you outline the technology behind these tri-band solutions, and explain the benefits they deliver to the Royal Australian Navy?**

**Rowan Gilmore:** The antenna feed technology for simultaneous X-band and military Ka-band communications, with fall back to commercial Ka band, and by the way must also incorporate sensors for monopulse pointing to different satellites, is very complex indeed. Although the parabolic reflector itself is broadband, the feed has to be assembled in segments to couple off the correct signals at the correct frequencies. It includes its own combining networks to deliver the data signals at Ka-band through one section and X-band in another. The system uses a separate BUC and LNB for Ka-band (both military and commercial bands), and a second pair for X-band.

This complexity has its benefits however, chief being the terminal's versatility in increased data throughput (with simultaneous operation in two bands), its increased availability (because of the more accurate monopulse pointing, fall back to the GX network if the military network is congested, and reliance on X-band in poor weather), and its increased reliability (since it uses multiple BUCs and separate satellite systems).

**GMC: In October 2017, you gained a new board member: Major General Jeff Sengelman DSC, AM, CSC. What experience is he bringing to EM Solutions, and how will he**



● ● Tri-band X & Ka Cobra

### help develop and deliver continuously improving capabilities to your customers?

**Rowan Gilmore:** Jeff's presence on our Board will help strengthen EM Solutions in many ways. In the Australian Army, Jeff was at one point responsible for Land Forces Modernisation so is well versed in what a 'digital' armed force requires, including for communications, so he can talk knowledgeably and authoritatively about technology and requirements in the same terms as many of our customers. He is well-known among allied defence forces around the world for his work in counter terrorism, so he can help EM Solutions with introductions and his understanding of global operating scenarios and needs. And of course, he is highly respected among serving members of the Australian Defence Force, so he knows our customers well.

### GMC: What do you expect EM Solutions to achieve in 2018?

**Rowan Gilmore:** EM Solutions have doubled in size over the past four years and we expect that trajectory to continue. That growth enables us to continue to invest in new product development and in providing post-sales support to our customers. In 2018, we will be introducing our new amphibious 65cm terminal suitable for quick setup and removal on either a boat or four-wheel drive for tracking over either land or sea while on the move. In the course of the year, we also hope to demonstrate a working prototype of our revolutionary new flat panel antenna that will retain all the advantages of our current terminals – broad operating frequency to enable communications on dual-use satellites, and monopulse tracking for accurate pointing while on the move.

**GMC**



● ● 65cm Ku-band Salamander

**GVF** *Satellite.  
Solutions.  
The World.*

- **GVF serves as the unified voice of the international satellite industry** ●

[www.gvf.org](http://www.gvf.org)