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GVF Directory

& Satellite Resource Guide

2017

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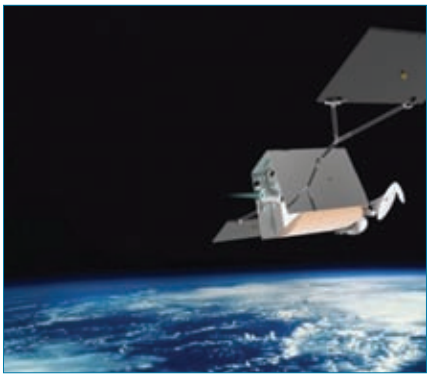


Satellite-based solutions are vital and essential

The importance of telecommunications in everyday lives across the world has grown exponentially over the past years. Satellite-based solutions have been a vital and essential element in providing individuals access to a global marketplace and communications. With the rapid development of new products and technology, services and applications continue to advance to meet ever-expanding requirements, allowing the industry to continually deliver valuable, secure, reliable, and cost-effective communication services to traditional enterprise customers.

Mobile users have become ever more reliant on evolving media habits and trends, such as smart devices, social media applications, the Internet of Things, over-the-top streaming, cloud and data storage services. Satellite bandwidth demand has increased with escalating user connectivity on mobile, on-land, at-sea and in-the-air channels.

The communication systems and service providers highlighted in this 2017 Directory are all leaders and driving forces in rolling out satellite based solutions transforming the way people, businesses, and organisations communicate worldwide.

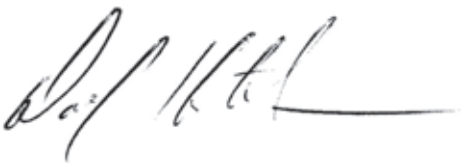
The work of GVF and the GVF Membership was recognized in 2016 by the Arthur C. Clarke Foundation with a 2016 Sir Arthur Award in International Achievement, in recognition of GVF's effective and staunch promotion of the satellite industry. The Society of Satellite Professionals International (SSPI) has also awarded the GVF with the 2016 Better Satellite World Award, in acknowledgement of GVF's achievements in training satellite professionals, enabling global disaster preparedness, and coordinating with partners to serve humanitarian solutions around the world.

The emergence of new technologies, such as HTS, NGSO and GSO systems, has allowed the satellite industry to effect dramatic changes in the economies of satellite services, opening the door to a shift away from a one-size-fits-all solution to an approach that allows providers to offer greater data capacity at much lower costs, providing broadband for a vast range of applications tailored to stakeholders' fast-growing, diverse demands. HTS has added new dynamics in the satellite broadband communication ecosystem by expanding product and service applied innovations, increasing satellite backhaul delivery, and securing global network access that serve corporations, governments, militaries, non-governmental organisations, institutions, small and medium businesses, and individuals.

Included in this edition of the GVF Member & Satellite Resource Guide are multiple initiatives designed to help take satcom services to the next level. The global communications community is using the GVF as a valuable tool kit, not only serving as a means of elevating their promotional profile, but as a provider of training for their staff and customers, a promoter of best practices and quality products, a leader in a 'culture of security', a critical supporter of global relief efforts and expanding access to key markets, and a guardian of continuous availability of bandwidth spectrum.

Anyone who wants to learn more about what the satellite industry has to offer is invited to make direct contact with GVF Members, either through the listings in this 2017 Directory, or via the interactive online GVF Directory at www.gvf.org. As a complimentary service to the communications community, GVF also provides numerous resources to strengthen awareness of the benefits of satellite-based broadband solutions and facilitates end user contact with the global satellite communications industry.

Lastly, GVF serves as the unified voice and advocate of the international satellite industry. Established in 1997, the GVF is celebrating its 20th year as a non-profit and non-partisan association that was founded by 27 companies from throughout the world, and has grown to a community of nearly 200 commercial organisations in every major region of the world. Whether your organisation is a satellite service or system provider, a regulator or ministry, or an end user, we would be honoured to facilitate your participation in this dynamic industry.

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Chairman

Arunas Slekys, Vice President, Corporate Marketing, Hughes Network Systems. Arunas Slekys is responsible for managing all of Hughes marketing communications and advocacy initiatives worldwide.

He holds a B.App.Sc. degree in electrical engineering from the University of Toronto, a M.Sc. from the University of Illinois, and a PhD in computer and communications engineering from UCLA. He is the co-author of a founding patent for wireless data systems (CDPD), and is a frequently published author on satellite and wireless communications. Dr. Slekys has served as the elected Chairman of the GVF Board since 2006.

Dr. Arunas Slekys
Vice President Corporate Marketing
Hughes Network Systems, LLC

Director

Yasir Hassan, Director of Transmission Operations, Arabsat. Yasir Hassan has almost 20 years of experience in the telecommunication field starting with King Fahad City for Satellite Communication in Saudi Arabia. He joined Arabsat in July 1998, held the position of Engineering Services Head in 2008 and was selected to be the Director of Transmission operation in 2010.

Mr. Hassan holds a Bachelor of Science with honour degree in Electrical & Electronic Engineering from Eastern Mediterranean University, Northern Cyprus, and obtained his MBA from University of Leicester, UK in 2005. He also serves as a Director on the Satellite Interference Reduction Group.

Yasir Hassan
Director of Transmission Operations
ARABSAT

Director

Michael DeMarco, Senior Vice President, Operations, Intelsat. Mr. DeMarco leads Intelsat's network engineering, network operations and information system teams, including the company's global teleport operations. With more than 20 years of experience in the telecommunications industry, Mr. DeMarco is also responsible for the company's information system strategy and the delivery of the company's end-to-end service portfolio – including the integration of the Intelsat Epic$^{NG®}$ platform.

Mr. DeMarco earned a Bachelor of Science degree in Finance and a MBA from Fairfield University in Connecticut.

Michael DeMarco
Senior Vice President, Operations
Intelsat

Director

Paul Deedman, Director, Spectrum Regulation, Inmarsat. Mr. Deedman's role in Inmarsat is to ensure that the necessary international spectrum regulations are in place for the continuing operation of the current Inmarsat satellites, network, and future systems. He is involved in CEPT spectrum activities and the ITU-R working parties, most recently on issues such as new regulations for Ka-band mobile terminals (ESIMs) and protection of the L-band MSS spectrum for proposed terrestrial LTE systems. He has participated in all of the ITU World Radiocommunication Conferences since 1997, and has been closely engaged in the regional preparations for WRC.

Mr. Deedman joined Inmarsat in 2000, having previously worked for the Radiocommunications Agency, and has an honours degree in telecommunications from the University of London (Queen Mary College).

Paul Deedman
Director, Spectrum Regulation
Inmarsat

Director

Simon Gray, Vice President of Humanitarian Affairs, Eutelsat. Mr. Gray is also a member of the ITU Advisory board for developing disaster comms strategy world-wide. He has been elected by the other eight satellite fleet operators to coordinate the satellite charter with the UN for the satellite industry. Mr. Gray has worked in the satellite industry for over 20 years and while at Eutelsat has been responsible for the largest training program ever undertaken by a satellite operator. His role in Eutelsat has also encompassed developing a new class of satellite terminal, equipment approval, mobile apps, training courses & training tools. His team has also been responsible for overseeing over 350,000 terminal installations across four continents and he is the point of reference for the Eutelsat fleet for remote terminal technology.

Simon Gray
Vice President of Humanitarian Affairs
Eutelsat

Director

Keith Johnson, Senior Vice President, SpeedCast. Mr. Johnson has 30 years of experience in the satellite telecommunication and energy industries. In his role at SpeedCast, he oversees all of SpeedCast's business activities for the energy and oil & gas sector, including strategic planning, programme management, business development and global sales. He is a member of the Executive Staff, and participates directly in supporting the various strategic acquisitions made over the last few years.

Mr. Johnson is an author of many published papers on telecommunications, satellite, wireless and IT. He attended Texas A&M University, and graduated from Houston Baptist University with a double major in Marketing and Management.

Keith Johnson
Senior Vice President
SpeedCast.

Director

Tracey Haslam has been the President of Harris CapRock Communications, Inc. (HCC) since January 2014. Ms. Haslam is responsible for leading HCC, the premier global provider of managed communications solutions for remote and harsh environments including the energy, government and maritime markets. Ms. Haslam has more than 25 years of experience leading businesses and teams in markets ranging from offshore oil exploration and production to defence, technology and after-market services. She served as Vice President and General Manager of Harris CapRock's energy business.

Ms. Haslam received a Bachelor of Science degree in mathematics and engineering from the University of Adelaide in Australia, and a Master's degree in business administration from INSEAD in France.

Tracey Haslam
President
Harris CapRock Communications

General Assembly & Members' Meetings

A General Assembly will be convened at least once each year in the 4th calendar quarter (Oct.-Dec.) and at other times as deemed necessary by the Board of Directors. The purpose of the General Assembly will be to present to the Membership: Election of the Board; Proposed Constitutional Amendments; Financial Reports; the Secretary General's Report; and other business as appropriate (strategy, policy, etc.). Non-Members of the GVF may be invited by the Secretary General to attend the open portion of these General Assemblies. The agenda and ballots for all formal votes will be delivered to the authorized voting representatives 30 days in advance of the General Assembly. Ballots may be returned in person at the meeting or by post. All votes made by post must be received at the designated location 7 days in advance of the meeting. A quorum will be deemed to be established for any General Assembly Meeting in which a minimum of 30 percent of the Full Members or 50 percent of the Full Founder Members are in attendance.

Members' Meetings will be convened periodically throughout each year, at times and in locations confirmed by the Board of Directors. The purpose of these meetings will be to provide to the Membership: Reports on global and local trends; Program Updates; Open Forum Discussions Related to Strategy, etc.; and other business as appropriate. Non- Members of the GVF may attend some portion of these Meetings.

David Hartshorn is Secretary General of the GVF, the London-based non-profit international association of the satellite industry. GVF consists of more than 230 member organisations from 100 nations in every major region of the world and from every sector of the industry, including mobile and fixed satellite operators, manufacturers, system integrators, and other service providers.

Supported by 15 affiliate offices, two regional offices and seven working groups, Mr. Hartshorn leads the Forum's global efforts to facilitate the provision of satellite-based communications solutions throughout all nations of the world.

Mr. Hartshorn works closely to support national, regional and global-level policy makers as they formulate state-of-the-art satellite regulatory frameworks. He is also responsible for creating greater awareness of the commercial, economic, political and technological advantages that satellite-based communications provide. GVF's education and training programme is an important means by which these aims are achieved.

David Hartshorn
Secretary General GVF

Martin Jarrold was appointed GVF Chief of International Programme Development in June 2001. His responsibilities include outreach to the 230+ member organisations of the GVF and the further development of the profile of the Forum within the satellite communications industry, and across the global telecommunications policy and regulatory community. This extends to the development and delivery of programmes focused on understanding and promoting the use of satellite-based communications in various key vertical markets.

He is a contributor to various telecommunications publications, and also frequently chairs and contributes to telecommunications conferences and symposia around the world. Martin Jarrold was formerly Commissioning Editor and Head of Research at Space Business International.

Martin Jarrold
GVF Chief of International Programme Development

Ms. Angie Mar joined the Secretariat as Director of International Programmes on November 2013. Her duties include managing the global promotion of current GVF members, events and initiatives, outreach to international organisations, and the creation of new opportunities and communication channels to benefit GVF Members. In addition to working for the forum and its members, she is responsible for providing support to the Satellite Spectrum Initiative, GVF working groups, and event programmes. Ms. Mar joins GVF with broad experience in the satellite industry and has developed a deep understanding of industry platforms to identify key market initiatives to grow platforms based on members needs. She previously tenured at the Intelsat Corporation, where she provided support to global and federal satellite industry regulatory initiatives, promoted international trade controls awareness, and contracts administration. Ms. Mar holds both an MBA and Master in Marketing degrees from the University of Maryland, and a Bachelor degree in Marketing from George Mason University.

Angie Mar
Director, International Programmes, GVF
GVF

GVF Code of Conduct Policy

Members must conduct themselves in their capacity and activities as a Member of the Global VSAT Forum in keeping with the aims and objectives of the association as outlined in the GVF mission statement, the GVF Opportunity and Rationalization document, and the GVF Constitution. Observing this code is a condition of membership in the association. If a Member is in breach of this code, or appears on reasonable grounds to be so, they may be reported to the Board by another member or a member of the Board.

The Board shall request, and the member concerned shall supply, all such information as is reasonable and relevant concerning the breach or apparent breach and may make such representations to the Board concerning the same as they may wish. The Board shall consider the evidence and the representations carefully and objectively, and shall record in writing their reasoning for any determination, and submit it to the Member concerned for comment, before the determination is actioned. Any determination by the Board must be proportionate to the breach or alleged breach and may consist of a verbal warning, a written warning, a suspension of membership or an expulsion from membership. In the case of an expulsion, no refund of membership fees shall be made. A determination made by the Board may be relaxed, suspended, withdrawn or reversed as the Board may further determine from time to time, on reasonable grounds.

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Countering the cyber-security threat

Launched in early 2014, the GVF Cyber-Security Task Force is aimed at countering the increase in cyber-security threats to the satellite industry. Chaired by Rakesh Bharania, Tactical Operations, Cisco Systems, the Task Force identifies security best practices, and provides guidance on how users and industry can optimize the application of VSATs to reinforce network integrity.

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With cyber-attacks very much on the rise across the world, and in a society that relies almost completely on digital networks, securing these assets is of paramount importance.

Bharania explains why the consensus-based group was established: "The Task Force launched in response to criticisms of the VSAT industry regarding security vulnerabilities and a perception that the industry is not responding as robustly as necessary to independent security researcher and customer concerns.

The member companies of the Global VSAT Forum (GVF), representing the major providers of satellite networking solutions, place security of communications utilizing their equipment and services at the highest level of importance. As a reflection of that commitment, the Task Force's mission is to work with the broader communications community to maximize security in the entire end-to-end solution: from the network operations centre to the hardware and software security protection embedded in the VSAT terminal on the user premises.

The Task Force is leveraging its work with current measures being applied by the international satellite communications industry to defend against cyber-attacks. For the thousands of operators and millions of VSAT systems throughout the world, the satellite communications industry is evaluating how a variety of considerations – from training and support to security policies, standards and protocols – can be most effectively adopted.

GVF Product Security Baseline (PSB)

The first major deliverable of the Task Force was to create the GVF Product Security Baseline (PSB). The PSB is a voluntary document that details minimum security functions of all VSAT products (Hardware and software), as well as the requirements of VSAT hardware and software vendors to manage vulnerabilities, distribute patches to customers, and to notify customers of security vulnerabilities that might affect them. Adoption of the PSB will bring the VSAT community into alignment with long-held internet security nest practices such as ISO 30111 and ISO 29147.

GVF Service Provider Specification (SPSS)

The second deliverable completed by the Task Force, the GVF Service Provider Specification (SPSS) defines best practices for VSAT service providers in the areas of network security, policy and incident response. The SPSS builds on the PSB by establishing how satellite service providers should protect networks and critical components of their infrastructure.

This includes ensuring personnel have sufficient training on security, that networks are monitored to detect and enable an effective response to any potential attack, and to establish incident response procedures within the organisation.

GVF and Satellite Industry Association collaborate on Joint Cybersecurity Initiative

In 2016, GVF and the Satellite Industry Association (SIA) released a joint statement on the satellite industry's commitment to cybersecurity, articulating core principles for cybersecurity and encouraging all segments of the satellite industry to continue efforts to address the dynamic challenge of cybersecurity. The statement emphasizes the criticality of cybersecurity to the satellite industry's core goal of providing mission critical, highly reliable, and secure connectivity. Drawing upon the industry's experience, GVF and SIA have identified three principles that—although not intended to be a comprehensive roadmap or exhaustive list—should be at the centre of private and government efforts to promote national and global cybersecurity:

- Voluntary, industry-led efforts and public-private partnerships are the optimal way to address cybersecurity at the national or international levels.
- Robust cybersecurity is aided by voluntary information sharing, free from fear of adverse consequences.
- Satellite industry organizations should actively address cybersecurity using industry best practices for risk management.

The joint statement and core principles are a product of the important lessons for effective cybersecurity learned by GVF and SIA members. The associations stress that security and risk management should be part of an organization's overall corporate culture and organisations should, implement and maintain best practices to protect against evolving threats, including leveraging industry-driven resources to inform their own development of voluntary, proactive approaches to mitigate risks. Collaboration, not regulation, is the best way for organizations to manage cyber risks, the associations argue. Finally, voluntary information-sharing among the private sector, between the private sector and government, and between the private sector and end users is vital.

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Crisis Connectivity Charter

Since its inception, GVF's Disaster Preparedness Working Group has been heavily involved with disaster relief operations and the promotion of the use of satellite as a vital communications tool in the aftermath of a disaster. Here, we take a closer look at the GVF's work with the Crisis Connectivity Charter.

In the past year alone, global natural disasters in places such as Ecuador, Central Italy, and the Caribbean, have demonstrated the critical role of maintaining reliable communications in the wake of crises. The satellite sector is an integral part of the first responder team, providing immediate communications links that support supply logistics, urgent medical care and coordination of relief efforts.

During the World Humanitarian Summit Global Consultation 2015 held in Geneva, the world's leading satellite operators, EMC, Eutelsat, Hispasat, Inmarsat, Intelsat, SES, Thuraya and Yahsat, under the umbrella of the EMEA Satellite Operators Association (ESOA) and the Global VSAT Forum (GVF), announced the signing of a *Crisis Connectivity Charter* with the global humanitarian community represented by the UN Office for the Coordination of Humanitarian Affairs (OCHA) and the Emergency Telecommunications Cluster (ETC).

Enhance connectivity

Embodying a commitment from the satellite community to enhance connectivity in humanitarian emergencies, the Charter formalizes terms and protocols in an effort to accelerate the ability of emergency response teams to access satellite-based communications when local networks are affected, destroyed or overloaded after a disaster. The principles of the Charter also include increased coordination to prioritize access to bandwidth for humanitarian purposes during disaster operations, pre-positioned satellite equipment and transmission capacity in 20 high-risk countries across the world, as identified by the ETC and other organisations, as well as providing training and capacity building services for the humanitarian community across all five continents.

Signing the Charter on behalf of UN OCHA, Stephen O'Brien, UN Under-Secretary General for Humanitarian Affairs and the UN's Emergency Relief Co-ordinator said: "The humanitarian community relies on satellite communications, as they are the only technology that are immune to natural disasters and that can be immediately deployed, regardless of constraints such as geography.

"This is a significant step for the humanitarian community and a step change in the way we have worked with satellite operators in the past."

Chair of the ETC and Chief Information Officer of the World Food Programme (WFP), Jakob Kern, noted: "The Charter seeks to ensure improved access to communications services in humanitarian emergencies, and with satellite services we can save lives. Through the Crisis Connectivity Charter and the ETC network, we endeavor to ensure that by 2020 all those responding to disasters, including affected people, can communicate to respond, recover and redevelop. Mobilising their members in this way, ESOA and GVF are supporting the ETC in making this vision a reality."

Signing for GVF, David Hartshorn, Secretary General noted: "Our members provide emergency communications on all continents using key satellite spectrum such as the C-band. We hope governments and administrations the world over will recognize the vital role satellite operators play in the globe's telecommunications infrastructure and its ability to ensure an immediate, robust and resilient response to disasters."

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With more than 25 learning courses, 15 certifications, and over 12,000 students, the GVF Training and Certification Program has been the standard for the satellite communications community since 2005. Interactive, simulator-based online training makes GVF training globally available, highly effective, efficient, and low cost.

GVF training is ideal for:

- VSAT field technicians and installers;
- Network Operations Center and Access Center technical staff;
- Teleport and broadcast uplink technicians;
- Ground equipment and link engineers;
- Marine satcom field technicians and engineers;
- Marine VSAT equipment operators (seafarers and crew);
- SNG truck/van operators;
- Mobile/autopoint terminal operators, including military and broadcast;
- Quick-deploy terminal operators, including military users; and
- Managers, commercial/sales staff, and support staff in satcom organizations.

The training programme is strongly supported by all sectors of the industry, including a formal resolution of endorsement by WBU-IMCG (formerly ISOG). Many major satellite operators, service providers, and manufacturers have integrated GVF training into their own staff development programmes.

Students or training organisations begin at www.gvf.org/training to explore the curriculum and certification paths. Upon registration, students receive individual login accounts to the dedicated learning system and work through their online courses at their own pace. Each course contains knowledge tutorials (many with animation and interactive simulations), followed by a quiz, and where applicable, a simulator-based skills test. Satcom Professional Certification students may register for a required hands-on skills test, offered by any of more than 100 GVF Examiners worldwide, who are either on-staff at participating organizations or offer testing sessions to the public.

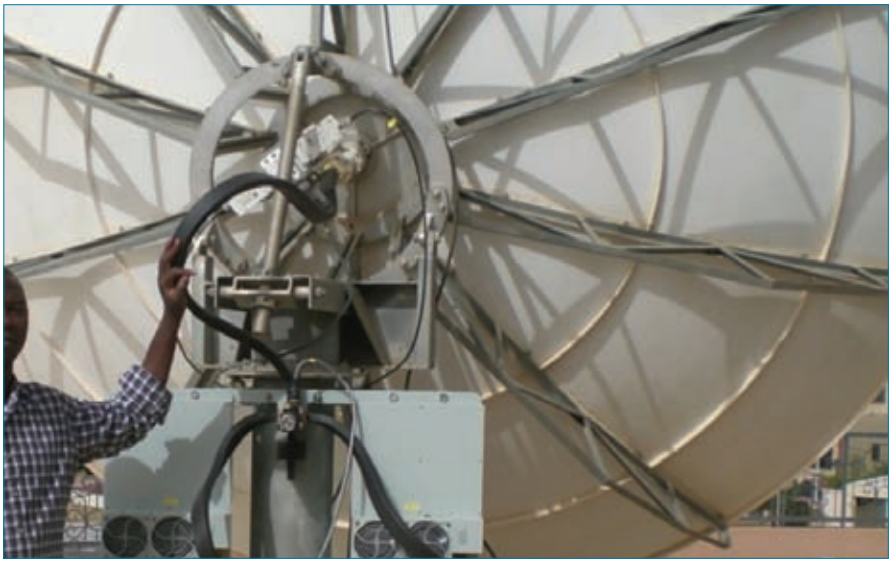
Knowledge Centre Subscription plan

Under the new Knowledge Centre Subscription plan, GVF now makes the entire suite of standard learning courses and certifications available for an affordable fixed annual subscription rate. Students may freely choose their courses, revisit them for refresher training and resources access, and renew their certification, at zero additional cost. Further, organizations may now enter into a Site License agreement, under which their entire staff is subscribed to the GVF curriculum for a heavily-discounted, single annual fee.

When certification requirements are met, the student may elect to be listed in the public directory of certified professionals, which serves as an excellent resource for organisations seeking expertise in their regions.

Separately, any organization or company which commits to its staff maintaining appropriate GVF certifications is now eligible to be recognized as an Accredited Organization for Training.

GVF training delivery is highly flexible and adaptable through a suite of Enhanced Training Services, which include branded, custom-designed portals, enabling organizations to integrate the GVF standard curriculum with their own specific training materials for delivery to staff and customers. In fact, most of the corporate and organization training programs in the satellite communications industry are built on the GVF curriculum and learning delivery system.



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Connectivity transitions: Evolving the GVF's Maritime SatCom Forum

Martin Jarrold Chief, International Programme Development, GVF Co-Chairman, Maritime SatCom Forum (With contributions from Roger Adamson CEO, Futurenautics & Co-Chairman, Maritime SatCom Forum) explains the work of the Forum.

The GVF website (www.gvf.org) and the content of this Directory both show that the organisational structure of GVF includes a number of Working Groups. The Maritime SatCom Forum (MSF) is one such group. I am one of the two Co-Chairs of the MSF, a role I share with Roger Adamson, the Chief Executive Officer of Futurenautics www.futurenautics.com.

Over the years the brief of the MSF has been, very simply, to heighten awareness about, and promote the opportunites for growth in, the use of satellite communications solutions in the global maritime industry. To this effect the Forum has provided a single voice to help shipping companies evaluate and identify optimal satellite solutions. Such work will continue incorporating such core elements as:

- Engaging with maritime industry associations;
- Furthering the development of inter-industry terminology tools;
- Product quality and type approvals, and the promotion of terminal motion profile testing resources;
- Engaging with and providing platforms for inter-industry dialogue;
- Expanding delivery of the GVF training portfolio;
- Strengthening advocacy efforts on communications/technology/regulatory issues.

However, now, beyond these various particular examples of the work of the MSF, the remit of the Forum is planned to evolve, to encompass the broader mobility marketplace, not only of satellite solutions in the maritime environment but also in aeronautical and the land vehicle and train environments, as well as covering the role of satellite in the backhauling of mobile wireless traffic.

The maritime space

One example of the core elements of established MSF initiatives is the previously published GVF Maritime Glossary. Whilst the Glossary is complete, it is a living document and will continue to evolve. Covering terminology from 'Accelerator' to 'Zone Beam', its publication was announced in September 2014. The Glossary may be viewed at www.gvf.org/images/pdf/MemberNews/MSF-MaritimeGlossary Intro.pdf, and www. MaritimeVSAT.com features The Glossary as one of its key inter-industry resources.

The Glossary was launched in collaboration with InterManager – the international ship management association – with which GVF has worked for some years. It was following strong recommendations from InterManager that what was required to facilitate a much-improved level of understanding between the communications solution decision-makers within the ship owner and ship management communities, and the satellite solutions providers, was a comprehensive lexicon of terminology and vocabulary used by representatives of the satellite industry when communicating with the maritime sector. At the time of the launch, Captain Kuba Szymanski, Secretary General of InterManager commented: "The shipping industry needs more standardisation and I am delighted to see this joint project completed. Our new Glossary shows that it is possible to identify and agree on terms to make the industry understandable for all stake holders, with special attention to seafarers who are, ultimately, the end users."

GVF, Futurenautics, and InterManager are engaging in a continuing programme to disseminate the document as a key resource to enhance future dialogues between the satellite solutions community and the maritime solutions customer environment.

Beyond the MSF-InterManager relationship, and in the interests of developing a more comprehensive satellite industry-maritime sector collaboration, the MSF is now in process of developing similar connections with the International Maritime Organisation (IMO), InterCargo, InterTanko, and the Baltic & International Maritime Council (BIMCO).

Cyber security

One facet of establishing and developing these connections relates to cyber-security. This topic is high on the contemporary satellite communications agenda – network resilience and robustness are an imperative as cloud-based networks of applications, data, and services become an increasingly attractive target – and the industry has taken steps to engender an enhanced culture of cyber security.

In 2014, the GVF established its Cyber Security Task Force (CSTF) as a coordination centre for satellite security knowledge. A GVF February 2014 press release noted that the satellite industry required a "…global initiative to address escalating cyber security threats with the establishment of a task force that will identify best practice and provide guidance on how users and industry can optimise the application of VSATs to reinforce network integrity." More recently, on 17th November 2016, the GVF and the Satellite Industry Association (SIA) issued a press release announcing collaboration on a joint cyber security initiative, setting-out core principles for industry and government efforts to promote cyber security. The release may be viewed at www.icontact-archive.com/YaDOh0pPV3BYaZ1ULmguJ33lohWurgA5?w=3.

Moreover, the maritime sector associations noted above have themselves launched maritime industry cyber security guidelines, and GVF will continue to work to coordinate the respective industry/sector initiatives. More details about the maritime industry guidelines may be found at www.maritime-executive.com/article/shipping-industrys-own-cyber-security-guidelines-released.

Product quality & type approvals – ESA ARTES Project on Earth Station Testing

The international satellite communications

Photo courtesy Maersk Group

The MSF looks to Evolving Maritime Horizons

The shipping industry is facing many pressures as we enter 2017. From over-capacity in virtually every sector to weakening demand as the link between global GDP and seaborne trade volumes shows further signs of an eventual decoupling. Many are beginning to talk of a 'new normal' for shipping. But as digital forces reshape the global economy the old rules and the old solutions increasingly don't apply. Thanks to digital disruption and transformation it's unlikely that anything is going to feel 'normal' again and the future of shipping is going to look nothing like its past. 2017 could be the year that sees the foundations laid down for what the industry will eventually become.

In the short-term ship operators will utilise expanded and newly launched VSAT satellite capacity from the likes of Intelsat and Inmarsat to drive further operational efficiencies within their businesses. Connectivity, coupled with Big Data, analytics, the internet of things (IOT), automation and prediction will enable seamless interaction between ship operators, their suppliers, vessel and crew, increasing operational efficiency and margins.

Enhanced connectivity will make the industry more information enabled than ever before and allow it to become integrated within intelligent transport systems that are developing out of Smart Cities, Smart Ports and wider logistics ecosystems. This integration requires enterprise grade connectivity as new ecosystems, platforms and relationships develop.

This is where connectivity suppliers will demonstrate value to the ship operator and ultimately the entire logistics channel.

However, the threat from cyber-attack could act as a brake on technology adoption within the shipping industry, hence why it is incumbent upon connectivity suppliers to support ship operators to develop digital competence, at the same time as making their own networks as resilient as possible.

Along with the adoption of connectivity will come further opportunities for solutions based around crew requirements, from simply staying in touch with friends and family, to films, TV, music and training.

And we mustn't rule out the possibility of new disruptive technology companies entering the market – both connectivity and also shipping. 2017 will be an interesting year for all.

industry continues to expand a product-quality initiative to provide earth station testing through a mutually-recognised technical global framework. The expansion, which addresses type approval of Satcom on the Move (SOTM) terminals, has been facilitated through contracts on 'Standards Preparation for SOTM Terminals' that were awarded by the European Space Agency's (ESA) ARTES programme to Fraunhofer IIS, a Germany-based GVF member that is one of the largest research institutes in Europe, and to GVF.

The contracts – the work by Fraunhofer and GVF for which was completed and accepted by ESA in January 2017 at a meeting held at ESTEC in the Netherlands – were in response to growing demand for high-performance satellite communications equipment for use in challenging mobile environments, resulting in recommendations for new standards that will allow players in the market, such as service providers, satellite operators, and end users, to clearly understand the capabilities of SOTM terminals without having to undergo expensive and lengthy validation campaigns themselves before investing in and deploying a product.

The initiative's focus has to-date been on the mobile Ku and Ka-band VSAT market for the maritime and land mobile environments. The aeronautical, and high-speed train, environments are planned for the future.

SOTM terminals: Specification and verification

In order to define a common way to specify and verify SOTM terminals, the following were addressed:

- Analysis of the current satellite mobile market segment;
- Identification of inefficiencies in the business transactions (buying/selling) of products and services related to SOTM terminals;
- Identification of ambiguities/ inconsistencies in how products and services are specified;
- Identification of the needs of the members of the value chain in terms of how SOTM terminals should be specified and how those specifications can be trusted;
- Proposals for solutions in the form of recommendations for future mutually recognised standards for specifying SOTM; and
- Analysis of the verification needs to implement such standards.

Mutually recognised standards, once implemented and gaining the approval and acceptance of the value chain actors, will facilitate overcoming inefficiencies in the mobile market and make transactions more fluent. The global type approvals issue has a major bearing on industry profitability and competitiveness. It has gained in importance as demand for SOTM systems and services have increased, volumes have risen, and new types of equipment are being introduced.

Fraunhofer IIS has used GVF Mutual Recognition Arrangement Working Group (MRA) procedure GVF-101 and GVF-105, which defines the set of standard tests that an antenna or earth station manufacturer must perform in order to apply for Type Approval from satellite operators. Use of the procedure not only improves the quality and completeness of test data, but helps reduce the time and cost required to bring new ground-segment technology to the market, thus advancing the competitiveness of satellite communications.

Maritime motion profiles defined

Testing the performance of a SOTM system is an integral very important step in the process of SOTM market development. SOTM systems with poor performance represent a concrete problem to the value-chain actors. Satellite operators often suffer from levels of Adjacent Satellite Interference (ASI) caused by the SOTM equipment.

Testing a SOTM terminal is done in one of two ways: (1) Free-field (Proving Grounds): The main advantage of a free-field test is the ability to measure the performance of the full system under realistic conditions. However, since a satellite payload has to be involved and different motion tracks might be needed, it is cost inefficient and not attractive for smaller emerging market contributors. (2) Laboratory: Many state-of-the-art laboratories for testing SOTM terminals nevertheless lack the ability to offer complete system tests. Some offer partial tests for the modem performance. A laboratory offering comprehensive system testing including all factors was missing until the Facility for Over-The-Air Research and Testing (FORTE) built by Fraunhofer IIS filled this gap. Complete SOTM terminal testing including the Indoor Unit IDU and the Outdoor Unit ODU is possible at FORTE, and all parameters are controlled to fulfil different test requirements and different customer needs, including fully reflecting actual variations in real-world maritime conditions.

Previously there has been no comprehensive standardised testing plan for SOTM terminals. There exists either (1) Recommendation and Norms (e.g. ETSI or FCC). These specify operation limits which a terminal has to satisfy e.g. off-axis emission criteria, Tx cessation time, etc. However, how to test the system against these limits is left open for the applicant. Or (2) Type Approvals: Often specified by satellite operators. There exists no global agreement on a unified Type Approval procedure. A terminal manufacturer or integrator has to run several tests which may overlap to a large extent. This represents a major factor of cost inefficiency in the value-chain.

In all recommendations and Type Approval procedures, there is no specification of the motion tracks which have to be used. A poor performing terminal can satisfy all norms and limits if tested in calm sea conditions. On the other hand, a better performing terminal can fail to satisfy the same limits if it was tested in rough sea conditions. This shows how important it is to specify standard motion tracks (profiles) which are widely admitted and applied in recommendations for Type approvals.

HTS and the wider mobility context

The GVF-EMP HTS Roundtable series of events in London and Washington DC have provided in-depth exploration of the drivers and trends behind the massive growth potential for the market for satellite-based broadband solutions, arising from a host of new applications that are being delivered into new market sectors, including into the satellite communications on the move

ecosystem. These applications are being enabled through the deployment of more-highly bandwidth efficient networks that use the advanced in-orbit technologies of existing and planned HTS systems. Global HTS capacity supply is likely to more than quadruple from the figure of 680 Gpbs in 2015 to almost 3Tbps in 2020, and HTS companies are extending their services into nearly every operating environment, including ships, planes, and trains.

In the future we will see the addition of the LEO factor, with multi-hundred-sized constellations of low Earth orbiting spacecraft providing high-throughput broadband services to user markets which will include maritime and aeronautical interests, and wireless operators, as well as oil & gas companies, military, civil government agencies, and not least the individual consumer.

The aeronautical space

During 2016 the GVF-EMP Partnership realised plans to expand and enhance its core portfolio of leading communications connectivity events by extending its thematic coverage to encompass detailed analysis of the technologies, services, equipment deployment and markets of the aeronautical in-flight connectivity and entertainment space.

Intially, *GVF Connectivity 2016: Air, Sea, Surface, and Rail: Evolving the 'New' New Verticals* explored broadband connectivity to the Internet, whenever you want, wherever you are, wherever you're going to, and however you're getting there. It featured a keynote entitled 'Airline In-Flight Connectivity: The New Paradigm of Passenger Experience' from the CEO of the Airline Passenger Experience Association (APEX), Joe Leader, who supported the development of a follow-on event agenda specifically and wholly dedicated to the aeronautical segment of the SOTM market.

During his keynote, Mr Leader particularly noted that "According to a recent APEX survey of global passengers, Wi-Fi was rated the highest in terms of increasing satisfaction with the inflight passenger experience. This demonstrates a huge opportunity for in-flight connectivity with an insatiable desire for higher broadband speeds."

Within the overall dynamics of the in-flight entertainment and connectivity (IFEC) ecosystem, Mr Leader emphasised the significance of this as a critical data point for airlines, because the carriers that make the most ancillary revenue are those that lead in the connected passenger experience. As the satellite operators are increasingly covering the world's principal air corridors with HTS service solutions, the greater availability of broadband capacity over airline routes is increasingly able to ensure that the connectivity demands of the mobile consumer as airline passenger are met.

The IFEC experience and the airline carrier's operational data requirements were then explored further in the GVF-EMP event *AeroConnect 2016*.

The aeronautical connectivity ecosystem encompasses not only the IFEC experience but also airline carriers' operational data requirements. The characteristics of passenger online activities are divided between Entertainment (streaming, general web browsing, etc.); Productivity (work email, LinkedIn, etc.); and, Communication (Skype, social media such as Facebook, Instagram, etc., as well as voice); together with general travel planning websites (Expedia, TripAdvisor, etc.) and airline carrier-specific travel, reservations, ticketing, baggage tracking, on-board duty free shopping apps; as well as the architectures for connecting passenger devices (smartphone, tablet, laptop). Carrier/airline operational requirements include the data environments of the aircraft cockpit (flight navigation, real-time flight-tracking, weather situational awareness, QAR, etc.); cabin crew (digital crew operations, live on-board sales, telemedicine, etc.); aircraft management & maintenance (aircraft operations IT); and air traffic management (ATC, tower communications, etc.).

So far, this GVF programme has sought to characterise the various determinants of, and the prime drivers of, the nature and scale of the investments being made today – and the investments being planned for tomorrow – by key market players to provide the infrastructure for the current generation, and for future generations, of in-flight connectivity which will render the airline seat a fully functioned extension of the office desk and of the domestic living room. This fully functioned extension of office broadband and home broadband brings massive new revenue potential not only for the SOTM solutions provider marketplace, but also for the airline carriers, the connectivity investment budgets of which will be well-positioned within a multi-billions of dollars virtuous circle of enhanced revenues-increased profits-expanded investment… All this is subject to further initiatives in the programme of a newly-evolved MSF.

Wireless backhaul

Cellular Backhaul: Smartphones and Tablets – To the Satellite Network and the World was added to the GVF-EMP Portfolio in June 2016 to explore the current interaction between the satellite and wireless industries, the current and future growth of data traffic from mobile devices and how that will impact both cellular and satellite networks, together with exploring the problems, risks and opportunities that this continued growth offers to both these industries and to the businesses that will rely on these future networks, ranging from the Fortune 500 to government and the military, and from planes, trains and automobiles to schools, restaurants and businesses all around the data-hungry world.

The satellite industry is at a crucial stage of evolution, with more data coverage 'in build', and due to be launched, in the coming years than on all the satellite communication payloads ever launched combined. The wireless industry is seeing data usage by business and consumers doubling regularly, posing network stretch and technology challenges across the spectrum. With the growth of M2M, the exponential expansion in the internet-of-things, and 5G in coming years, these challenges may make 4G LTE seem like a simple deployment.

Satellite has excellent synergies with other,

Photo courtesy Maersk Group

that is to say terrestrial, technologies, including mobile wireless. Backhaul for mobile networks is critical to ensure speed and capacity as it relates to the transport of data (and, of course, voice) from distributed network sites to the network core.

Inter-industry dialogues: Events & promotions

GVF-EMP is an events production partnership between GVF and EMP (Event Management Partners). The Partnership delivers conference programmes across a range of satellite communications horizontal and vertical markets, in many locations around the world. Several of these programmes touch upon maritime-related themes, i.e., the (offshore) oil & gas communications series, the HTS Roundtable series, and the all-embracing Connectivity series. Added to this portfolio during 2016 was the AeroConnect series (see above), and the Cellular Backhaul series (see above). For more details about GVF-EMP events you are invited to consult www.uk-emp.co.uk, where a range of archived recent events content is available to download as PDF files of PowerPoint presentations.

Additionally, the MSF works to engage with maritime events produced by leading commercial/third party exhibitions and conference organisers. For example, during 2016 GVF contributed to *Digital Ship* programmes in Athens and Hamburg focused on maritime cyber security and related iniatives in the satellite industry (see above).

The MSF also develops plans for programmes to be delivered during the maritime sector's industry events – such as Posidonia and SMM – and contributes to other satellite communications events produced by other organisations which are only partially dedicated to maritime communications. One example is CABSAT, where the GVF organises and presents the *GVF Satellite Hub Summit*. For example, at CABSAT in March 2017 the GVF Satellite Hub Summit will feature the following themes which will incorporate a mobile satcoms element:

- Spectrum: Satellite & the Next ITU World Radiocommunication Conference;
- High Throughput Satellites: Leveraging Advancing Technologies & Scaling Innovative Services to Evolve Larger & Emergent Markets;
- Constellations for Connectivity: The Low Earth Orbit Solution Re-born?;
- Into the Mainstream: VSAT Communications-on-the-Move & the New Strategic Marketplace;
- Ensuring an Interference-Free World of Satellite Services; and
- Integrating & Securing Our Digital World: Cyber Security for Satellite in a World of Big Data, the IoT & the Cloud.

The GVF training portfolio for the maritime space

The MSF has helped to identify the different training opportunities where the satellite industry can better educate the maritime sector on the installation, deployment and operation of satellite communications technology. Again as reflected on the GVF website (www.gvf.org/training/training.html), and elsewhere in this Directory, GVF has an extensive training programme both for seafarers responsible for satellite equipment while at sea, and for field technicians, who install and maintain satellite equipment on vessels. GVF's partnership with SatProf (www.satprof.com) – the organisation which has developed our courses, continues to develop new courses, and administer the expanding and successful deployment of the entire suite of GVF training – now prominently features course certifications dedicated to the maritime satellite communications environment. Examples of the Marine Operator and Professional Training courses can be found at: https://gvf.org/training/course-catalog-and-fees.html

Advocacy

The maritime industry is a global market and frequently has to address communications and technology issues with numerous regulatory issues. The MSF – in coordination with the GVF Regulatory Working Group (GVF-RWG) – helps to track and monitor any issues around the use of satellite technology and build support for appropriate action wherever relevant.

A previous example of an MSF project was the preparation of a detailed briefing document which would serve to explain the imperatives of the maritime satellite communications marketplace to the global regulatory and licensing community. The GVF White Paper: *Maritime Communications via Satellite* was the result of collaboration between the members of the MSF Regulatory Sub-Group.

ITU World Radio Communication Conferences and ESIMs - In November 2015 the ITU World Radiocommunication Conference (WRC-15) adopted new regulations to facilitate the operation of 'Earth Stations in Motion' (ESIMs) in part of the Ka-band satellite spectrum (19.7-20.2 GHz and 29.5-30 GHz). ESIMs operating in this band provide satellite broadband connectivity to mobile terminals, such as on ships and aircraft. The new regulations adopted by WRC-15 will facilitate the global roaming of such terminals, while protecting other services and applications from interference.

The next World Radio Communication Conference takes place in 2019, and the satellite industry – together with government and other organisational stakeholders – is again gearing itself to defend and protect the spectrum that is central to current and future planned communications services, not only in C-band, but also in the Ku, Ka, and Q/V parts of the satellite spectrum.

Transition

As noted throughout this Directory chapter, during 2017 it is planned that the core work of the MSF will develop and evolve to encompass other facets of the satellite mobility environment, extending the original maritime focus to the aeronautical space and the land mobile space (including high-speed trains).

In effecting the availability and accessibility of mobile broadband Internet services to users, focus will also be given to the wireless backhaul environment and to maximisation of the synergies between the satellite and wireless ecosystems.

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MRA Working Group

The GVF Mutual Recognition Working Group was established with the goal of the development of type approval test procedures that are used to qualify earth station performance, eventually leading to formal type approval by a satellite operator. The work of the group has helped to drive up antenna reliability and reduce interference. Colin Robison, Chair of the MRA Working Group looks back over the achievements of last year.

Background: It has now been twenty years since the GVF was established as a non-profit organisation in the UK. It comprised members from the satellite operators, earth station manufacturers, value-added re-sellers and regulatory agencies. The primary focus for the GVF continues to be directed towards supporting product quality initiatives that enhance the reliability of satellite communications services as well as reducing factors that cause interference to primary and adjacent satellite services.

This initiative has been accomplished through the actions of one of the GVF sub groups known to the industry as the Mutual Recognition Arrangement or MRA working group. The MRA has, and continues, to develop type approval test procedures with input and consensus from the satellite operator and manufacturing community. These test procedures are used to qualify the performance for earth stations leading to formal type approval by a satellite operator. This in turn enables a manufacturer to supply earth station equipment without the need for testing each terminal before it is deployed. The tests are witnessed by an independent Authorised Test Entity or ATE and the test results may be used by other satellite operators for granting additional equipment type approvals without the need for repeating similar tests.

The following highlights the GVF-MRA working group activities for the past year. The working group conducts its business through periodic phone conferences and workshops.

European Space Agency (ESA) and GVF-105: The operation of mobile satellite communications terminals presents unique operational challenges. GVF-105 was developed to provide performance and test guidelines for type approval of COTM (COMS on the Move) or ESIM (Earth Stations in motion) satellite terminals. Both terminologies are in common usage - the newer ESIM acronym was introduced during the November 2015 World Radiocommunication Conference (WRC-2015). We will use the new ESIM designation going forward. Critical operational constraints include pointing accuracy and polarisation skew angle alignment for an active terminal under potentially severe motion profiles. This level of testing is required if interference to adjacent satellite services is to be avoided. ESIM terminals are also required to demonstrate their ability to determine when their pointing accuracy exceeds specified limits and to terminate uplink transmissions if the specified limits are exceeded for more than 100ms.

The value of this activity was recognised by ESA and the GVF was invited to team with the Fraunhofer Institute located in Ilmenau Germany to expand on the test procedures outlined in GVF-105. Two ESA projects were initiated with Fraunhofer leading the effort. The first involving the GVF is covered by a change notice to an existing ESA contract, *"Characterisation of the Mobile Tracking Needs".* The GVF role has been to update the provisions of GVF-105 to include motion profiles measured by Fraunhofer as a part of the ESA contract. These profiles cover a variety of conditions for land mobile and maritime applications. A test program was recently conducted to validate the GVF-105 test procedures as a part of the ESA contract.

The second project carries the project title of, *"Standards preparation for SOTM terminals"*. It falls under the ARTES (Advanced Research in Telecommunications Systems) activities. The purpose of the ARTES project is to elevate the COTM market and associated products from what has been described a "niche market" to the "main stream". The focus of the joint Fraunhofer/ GVF project is to develop recommendations for specifying and validating (type approving) COTM terminals and identifying protocols for speeding COTM products to market. Key market sectors were evaluated and the feedback has been used to identify recommendations for improving the business and operational environment for the satellite operators, hardware manufacturers and customers involved in ESIM activities. This has included an analysis of the current ESIM market, identifying inefficiencies in the purchase/selling chain, specification ambiguities and preparing mutually acceptable performance verification procedures for product qualification. The development of ESIM terminal performance specifications remains an objective with a challenge that it needs to address the various needs of individual satellite operators.

The study phase of the ESA contract has been completed and has resulted in two important additions. One objective calling for the development of new ESIM performance recommendations (specifications and standards) was modified to develop standard test procedures for qualifying ESIM terminals. This was accomplished by the distribution and industry acceptance of GVF-105. Other challenges faced by the industry, with particular emphasis on the satellite service provided to the market sector, including the lack of uniformity in how the performance of ESIM products is presented to the market in manufacturers promotional product literature. As an example, the performance of some ESIM terminals has been reported without referencing the impact of radomes used to protect the antenna from environmental factors. Testing has shown that radomes can decrease gain by as much as 4dB, degrade the antenna sidelobe envelope to above acceptable limits and impair cross pol levels. These factors in combination have the effect of reducing link margins and causing harmful interference to adjacent satellite services. The ESA study was expanded to include an identification of all commonly employed specification terminologies and recommendations of standard definitions for these terms. The GVF is preparing a new document to capture this information including industry accepted test procedures for validating terminal performance.

To further support this activity, the GVF has initiated a directory listing qualified test facilities with the equipment and technical expertise required to conduct type approval testing. At present this directory has focused on test facilities located in Europe and the US but plans call for expanding the directory to include qualified test facilities at a global level.

GVF-101. This was the first type approval document prepared by the GVF-MRA and has been extensively utilised for type approvals covering stationary VSAT antennas and earth stations on a global basis. The procedure covers all satellite frequency bands and antenna apertures ranging from below 1 meter to 3.8 meters. Until recently, the majority of VSAT antennas provided terminals with stable radiation patterns.

New developments have introduced compact phased array antenna solutions for VSAT terminals. The radiation patterns and antenna gain for these antennas changes with scan angle. It was recognised that GVF-101 required updates to define new test procedures for electronically scanned antennas and Thinkom's Stuart Coppedge led one of the sub-group efforts in developing new procedures for type approving terminals with the new class of antennas. The new procedures have been accepted by the satellite operator community. The GVF conducted type approval activities in support of one manufacturer and satellite operator for high wind Ku-band VSAT antennas.

GVF-104. AvL Technologies is leading a working sub-group to update GVF-104, "Performance and Test Guidelines for Type Approval of Auto-Deploy and VMES Satellite Communications Terminals". This effort is being supported by Satprof, Eutelsat, Inmarsat, Cobham and General Dynamics Satcom Technologies.

The original GVF-104 document focused on identifying type approval procedures for auto-deploy pointing accuracies and repeatability in pointing accuracy following multiple auto-deploy/stow operations.

The procedures placed heavy emphasis on the measurement of the radiation pattern

coverage characteristics for the AUT but were generally silent on the performance contributions from ancillary equipment such as beacon, tracking receiver and modems. New procedures and best practices have been included contained in GVF-104 which has now been officially released and uploaded to the GVF website.

Harmonisation of VSAT Specifications: A satellite operator sub-group led by SES (Anja Ellerbrock) and supported by AsiaSat, Eutelsat, Inmarsat and Intelsat and has reached consensus regarding the minimum acceptable performance standards for the group to access individual satellite operator services.

The results of this study are being evaluated, and with the approval of the satellite operator sub-group, the plan calls for the broader dissemination of the study to the satellite community. The initiative will also address how manufacturer performance characteristics are documented with an objective for improving the uniformity as to how products are specified and promoted in the market place. This has been an on-going effort and is close to a conclusion where the results and "strong recommendations" can be approved for general release to the satellite industry.

Expansion of the ATE pool: The GVF-MRA has expanded its test pool coverage with the addition of Markus Landmann (Fraunhofer Institute). The Fraunhofer facilities are equipped with an outdoor range and motion table hardware that provides an excellent resource for conducting ESIM equipment type approval.

The facility also includes hardware to simulate adjacent satellites so that assessments can be made regarding the potential adjacent satellite interference (ASI) resulting from ESIM terminals operating under various motion profiles. The GVF-MRA is now represented with ATE's located in the USA, UK, France, Germany and China for true global type approval coverage.

2017 GVF MRA Activities: The GVF-MRA continues to plan for a busy year with initiatives to enhance the operational and business climate for companies involved in the market. Inmarsat has announced its intent to allow the GVF-MRA process to be used for qualifying terminals used on the Inmarsat GX program. The GVF-MRA plans to increase its involvement with qualified test facilities as it expands the qualified test directory. The GVF-MRA welcomes input and comments from the industry regarding key areas where it is focusing its activities and priorities.

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The expert voice of the satellite communications industry

The GVF Regulatory Working Group is dedicated to keeping tabs on the satellite regulatory environment and working with governments across the world to lobby for improved procedures, policies and market access for the satellite community. Here, we look at the RWG's role and goals.

The Regulatory Working Group (RWG) of the GVF brings together a non-partisan group of legal and regulatory experts from across the globe to share first-hand industry experience with national and international satellite regulators. Through the RWG, members can tap the collective knowledge and expertise of GVF's global network of satellite industry contacts to keep abreast of emerging regulatory trends and developments in satellite policy. The RWG also functions as the primary point of contact with national regulators and international organizations, advocating for improvements to satellite communications policy worldwide.

Experienced input for policy development

RWG provides presentations, whitepapers, and regulatory comments to help educate regulators, and shape favourable satellite policy decisions. RWG members are frequently invited as speakers and panelists to provide expert input at major international industry conferences. Some recent issues that RWG has contributed input on include:

A responsible framework for spectrum sharing

The increasing demand for spectrum requires proactive technical and strategic leadership from the satellite industry. RWG led and partnered with numerous regional associations in 2016 to contribute to consultations for UK Communications regulator Ofcom, the US Federal Communications Commission (FCC), the Australian Communications and Media Authority (ACMA), Colombia Agencia Nacional del Espectro (ANE), the Indian Space and Regulatory Organisation (ISRO) and other governing bodies regarding these new opportunities, and the continuing need for viable access to spectrum for satellite services.

Advocating for regulatory best practices

RWG leveraged its global experience with satellite regulation to provide guidance to regulators on best practices for fair, transparent, and efficient satellite licensing policies. Ofcom, ACMA, and other organizations, sought input on satellite licensing procedures in 2016. RWG took these opportunities to urge regulators to adopt streamlined licensing requirements, fair fees, and blanket licensing or registration wherever possible. RWG also continued its advocacy for a global "Open Skies" policy, including releasing an updated version of GVF's updated policy and regulatory guidelines for satellite regulators.

Looking ahead to WRC-19

Following GVF's global coordination of successful spectrum campaigns at the ITU World Radiocommunication Conferences (WRCs) in 2007 and 2015 - through which GVF and its allies defended the integrity of the L, C, Ku, Ka, Q and V-band spectrum – the RWG has already implemented global initiatives to closely track government proceedings to ensure that satellite communications interests continue to be strongly represented. The RWG has addressed the next steps to be taken in preparation for WRC-19, coordinated a global campaign with partners and allies, and monitoring the regulatory implications and changes in the US Administration and FCC transition, as well as national spectrum proceedings in Asia, the Americas, Europe, the Middle East and Africa.

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Founded in 1976 by the 21 member-states of the Arab League, Arabsat has been serving the growing needs of the Arab world for over 40 years, operating from its headquarters in Riyadh-KSA and two satellite control stations in Riyadh and Tunis. Now one of the world's top satellite operators and by far the leading satellite services provider in the Arab world, it carries over 500 TV channels, 200 radio stations, pay-tv networks and wide variety of HD channels reaching tens of millions of homes in more than 80 countries across the Middle East, Africa and Europe—including an audience of over 170 million viewers in the Middle East and North Africa (MENA) region alone tuned into Arabsat's video "hotspot" at 26° E.

Operating a growing fleet of owned satellites at the 20°E, 26°E, 30.5°E, 39°E and 44.5°E, Arabsat is the only satellite operator in the MENA region offering the full spectrum of broadcast, telecommunications and broadband services. This capacity will continue to expand with the launching of new satellites, making Arabsat satellites' fleet the youngest in the region. Arabsat also maintains strategic partnerships with most of the world's leading satellite companies and VAS integrators. With the acquisition of Hellas Sat, one of the leading telecom groups in southeastern Europe, these partnerships and acquisitions continue to expand Arabsat's reach with new orbital slots and frequency rights, allowing customers to reach farther than ever and deliver content and state-of-the-art solutions to any end-viewers audience or business partner around the world.

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With a fleet of 39 satellites serving broadcasters, video service providers, telecom operators, ISPs and government agencies operating across Europe, Africa, Asia and the Americas, Eutelsat is one of the leading operators in the commercial satellite business. Eutelsat was created as an international organisation in 1977, launched its first satellite in 1983 and became a private company in 2001. Its long and rich track record makes it one of the most experienced commercial satellite operators in the world.

The company provides capacity to clients that include broadcasters and broadcasting associations, pay-TV operators, video, data and Internet service providers, enterprises and government agencies. Eutelsat's satellites provide ubiquitous coverage of Europe, the Middle East, Africa, Asia-Pacific and the Americas, enabling video, data, broadband and government communications to be established irrespective of a user's location.

Headquartered in Paris, with offices and teleports around the globe, Eutelsat represents a workforce of 1,000 men and women from 37 countries who are experts in their fields and work with clients to deliver the highest quality of service.

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General Dynamics SATCOM Technologies is one of the leading providers of systems engineering, communications products, and engineering services for global satellite communications services. SATCOM Technologies is positioned to provide solutions for global satellite and wireless communications requirements. It is a market leader for base station and earth station communications products and services, VSAT antennas and antenna systems, and wireless backhaul products. The company offers an exciting range of new communications products and services backed with high quality and expertise.

NAME: GILAT SATELLITE NETWORKS
Address: 21 Yegia Kapayim St., Kiriat Arie, Petah-Tikva 4913020, Israel.
Tel: +972 3 925 2000
Fax: +972 3 925 2222
Email: info@gilat.com
Internet: www.gilat.com
Contact: Doreet Oren
Job Title: Director Product Marketing

Gilat Satellite Networks Ltd is a leading provider of end-to-end satellite-based broadband communication solutions. It

Photo courtesy of ESA

specializes in fixed and on-the-move communications for commercial and government entities. Its offerings are specifically tuned to take advantage of high throughput satellites (HTS) as well as wide beam satellites.

Gilat develops innovative technology in five R&D centres to support a wide range of high-performance satellite ground segment VSAT equipment, and small-cells for an integrated cellular offering. Gilat also provides leading satellite-on-the-move communication terminals including antennas, solid-state power amplifiers (SSPAs), block up-converters (BUCs), transceivers, and modems.

The company primarily focuses on consumer broadband, enterprise, cellular, and mobility applications for the commercial, public safety and the defence sectors, and works closely in partnership with the satellite operators to bring extensive expertise for a range of turnkey projects.

Gilat offers complete, integrated solutions that include satellite capacity, fully managed services, remote network operation, call centre support and hub and field operations.

In addition, managed networks and communication services for rural telephony and Internet access are provided via its subsidiaries in Peru and Colombia.

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HARRIS CAPROCK

Name: HARRIS CAPROCK
Address: 4400 S. Sam Houston Pkwy East, Houston, TX 77048, USA.
Tel: +1 832 668 2300
Email: Contact Form
Internet: www.harriscaprock.com
Contact: Tracey Haslam
Job Title: President

Harris CapRock Communications is a premier global provider of managed satellite, terrestrial and wireless communications solutions for the maritime and energy markets. Harris CapRock owns and operates a robust global infrastructure that includes teleports on six continents, five 24/7 customer support centres, a local presence in 24 countries and hundreds of global field service personnel supporting customer locations across North America, Central and South America, Europe, West Africa, Middle East and Asia-Pacific.

Photo couretsy of Shutterstock

HUGHES
An EchoStar Company

Name: HUGHES NETWORK SYSTEMS
Address: 11717 Exploration Lane, Germantown, MD 20876, USA.
Tel: +1 301 428 5500
Fax: +1 301 428 1868
Email: Contact Form
Internet: www.hughes.com
Contact: Doug Gunster
Job Title: Director, Marketing Communications

Hughes is the world's leading provider of satellite broadband for home and office, delivering innovative network technologies, managed services, and solutions for enterprises and governments globally. HughesNet® is the #1 high-speed satellite Internet service in the marketplace, with over one million HughesNet subscribers as of Q2 2014 in North America, and offerings to suit every budget. To date, Hughes has manufactured and shipped more than four million terminals to customers in over 100 countries, and has consistently maintained a global market share of over 50 percent. Its products employ global standards approved by the TIA, ETSI and ITU organizations, including IPoS/DVB-S2, RSM-A, and GMR-1.

Hughes owns and operates service businesses throughout the United States, Europe, India, and Brazil delivering continent-wide broadband satellite connectivity along with an ever growing range of fully managed solutions and applications to major enterprise customers in virtually every vertical sector, including many of the Fortune 1000. Its technology footprint covers the globe, exceeding one million broadband sites operating on more than 20 satellites, including the Ka-band,100+Gbps EchoStar® XVII with Jupiter™ high-throughput technology and the award-winning SPACEWAY® 3 satellite in North America, the world's first with onboard switching and routing.

Hughes supplies a growing family of authorized service providers, government organizations, and businesses with advanced broadband systems and terminals including satellite Network Operations Centers (NOCs) and gateways; broadband satellite routers and modems; mobile satellite systems, handhelds and high-speed IP data terminals.

Headquartered outside Washington, D.C., in Germantown, Maryland, USA, Hughes operates sales and support offices worldwide, and is a wholly owned subsidiary of EchoStar Corporation (NASDAQ: SATS), a premier global provider of satellite operations and digital TV solutions.

Name: INMARSAT
Address: 99 City Road, London EC1Y 1AX, UK.
Tel: +44 20 7728 1000
Email: Contact Form
Internet: www.inmarsat.com
Contact: Jonathan Sinnatt
Job Title: Director of Global Communications

Inmarsat plc is the leading provider of global mobile satellite communications services. Since 1979, Inmarsat has been providing reliable voice and high-speed data communications to governments, enterprises and other organizations, with a range of services that can be used on land, at sea or in the air. Inmarsat operates in more than 60 locations around the world, with a presence in the major ports and centres of commerce on every continent.

As well as merchant shipping, customers include governments, airlines, the broadcast media, the oil and gas industry, mining, construction, and humanitarian aid agencies – to name just a few.

Inmarsat's customers connect to a fleet of 11 satellites using a range of equipment, including global handheld satellite phones and notebook-size broadband internet devices, as well as specialist terminals and antennas fitted to ships, aircraft and road vehicles.

Name: INTELSAT
Address: 7900 Tysons One Place, McLean, VA 22102-5972, USA.
Tel: +1 703 559 6800
Fax: +1 703 559 7898
Email: Contact Form
Internet: www.intelsat.com
Contact: Michele Loguidice
Job Title: Director Investor Relations & Corporate Communications

Intelsat operates the world's first Globalized Network, powered by its leading satellite backbone, delivering high-quality, cost-effective video and broadband services anywhere in the world.

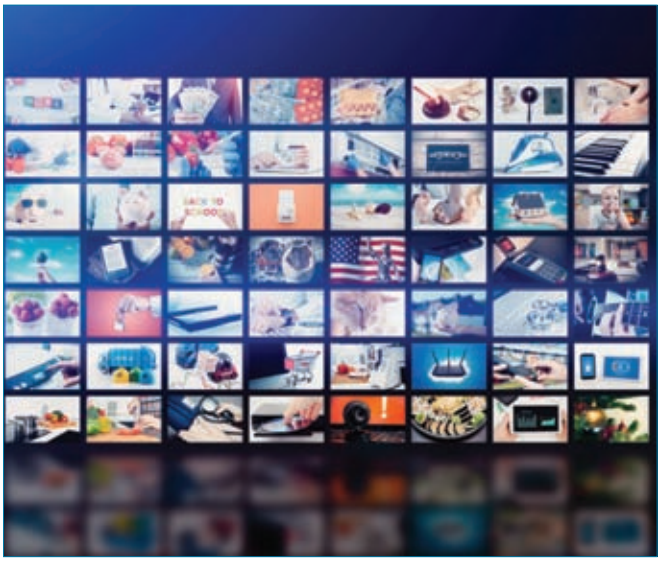

Photo courtesy of Piotr Adamowicz/Shutterstock

Intelsat's Globalized Network combines the world's largest satellite backbone with terrestrial infrastructure, managed services and an open, interoperable architecture to enable customers to drive revenue and reach through a new generation of network services. Thousands of organizations serving billions of people worldwide rely on Intelsat to provide ubiquitous broadband connectivity, multi-format video broadcasting, secure satellite communications and seamless mobility services.

Name: MEASAT
Address: MEASAT Teleport and Broadcast Centre, Jalan Teknokrat 1/2, 63000 Cyberjaya, Malaysia.
Tel: +60 3 8213 2188
Email: sales@measat.com
Internet: www.measat.com
Contact: Raj Malik
Job Title: Senior Vice President, Sales & Marketing

MEASAT is a premium supplier of communication and video services to leading broadcasters, Direct-To-Home platforms and telecom operators across Asia and Africa. With capacity across six communication satellites, MEASAT provides services to over 150 countries representing 80 percent of the world's population across Asia, Middle East, Africa, Europe and Australia.

Working with a select group of world-class partners, MEASAT provides a complete range of broadcast and telecommunications solutions. Services include UHD/HD and SD video play-out, video turnaround, co-location, uplinking, broadband and IP termination services.

Name: O3B NETWORKS
Address: 3rd Floor Anley House, Anley Street, St Helier, JE2 3QE, Jersey.
Tel: +44 1534 828 590
Fax: +44 1534 862 301
Email: getconnected@o3bnetworks.com
Internet: www.o3bnetworks.com
Contact: Vicki Warker
Job Title: VP Marketing

O3b Networks is a global satellite services provider building a next-generation satellite network for telecommunications operators and Internet Service Providers, as well as enterprise customers and government departments and agencies, providing billions of consumers and businesses in nearly 180 countries with low cost, high speed Internet and mobile connectivity. The O3b system combines the global reach of satellite with the speed of fibre. The company focus on:

- High capacity;
- Fibre-like latency; and
- Bandwidth that is significantly lower in cost.

O3b's Medium Earth Orbit (MEO) satellites orbit at 8,062km above the Earth. From this low altitude, latency is dramatically reduced bringing it on par with a long haul fibre transmission. Operators can now consider satellite technology for applications that are latency sensitive. O3b's constellation of satellites utilizes multiple spot beams, which significantly increase each satellite's capacity and decrease the cost of bandwidth.

Name: ONEWEB
Address: 1400 Key Blvd, Level A - Suite #1, Arlington, VA 22209, USA.
Email: Contact Form
Internet: www.oneweb.world
Contact: Eric Béranger
Job Title: CEO

OneWeb's mission is to enable affordable Internet access for everyone and it is building a communications network with a constellation of Low Earth Orbit satellites that will provide connectivity to billions of people around the world. With more than 10 terabits per second of new capacity, it will transparently extend the networks of mobile operators and ISP's to serve new coverage areas, bringing voice and data access to consumers, businesses, schools, healthcare institutions and other end users.

Name: SPEEDCAST
Address: 2405-8, Dah Sing Financial Center, 108 Gloucester Road, Wanchai, Hong Kong.
Tel: +852 3919 6800
Fax: +852 3919 6880
Email: marketing@speedcast.com
Internet: www.speedcast.com
Contact: Pierre-Jean Baylier
Job Title: CEO

SpeedCast International Limited is a leading global satellite communications network service provider, offering high-quality managed network services in over 90 countries and a global maritime network serving customers worldwide. With a network of 40 sales and support offices around the world and 39 teleport operations, SpeedCast has a unique infrastructure to serve the requirements of customers globally. With over 5,000 links on land and at sea supporting mission critical applications, SpeedCast has distinguished itself with a strong operational expertise and a highly efficient support organization.

Photo courtesy of SES

Name: SES
Address: Chateau de Betzdorf, Rue Pierre Werner, Betzdorf L-6815, Luxembourg.
Tel: +352 710 725 1
Fax: +352 710 725 227
Email: Contact Form
Internet: www.ses.com
Contact: Ferdinand Kayser
Job Title: Chief Commercial Officer

SES is the world-leading satellite operator and the first to deliver a differentiated and scalable GEO-MEO offering worldwide, with more than 50 satellites in Geostationary Earth Orbit (GEO) and 12 in Medium Earth Orbit (MEO). SES focuses on value-added, end-to-end solutions in four key market verticals (video, enterprise, mobility and government). It provides satellite communications services to broadcasters, content and internet service providers, mobile and fixed network operators, governments and institutions, and businesses worldwide. SES's portfolio includes the ASTRA satellite system, which has the largest Direct-to-Home (DTH) television reach in Europe, and O3b Networks, a global managed data communications service provider. Another SES subsidiary, MX1, is a leading media service provider and offers a full suite of innovative digital video and media services.

Name: TALIA
Address: 19 Nassau Street, London W1W 7AF, UK.
Tel: +44 203 318 1500
Fax: +44 207 631 3343
Email: Contact Form
Internet: www.talia.net
Contact: Alan Afrasiab
Job Title: President and CEO

Talia is a top-tier provider of Internet, voice, and video services, and is recognised as a market leader throughout the Middle East, Africa, and Europe. Expert in satellite, voice, video, and broadcast communications, Talia provides global network coverage, enabling enterprises, PTTs, mobile carriers, and broadcasters to connect to the largest global meet me room, and linking the major regional telecoms hubs around the world.

With headquarters in the UK, Talia operates its own teleport facility in Germany along with support and sales offices in the US, UAE, Nigeria, South Sudan, Uganda and Iraq. Talia is ideally positioned to meet the demands of today's global market. Talia provides solutions for enterprises, media companies, NGOs, and government agencies.

Photo courtesy of Airbus

Name: TELESAT
Address: 1601 Telesat Court, Ottawa, Ontario, Canada K1B 5P4.
Tel: +1 613 748 0123
Email: Contact Form
Internet: www.telesat.com
Contact: Tom Eaton
Job Title: Vice President International Sales

Telesat is a leading global satellite operator, providing reliable and secure satellite-delivered communications solutions worldwide to broadcast, telecom, corporate and government customers. Headquartered in Ottawa, Canada, with offices and facilities around the world, the company's state-of-the-art fleet consists of 15 satellites plus the Canadian payload on ViaSat-1 with two new satellites under construction. An additional two prototype satellites are under construction and will be deployed in low earth orbit. Telesat also manages the operations of additional satellites for third parties. Privately held, Telesat's principal shareholders are Canada's Public Sector Pension Investment Board and Loral Space & Communications Inc. (NASDAQ: LORL).

Name: VIASAT INC
Address: 6155 El Camino Real, Carlsbad, CA 92009, USA.
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Fax: +1 760 929 3941
Email: Contact Form
Internet: www.viasat.com
Contact: Steven Hart
Job Title: EVP, Engineering & Chief Technical Officer

ViaSat is in the business to connect the world. As a global broadband services and technology company, it is connecting international communities to the internet by offering residential internet service; enabling passengers and operations crews to stream high-bandwidth media, applications, and content when travelling globally on commercial, business or government aircraft and maritime vessels; and empowering international warfighters on the front lines of battle with real-time, secure internet-based intelligence, surveillance, and reconnaissance for high-requirement missions. Viasat delivers and protects information – when and where it is needed most – with trusted communications ground systems, infrastructure, and services.

Photo courtesy of KYMETA

Name: VT IDIRECT
Address: 13861 Sunrise Valley Drive, Suite 300, Herndon, VA 20171, USA.
Tel: +1 703 648 8002
Email: sales@idirect.net
Internet: www.idirect.net
Contact: Julie Bettinger
Job Title: Vice President, Corporate Marketing

VT iDirect® is a global leader in IP-based satellite communications. The company provides technology and solutions to enable service providers and satellite operator partners to optimize their networks, differentiate their services and profitably expand their business.

For more than 20 years, the VT iDirect organization has focused on meeting the economic and technology challenges across the satellite industry. Today, the product portfolio, branded under the name iDirect, sets new standards in performance and efficiency, making it possible to deliver voice, video and data connectivity anywhere in the world.

VT iDirect's parent company, Vision Technologies Systems, Inc. (VT Systems) and its subsidiaries are providers of engineering solutions, products and integrated systems and services. VT Systems is a wholly-owned subsidiary of Singapore Technologies Engineering Ltd (ST Engineering). As part of the larger ST Engineering family, the combined synergies enable expansive technology capabilities, leadership across multiple vertical industries, and broad access to global resources for VT iDirect's network of more than 350 partners.

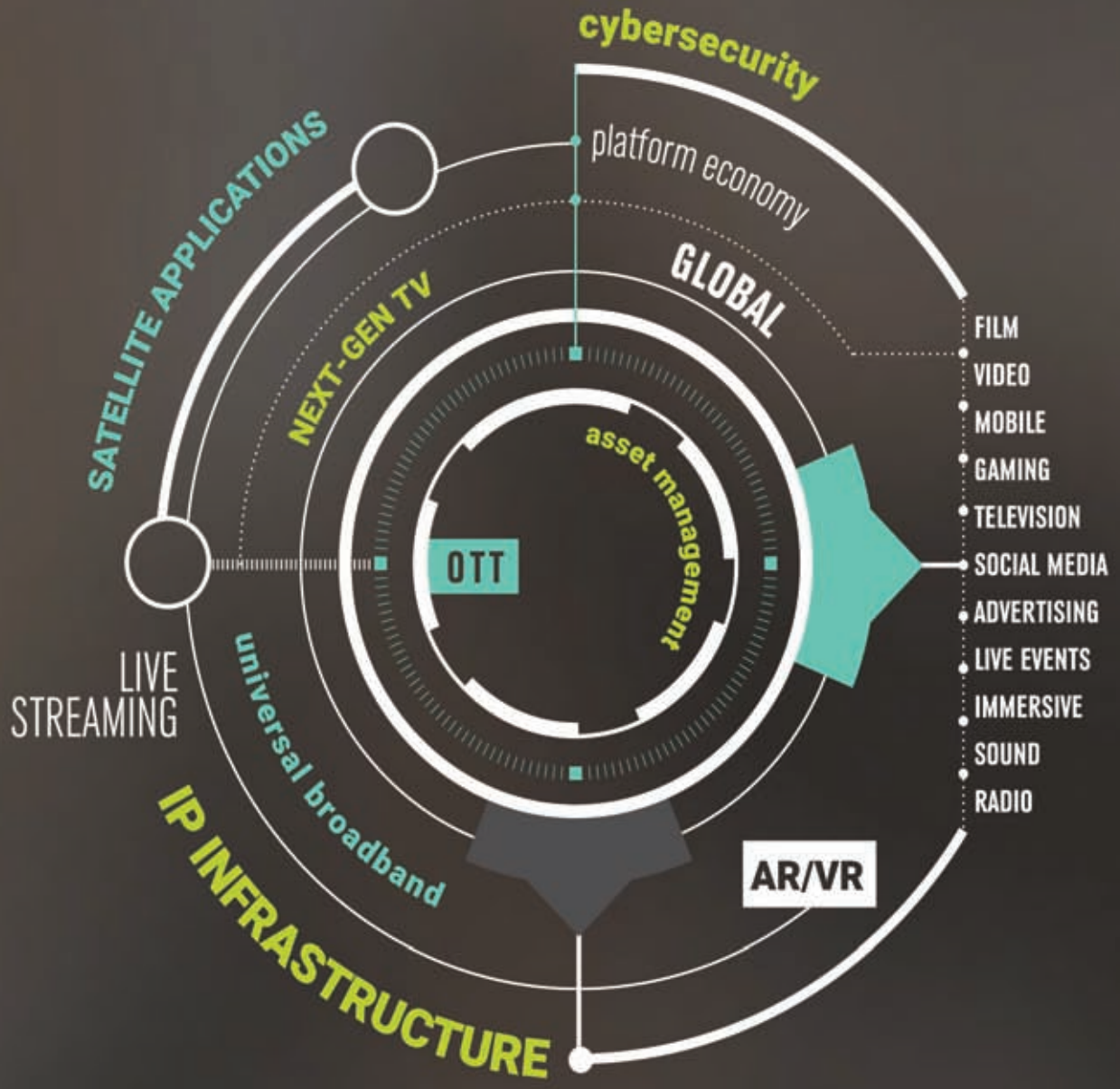
iDirect Government™ is a wholly owned subsidiary of VT iDirect, formed in 2007 to better serve the US Government and defense communities.

Name: YAHSAT
Address: Al Falah City, Abu Dhabi, UAE.
Tel: +971 2 510 0000
Fax: +971 2 510 0001
Email: info@yahsat.ae
Internet: www.yahsat.com
Contact: Farhad Khan
Job Title: Chief Commercial Officer

Yahsat provides multipurpose satellite solutions (government and commercial) for broadband, broadcast, military, and communications use across the Middle East, Africa, Central and South West Asia. Based in Abu Dhabi, UAE and wholly owned by the Mubadala Development Company, the investment vehicle of the Government of Abu Dhabi, Yahsat is the first company in the Middle East and Africa to offer multi-purpose satellite services:

- YahClick – offers home solutions, business solutions and transportable solutions;
- YahService – offers managed solutions and government capacity; and
- YahLink – offers IP trunking solutions, corporate networking capacity and backhauling capacity.

Yahsat's first satellite Y1A was successfully launched in April 2011 and the company's second satellite Y1B was successfully launched in April 2012.



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LET'S THRIVE.

Name: ABS
Address: O Hara House, 3 Bermudiana Road, Hamilton, HM08, Bermuda.
Tel: +1 441 295 7149
Email: info@absatellite.com
Internet: www.absatellite.com
Contact: Raymond Chow
Job Title: Deputy COO

ABS is a young and fast growing global satellite operator, with an entrepreneurial and creative business approach. Headquartered in Bermuda, ABS has offices in the United States, UAE, South Africa, Germany, Philippines, Indonesia and Hong Kong.

ABS is majority owned by the Permira funds which are advised by European Private Equity firm Permira. The Permira funds acquired ABS in 2010.

Led by a management team of talented and experienced professionals, ABS offers a complete range of end-to-end solutions including Direct to Home (DTH), Cable TV distribution (CATV), cellular backhaul, VSAT and Internet backbone services with diverse IP transit through its European, Middle East and Asian internet gateways.

ABS operates a fleet of satellites serving 93 percent of the world.

- ABS-2 (75°E, prime orbital location);
- ABS-2A launched on 15th June 2016 (75°E, prime orbital location);
- ABS-3 (85.3°E);
- ABS-3A (3°W) – in Service August 31 2015;
- Mobisat-1 / ABS-4 (61°E);
- ABS-6 (159°E); and
- ABS-7 (116.1°E).

The new satellites: ABS-2A was launched on 15th June 2016 and ABS-8 is planned for future deployment. ABS plans to add more satellites over the next 2-3 years to its growing fleet.

Name: ACCESS INTELLIGENCE
Address: 9211 Corporate Blvd, Fourth Floor, Rockville MD 20850, USA.
Tel: +1 301 354 2000
Email: info@accessintel.com
Internet: www.accessintel.com
Contact: Jenn Heinold
Job Title: Senior Vice President, Events

Access Intelligence is a leading worldwide information and marketing company that provides unparalleled business intelligence and integrated marketing solutions in nearly a dozen global market sectors, including aerospace and satellite. Access Intelligence publishes *Via Satellite* magazine and produces the annual SATELLITE Conference and Exhibition in Washington, DC.

With a customer-centric culture dedicated to editorial excellence and marketing integrity, Access Intelligence serves business professionals worldwide with a portfolio of products, including events, e-letters, data and digital products, e-learning magazines and e-media solutions.

Name: ACCESS PARTNERSHIP
Address: Broadway Studios, 20 Hammersmith Broadway, London W6 7AF UK.
Tel: +44 20 3143 4900
Fax: +44 20 8748 8572
Email: london@accesspartnership.com
Internet: www.accesspartnership.com
Contact: Gregory Francis
Job Title: Managing Director

Since 1999, Access Partnership has helped some of the world's leading ICT organisations gain access to new markets, drive sales, meet regulatory goals, shape policy outcomes and introduce new services into previously underserved markets.

The company's expertise in the areas of government relations and regulatory affairs means it is able to provide clients with a range of solutions that create the commercial environment they need to flourish.

Name: ADVANTECH WIRELESS
Address: 657 Orly Avenue, Montreal, QC, H9P 1G1, Canada.
Tel: +1 514 420 0045
Fax: +1 514 420 0073
Email: info.canada@advantechwireless.com
Internet: www.advantechwireless.com
Contact: Cristi Damian
Job Title: Vice President, Business Development

Advantech Wireless delivers intelligent broadband communications solutions that achieve excellence, maximize performance and minimize operational costs, all with uncompromising quality. Ultimately, the company helps people stay connected and informed by designing and manufacturing the most advanced terrestrial and satellite communication technologies on the planet.

Advantech Wireless is the leading wireless broadband communications solution provider for commercial, critical infrastructure & government and military clients.

Name: AETHERIC ENGINEERING LTD
Address: Katana House, Fort Fareham Trading Estate, Fareham PO14 1AH, UK.
Tel: +44 1329 823583
Fax: +44 1329 288675
Email: sales@aetheric.co.uk
Internet: www.aetheric.co.uk
Contact: Peter Milne
Job Title: Principal Consultant

Satellite communications, design and technology specialists, Aetheric Engineering is an independent telecommunications consultancy, established in 1989. Aetheric Engineering offers and is renowned for its flexibility and tailoring of support to the actual needs of each of its clients.

The company offers advice and support throughout all project phases from feasibility and design studies, through procurement and project management, to installation, commissioning and operation of telecommunications networks, especially satellite communication systems. Support is available for both civilian and military systems.

Photo courtesy of Shutterstock

Name: AGUIAR & MARSIGLIA
Address: Zentena 3175, C1425CCB, Buenos Aires, Argentina.
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Fax: +54 11 4802 5647
Email: henochaguiar@yahoo.com
Contact: Henoch Aguiar

Consultancy based in Argentina and GVF Correspondent for the Southern Cone.

Name: AIRBUS DEFENCE & SPACE
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Tel: +33 5 62 19 40 40
Email: Contact Form
Internet: www.airbusdefenceandspace.com
Contact: Jean-Pierre Talamoni
Job Title: Executive Vice President Marketing and Sales

Airbus Defence and Space is a division of Airbus Group responsible for defence and aerospace products and services. The division was formed in January 2014 during the corporate restructuring of European Aeronautic Defence and Space (EADS), and comprises the former Airbus Military, Astrium, and Cassidian divisions. It is the world's second largest space company after Boeing and one of the top ten defence companies in the world. Airbus Defence and Space provides a total satellite communications system capability in-house, from spacecraft and payload design, manufacture, test, launch and operations, to the complete communications system infrastructure.

Name: ALKAN TELECOM
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Tel: +202 251 69722
Fax: +202 251 69560
Email: info@alkantelecom.com
Internet: www.alkancit.com

Alkan Telecom is a leading telecommunications solutions provider and systems integrator that offers a wide-set of turnkey solutions to meet the ongoing demands of fixed and wireless operators in the Middle East and Africa. With regional presence in most of MEA countries, Alkan Telecom has always been able to support its clients' business needs, from inception to completion, going through all phases from planning right through operation.

APPLIED INSTRUMENTS, INC.
RF TEST AND MEASUREMENT

Name: APPLIED INSTRUMENTS, INC
Address: 5230 Elmwood Avenue, Indianapolis, IN 46203, USA.
Tel: +1 317 782 4331
Fax: +1 317 786 9665
Email: info@appliedin.com
Internet: www.appliedin.com
Contact: Tom Haywood
Job Title: President

Applied Instruments designs and manufactures RF test equipment used in the satellite and cable television sectors of the telecommunications industry. Product lines include signal measurement meters, test signal generators and signal switches. Users of Applied Instruments' equipment include the major satellite and cable television service providers and their contractors and equipment manufacturers. Applied Instruments' equipment is primarily used for the installation and maintenance of the service providers' networks, or to ascertain performance thresholds by their equipment manufacturers. Other market segments using Applied Instruments' equipment include commercial, institutional, and military.

Name: APPLICATION TECHNOLOGY STRATEGY
Address: Georgetown, Texas, USA.
Tel: +1 512 943 0454
Email: bruce@applicationstrategy.com
Internet: www.applicationstrategy.com
Contact: Bruce Elbert
Job Title: President

ATS is committed to the success of new and existing networks, application systems and organizations that employ broadband technologies, satellite and wireless communications, and information technology. Its experience in satellite communications, both in the space segment and ground segment, allows it to better assist clients that are considering how this medium can address earthly needs. ATS is an expert in preparing program plans and cost-reduction analyses that provide a foundation for sound decisions. Other expertise includes RF design and radio wave propagation, satellite design and performance evaluation, and ground segment systems engineering.

Name: APT SATELLITE COMPANY
Address: 22 Dai Kwai Street, Tai Po Industrial Estate, Tai Po, New Territories, Hong Kong.
Tel: +852 2600 2100
Fax: +852 2522 0419
Email: info@apstar.com
Internet: www.apstar.com
Contact: Cheng Guangren
Job Title: Executive Director & President

APT Satellite Company Limited is a leading satellite operator in the Asia-Pacific region. APSTAR commenced its operation in 1992. The company currently owns and operates five in-orbit satellites: APSTAR-5, APSTAR-6, APSTAR-7, APSTAR-7B (partial), and APSTAR-9 satellites, covering regions in Asia, Europe, Africa, Australia and Pacific islands which contain approximately 75 percent of the world's population.

Supported with comprehensive and high-quality services, the advanced APSTAR Satellite Fleet has become a very important satellite resource for the Asia-Pacific region. APT offers the services to a wide range of applications including video distribution, Direct-To-Home TV, cellular backhaul, corporate network, maritime and aeronautical mobility services.

Photo courtesy of Shutterstock

Name: AQYR
Address: 26 Clinton Drive #114; Hollis, NH 03049, USA.
Tel: +1 603 402 7100
Fax: +1 603 521 6099
Email: info@aqyrtech.com
Internet: www.aqyrtech.com
Contact: Rory Eddings
Job Title: Director Sales and Marketing

AQYR is a wholly owned subsidiary of Windmill International, Inc. For over twenty-five years, Windmill International, Inc. has been considered one of the defense industry's business leaders in program management, engineering, training, technology and software development. Headquartered in Nashua, New Hampshire, the veteran-owned company has built an excellent reputation with its customers as a highly efficient and skilled solutions-provider.

Name: ARABIC AND ISLAMIC BROADCASTING UNION
Address: Octave House, Empire Way, Wembley, Middlesex, HA9 0RH, UK.
Tel: +44 20 8903 8898
Fax: +44 20 8903 9880
Email: info@aibu.tv
Internet: www.aibu.tv

The Arab Islamic Broadcasting Union (AIBU), formed in 2013 in the United Kingdom, is an organization that represents members of the television and radio industry across the Arab and Islamic world.

AIBU is a bridge, connecting the businesses, professionals and institutions involved in broadcasting across the Arab and Islamic world. It is an agent for innovation and growth. A trusted central resource, where the outside world can access quality content and accurate information. In addition, AIBU aspires to develop suitable areas of co-operation among members, including co-production for the exchange of broadcasting material.

Name: ARQIVA
Address: Crawley Court, Winchester SO21 2QA, UK.
Tel: +44 1962 823434
Email: enquiries@arqiva.com
Internet: www.arqiva.com
Contact: David Crawford
Job Title: Managing Director Satellite & Media

Arqiva is a leading UK communications infrastructure company enabling a vibrant digital economy. Every day the company's infrastructure and associated services enable millions of people and machines to connect wherever they are through TV, radio, mobile WiFi and the Internet of Things (IoT).

Photo courtesy of BP

The company is an independent provider of telecom towers, with around 8,000 active sites, and the only national provider of terrestrial television and radio broadcasting.

Arqiva works with everyone from mobile network operators, such as BT-EE, Vodafone, O2 and Three to independent radio groups and major broadcasters, such as the BBC, ITV, Sky, Turner and CANAL+ to utility companies such as Thames Water.

Arqiva provides digital and satellite services and distribution for international clients in Europe, the US, the Far East and Australia, including Turner and Canal+ and the Al Jazeera Network.

Name: ASIA PACIFIC ZONE SYSTEMS
Address: 13, Jalan Astaka U8/83, Seksyen U8, Bukit Jelutong Industrial Park, 40150 Shah Alam, Selangor Darul Ehsan, Malaysia.
Tel: +60 3 7846 2288
Fax: +60 3 7846 5588
Email: sales@zonesystems.net
Internet: www.zonesystems.net
Contact: Lai Nam Onn

Zone Systems A/S is a premier provider and integrator of commercial satellite and terrestrial broadcast systems, maintaining readiness and providing daily operational services to customer's broadcast systems worldwide. Over the past 20+ years Zone Systems A/S has successfully worked with leading broadcasters and telecommunications corporations deploying complete full turnkey solutions specializing in the field of TV and FM radio broadcast transmission over terrestrial and satellite networks.

Name: ASISAT
Address: Insurgentes sur 421-B613, Col. Hipodromo Condesa, 06170 Mexico, D.F.
Tel: +52 5584 4550
Mobile: +52 500 0687

ASISAT is a Mexican organisation that represents its members in forums and conferences of the satellite industry, related to telecommunications, technical matters, DTH, regulatory and international affairs. The organisation serves as the Mexico Correspondent for the GVF.

Name: ASSI - THE INDONESIAN SATELLITE ASSOCIATION
Address: Cisanggarung Street No. 2, 2nd Floor, Room 26, Bandung 40155, West Java, Indonesia.
Tel: +62 22 452 1658
Fax: +62 22 452 1657
Email: admin@assi.or.id
Internet: www.assi.or.id
Contact: Feti Fatimah

ASSI is an association to protect the interests of Indonesia's satellite business, especially through regulations that favour domestic industries and encourage the development of satellite business in Indonesia, providing technology and business education to the public and encouraging the creation of national potential in the field of satellite technology and space. Serves as the GVF's Indonesian Correspondent.

Name: AVANTI COMMUNICATIONS
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Tel: +44 207 749 1600
Email: webenquiry@avantiplc.com
Internet: www.avantiplc.com
Contact: David Williams
Job Title: Chief Executive Officer

Avanti connects people wherever they are – in their homes,

businesses, in government and on mobiles. Through the HYLAS satellite fleet and more than 180 partners in 118 countries, the network provides ubiquitous internet service to a quarter of the world's population. Avanti delivers the level of quality and flexibility that the most demanding telecoms customers in the world seek.

Avanti is a first mover in high throughput satellite data communications in EMEA. It has rights to orbital slots and Ka-band spectrum in perpetuity that covers an end market of over 1.7 billion people.

The Group has invested $1.2bn in a network that incorporates satellites, ground stations, datacentres and a fibre ring.

Name: AVL TECHNOLOGIES
Address: 15 North Merrimon Avenue, Asheville, NC 28804, USA.
Tel: +1 828 250 9950
Fax: +1 828 250 9938
Email: Contact Form
Internet: www.avltech.com
Contact: Krystal Dredge
Job Title: Marketing Manager

AvL Technologies, Inc. is a privately held US company specializing in the design, development and production of mobile satellite antennas and positioner systems. With corporate headquarters based in Asheville, North Carolina, and a regional office located in the UK, AvL is able to offer superior service and support to customers around the world. AvL provides systems integrators with positioner and complete antenna system products, product development and services that maximize the technical and commercial benefits for their customers with cost, performance, quality and reliability requirements.

AvL provides solutions and support for satellite ground terminals for SNG, mobile broadband Internet access, disaster relief, oil & gas data backhaul, and defense & homeland security customers throughout the world. AvL offers the world's largest range of satellite antennas for vehicle-mount, flyaway and fixed Earth station applications with sizes ranging from 60cm to 5.0M.

Name: AZURE SHINE
Address: 1000 Gwang Fu Road, Pa Teh City, Taoyuan, 33455 Taiwan ROC.
Tel: +886 3 3611 393
Fax: +886 3 3615 877
Email: azure.shine@azureshine.com.tw
Internet: www.azureshine.com.tw

Azure Shine produces almost all kinds of DTH and VSATsatellite antennas. With the capacity of one million sets per month, the company sells its products all over the world. Asia, Europe, America and Africa, it's not overstating to say that where you can see the sky you can find an antenna marked Azure Shine.

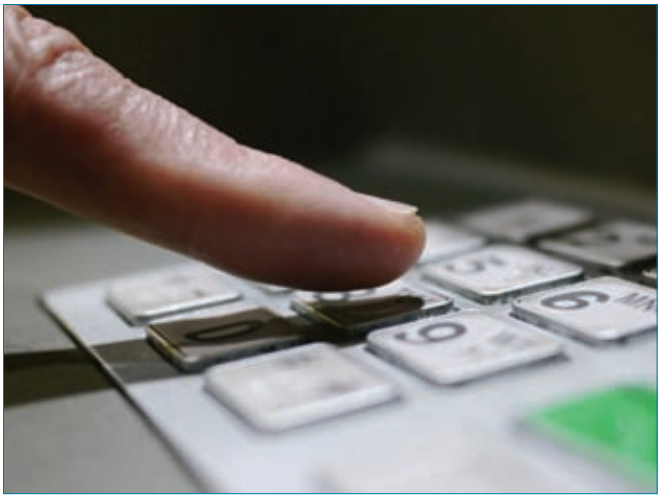

Photo courtesy of Shutterstock

Name: BALKAN TELEKOM
Address: Kisikli Caddesi, Haluk Turksoy Sokak, No 4/1 34662, Altunizade, Istanbul, Turkey.
Tel: +90 216 651 8550
Fax: +90 216 651 8560
Email: info@balkantelekom.net
Internet: www.balkantelekom.net

Balkan Telekom is one of the leading satellite service providers in Turkey with its experienced and dynamic structure. Offering uninterrupted, economical and reliable communication solutions to its customers, Balkan Telekom provides satellite internet services especially in Turkey, Turkic Republics, Middle East and Africa regions.

Name: BHS TELECOMMUNICATION COMPANY
Address: No.401, Building No.1, Dubai Media City, Sheikh Zayed Road, Dubai, UAE.
Tel: +971 4551 5523
Fax: +971 4551 5524
Email: info@bhs-media.com
Internet: http://bhs-media.com
Contact: Hamid Rahmani

BHS delivers content to any place throughout the world. BHS' comprehensive infrastructure and capabilities for signal delivery including satellite, terrestrial and IP connectivity, make it simple for all of its clients to distribute their contents globally.

Name: BOEING
Address: 100 North Riverside, Chicago, Illinois 60606, USA.
Tel: +1 312 544 2000
Email: Contact Form
Internet: www.boeing.com

Boeing is the world's largest aerospace company and leading manufacturer of commercial jetliners and defense, space and security systems. A top US exporter, the company supports airlines, US and allied government customers in 150 countries. Boeing products and tailored services include commercial and military aircraft, satellites, weapons, electronic and defense systems, launch systems, advanced information and communication systems, and performance-based logistics and training.

Name: C-COM SATELLITE SYSTEMS
Address: 2574 Sheffield Road, Ottawa, Ontario, Canada K1B 3V7.
Tel: +1 613 745 4110
Fax: +1 613 745 7144
Email: info@c-comsat.com
Internet: www.c-comsat.com
Contact: Drew Klein
Job Title: Director - International Business Development

C-COM Satellite Systems Inc. is a leader in the development, manufacture and deployment of commercial grade mobile satellite-based technology for the delivery of two-way high-speed Internet, VoIP and video services into vehicles. C-COM has developed a number of proprietary mobile auto-deploying (iNetVu®) antennas that deliver broadband over satellite into vehicles while stationary virtually anywhere where one can drive. The iNetVu® mobile antennas have also been adapted to be airline checkable and easily transportable. More than 7,000 C-COM antennas have been deployed in 103 countries around the world in vertical markets such as oil & gas exploration, military communications, disaster management, SNG, emergency communications, cellular backhaul, telemedicine, mobile banking, and others. The company's satellite-based products are known worldwide for their high quality, reliability and cost-effectiveness.

Name: COM-RAC
Address: 5802 Bob Bullock C1, Suite 328c-278, Laredo, TX 78041, USA.
Tel: +1 713 893 8073
Email: info@com-rac.com
Internet: www.com-rac.com
Contact: Stuart Browne
Job Title: Chief Executive Officer

COM-RAC Corporation provides network operators with integrated telecom terminal kits called a TeleStation®. Each station terminal may be configured for: small cell BTS, long range Wi-Fi access points, TV white space base/remotes, IoT monitor and control, video surveillance, and weather monitoring, and are powered by a solar PV power supply.

COM-RAC offers complete kit packages that include: all electronic components, antennas, cables/connectors, masts, mounting systems and solar PV equipment, everything a network operator needs to install and operate a communications site running "off grid".

Optionally, COM-RAC can supply just the PowerTower® mast and mounting kits, the SPARCS® solar gen set, with the network operator providing the telecom equipment.

Name: C2SAT
Address: Isafjordsgatan 32B, SE-16440, Kista-Stockholm, Sweden.
Tel: +46 8 705 9500
Fax: +46 8 705 9509
Email: info@c2sat.se
Internet: www.c2sat.com

C2SAT, established in 2000 and headquartered in Solna, Sweden, develops, manufactures and supplies innovative stabilised maritime VSAT antenna systems enabling vessels in motion on-line two-way satellite broadband communication. C2SATs business objective is to reduce costs for maritime VSAT satellite services making it possible to get availability to the bandwidth actually paid for during dynamic conditions. Customers range from fishermen in the Scandinavian fishing fleet, oil & gas to military & governmental companies.

By adding the forth axis the C2SAT systems solve high elevation problems and enables accuracy and high speed even during dynamic conditions.

Name: CETEL GMBH
Address: Falkenweg 1, D-53809 Ruppichteroth, Germany.
Tel: +49 2295 90878 0
Fax: +49 2295 90878 22
Email: contact@ce-tel.com
Internet: www.ce-tel.com
Contact: Sven Sünberg
Job Title: Vice President Marketing & Sales

CETel is a German provider of satellite, fibre and wireless enabled communications solutions. It designs, implements and operates independent, end-to-end connectivity services and networks. Customers take advantage of fully managed services, operated from the company's own teleport in Germany as well as technical support and consulting services.

CETel takes responsibility and manages whole networks for customers, that have been designed and tailored by the company's engineering team individually and cost-efficiently to the customer's requirements.

Photo courtesy of Shutterstock

Photo courtesy Alexandra Pugachevsky and Wikimedia

Name: CLARKE BELT 2.0
Address: 22 King Street South Suite 300, Waterloo Ontario N2J 1N8, Canada.
Tel: +1 904 388 2999
Email: mark.brady@att.net
Contact: Mark Brady

The commpany is a start-up looking to deploy an innovative IP satellite constellation. For further information contact Mark Brady.

Name: CISCO SYSTEMS
Address: 170 West Tasman Dr. San Jose, CA 95134, USA.
Tel: +1 800 553 6387
Email: Contact Form

Cisco is the worldwide leader in IT. The company has shaped the future of the Internet by creating unprecedented value and opportunity for customers, employees, investors and ecosystem partners and has become the worldwide leader in networking - transforming how people connect, communicate and collaborate.

Name: COMSOURCE INC
Address: 8430 Spires Way, Suite B, Frederick MD 21701, USA.
Tel: +1 240 379 1700
Fax: +1 301 620 2065
Email: sales@comsourceinc.net
Internet: www.comsourceinc.net
Contact: Byron Parker
Job Title: President

ComSource, Inc. is a leading provider of engineering services, software development, interoperability testing, and equipment evaluation for the telecommunications industry. The company supports a wide variety of telecommunications projects including logistics, acquisition, site selection, infrastructure, testing, design, and first-office simulation. ComSource performs research directed toward the discovery and application of innovative solutions to challenges within the tele-communications field. The consulting services offered by ComSource provide their customers with the best options for solving their communications needs. Employees are encouraged to gain unmatched knowledge of current and emerging technologies. ComSource specializes in GSM to include GPRS and EDGE. ComSource also supports CDMA, UMTS, WiFi, WiMax, PBXs, central office switching environments, SS7 MTP layers 2 and 3, TUP, ISUP, SCCP, TCAP, MAP, UNI to UNI compatibility, and ITU-T Q.780.

Name: COMSYS
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Tel: +44 1727 832288
Fax: +44 208 7317982
Email: susan@comsys.co.uk
Internet: www.comsys.co.uk
Contact: Susan Bull
Job Title: Senior Consultant

As well as consultancy, Comsys offers multi-client reports which have earned a reputation in themselves as reliable, realistic and accurate. This is because it undertakes its own primary research, visiting countries and companies in all regions of the world. It publishes the VSAT Report known as the 'Bible' of the industry.

Name: COMTECH EF DATA
Address: 2114 West 7th Street, Tempe, AZ 85281, USA.
Tel: +1 480 333 2200
Fax: +1 480 333 2540
Email: sales@comtechefdata.com
Internet: www.comtechefdata.com
Contact: Sue Lassandro
Job Title: Director, Marketing

Comtech EF Data Corp., a subsidiary of Comtech Telecommunications Corporation, is the recognized global leader in satellite bandwidth efficiency and link optimization. The advanced communication solutions encompass the Heights Networking Platform, advanced VSAT solutions, satellite modems, RAN & WAN optimization, network & bandwidth management and RF products. The company is recognized as a technology innovator, and has a reputation for exceptional product quality and reliability. The solutions enable commercial and government users to reduce OPEX/CAPEX and to increase throughput for fixed and mobile/transportable satellite-based applications.

Name: CPI SATCOM
Address: 811 Hansen Way, Palo Alto, CA 94304-1031, USA.
Tel: +1 650 846 3803
Fax: +1 650 424 1744
Email: satcommarketing@cpii.com
Internet: www.cpii.com/satcom
Contact: Doug Slaton
Job Title: Marketing Product Manager

CPI's Satcom Division (CPI Satcom) is a worldwide leader in uplink amplifier products and systems for satellite communications. The company has played a pivotal role in the satcom industry since its inception. The first satellite projects, including Intelsat and CONUS, were supported by CPI, which was then part of Varian Associates, Inc.

Today, its scope and global reach is unmatched, having shipped over 40,000 high power amplifiers to uplink stations in over 150 countries. CPI Satcom products for satellite uplink and troposcatter applications are available in all standard frequencies, including:

- S-band;
- C-band;
- Ku-band;
- Ka-band;
- DBS-band; and
- X-band.

CPI Satcom is uniquely equipped to be your one-stop HPA sub-system supplier for standard and emerging satcom applications.

Name: DATAPATH
Address: 2205 Northmont Parkway, Duluth, GA 30096, USA.
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Email: Contact Form
Internet: www.datapath.com
Contact: Michael Barnes
Job Title: VP Marketing & Product Management

DataPath leverages 25 years of experience and projects across 40 countries to bring best practices to everything: "From terminals to teleports and all the tools in between™. The company focus on remote, distributed or at-risk environments, where reliable communications are a must. This includes government, broadcast, emergency response, and industrial markets."

The core of the company revolves around engineering expertise and life-cycle support for satellite terminals ranging in size from tactical man-portable units to vehicle mounted auto-acquire systems to master earth stations for teleports. In addition to custom systems development, DataPath manufactures a line of rapid deployment portable satellite antenna products.

However, DataPath has broad experience providing products and services that span the entire continuum of a network architecture.

Name: DATASAT COMMUNICATIONS
Address: Brookmans Park Transmission Station, Great North Road Hatfield, Herts AL9 6NE, UK.
Tel: +44 (0) 1707 665320
Email: sales@datasat.com
Internet: www.datasat.com
Contact: Phil Emmel
Job Title: Managing Director

A remote communications specialist delivering secure and reliable networks into hard to reach places and the world's harshest environments. A leading service provider of VSAT satellite communications, the company combines intelligent outdoor wireless technology to design and build end-to-end multi-service networks over a single infrastructure.

Name: DIADEM TECHNOLOGIES
Address: Unit F,13th Floor Hai Shang-Jie Zuo Building, NO.578 YingKou Road, Shanghai, China PR.
Tel: +86 157 2117 7848
Email: diadem@diadem-tech.cn
Internet: www.diadem-tech.cn

DiaDem Technologies (DiaDem) has a global open-minded vision and is dedicated to developing and partnering together on the commercialization of attractive advanced technologies, products, solutions and applications.

DiaDem is successfully involved in projects with customers and partners from the EU, Asia Africa, the Middle East as well as the Chinese domestic Market.

With DiaDem's professional ground wireless knowhow and experience - DiaDem's entrance into the satellite field with the unique vision on the combined co-development of both ground wireless and satellite communication segments complement each other.

Name: EGYPTSAT
Address: 24 Ebour Buildings, Salah Salem Road, Cairo, Egypt 11371.
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Fax: +20 2 2405 3949
Email: sales@egyptsat.com
Internet: www.egyptsat.com

EgyptSat provides high-speed Internet connection, using the Express AM22 satellite, which offers a hot spot beam pointed

just over the Middle East, from the Indian Ocean to the Atlantic Ocean coast. This extensive coverage for all countries in the Middle East, Europe and Africa provides customers with an excellent range of geographic locations. Due to the strong signal obtained from the satellite, a fairly small antenna is used to get a reliable and fast Internet connection.

Name: EMC
Address: 3044 N. Commerce Parkway - Miramar, FL 33025 USA.
Tel: +1 954 538 4000
Email: Contact Form
Internet: www.emcconnected.com

EMC specializes in mission-critical communications and content for organizations and people on the move in the most remote locations. At sea, on land and in the air, the company provides seamless, reliable connectivity and access. EMC leverages its wholly-owned and operated satellite-terrestrial cellular broadband network with fully meshed Multiprotocol Label Switching (MPLS) interconnected teleports.

On July 27, 2016, Global Eagle Entertainment (GEE) acquired EMC to become a worldwide leader in end-to-end connectivity and media services for the rapidly growing global mobility markets across air, sea and land.

GEE brings a rich product portfolio that complements EMC's connectivity services, including a full suite of entertainment content through longstanding relationships with Hollywood studios.

Name: EMEASAT
Address: 1306 King Street, Santa Cruz, CA 95060, USA.
Tel: +1 408 807 8515
Fax: +1 408 904 5240
Email: info@emeasat.com
Internet: www.emeasat.com
Contact: Mary Ellen Hannon
Job Title: Managing Director

EmeaSat supplies equipment and services for satellite communication and broadcasting systems. The products the company delivers have been carefully selected. To assure customers receive true value and excellent service the company has narrowed down the list of brands it offers to include only those products that meet the highest standards of performance and reliability.

Name: EMP
Address: 145-157 St John Street, London EC1V 4PY, UK.
Tel: +44 207 099 5546
Email: paul.stahl@uk-emp.co.uk
Internet: www.uk-emp.co.uk
Contact: Paul Stahl
Job Title: Executive Director

EMP, (Event Management Partners), was launched in 2004 to develop and manage a niche portfolio of highly specialised technology focused conferences. EMP is particularly preoccupied with the practical application of various ICTs to selected vertical and emerging markets.

EMP works closely with key industry and government bodies as well as commercial entities and end-users with shared interests to ensure that critical industry objectives are analysed in depth and from a variety of perspectives.

Name: Es'hailSat, Qatar Satellite Company
Address: Property No. 414, Al Markhiya Street No. 380, Area No. 31, Umm Lakhba, PO Box 10653, Doha, Qatar.
Tel: +974 4499 3535
Fax: +974 4499 3504
Email: info@eshailsat.qa
Internet: www.eshailsat.qa
Contact: Ali Ahmed Al-Kuwari
Job Title: President and CEO

Es'hailSat, the Qatar Satellite Company, is a communications satellite operator headquartered in Doha, Qatar. Es'hailSat was established in 2010 as an independent company with the goal to manage and develop Qatar's presence in space. The company provides independent, high-quality, advanced satellite services to broadcasters, businesses and governments in the MENA region and beyond. Es'hailSat aims to be a world class operator who effectively contributes to the success of Qatar's National Vision 2030 by adding a new dimension to the diversifying economy. Es'hailSat will provide advanced satellite services to strategic stakeholders and commercial customers, who value broadcasting and communications independence, quality of service and wide geographical coverage.

Name: EUROCONSULT
Address: 86 Boulevard de Sebastopol, 75003 Paris, France.
Tel: +33 1 49 23 75 30
Email: Contact Form
Internet: www.euroconsult-ec.com
Contact: Pacôme Révillon
Job Title: Chief Executive Officer

Euroconsult is a leading global consulting firm specializing in space markets. As a privately-owned, fully independent firm, it provides first-class strategic consulting, develops comprehensive research and organizes executive-level annual summits and training programs for the satellite industry.

With over 30 years of experience, Euroconsult is trusted by 600 clients in over 50 countries. It has a multi-cultural team of over 30 full-time experts based in France, the United States, Canada and Japan, complemented by a network of senior affiliate consultants.

Name: EVERARD SOLUTIONS
Address: 16 Bricknell Ave, Bredon, Tewkesbury, Gloucestershire GL20 7QH, UK.
Tel: +44 7818 033524
Email: brian.everard@btinternet.com
Contact: Brian Everard
Job Title: Managing Director

An independent IT networking and telecommunications consultancy with over 25 years of managerial experience, knowledge and expertise gained in a wide range of voice and data communications systems, from radio to fixed and mobile satellite systems, delivering services to UK and multiple international offices over a global WAN.

Name: EXPEDITION COMMUNICATIONS
Address: 2501 E 28th Street, Suite 102, Signal Hill, CA 90755, USA.
Tel: +1 877 410 8101
Email: ushq@expeditioncommunications.com
Internet: www.expeditioncommunications.com
Contact: Dean Eldridge
Job Title: President & CEO

Expedition Communications was founded upon delivering innovative yet affordable communications solutions. Its team of

professionals is staffed with licensed and experienced communication experts specializing in installation and maintenance of VSAT, satellite internet services and other communication systems equipment. All of these are maintained and run by professional satellite providers, installers and other communication industry experts.

Name: **FRAUNHOFER IIS**
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Tel: +49 9131 776-0
Fax: +49 9131 776-2019
Email: info@iis.fraunhofer.de
Internet: www.iis.fraunhofer.de
Contact: Thoralf Dietz
Job Title: Head of Corporate Communications

The Fraunhofer Institute for Integrated Circuits IIS is one of the world's leading application-oriented research institutions for microelectronic and IT system solutions and services. By driving technology ideas and anticipating and inspiring the technologies and applications of tomorrow, the company is playing a major role in maintaining Germany's technological leadership.

Name: **GEOFF DANIELL COMMUNICATIONS**
Address: PO Box 70179, The Willows, Pretoria 0041, South Africa.
Tel: +27 12 807 0482
Fax: +27 82 131 783 9184
Email: geoff.daniell@gvf.org
Contact: Geoff Daniell
Job Title: Telecommunications Consultant

Leading South African communications consultant and GVF correspondent for sub-Saharan Africa, Mr Daniell has many years of experience with satellite communications in the region.

Name: **GESTION DE PROJETS INT'L**
Address: 198 FX Garneau, Boucherville, Quebec J1B 6R6, Canada.
Tel: +1 514 569 8049
Email: db@advapro.com
Contact: Denis Beaudoin

Name: **GILAT SATCOM**
Address: 21 Yegia Kapayim Street, PO Box 7144, Petach-Tikva, 49130, Israel.
Tel: +972 3925 5174
Fax: +972 3921 7938
Email: sales@gilat.net
Internet: www.gilat.net
Contact: Gal Kohn
Job Title: Vice President Sales

Gilat Satcom is a leading communication solutions provider that offers satellite and fibre-based connectivity solutions in Africa, Asia and the Middle East. With successful deployments in 50 countries, it consistently delivers high-quality, cost-effective and efficient communication solutions to telcos, ISPs, governments, enterprise customers and international organizations.

With African subsidiaries in Nigeria, Ghana, Uganda and DRC, the company operates three international teleports in Europe and the Middle East, multiple hubs/PoPs in Africa, Europe and the US.

Name: **GILBERT ADANUSA TELECOMMUNICATIONS CONSULTING**
Address: PO Box 8051, Accra, Ghana.
Tel: +233 21 772 233
Fax: +233 21 224 797
Email: gilbert.adanusa@gvf.org
Contact: Gilbert Adanusa
Job Title: President

Provides satellite communications consultancy services including support for market intelligence and promotion of partnerships for satellite systems and services, local representation, etc.

Mr Adanusa, who previously worked as a regulatory advisor to the Ghana Ministry of Communications, also serves as the GVF's West Africa Correspondent.

Name: **GILL GOVIER LTD**
Address: Hinxworth, SG7 5HB, UK.
Tel: +44 1462 743522
Email: info@govieronline.co.uk
Internet: www.govieronline.co.uk

Established in September 2004, the company provides a broad portfolio of management solutions. Its services are based on over 20 years' practical experience within the satellite communications community delivering complex programmes and acting as a catalyst for strategic, organisational change.

Name: **GLOBECOMM SYSTEMS**
Address: 45 Oser Avenue, Hauppauge, NY 11788-3816, USA.
Tel: +1 631 231 9800
Fax: +1 631 231 1557
Email: Contact Form
Internet: www.globecommsystems.com
Contact: Paul Scardino
Job Title: SVP, Sales Engineering and Marketing

Globecomm is a leading engineering-driven, global connectivity provider serving media, maritime, enterprise and government markets in over 100 countries.

It develops smart connectivity solutions to address customer issues across a broad spectrum of areas, including system design and integration, managed communication services including mobile and IoT, media services and mission critical networks.

Globecomm is known for its unique ability to provide robust connectivity to the most remote locations under the most treacherous conditions. Globecomm is dedicated to improving communications and leverages its world class, global network to offer end-to-end, managed service communication's solutions worldwide.

Name: HELLAS SAT
Address: Konstantinoupoleos 48, Koropi, GR-19400, Athens, Greece.
Tel: +30 210 6159700
Fax: +30 210 6645433
Email: sales@hellas-sat.net
Internet: www.hellas-sat.net
Contact: Christodoulos Protopapas
Job Title: President and CEO

Hellas Sat is a leading satellite operator, offering services in Europe, Middle East and Africa. It was established in August 2001 and owns and operates the Hellas Sat 2 high power satellite. The company has been focusing on the development of the orbital position of 39° East into an attractive alternative proposition for video broadcasting, as well as VSAT applications and through the successful operation of three DTH platforms is broadcasting more than 300 HD and SD TV channels to more than 2.9 million households. Since April 2013 Hellas Sat has been part of the Arabsat Group.

Name: HISPAMAR
Address: Praia do Flamengo, 200 /17 Andar Flamengo, CEP 2210-901, Brazil.
Tel: +55 21 2555 4800
Email: Contact Form
Internet: www.hispamar.com.br
Contact: Sergio Chaves
Job Title: Business Manager for South America

HISPAMAR is HISPASAT's Brazilian subsidiary. Ten years in the Pan-American telecommunications market, HISPAMAR satellites have become a reference in the sector, connecting the Americas as well as both sides of the Atlantic.

The company aims to enable communication, information and knowledge through innovative and reliable satellite services, contributing to the development of the business of its customers and quality services.

Name: HISPASAT
Address: Paseo de la Castellana, 39, 28046 Madrid, Spain.
Tel: +34 91 710 25 40
Email: Contact Form
Internet: www.hispasat.com
Contact: Carlos Espinos Gomez
Job Title: Chief Executive Officer

HISPASAT is the Spanish satellite communications operator, leader in the distribution of content in Spanish and Portuguese. With more than 25 years of experience, the HISPASAT Group maintains an important presence on the Iberian Peninsula and in Latin America, where it is now the fourth satellite operator. HISPASAT has solidly positioned itself in high growth markets and has a stable strategic client base. HISPASAT distributes more than 1,250 television and radio channels through its powerful fleet of satellites and is a key driver for the Spanish aerospace industry.

Name: HORIZON SATELLITE SERVICES
Address: PO Box 502343, Office Number 406, Zee Tower, Dubai Media City, UAE.
Tel: +971 4 391 5122
Fax: +971 4 391 2906
Email: info@horizonsat.com
Internet: www.horizonsat.com

Established in 2001, HorizonSat is recognized as a major satellite service provider, covering the Middle East, Asia, Africa and Europe. Committed to quality and continuous development of its product range, HorizonSat has strengthened its presence in these regions.

Systems are reliable and deliver a trouble-free service for broadcasters and content owners who have to cater to large audiences around the world. With access to an array of satellites, HorizonSat currently operates on Eutelsat, ABS, Apstar and Azercom satellites. Its broad range of services include managed broadband solutions, iDirect networks (with and without VNO), IP trunking, VoIP and GSM backhauling, media and broadcast services including video distribution, contribution and turnaround.

HorizonSat operates its own uplink facilities (teleport) from Munich, Germany, namely Horizon Teleports. Horizon Teleports comprises 16 high-end antennae, and offers access to C-band, Ku-band and Ka-band satellites located from 55 degrees West to 78 degrees East. With a redundant core network and backbone connectivity, it guarantees 99.9 percent uptime.

Name: HUCKWORTHY
Address: 20 F St NW, Washington DC 20001, USA.
Tel: +1 202 507 6220
Email: info@huckworthy.com
Internet: www.huckworthy.com
Contact: David Howgill
Job Title: President

Established in 2003, Huckworthy is a HUBZone Certified Small Business, and DOD Mentor Protégé Program participant under Boeing, that was founded to help launch, distribute and manage cutting edge technologies, with emphasis on the wireless, A/V and energy sectors. Huckworthy blends disruptive new technologies from it's partners in the USA, UK and EU with in-house experience, networks and product design capabilities; providing direct distribution and integration of those technologies into wider more extensive solutions - under Huckworthy's TRAVELLER brand for integrated products, or under the brand of origin for pure distribution into government, military and civilian markets.

Huckworthy has helped multiple small businesses with disruptive technologies to find new markets, industry partnerships, distribution channels and success around the world. Equally Huckworthy is actively involved with some of the largest satellite, wireless and energy companies; providing not only product but also consulting and technology diligence services.

Name: INTEGRASYS
Address: Esquilo, Las Rozas, 28230 Madrid, Spain.
Tel: +34 91 631 6846
Fax: +34 91 631 7156
Email: info.sales@integrasys-sa.com
Internet: www.integrasys-space.com
Contact: Alvaro Sanchez
Job Title: Sales & Marketing Director

INTEGRASYS S.A. is a privately owned SME software development, engineering and integration company specialising in the telecommunication and broadcasting markets. It was founded in 1990 by a group of Hewlett-Packard engineers - developers of automated RF & microwave test systems and software, starting as a turnkey project company specialising in software developments for measurement automation in distributed environments. Since then INTEGRASYS has evolved, offering a wide range of signal monitoring products for different telecom services.

Photo courtesy of Shutterstock

Name: INTELLIAN TECHNOLOGIES
Address: 18-7, Jinwisandan-ro, Jinwi-myeon (Chungho-ri), Pyeongtaek-si, Gyeonggi-do 17709, Korea.
Tel: +82 31 379 1000
Fax: +82 31 377 6185
Email: sales@intelliantech.com
Internet: www.intelliantech.com
Contact: Rachel Lee
Job Title: Global Marketing Manager

Intellian is a leading global provider of stabilized satellite antenna systems. Built upon its patented RF, stabilization and tracking technologies, products support a wide range of industries, including commercial maritime, offshore energy, defense & intelligence and luxury yachting. The company's comprehensive range of antenna systems includes satellite TV, VSAT, Global Xpress and FleetBroadband solutions.

Name: INTELSAT GENERAL CORPORATION
Address: 7900 Tysons One Place, 12th Floor, McLean, VA 22102, USA.
Tel: +1 703 270 4200
Email: sales.inquiries@intelsatgeneral.com
Internet: www.intelsatgeneral.com
Contact: Skot Butler
Job Title: President

Intelsat General (IGC) is a wholly owned subsidiary of Intelsat, operator of the world's first Globalized Network. IGC provides its government and commercial customers with high-quality, cost-effective, communications solutions via Intelsat's leading satellite backbone and terrestrial infrastructure. Customers rely on IGC to provide secure and seamless broadband connectivity, video communications, and mobility services for mission-critical operations anywhere on the globe through an open, inter-operable architecture.

Name: INTERNET SOLUTIONS
Address: The Campus, Le Mans Building, 57 Sloane Street, Bryanston, South Africa.
Tel: +27 011 575 1000
Fax: +27 011 576 1000
Email: info@is.co.za
Internet: www.is.co.za
Contact: Saki Missaikos
Job Title: Managing Director

Internet Solutions (IS) is a Pan-African communications service provider and has been providing innovative end-to-end telco solutions and related services for more than 20 years. Today, IS is at the forefront of Internet Protocol-based technologies building solutions and services tailored to the increasingly complex demands of organisations across the enterprise, public sector, global carrier and growing small-to-medium business sectors. As a wholly owned subsidiary of the Dimension Data Group which is owned by NTT Group, IS leverages its infrastructure and global footprint to support organisations with the rapid deployment of emerging technologies.

Headquartered in South Africa, IS has operating offices in five African countries and sales offices in UK, Singapore and USA.

Photo courtesy of SpeedCast

Name: INTERSPUTNIK International Organization of Space Communications
Address: 2nd Smolensky per. 1/4, 121099 Moscow, Russia.
Tel: +7 495 641 4420
Fax: +7 495 641 4440
Email: dir@intersputnik.com
Internet: www.intersputnik.com
Contact: Vadim Belov
Job Title: Director General

Founded in 1971 under the Agreement on the Establishment of the Intersputnik International System and Organization of Space Communications, Intersputnik is an international inter-governmental organization headquartered in Moscow. The Organization's mission is to contribute to the consolidation and expansion of economic, scientific, technological and cultural relations using satellite telecommunications, video and audio broadcasting and to support cooperation and coordination of the efforts of the member countries aimed at designing, procuring, operating and expanding an international satellite telecommunications system. Intersputnik can be joined by the Government of any state that shares the principles of Intersputnik's activity. Today, the Organization has 26 member countries.

Intersputnik operates an international satellite telecommunications system and makes its geostationary orbit and frequency resource on 17 satellites available to telecommunications operators and corporate customers. Through its subsidiary Isatel, Intersputnik offers full-scale services related to the installation and operation of satellite communications networks.

Within the framework of its long-term cooperation with the Russian Satellite Communications Company, Intersputnik makes available to its users the resource of Express-series satellites. Intersputnik is the official distributor of satellite resource and services of the European satellite operator Eutelsat S.A., markets and sells ABS, Intelsat, SES, Chinasat and Gazprom Space Systems satellite capacity, and works together with other regional and domestic satellite telecommunications operators.

Using its intergovernmental organization status Intersputnik filed its own orbit and frequency resource in a number of geostationary orbital positions. This resource is used under projects with interested partners to establish new satellite telecommunications systems.

Name: IRIDIUM
Address: 1750 Tysons Boulevard, Suite 1400 McLean, VA 22102, USA.
Tel: +1 703 287 7400
Fax: +1 703 287 7450
Email: Contact Form
Internet: www.iridium.com
Contact: Bryan J. Hartin
Job Title: Executive Vice President, Sales & Marketing

Iridium Communications Inc. is the only satellite communications company that offers truly global voice and data communications coverage. A technology innovator and market leader, Iridium, in collaboration with its vast partner network, is advancing the way global enterprises conduct daily mission-critical activities

through reliable, low-latency communications services.

Iridium's 66 low-Earth orbiting (LEO) cross-linked satellites – the world's largest commercial constellation – operate as a fully meshed network.

Reaching across land, sea, and air, including the polar regions, Iridium® solutions are ideally suited for industries such as maritime, aviation, government/military, emergency/humanitarian services, mining, forestry, oil and gas, heavy equipment, transportation and utilities. Iridium also provides service to subscribers from the US Department of Defense, as well as other civil and government agencies around the world. Iridium sells its products, solutions and services through a network of service providers and value-added dealers.

Name: **IRWIN COMMUNICATIONS**
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Irwin Communications is an international telecommunications consultancy specializing in satellite communications and its role in information and communications technology. For over 20 years, the company has helped its clients develop new products, enter new markets, establish strategic relationships, obtain market information and increase the efficiency of their communications systems.

Name: **ISAT AFRICA**
Address: PO Box 500459 105, Building 10, Dubai Internet City, Dubai, UAE.
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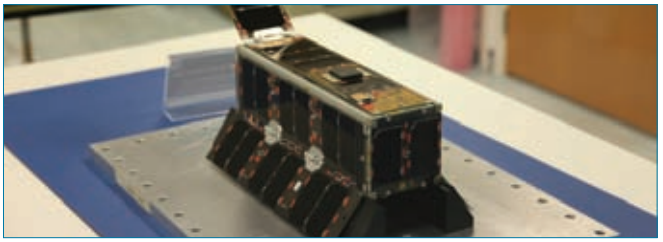
Internet: www.isatafrica.com

iSAT Africa is a UAE based company and a subsidiary of Wananchi Group Holdings, a fast growing fixed satellite solution service provider in Africa. iSAT's satellite solutions, backed by powerful satellites, teleport infrastructure and latest chosen technology solutions are unique in the industry, whether it's for transmission of video, data or voice services.

Name: **ITC GLOBAL**
Address: 3520 S. Sam Houston Parkway E, Suite #400, Houston, TX 77047, USA.
Tel: +1 855 639 4482
Email: Marketing@itcglobal.com
Internet: www.itcglobal.com
Contact: Joe Spytek
Job Title: Chief Executive Officer

Part of the Panasonic family, ITC Global offers global-scale presence and local on-site support. The company's mission is to be the world's best satellite communications provider by offering the best technical solutions, backed by the best customer service in the industry. The company specializes in satellite-based communications for industrial operations in extreme environments, including deep-water energy exploration, remote mining and transoceanic shipping. ITC Global is the number one provider of satellite communications networks to the mining industry and among the top three providers to the oil and gas industry.



UKube-1 courtesy Steve Greenland 2MoSCG

Name: **JONES DAY**
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Email: bolcott@jonesday.com
Internet: www.jonesday.com
Contact: Bruce Olcott
Job Title: Partner

Bruce Olcott has a broad range of experience in communications law and policy. His practice focuses on regulatory and transactional issues involving wireless and wireline services, including satellite, cellular, internet, fibre-optic, and broadband communications technologies. Bruce has assisted clients in developing innovative commercial and private communications services and in securing domestic and international authorizations for the acquisition, construction, and operation of networks. He represents clients in rule makings and consultations before regulatory authorities, often seeking the elimination of legal and regulatory barriers to the provision of new services.

Name: **KASKILO COMMUNICATIONS GMBH**
Address: Am Buchenhang 3, D-83031 Grünwald, Germany.
Tel: +49 151 1560 1035
Fax: +49 89 64 24 89 69
Email: Matthias.Spott@kaskilo.space
Internet: www.kaskilo.space
Contact: Matthias Spott
Job Title: Chief Executive Officer

Kaskilo is an early-stage company seeking to leverage the tremendous business opportunities in NewSpace and become a disruptive leader in future commercial satellite communications.

The company is striving to play a leading role in the emerging NewSpace arena of LEO (Low Earth Orbit) communication satellite constellations by differentiating itself with a dedicated focus on Industrial Internet of Things (IIoT) applications and customers. Also, a comprehensive approach, by not just being a sole capacity provider of satellite connectivity, but also offering proprietary data connectivity solutions to clients, will make it stand out.

Kaskilo aims to become the global data and network management company driving 'digitization and business transformation from space' by providing broadband internet connectivity – everywhere and anytime.

Name: **KNECT365**
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Informa's Knowledge & Networking Division, which operates as KNect365, is the world's leading facilitator of knowledge sharing and business connections. The KNect365 portfolio connects communities around its leading brands, through year round provision of high quality digital and face-to-face content, networking and professional development and learning opportunities.

Name: **KOLAGEN TELECOM**
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Tel: +225 22 41 12 68
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Email: info@kolagen-telecom.com
Internet: www.kolagen-telecom.com

KOLAGEN TELECOM West Africa is part of the GVF community providing Internet and satellite communication services to NGOs, government services and corporate companies in Cote d'Ivoire. KOLAGEN TELECOM West Africa is a SatADSL solution main

distributor for Ivory Coast and BePartner for Newtec in the region.

With its internal skilled resources (all GVF certified), KOLAGEN TELECOM West Africa also acts as a service integrator in the West and Central Africa region, enabling satellite service providers to get deeper down in the value chain to meet customer 'end-to-end' and full managed service requirements.

Name: KRATOS TTS
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Internet: www.kratostts.com

The Kratos Technology & Training Solutions Division specializes in information technology, satellite communications and training to help customers achieve consistently higher levels of performance. Kratos is also a lifecycle training solutions developer, specializing in assuring the readiness, reliability and operational effectiveness of Warfighter and C5ISR systems. It helps organizations and teams optimize performance by improving training outcomes while reducing training time and costs. Kratos develops and delivers the optimal blend of media, from computer-based training to full-fidelity training devices, employing advanced workforce competency and instructional design capabilities to help organizations meet and exceed mission performance goals.

Name: KYMETA
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Fax: +1 866 230 9790
Email: Contact Form
Internet: www.kymetacorp.com
Contact: Nathan Kundtz, Ph.D
Job Title: President & CEO

Kymeta delivers on what connectivity is meant to be – secure, available, universal, and global. Kymeta is removing barriers by providing an innovative means of leveraging satellite network capacity for high bandwidth communication access while on the move. The company's first product, a software-enabled metamaterials-based electronic beamforming antenna for satellite communications, will keep boats, planes, cars, and more connected.

The company has been awarded the 2016 Seattle Business Silver Tech Impact Award for Emerging Technology, the 2016 AHEAD Innovators Award, which were closely preceded by the Frost & Sullivan 2016 New Product Innovation Award. The company has also been recognized as a CNBC Disruptor for two consecutive years, a FiReStarter by Strategic News Network and a top 50 MIT Technology Review Disruptive Company. Kymeta has formed significant partnerships with industry leaders including Toyota, Intelsat, Panasonic, Inmarsat, Airbus Defence & Space, Sharp, Intellian, O3b, and more. If it moves, Kymeta will keep it connected. Anywhere. The company is based in Redmond, Washington and operates on a worldwide basis.

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Internet: www.lintasarta.net
Contact: Alfi Asman
Job Title: General Manager

Founded in 1988, Lintasarta is one of the most comprehensive and advanced information and communication technology service providers in Indonesia, connecting businesses throughout the length and breadth of the archipelago, bringing data communication, business information services and Internet even to remote areas.

Name: LIQUID TELECOMMUNICATIONS LTD
Address: 5th Floor, Ebene Mews, 57 Cybercity, Ebene, Mauritius.
Tel: +230 466 7620
Email: Contact Form
Internet: www.liquidtelecom.com
Contact: Nic Rudnick
Job Title: Chief Executive Officer

Liquid Telecom is the leading independent data, voice and IP provider in eastern, central and southern Africa. It supplies fibre optic, satellite and international carrier services to Africa's largest mobile network operators, ISPs and businesses of all sizes. It also provides payment solutions to financial institutions and retailers, as well as award winning data storage and communication solutions to businesses across Africa and beyond.

Name: LONDON SATELLITE EXCHANGE
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Internet: www.airbusdefenceandspace.com

The London Satellite Exchange is a wholly owned division of Airbus Defence and Space and is the commercial satellite capacity procurement centre for Airbus Defence and Space and its Paradigm Secure Services division in Britain, which handles the Skynet 5 services contract. The milsatcom capacity in UHF and X-band also is managed by LSE.

Name: MAHDI BAGH COMPUTERS PVT LTD
Address: Plot # 9, Angel Apartment, Kalyani Nagar, Pune - 411 006, Maharashtra, India.
Tel: +91 20 26658831
Email: service.support@mbcin.com
Internet: www.mbcin.com

Mahdi Bagh Computers belongs to the highly acclaimed and prestigious Mahdi Bagh Group of Companies which has been in business for over 115 years, and is recognized as one of the oldest and most reputed business houses. It is the one-stop-shop, addressing the entire value chain in the ground segment related to satellite communication. Getting your VSAT network up and running quickly is its priority. Its team of qualified and experienced professionals ensures time schedules are met and high quality workmanship to benchmark industry standards.

Name: MAJU NUSA SDN BHD
Address: Unit 21-10 & 21-11, Menara 1 MK Kompleks, 1 Mont Kiara, No. 1 Jalan Kiara, Mont Kiara, Kuala Lumpur 50480, Malaysia.
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Fax: +60 3 6201 0378
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Internet: www.majunusa.com.my
Contact: Ab Jabar Ab Rahman
Job Title: Director

Incorporated in September 1993, Maju Nusa Sdn Bhd is a company specializing in the provision of IP telecommunications solutions. Through strategic alliances with international principals, it has evolved to become a specialist in providing sophisticated state-of-the-art, all IP based and industry leading telecommunications solutions. Maju Nusa Sdn Bhd carries Network Service Provider (NSP), Network Facility Provider

(NFP) and Application Service Provider (ASP) licenses awarded by SKMM (MCMC) and is involved in various projects under managed services, satellite networks and mobile data.

Name: MARLINK
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Contact: Kate Callaghan
Job Title: Senior Marketing Communications Manager

Marlink is the pioneer of business critical communication solutions for customers operating in remote environments. The company is the largest technology-independent satellite communication and digital solutions provider serving the maritime and enterprise markets. Marlink's multi-band communication services covering Ku, Ka, C and L-band extended with mobile and terrestrial links, enable over 200,000 customers to operate in an ever smarter, safer and more profitable way. With over 75 years' experience in developing innovative business critical communication solutions, Marlink's legacy is to deliver the benefits of a digital and connected world to its customers' remote operations. Today Marlink is the leading maritime communication and maritime VSAT operator in the world. It's leveraging strong partnerships with all major satellite network operators in the industry and delivering its communication solutions direct to the customer and via an unrivalled network of service provider partners.

Name: MAXIS BERHAD
Address: Level 8, 11, 14 - 25, Menara Maxis, Kuala Lumpur City Centre, Off Jalan Ampang, 50088 Kuala Lumpur Malaysia.
Tel: +60 03 2330 7000
Fax: +60 03 2330 0590
Email: Contact Form
Internet: www.maxis.com.my
Contact: Nasution bin Mohamed
Job Title: Chief Financial and Strategy Officer

It is the leading communications service provider in Malaysia, enabling individuals, families and businesses to do more in an always-on-world. Its customers increasingly immerse themselves in an ever expanding universe of connected applications, and the company are obsessed with providing an unmatched end-to-end internet experience – bringing together advanced always on connectivity and always great tech care.

Customers enjoy a superior Internet experience, make voice calls and text, and immerse themselves in an ever expanding universe of connected applications on the most advanced cellular network, encompassing 3G and 4G LTE technologies.

MEDIA BROADCAST

Name: MEDIA BROADCAST SATELLITE GMBH
Address: Ginnheimer Stadtweg 90, 60341 Frankfurt am Main, Germany.
Tel: +49 (0) 6081/100 – 2411
Email: andreas.rohde@media-broadcast.com
Internet: www.media-broadcast.com
Contact: Andreas Rohde
Job Title: Head of Marketing

Media Broadcast Satellite is a leading independent provider of global satellite communication solutions. Delivering advanced network technologies and managed services for Enterprise, Government, Carrier and Broadcast markets, as well as offering hosting services from its 1.4M sqm teleport facility. Government and corporate satellite solutions via one of Europe´s largest teleports complement the portfolio for a global customer base. Services are realized on the latest VSAT platforms.

From its fully independent teleport in Usingen, just outside Frankfurt, Media Broadcast Satellite operates engineering and support offices providing worldwide premier global satellite, terrestrial data services, broadcast and digital TV solutions. Sales operations are located in Europe and North America.

Media Broadcast Satellites' extensive and in-depth experience with teleport operations and delivery of hybrid networks makes it the 'go to' partner for data transmission and broadcast service requirements.

By partnering with global operators and system integrators Media Broadcast Satellite delivers customer focused solutions, utilizing cutting edge technology of satellite modems and high speed IP data terminals.

Besides supplying dedicated networks to enterprise and government customers worldwide, Media Broadcast Satellite owns and operates shared hub services.

Customers can realize the many benefits of satellite connectivity without having to build and operate their own dedicated hubs. All monitored 24/7 by its NOC located at the teleport in Germany.

Name: MERCANTILE COMMUNICATIONS
Address: Hitti Pokhari, Durbar Marg, Kathmandu, PO Box 66, Nepal.
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Fax: +977 1 4427614
Email: info@mercantile.com.np
Internet: www.mos.com.np
Contact: Suman Joshi
Job Title: Group Managing Director

Mercantile has been at the forefront of the Internet evolution and is a cutting edge Internet Service Provider (ISP) in Nepal. Mercantile pioneered the concept of providing Internet Service in Nepal when the popularity of Internet was just beginning in the United States of America. Mercantile in fact has become the first company that led the nation in introducing new and appropriate information technology by giving individuals and small businesses the ability to use the Internet as a tool to make their lives more productive and their businesses more profitable.

Mercantile is continually developing a new and innovative suite of services that make it a faster, easier and smarter Internet experience.

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Address: 3100 Highwoods Blvd, Suite 120, Raleigh NC 27604, USA.
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Contact: Greg Hurt
Job Title: Vice President Sales & Marketing

Founded in 1988, Microspace Communications is a pioneer in innovative broadband solutions for established and emerging enterprise applications, including corporate communications, digital signage, radio broadcasting, wireless messaging and a host of IP data applications.

The company operates one of the world's largest satellite based networks that now totals over a quarter of a million sites. Fortune 500 organiszations and small companies alike rely on Microspace to deliver and manage their business critical video, audio and data content.

Microspace recently introduced DataBridge, a revolutionary, next generation 2-way VSAT satellite service. DataBridge sets a new standard for communications cost, performance, and convenience. The service features unprecedented affordability highlighted by inexpensive hardware and low monthly operational costs. It's a perfect solution for applications like

M2M, SCADAm and IoT. Network management and monitoring is a key feature of DataBridge. Fully redundant, advanced monitoring and control provides a true enterprise level service with 24/7 visibility of your network. This means that sites with connectivity or hardware issues can be identified and promptly addressed from the award winning Network Operations Center.

The service utilizes small .76 meter satellite antennas and an integrated IP modem and router to offer connectivity no matter when or where you need it.

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Contact: Richard Byrne
Job Title: Senior Vice President

MITRE is a not-for-profit organization that operates research and development centers sponsored by the federal government.

It operates FFRDCs—federally funded research and development centers—which are unique organizations that assist the United States government with:

- Scientific research and analysis;
- Development and acquisition; and
- Systems engineering and integration.

It also has an independent research program that explores new and expanded uses of technologies to solve its sponsors' problems.

MITRE is chartered to work in the public interest. It has no commercial interests. It has no owners or shareholders, and it can't compete for anything except the right to operate FFRDCs. This lack of commercial conflicts of interest forms the basis for its objectivity.

Name: MOBAX GROUP
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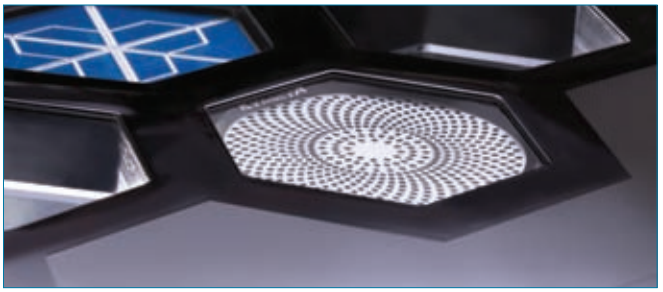
Mobax Group (Pty) Ltd is a leading African telecommunication technology group based in South Africa. Mobax Group's business model comprises both geographical and technological diversification through its subsidiary companies in Southern Africa, Western Africa and Eastern Africa markets.

Name: MT MECHATRONICS GMBH
Address: Weberstraße 21, 55130 Mainz, Germany.
Tel: +49 6131 2777-0
Fax: +49 6131 2777-205
Email: info@mt-mechatronics.de
Internet: www.mt-mechatronics.com
Contact: Dr Jens Bormann/Lutz Stenvers
Job Title: Managing Director

MT Mechatronics, located in Mainz, Germany, provides global services as prime contractor for design, development, system integration, commissioning, training, maintenance and operations for communication and deep space antennas, radio and optical telescopes, mechatronic equipment for research institutions, launching facilities for the European space program and large medical systems for the next generation of particle cancer therapies. With over fifty years' experience in the telescope and antenna business MT Mechatronics has assembled a highly qualified team of engineers and experts with all relevant capabilities and experience to provide the best value and highest quality for your Mechatronic product.



ND SATCOM

Name: ND SATCOM
Address: Graf-von-Soden-Strasse, 88090 Immenstaad, Germany.
Tel: +49 7545 939 0
Fax: +49 7545 939 8780
Email: info@ndsatcom.com
Internet: www.ndsatcom.com
Contact: Dr Michael Weixler
Job Title: Head of Product Management and Marketing

With over three decades of experience, ND SatCom is the premier supplier of and integrator for innovative satellite communication equipment systems and solutions to support customers with critical operations anywhere in the world. Customers in more than 130 countries have chosen ND SatCom as a trusted and reliable source of high-quality and secure turnkey and custom system-engineered communication solutions. The company's products and solutions are used in more than 200 transnational networks in government, military, telecom and broadcast environments. ND SatCom's flagship product, the SKYWAN platform, enables international users to communicate securely, effectively and quickly over satellite.

Name: NEWTEC
Address: Newtec Cy N.V., Laarstraat 5, B-9100 Sint-Niklaas, Belgium.
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Fax: +32 3 780 6549
Email: sales@newtec.eu
Internet: www.newtec.eu
Contact: Thomas Van den Driessche
Job Title: Chief Executive Officer

For over 30 years Newtec has developed satellite communication equipment and technologies for broadcast, government and defense, IP trunking and consumer and enterprise VSAT. Its dedicated team meets industry standards with efficient, scalable and economical solutions. Through the company's expertise and in cooperation with its customers, Newtec makes the world a safer, more informed and connected place.

Name: NORTHERN SKY RESEARCH
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Internet: www.nsr.com
Contact: Christopher Baugh
Job Title: President

NSR is a global leader in providing satellite industry market research and consulting services to clients around the world. Founded in 2000, NSR specializes in analysis of growth opportunities across four core satellite industry sectors: satellite communications, broadcast & digital media, hybrid & emerging applications, and commercial space.

NSR's expert consultants are located globally and possess over 120 years of combined industry experience.

Name: OMNIACCESS
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Tel: +34 971 22 19 79
Email: sales@omniaccess.com
Internet: www.omniaccess.com
Contact: Carlos Carbajal
Job Title: Commercial Director

OmniAccess has thrived from being an innovator in marine networks and mobile VSAT communications. Its visionary managers rely on the engineering and product development team to turn a sketch on the drawing board into a great product. The scope of expertise is as wide as the depth of their knowledge. Ranging from programming code, RF engineering, satellite technology, AV system design to advanced networking skills.

Name: ON CALL COMMUNICATIONS
Address: 19631 Descartes, Foothill Ranch, CA 92610, USA.
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Internet: www.occsat.com

On Call Communications is a leading provider of IP based mobile satellite solutions. Since the early 1990s it has been providing video, voice, fax, and internet communications for both short term and permanent installations throughout the world. Over the years its services have evolved from sending satellite engineers out into the field to set-up and to operate large fly away systems supporting events such as phone call home services for troops during the first Gulf War to press pool communications during NATO operations in Bosnia to installing international long distance voice services to destinations throughout South America, Africa and Asia.

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Email: info@onlime.com
Internet: www.onlime.com
Contact: Irina Petrov
Job Title: Vice President Marketing

Onlime brings together the solid technical expertise of CET Teleport in Germany with the extensive developing world experience of the Limeline Group to lead the way in high quality, secure and reliable business communications for enterprise customers across the globe. Onlime provides premium quality connectivity to enterprise, government, military, oil & gas, mining, banking, NGO and many other customer groups across the globe.

Extensive satellite coverage, across Europe, Africa, the Middle East, Central Asia through the Caribbean and South America, as well as dedicated access to a growing network of fibre links and with a range of the latest technology platforms, wherever an organisation is in the world, allow Onlime to provide an unrivalled communications environment for business.

With a philosophy of being 'closer to the customer' Onlime has a dedicated team of professionals based in offices in Germany, the United Kingdom, Italy, India, Sierra Leone, Angola, DR Congo, South Africa and UAE. The technical hub in Germany is a fully manned disaster recovery facility with a help desk running 24/7.

Name: OPTUS
Address: 1 Lyonpark Road, Macquarie Park, NSW, 2113, Australia.
Tel: +61 2 8082 7800
Email: Contact Form
Internet: www.optus.com.au
Contact: Robert Parcell
Job Title: Managing Director, Wholesale, Satellite & Small Business

Optus is an Australian leader in integrated telecommunications, delivering cutting-edge communications, information technology and entertainment services. In 2001 Singtel became the parent company of Optus, paving the way to become a strong and strategic telecommunications player within the Asia-Pacific region.

With more than 130 years of operating experience the Singtel Group is Asia's leading communications group providing a wide spectrum of multimedia and infocomms technology (ICT) solutions, including voice, data and video services over fixed and wireless platforms.

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Address: 26200 Enterprise Way, Lake Forest, CA 92630, USA.
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Email: Contact Form
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Contact: David Bruner
Job Title: Vice President Global Communications Services

For more than 35 years, Panasonic Avionics has strengthened the connection between the world's airlines and their passengers. It is recognized globally for its experience and leadership in product innovation and customization, system reliability, and customer care.

It collaborates with over 300 airline customers to develop inflight entertainment and communications (IFEC) solutions that are designed to meet their unique fleet, brand, operations, and business requirements, based on state-of-the-art technology, connectivity, and industry know-how. Based on the results of awards from organizations such as APEX and Skytrax, the world's award-winningest airlines are all customers of Panasonic. Every year, more than 500 million passengers enjoy an amazing entertainment experience flying onboard Panasonic-equipped aircraft.

Name: PHASOR
Address: 1655 North Fort Myer Drive, Suite 700, Arlington, Virginia, 22209, USA.
Tel: +1 703 570 5776
Email: info@phasorsolutions.com
Internet: www.phasorsolutions.com
Contact: David Helfgott
Job Title: Chief Executive Officer

By using its unique innovations to standard microchip technologies, Phasor has radically rethought the very idea of an antenna, enabling almost any vehicle surface to receive and send satellite signals. Phasor was founded to solve the challenges of providing broadband internet services to high-speed passenger trains, with very low profile antennas. Since

then, Phasor has developed its unique antenna technology to be suited to land-mobile, aeronautical and maritime satellite communication applications.

Phasor demonstrated successful satellite links with commercial geostationary satellites, and has proven the core technology's functionality and dynamic beam-forming capabilities in test chambers and with outdoor range results.

Name: PLANET COMMUNICATIONS ASIA CO., LTD.
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Fax: +66 2792 2499
Email: Contact Form
Internet: www.planetcomm.com
Contact: Prapat Rathlertkarn
Job Title: President & CEO

Planet Communications Asia Public Company Limited, located in Bangkok, Thailand was founded on April 27, 1994. The company provides professional communications services that include consultancy, development and implementation of satellite communication solutions for public and private sectors.

Name: PRO BRAND INTERNATIONAL
Address: 1900 West Oak Circle, Marietta, Ga 30062, USA.
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Email: sales@pbigroup.com
Internet: www.pbigroup.com
Contact: Eric Shin
Job Title: Vice President Business Development

ProBrand is the world leading designer and manufacturer of advanced RF (microwave) electronics and antenna systems. Founded in 1983 with its US headquarters in Marietta, Georgia, it serves some of the largest telecommunications and satellite operators in the world. Specializing in high-volume ODU & IDU terminals and CPE's, it links devices, homes, and people to the wireless and satellite signals blanketing Earth. In short, ProBrand links the world.

Name: PROCOMSAT
Address: Rue Olof Palme, bloc 7 16035 Hydra, Alger - Algeria.
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Fax: +213 (0) 23 48 28 25
Email: Contact Form
Internet: www.procomsat.com

PROCOMSAT provides hardware and support to its clients who are professionals in the industry, mainly broadcasters, telecom operators and solution integrators who use VSAT equipment, radio, microwaves, broadcast, backhauling, GSM, IPTV/SMATV … enabling them to have quick reliable solutions and communications in the most remote geographical areas difficult to access. PROCOMSAT has resources and premises in Algeria (North and South), Libya and Europe, to facilitate storage and fast import of equipments and spare parts as well as for maintenance.

Name: RCS COMMUNICATIONS
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RCS is a professional ICT (Information Communication Technologies) company for businesses and organisations looking for a service provider that understands the terrain, accepts responsibility for performance and ensures future-relevance for clients in a fast-changing world. It offers a wide range of Internet connectivity, networking, radio, energy saving and mobile satellite solutions in partnership with selected suppliers and service partners.

RCS combines in-country experience across East and Central Africa, offering international best practises and a proven track record for delivering projects in challenging environments to specification and within agreed timeframes.

Name: RED52
Address: Carr. Mex-Toluca #1725-F6, Col. Palo Alto, Mexico City, DF 05110, Mexico.
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Fax: +52 55 5570 3973
Email: ventas@red52.com
Internet: www.red52.com
Contact: Sergio Murillo

RED Five Two, S.A. de C.V. is a Mexican licensed satellite telecommunications provider, known throughout Latin America by its trade name, RED52.

The company was founded in 1999 by Sergio Murillo and Esperanza Hernandez with a clear vision to provide its customers with outstanding value added connectivity services, teleport services, occasional and full time space segments for data, voice, and video applications, as well as Internet access and tele-education content. RED52's field engineers are certified by all the major VSAT platforms, and provide training and certification to new entrants in the field.

The company is often called upon for VSAT Installations, maintenance, and emergency repairs by major carriers throughout entire Latin American region. The company recently added terrestrial fibre optic connectivity services to its line-up of world class offerings. The company serves corporate, government, and military customers through its proprietary technology and infrastructure, and operates one of the most advanced network operations centres in the region. Services include C/Ku uplink truck service, voice, video, and data links, full teleport services, including video uplink and turnaround, pre and post production, fibre optic terrestrial circuits, regulatory licensing and permitting, VSAT installations, site surveys & maintenance.

Name: RHEA GROUP
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Internet: www.rheagroup.com
Contact: Soledad Monsalve
Job Title: Director, Marketing & Corporate Communications

RHEA Group is a niche and highly specialized international engineering company providing services to the most respected organizations and firms in aerospace, security, and defence around the world. Headquartered in Belgium, RHEA Group consolidates its commitment to the Belgian space industry, which plays a significant role within the European Space sector thanks to the efforts of the Belgian Federal Science Policy Office and the research of the European Space Agency (ESA) in the country.

GVF: Satellite...Solutions...The World

Name: RIGNET
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Contact: Jay T. Hilbert
Job Title: Senior Vice President Sales

RigNet (NASDAQ:RNET) is a leading global provider of digital technology solutions serving remote locations, including energy facilities and maritime vessels. RigNet provides solutions ranging from fully-managed voice and data networks to more advanced applications that include video conferencing, crew welfare, asset monitoring and real-time data services. RigNet is based in Houston, Texas and has operations around the globe.

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Contact: Julian Sesena Navarro
Job Title: Consultant

Julian Sesena Navarro acts as the GVF's Spanish Correspondent. Rose has three main areas of activity: e-commerce, engineering projects on telecommunications and development of corporate webs and Internet consultancy services.

Name: RPC TELECOMMUNICATIONS
Address: Lion House, Market Place, Hadleigh, Suffolk IP7 5DN, UK.
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Internet: www.rpctelecom.com
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Job Title: Managing Director and Principal Engineer

RPC Telecom specialises in satellite and radio communications engineering, software and training, and with a particular emphasis on ITU satellite filing, coordination and radio-regulatory matters. Since 1993 it has been supporting satellite operators, government agencies and others to secure and develop the orbit and spectrum resources needed to implement their satellite projects. During this time RPC's expert team has supported more than 120 satellite frequency coordination meetings and been responsible for making in excess of 90 ITU satellite filings.

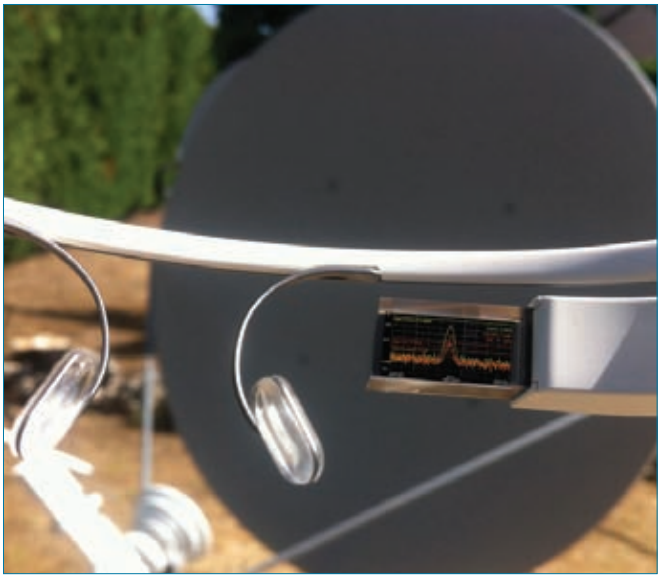

Photo courtesy of Integrasys

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Email: richard@dsairpublications.com
Internet: www.satellite-evolution.com
Contact: Richard Hooper
Job Title: Publishing Director

The Satellite Evolution Group is a multimedia information and marketing platform for the global satellite industry. Its portfolio comprises a webportal, html newsletters, magazines, yearbooks, CD-ROMs and the only true video industry news channel. Its market-leading publications Satellite Evolution Asia, Satellite Evolution EMEA and Global Military Communications, have established themselves as the definitive voice of the industry around the globe.

Name: SATELLITE MARKETS & RESEARCH
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Contact: Virgil Labrador
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SatelliteMarkets.com is a free online service providing subscribers with news analysis, industry forecasts and market intelligence, covering the key trends on the global satellite communications market. This free service includes online access to the very latest insights and analysis, searchable archives, and PDF access to the Satellite Executive Briefing magazine.

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Contact: Silvano Payne
Job Title: Publisher

Satnews is a leading provider of satellite news, publications, research and other satellite industry information in both commercial and military enterprises worldwide. Satnews is pleased to offer a range of products and services to satellite professionals, including free daily news and magazines.

Name: SATPROF
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Contact: Ralph Brooker
Job Title: President

SatProf was founded by satellite ground system engineering industry veterans to meet the need for accessible training for satellite communications technical professionals. SatProf offers standard and custom web-based learning material and technical support for satellite installers, technicians, engineers, and managers.

Name: SATWAYS
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SatWays provides telecommunication solutions to domestic and international clients. Its highly trained staff provide total solutions for your telecommunication needs. SatWays is a telecommunication management corporation. Its services are focused on design, implementation, and operations of small and large networks.

The company also offers consulting to clients looking for an independent audit of their network, design efficiency, proper utilization of bandwidth, process and procedures of operations, and billing information gathering for just-on time billing. SatWays is located in the Washington DC Metro area.

Name: SEMATRON
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Contact: Glenn Toal
Job Title: Marketing & Product Manager

Sematron is a technology distributor with excellent supplier relationships with the leading players in the industry. The company can help you source satcoms and broadcast equipment and systems, RF/microwave or digital components, and diagnostic test and measurement instrumentation.

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Email: sales@signalhorn.com
Internet: www.signalhorn.com
Contact: Robert J. Kubbernus
Job Title: Chairman & CEO

The company has a 40+ year history of providing network services and communications solutions globally using terrestrial satellite and wireless technologies. For this reason, its customers place implicit trust in the solutions and services it offers. Services and solutions encompass end-to-end network design and management including hosting and housing. German art of engineering and Swiss precision create a seamless customer experience across heterogeneous technologies and systems. Supported by its own geo-diverse teleports in Germany and Switzerland, secure and cost-effective connectivity is enabled via over 30 satellites and hundreds of terrestrial points-of-presence globally. Its multilingual in-house NOC guarantees around the clock assistance with unparalleled expertise.

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Email: contact@singtel.com
Internet: www.singtel.com/satellite
Contact: Kian Soon Lim
Job Title: Head of Satellite

Singtel Satellite is Asia's leading provider of one-stop satellite communications and ICT solutions, delivering award winning innovations to meet voice and digital challenges in fixed and mobile satellite segments on both land and at sea. With more than 35 years of collective experience in fixed and mobile satellite services, it can offer customised solutions to meet the varied business needs of industries such as oil and gas, broadcast, energy, maritime, telecommunications, banking and finance, transportation and logistics, government agencies and non-governmental organisations.

Name: SIS LIVE
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Contact: Donna Palumbo
Job Title: Marketing Manager

SIS LIVE is Europe's largest supplier of satellite uplinks. In the UK, it provides contracted digital satellite services to all the major broadcasters — BBC, ITV, Channel 4, Five, Good Morning Britain, Sky News and Sky Sports.

SIS LIVE is also the only company with multiple regional bases throughout the UK. Since its first live non-sport broadcast of the fall of the Berlin wall back in 1989, it has become a major force in the uplink and satellite news gathering (SNG) markets. From a handful of vehicles its fleet has grown and now numbers approximately 128 uplink trucks and additional flyaway units.

The company covers over 100,000 hours of satellite links each year for worldwide events.

SIS LIVE operates two broadcast teleports, located at MediaCityUK in Manchester and Milton Keynes. Its teleports are robust, resilient and secure, providing essential connectivity to broadcasters, with direct access to the global satellite market. Its dedicated network operations centre (NOC) is operational 24hrs a day, 365 days a year. This facility provides monitoring and switching for both satellite and ground based communications and can carry out the most complex routing tasks.

The company's rapidly expanding fibre network Anylive®, connects its headquarters in MediaCityUK and Milton Keynes with major UK broadcasters, sporting venues, network operators and studio facilities plus international teleports and global connectivity providers.

Name: SKY PERFECT JSAT CORPORATION
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Email: Contact Form
Internet: www.sptvjsat.com
Contact: Shinji Takada
Job Title: Representative Director, President & Chief Executive Officer

SKY Perfect JSAT Corporation is a leader in the converging fields of broadcasting and communications. It is Asia's largest satellite operator with a fleet of 18 satellites, and Japan's only provider of both multi-channel pay TV broadcasting and satellite communications services. SKY Perfect JSAT delivers a broad range of entertainment through the SKY PerfecTV! platform, the most extensive in Japan with a total of three million subscribers. In addition, SKY Perfect JSAT's satellite communications services, which cover Japan and the rest of Asia, as well as Oceania, Russia, Middle East, Hawaii and North America, play a vital role in supporting safety, security and convenience for society as a whole.

Photo courtesy Yahsat

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Contact: Riyadh Al Adely
Job Title: Managing Director

Headquartered in Dubai, with a strong local presence in Middle East and Afghanistan, SkyStream is a leading provider of secure satellite communication solutions across the Middle-East. With customers primarily based in the marine, military and oil&gas sectors, its reputation is built on keeping them connected in some of the most isolated locations in the region via our secure VSAT networks.

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Contact: Ori Watermann
Job Title: Chief Executive Officer

SkyVision, established in the year 2000, is a global satellite communications service provider, offering comprehensive, integrated solutions to meet all corporate, government and Telco market requirements.

Known for its innovative approach, the company offers an extensive suite of customized services and solutions for end-to-end IP connectivity, managed from its international gateways and selected local hubs.

SkyVision's global-reaching network connects its customers to the Internet backbone with more than ten satellite platforms and a network of high-capacity fibre optic cables, via its gateways in Africa, Europe, North America and the Middle East as well as multiple points of presence (POPs) in Africa.

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Contact: David C. McCourt
Job Title: Chairman

Skyware Technologies is a global leader in advanced integrated terminal solutions and satellite RF electronics, with operations on three continents and extensive expertise in the world's most in-demand satellite communications technologies. Skyware Technologies' winning combination of high technology and low-cost manufacturing makes its cutting-edge terminal solutions and RF electronics platforms unique in the market.

Skyware Technologies' flagship VSAT products include transportable and fixed terminals for government and commercial applications, the market's first enterprise Ka-band transceiver, and the world's most versatile Ka-band transceiver with electronic polarization switching. Partnered with Inmarsat, the new ATOM and SKY integrated terminals are available with out-of-the-box compatibility with the Global Xpress® network.

Photo courtesy Shutterstock

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Contact: Julia Rotar
Job Title: Marketing Director

The SMi Group is a highly professional, independent and global event producing company that specialises in business-to-business conferences, workshops, masterclasses, training and online communities.

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Internet: www.sonema.com
Contact: Catherine Delom
Job Title: Managing Director

Sonema is a VSAT integrator and telecommunications service provider since 1997. It owns and operates two teleports in France and provides global satellite coverage. It manages close to 600 VSAT installations in 45 countries across multiple sectors: banking, oil & gas, mining and maritime. Sonema provides fully managed communications by leveraging expertise across multiple technologies – satellite, wireless and terrestrial. Each customer it serves has their own set of distinct requirements but share the common need for reliable communications in remote and harsh environments. The combination of its strong network designs, a 24/7 Network Operations Center and extensive network of local partners across the world provides the highest performance and quality customers can expect.

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Email: info@squiresanders.com
Internet: www.ssd.com
Contact: Robert B. Kelly
Job Title: Partner

Its client base spans every type of business, both private and public, worldwide. It advises a diverse mix of clients, from Fortune 100 and FTSE 100 corporations to emerging companies and from individuals to local and national governments. In the private sector, it provides the full range of legal advice required to implement practical strategies and resolve disputes. In the public sector, it counsels governments on privatization of whole industries and on establishment of regulatory systems under which new private businesses can compete.

Name: STAR ONE
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Embratel Star One, a wholly-owned subsidiary from Claro, is the largest satellite company of Brazil and Latin America and operates five GEO satellites (Star One C1, C2, C3, C4, C12 and D1), and three in inclined orbit (Brasilsat B2, B3 and B4).

Firstly designated as Star one, the company was created in December of 2000. Then, it was renamed to Embratel Star One in 2014. To meet new infrastructure demands in Brazil, along with the requirements of major sporting events, such as the Olympics, the company launched two new satellites: Star One C4, in July 2015 and Star One D1, in December 2016.

To operate the fleet, Embratel Star One keeps the best and largest satellite operations center of Latin America, located in Guaratiba, Rio de Janeiro. From it, the company controls, monitors and manages its satellite fleet, with a highly skilled team of engineers and technicians. The center has one of the largest park of antennas of Latin America and the state-of-the-art technology.

All this infrastructure, unique in the Brazilian market, is used by the largest companies, by banks, government entities, TV stations and clients from various segments that require communication of data, video and broadband.

Name: SUMERU MICROWAVE COMMUNICATIONS
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Email: contact@sumerugroup.com
Internet: www.sumerugroup.com

SUMERU is now the largest VSAT antenna supplier in India. SUMERU has a state of the art integrated facility from product design to product delivery. Its holistic design approach involving RF parameter design, mechanical structures, packing, warehousing and logistics provides cost efficiency. The highly experienced in house design team and captive manufacturing facilities for antenna, distinguishes it from others.

Launched in 1996 and achieving leadership position in the domestic market, it is now going global with products for all regions of the world. It has an extensive product range from 0.76 m to 6.3 m size and frequencies of operation from C-band to Ka-band.

Photo courtesy Hung Tran of O3b Networks

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SVEC was established in 1991 and deals in satellite antenna systems - all types and specifications, and the related products such as positioners, receivers, and satellite radio.

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Contact: Thomas Lindell
Job Title: Sales & Marketing Director

Swedish Microwave (SMW) is a leading manufacturer of professional Low Noise Blockdownconverters (LNB) for the satellite market.

The products are used in VSAT systems (Very Small Aperture Terminals), SNGs (Satellite News Gathering), cable-TV headends, marine VSAT, and satcom on-the-move applications.

All work is in-house allowing custom-design products, short delivery times, high flexibility, quick service and support.

Swedish Microwave designs and manufactures its products in Motala, Sweden, and has shipped to more than 120 countries.

Since Swedish Microwave (SMW) started in 1986 the business has seen many companies come and go. Today it is one of Europe's oldest manufacturer of Low Noise Block converters (LNB), serving a global market.

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Telefónica is one of the largest telecommunications companies in the world by market capitalization and number of customers with a comprehensive offering and quality of connectivity that is delivered over world class fixed, mobile and broadband networks. As a growing company it prides itself on providing a differential experience based both on its corporate values and a public position that defends customer interests.

The company has a significant presence in 21 countries and 349 million accesses around the world. Telefónica has a strong presence in Spain, Europe and Latin America, where the company focuses an important part of its growth strategy.

Telefónica is a 100 percent listed company, with more than 1.5 million direct shareholders. Its share capital currently comprises 4,900,571,209 ordinary shares traded on the Spanish Stock Market and on those in London, New York, Lima, and Buenos Aires.

Name: TELE-POST
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Behind TELE-POST is the TELE Greenland A/S group, wholly owned by the Government of Greenland. TELE Greenland A/S covers a population of 56,000 scattered over thousands of kilometres, providing telecommunications, IT and postal services.

Name: TELENOR SATELLITE
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Job Title: Director of Operations

Telenor Satellite is a major European satellite provider of broadcast and data communication services for customers in the broadcast, maritime, and oil and gas markets. Telenor Satellite owns and operates the THOR satellite fleet, positioned at 1°West, which provides high-powered and high-quality satellite capacity throughout Europe, the Middle East and Africa.Telenor Satellite has also strengthened its position by moving its Thor III satellite to a new orbital location, 4°West, from where it offers inclined-orbit services throughout the Middle East. With the successful launch of THOR 7 in 2015, Telenor Satellite is increasing its presence and expanding its regional coverage to support the growth requirements of its broadcast and enterprise customers.

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Contact: Luigi Pasquali
Job Title: Chief Executive Officer

Telespazio, a joint venture between Leonardo (67 percent) and Thales (33 percent), is one of the world's leading players in satellite services. The company, headquartered in Rome (Italy), employs approximately 2,500 people, relying on an international network of space centres and teleports, and operating worldwide through many subsidiaries and joint ventures.

Telespazio is a leading company in sectors that are becoming increasingly important to public institutions, business operators and consumers. Its activities range from the design and development of space systems to the management of launch services and in-orbit satellite control, from Earth observation services, integrated communications, satellite navigation and localization, to scientific programmes. Telespazio now covers the whole space market value chain through its four business units: Satellite Systems & Applications, Satellite Operations, Geoinformation, and Networks & Connectivity.

Photo courtesy of Shutterstock

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Nothing beats the experience of meeting people face-to-face to gain inspiration, to learn and to do business. At Terrapinn, they curate events that stimulate the brain, spur creativity and facilitate meetings. Its conferences are major industry gatherings focusing on strategy, innovation and technology and its trade exhibitions are marketplaces for global business.

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Contact: Bob Hansen
Job Title: Vice President Global Sales & Marketing

Terrasat Communications designs and manufactures innovative RF solutions for satellite communications systems. Its ground-breaking IBUC – the Intelligent Block Upconverter – brings advanced features and performance to C-band, X-band, Ku-band and Ka-band satellite earth terminals and VSAT's. Its products offer exceptional value at reasonable cost, thereby allowing customers to stay ahead of their competitors.

Name: TESACOM
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TESACOM is the leading Latin American provider of remote area integrated telecommunications solutions, and is supplier to major government organizations, the military, defense and humanitarian aid organizations, private and corporate customers in the maritime, fluvial, oil and gas, agricultural, mining, energy, tourist, and transportation markets among others.

With offices in Argentina, Brazil, Chile, Paraguay, Panama, Peru, Uruguay and Venezuela, TESACOM provides a wide range of integrated communications solutions, including satellite voice, data and text messaging services. The company also provides a full portfolio of added value applications, including network integration, asset tracking and control, ship and vehicle location, and bespoke M2M integration for all the above market sectors. TESACOM also provides a Customer Support Service in English, Spanish and Portuguese 24×7 year round.

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Contact: Patompob Suwansiri
Job Title: Chief Commercial Officer

The Company became a listed company on the Stock Exchange of Thailand on 18 January 1994, and is officially traded under the symbol THCOM. Since its establishment, the Company has expanded its business activities to include Internet and telephone services, and DTV satellite television dish sales. As of 31 December 2012, INTOUCH, which is the Company's major shareholder, holds 41.14 percent of the

Company's shares. Thaicom has launched eight satellites, Thaicoms 1, 2 and 3 (all de-orbited), Thaicom 4, (IPSTAR), Thaicom 5, 6, 7 and Thaicom 8 which was successfully launched at the end of May 2016. The company has also built high-quality satellite service facilities besides its main earth control station. This teleport and DTH center has been ISO9001:2000 certified since 2002. In addition the Company also received an ISO 22301:2012 certificate for Business Continuity Management System (BCMS) in 2016. This recognition assures that the Company has an effective management plan to mitigate the risk of potential business disruption.

At present, IPSTAR offers broadband and mobile backhaul services to operators and providers in 13 countries across Asia while its conventional satellites serve more than 700 TV channels.

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Contact: Greg Otto
Job Title: Director - Sales & Marketing

ThinKom, established in 2000, is focused on enabling its customers to provide global connectivity through innovative and cutting edge antennas. Its current antenna offerings operate in the X, K, Ka and Q frequency bands and it continues to expand a library of antenna offerings. The company's patented VICTS and CTS technologies are incorporated in extremely low profile antennas, ideally suited for commercial aircraft, military vehicles and other applications in which low drag and/or low probability of detection are key advantages. In addition to being low profile, the efficiency of apertures result in operating significantly below what is possible with other low profile antennas offered in the marketplace.

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Internet: www.thuraya.com
Contact: Reem Sadek
Job Title: Communications Manager

Thuraya Telecommunications Company is an industry leading MSS operator and a global telecommunication provider offering innovative communications solutions to a variety of sectors including energy, broadcast media, maritime, military and humanitarian NGO. Thuraya's superior network enables clear communications and uninterrupted coverage across two thirds of the globe by satellite and across the whole planet through its unique GSM roaming capabilities. The company's diverse range of technologically superior and highly reliable mobile satellite handsets and broadband devices provide ease of use, value, quality and efficiency. Thuraya remains committed to serving humanity through delivering the essential tools for optimal connectivity, never leaving anyone out of reach.

Name: TS GLOBAL NETWORK SDN BHD
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Contact: Kent Ho
Job Title: Group Chief Executive Officer

TS Global Network Sdn Bhd (TSGN), a privately owned Malaysian company, is a premier satellite communications

(SATCOM) services and solutions provider with an evolving presence in the ASEAN region.

As Malaysia's largest VSAT (very small aperture terminal) technology provider, TSGN serves more than 150 Malaysian corporates and multi national companies comprising oil and gas majors, plantation conglomerates, banks, telco's, defense, security, education and health institutions throughout Malaysia, Indonesia and Brunei.

In October 2015, TSGN co-launched a satellite - MySAT-1. Located at 142E orbital slot, MySAT-1 is equipped with C-band coverage consisting of one broad beam for Asia-Pacific region ("AP Beam") and one enhanced beam for South East Asia ("SEA Beam"), suitable for video broadcast, VSAT networks and cellular backhaul services. Ku-band covers West Pacific and East India Ocean regions, providing DTH, VSAT, mobility services such as maritime and inflight connectivity.

TSG International, a subsidiary, owns and operates TSGN's state-of-the-art RM100 million Cyberport at Cyberjaya which will transform the company into a full fledged SATCOM player offering a compete suite of satellite teleport, international IP gateway and data center in ASEAN and the Asia-Pacific region.

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Address: Konya Yolu 40. Km, Golbasi/Ankara, Turkey.
Tel: +90 312 615 3000
Fax: +90 312 499 5115
Email: info@turksat.com.tr
Internet: www.turksat.com.tr
Contact: Abdulkadir Sener
Job Title: Deputy General Manager

Türksat Company is one of the world's leading companies providing satellite communications through the satellites of

Türksat as well as the other satellites. Providing services for voice, data, internet, TV, and radio broadcasting through the satellites across a wide area extending from Europe to Asia, Türksat is able to provide flexible solutions aimed at customers' needs in regions where no terrestrial infrastructure is available. Bringing different languages and cultures together by means of its global solutions in satellite communications, Türksat provides cable broadcasting services as well for its domestic subscribers through its existing cable infrastructure. Furthermore, Türksat operates the e-Government Portal within the scope of its information services and conducts projects for the provision of public services electronically.

Name: TUYAD
Address: Halil Rifat Pasa Mah.Perpa Ticaret Merkezi B Blok Kat:12, No:2124 PK:34384 Okmeydaný, Istanbul, Turkey.
Tel: +90 212 220 0733
Email: info@tuyad.org
Internet: www.tuyad.org
Contact: Hayrettin Ozaydin
Job Title: Chairman

TUYAD is a non-profit, non-governmental organization which was founded by the companies in the satellite sector. It was set-up in Istanbul in 2001 by the most respected satellite operator, DTH pay TV platforms, STB manufacturers, SMATV equipment manufacturers and integrator companies of Turkey for the purpose of increasing the quality of the industry.

Name: ULTISAT
Address: 708 Quince Orchard Rd, Suite 120, Gaithersburg, MD 20878, USA.
Tel: +1 240 243 5100
Fax: +1 301 916 8545
Email: Contact Form
Internet: www.ultisat.com
Contact: Moe Abutaleb
Job Title: President & CEO

For over 25 years, UltiSat has been a recognized leader in providing secure, reliable satellite communications networks that are flexible and scalable to constantly changing environments. Headquartered in Gaithersburg, Maryland, USA, it has over 70 employees, a teleport in Blaavand, Denmark, sales offices in the United States and Europe, a global field-service operation, and technology partners around the globe.

Leveraging its managed networks expertise, ground-segment infrastructure, and VSAT capabilities, UltiSat provides broadband networking, enterprise data, digital telephony and video-on-demand services anywhere in the world to military and government entities, telcos, service providers, IGOs, and enterprises.

With networks in more than 130 countries, UltiSat is one of the few companies that currently operates global monitoring networks that comprise sites on every continent.

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Tel: +65 9880 9821
Email: mp@ultra-dev.net
Internet: www.ultra-dev.net
Contact: Michael P. MacDonald
Job Title: Consultant

Ultra comprises a group of expatriates and local consultants in various countries with a unique track record of establishing and managing business both in their own territories but also across the Asian-Pacific region. Ultra has specific experience and partner presence in Singapore, Australia, China, Hong Kong, Myanmar, Vietnam, Thailand, Indonesia, Laos, South Africa and Tanzania.

Name: ULTRA ELECTRONICS, GIGASAT
Address: Tring Business Centre, Icknield Way, Tring, HP23 4JX, UK.
Tel: +44 1442 892000
Email: enquiries@ultra-gigasat.com
Internet: www.ultra-gigasat.com
Contact: Tom Cross
Job Title: Business Unit Director

Ultra Electronics, GigaSat is an industry leader for mobile and flyaway satellite earth stations with a focus on wireless broadband communications as the core technology. Formally the Giga-Group, the company was formed in 2001 and acquired by Ultra Electronics in 2012. The business has won several prestigious awards including the Queens Award for Industry in 2005 & 2012 and a European Space Agency award for Research and Development in 2006. Supporting an impressive customer list including the BBC, CNN, and Al Jazeera - GigaSat has the technical resources to undertake virtually any ground based satellite communications project.

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Tel: +55 21 2533 9540
Email: Contact Form
Internet: www.unisat.com.br

UNISAT is a company dedicated to the provision of specialized technical services of consulting and professional training in telecommunications, television, networks and Internet , with a vast history of activities with organizations of the public and private sectors in Brazil and abroad.

UNISAT is also the representative, for Brazil and Portuguese-speaking countries, and the Global VSAT Forum.

Name: VIKING SATCOM
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Internet: www.vikingsatcom.com
Contact: Ken Sexton
Job Title: Sales and Marketing Manager

Viking Satcom is at the forefront of innovation and technology and a leader in the commercial satellite antenna industry. It offers a wide selection of satellite communication products ranging from antennas to their related RF components. The Viking team has years of experience both in the industry and in the field to bring you the highest level of product knowledge and customer service available.

Name: VSAT SERVICES ASSOCIATION OF INDIA
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Fax: +91 11 2372 3909
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VSAT Services Association of India (VSAI) is the independent, non-partisan and non-profit organisation representing the VSAT industry in India, which includes VSAT network operators, VSAT manufacturers, satellite operators and organisations associated with the telecom industry. VSAI is also a founder member of the Global VSAT Forum.

GVF serves as the unified voice of the international satellite industry. Whether your organisation is a satellite service or system provider, a regulator or ministry, or an end user, we would be honoured to facilitate your participation in this dynamic industry.

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This agreement represents a contract between the Members of the Global VSAT Forum (hereafter the GVF). The GVF is a non-profit, independent entity registered as a company limited by guarantee in the United Kingdom whose primary business is the representation and promotion of the global Satellite Communications Industry. GVF invites organisations involved in the provision of satellite systems or services to sign up for membership. Please fill out the form below and return it via email to:

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Director, International Programmes, GVF
Tel: +1 202 905 0415
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Email: angie.mar@gvf.org

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GVF Satellite. Solutions. The World.

Leading edge wireless broadband communications solution provider

Advantech Wireless supports the critical need for High Throughput Satellite (HTS) communications in a rapidly expanding digital environment. Our proven, low-cost, and highly reliable system solutions are meeting the ever-increasing need for high-bandwidth communications essential to military and government solutions, as well as cellular network providers, broadcasters, robust corporate networks, and security. We integrate award-winning research and development engineering into our designs. The result: custom solutions with lowest overall capital and operating costs, together with an unparalleled commitment to lead the industry in materials, design and reliability.

For more than 25 years, Advantech Wireless has led the market with the most powerful innovations in technologies helping its customers obtain the most efficient and cost effective satellite and terrestrial microwave radio solutions. In 2015 Advantech Wireless was recognized as the VSAT Manufacturer of the Year by the VSAT Industry Awards.

As a global company, Advantech Wireless is committed to creating best-in-class technologies to meet and exceed its customers' needs. For both commercial and military needs, the company is uniquely positioned to satisfy the most demanding requirements on land, sea and air. Advantech Wireless is delivering real-world solutions today with successful projects implemented in more than 150 countries in LATAM, Europe, Asia, Oceania, Africa and North America and offices around the world.

VSAT SOLUTIONS

Adaptive Satellite Access Technology 2nd Generation – A-SAT-II™

Efficient bandwidth utilization is key for the success of any satellite system and is a critical capability in a High Throughput Satellite Network. Well ahead of any solution available in the market, Advantech Wireless has developed a revolutionary technology for use on the Discovery VSAT Discovery Hubs product line-up based on Adaptive Satellite Access Technology Second Generation (A-SAT-II™).

Maximizing satellite bandwidth efficiency

Our new Award Winning A-SAT-II™ technology is even more efficient than our industry leading A-SAT™ technology which, monitors channel utilization and dynamically switches the satellite access method and MODCOD seamlessly for the return channel.

A-SAT-II™ combines three different waveforms to optimize the spectral efficiency (Bits/symbol/Hz) based on the traffic or application being transmitted in the network. The traffic is constantly monitored and switched dynamically to the optimal access scheme and thereby minimizes the satellite bandwidth costs.

Advantech Wireless has developed a new line of VSAT Discovery™ Hubs based on A-SAT-II™. The complete line of DVB-RCS Hubs range from the Entry Level Discovery 100 through the Discovery 200 and Discovery 300, to the New Millennium Series High Capacity VSAT Hub and terminals for HTS. This powerful suite of products provides a solution well matched to a broad range of user applications and requirements.

Millennium Series VSAT Hub for HTS

The Advantech Wireless Millennium high capacity VSAT hub is purposefully developed to meet the needs of large VSAT networks typically operating on High Throughput Satellites (HTS). The Millennium modular design is easily expanded as network size increases.

The Millennium rack pictured above is for a typical high throughput deployment. With Advantech Wireless'modular design, a custom configuration can be designed to maximize rack space utilization and minimize the amount of equipment required to support network requirements.

Each forward link block includes the Advantech Wireless FLS-1000 DVB-S2 modulator with an IP encapsulator followed by the ACM merger/slicer allowing transmission of different MODCODs simultaneously. The ACM merger/slicer function provides feedback to the QOS-1000 device for traffic shaping and priority classification. The PEP-1000 performs TCP

and HTTP acceleration, payload and header compression, including RTP compression as well as HTTP pre-fetching and caching.

Each return link block consists multiple multicarrier demodulators (MCD) and several processors. Each MCD can support up to 96 carriers with an aggregate throughput of 48 Mbps. Return carrier burst rates range from 128 kbps to 12 Mbps each. The processors schedule all traffic bursts dynamically almost 40 times per second, for the fastest satellite bandwidth scheduling refresh rate and the lowest jitter in the industry. The processors are also responsible for scheduling the SCPC-DAMA FDMA carriers when A-SAT-II™ is included the hub.

Applications

The Advantech Wireless Millennium high capacity VSAT hub has been developed to enable service providers targeting to support large broadband interactive HTS satellite networks.

Driven by the continual consumer demand for higher throughputs, the Advantech Wireless Millennium high capacity VSAT hub provides the service provider with an easily expanded platform to support over 100,000 consumer terminals in today's HTS satellite networks.

Ka-band HTS network configurations

Advantech Wireless family of 8000 Series VSAT terminals are the most powerful economical terminals available for HTS GEO constellations as well as traditional satellite systems.

These terminals are able to transmit in MF-TDMA, BM-FDMA, or DVB-S2/S2X mode and receive DVB-S2/S2X waveforms. The 8000 Series terminal design is an evolution of our previous generation of terminals including the significant increase in the transponder bandwidths supported for the forward link and the integration of the modem, BUC and LNB functionality into one outdoor unit as shown below.

The complete outdoor terminal including its size and weight reduction is a game changer. The terminal requires a single Ethernet connection to the indoor equipment easing installation. Supporting MF-TDMA, BM-FDMA, and DVB-S2/S2X adds greater transmit waveform flexibility, affording the end-user greater trade-off flexibility. The software-defined modem adds the ability to switch from burst MF-TDMA to continuous carrier DVB-S2/S2X transmission. This multi-waveform capability provides the user with flexibility to transition between the bandwidth-assignment flexibility of DVB-RCS/RCS2 and the unrivalled physical performance of DVB-S2/S2X transmissions.

The terminal has been designed with all key IP features to fulfill the needs of a consumer, enterprise or government user. The 8000 Series terminals offer powerful connectivity directly to the LAN/WAN environment or directly to a host computer. A truly universal solution, it is an out-of-the-box, ready-to-go, cost-effective broadband solution for HTS applications where cost, performance and waveform flexibility provides significant operational advantages.

The world's foremost expert in GaN based High Power Amplifiers and BUC's technology and products.

New second generation GaN based SSPAs/BUCs

- Continues the development roadmap introduced by Advantech Wireless in 2010;
- These GaN based units provide ani m - pressive 60% increase in Linear Transmit Power without any increase in size or weight;
- Designed to operate in harsh outdoor environments;
- These highly efficient systems allow recovery of the initial investment in 1 or 2 years of energy consumption savings;
- MIL-STD compliant;
- Modern Design Architecture, Ruggedized, All Outdoor;
- Modular, Built in Redundancy, Plug In concept;
- High Reliability, at least 50% more than all existing SSPAs technologies; and
- The ultimate solution in terms of Power, Linearity, Efficiency!

Advantech Wireless is the only company capable of offering a unique solution for services like DTH Broadcasting, High Data Rate Telecom Services and Deep Space Communication with impressive savings in energy costs, satellite bandwidth, CAPEX and OPEX.

The Second Generation SapphireBlu™

Class of UltraLinear™ GaN based SSPAs and BUCs from Advantech Wireless are the ideal choice for high power, wide frequency band uplinks. One single GaN based SSPA offers higher performance in multi carrier mode than several linearized TWTs and Klystrons. The new systems can saturate all transponders of an entire satellite and obtain maximum bandwidth/power efficiency.

Based on its analysis of the gallium nitride (GaN)-based devices market, Frost & Sullivan recognized Advantech Wireless with the 2014 North American Frost & Sullivan Award for New Product Innovation Leadership. Advantech Wireless was awarded Teleport Technology of the year 2014 by the World Teleport Association and Most Innovative Product of the Year.

Advantech Wireless

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Continuing to innovate

AnaCom, Inc has designed and manufactured satellite communications equipment for over 30 years. After shipping its first product in 1995, a 5W EC-band transceiver, AnaCom soon followed with its Ku-band line and has since developed product families of BUCs and SSPAs, as well as a variety of related accessories including the ubiquitous 1+1 Redundancy Protection Switch System.

AnaCom continues to innovate with new technologies, while never losing track of its founders' guiding principle: "Quality is Job #1," ensuring its position as industry leader in reliability and performance.

Anacom's future products include a redesign of classic product lines, bringing them well up-to-date with technological advances, including the upcoming adoption of GaN technology for smaller-sized units with better power consumption, good for your bottom line as well as the environment.

AnaCom's latest RF/microwave products include several lines of BUCs in ranges of power and size including a new 13GHz Ku-Band BUCs, as well as their indoor Rack-Mounted Converters. AnaCom's other popular product lines include AnaSat Transceivers, ELSAT BUCs, SSPAs, LNAs and other accessories covering C, Ku and X-band frequencies in power levels from 4 to 400 Watts.

All of AnaCom's products now feature Ethernet support as well as a RS202/485 serial interface. In conjunction with Ethernet support, AnaCom equipment now supports HTTP with a built-in web interface, so you can monitor and control your units via any web browser from your own computer. You can also connect via telnet or on an SNMP network, allowing you to monitor your AnaCom unit over your existing Network Management System.

AnaCom's Supervisor 10 Monitor and Control software offers a common interface for all AnaCom outdoor products. You can monitor all of your AnaCom ODUs from a single window, and control one or all of them with a single button click. Supervisor 10 puts you in control of your AnaCom units, from a single ELSAT BUC, to an entire network of ODUs, each protected with AnaCom's 1+1 or 1+2 Protection Switch redundancy systems.

As people are the key to any successful business, AnaCom, Inc. has worked hard to acquire good people and create an environment that keeps them challenged and excited. As a result, the average time worked at AnaCom by their employees exceeds 10 years. With such employment longevity, AnaCom employees know the products better, know their customers better, and have vast troubleshooting experience, resulting in immeasurable benefits to AnaCom's customers.

Manufacturing

Manufacturing facilities are located in a technology campus in San Jose, California, In the center of the Silicon Valley. AnaCom uses automatic pick and place assembly on their printed circuit boards, casting and CNC machining for their housings. Final test and calibration are done automatically via computer. Statistical Process Controls is applied to ensure good products with uniformity of quality across all product lines.

AnaCom has service centers in the USA, the UK (serving the EU), Africa, Russia, China, India, and Thailand. If it's broke, they can fix it - just about anywhere in the world.

AnaCom, Inc. also has sales personnel, distributors and representatives covering the globe. Wherever you are located, they can respond rapidly to your needs and requests. If you have a rush order, they can get you the equipment you need on time and on budget.

Since bringing out its first C-band units over 30 years ago, AnaCom, Inc. has always been at the cutting edge of RF design. The company's technical staff go the extra mile to fully understand the impact of design updates and industry trends, both good and not-so-good. AnaCom does not blindly follow the industry, but instead relies on its own research to develop a product strategy that best serves customer needs.

AnaCom today has a huge installed base of equipment covering the entire world. Whether it is a mountaintop in the Himalayas, an oil platform in the Gulf, or a wildfire in your state, behind the scenes - AnaCom is at work. Whether it is consumer, business, military or government applications, behind the scenes – AnaCom is at work.

ANACOM, INC.

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Internet: www.anacominc.com

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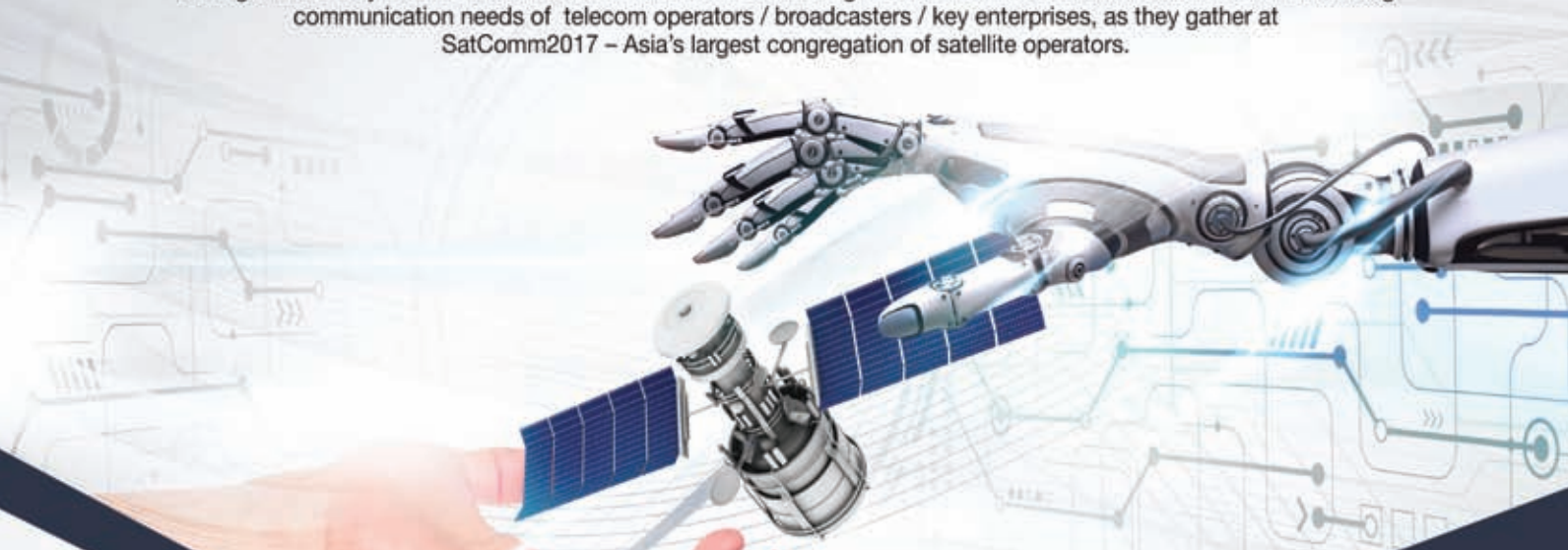
The rapid growth of IoT has allowed teleport and satellite operators to discover inroads to tap on the opportunities that it brings. The 3-day event showcases advance satellite technologies and sustainable solutions to meet the increasing communication needs of telecom operators / broadcasters / key enterprises, as they gather at SatComm2017 – Asia's largest congregation of satellite operators.



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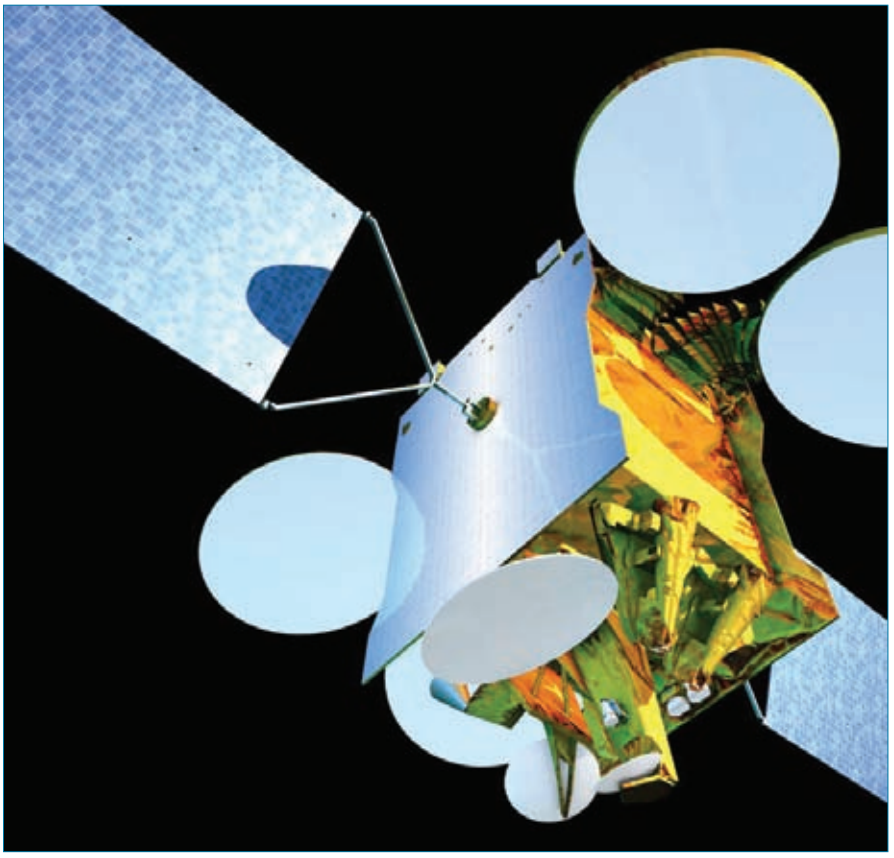
Arabsat-4, courtesy EADS Astrium.

Serving the growing needs of the Arab world

Founded in 1976 by the 21 member-states of the Arab League, Arabsat has been serving the growing needs of the Arab world for over 40 years, operating from its headquarters in Riyadh-KSA and two satellite control stations in Riyadh and Tunis.

Now one of the world's top satellite operators and by far the leading satellite services provider in the Arab world, it carries over 500 TV channels, 200 radio stations, pay-tv networks and a wide variety of HD channels reaching tens of millions of homes in more than 80 countries across the Middle East, Africa and Europe—including an audience of over 170 million viewers in the Middle East and North Africa (MENA) region alone tuned into Arabsat's video "hotspot" at 26° E.



Arabsat-5A, courtesy EADS Astrium.

Operating a growing feet of owned satellites at the 20°E, 26°E, 30.5°E, 39°E and 44.5°E, Arabsat is the only satellite operator in the MENA region offering the full spectrum of broadcast, telecommunications and broadband services. This capacity will continue to expand with the launching of new satellites, making Arabsat satellites' fleet the youngest in the region.

Arabsat also maintains strategic partnerships with most of the world's leading satellite companies and VAS integrators and with the acquisition of Hellas Sat, one of the leading telecom groups in southeastern Europe, these partnerships and acquisitions continue to expand Arabsat's reach with new orbital slots and frequency rights, allowing customers to reach farther than ever and deliver content and state-of-the-art solutions to any end-viewers audience or business partner around the world.

عرب سات
ARABSAT
Our world. Your world.

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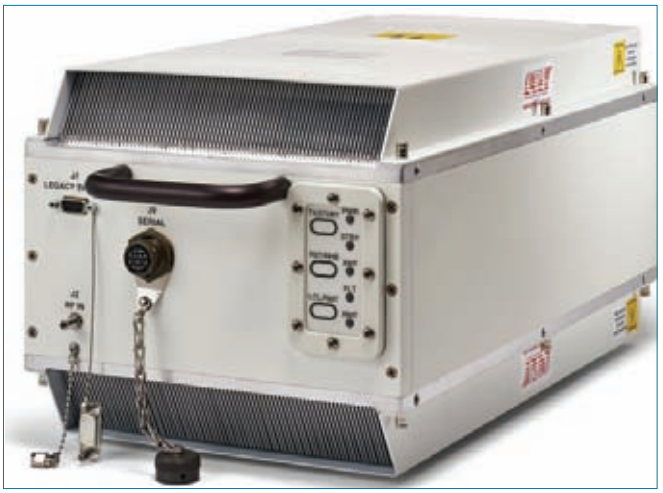

CPI's 160W Ka-band GaN BUC provides up to 100W of linear power at the flange

CPI: solid state VSAT solutions

Communications & Power Industries LLC (CPI) is a US based company with a long history of providing solutions for radio frequency, power control, instrumentation, defense communications, medical, scientific, and maritime, commercial, & military VSAT system needs. Over its 68 year history, the company has grown to be a global leader in medium and high power communications products including TWTAs and solid state power amplifiers.

CPI has continued to build upon its solid state product line, acquired from Codan five years ago. From this acquisition, CPI has gained more than fifty years of additional experience in high frequency technology. CPI's VSAT-related engineering capabilities are based in Palo Alto, CA (USA), Boalsburg, PA (USA), Adelaide, SA (Australia), and Georgetown, Ontario (Canada), reflecting the company's strong commitment to research and development. The product lines are manufactured at CPI's manufacturing facility in Georgetown.

Solutions for VSAT applications

A critical element of the transmit side is the block up-converter and amplifier (commonly referred to as the BUC, BUC/SSPA or SSPB). CPI's satcom products line provides a host of BUC solutions in C, X, Ku and Ka-bands. These solutions cover RF output power ranges from 8 watts up to 200 watts, and include GaN technology allowing for more efficient and more compact designs.

Typically, VSAT systems require output powers from as low as 1 watt to upwards of 50 watts. Therefore, CPI Satcom offers an attractive set of BUCs for higher-end VSAT terminals. For military systems, CPI has experience with X, Ku- and Ka-band products included in DISA and ARSTRAT/WGS certified terminals. This familiarity has proven valuable to our customer base in regards to the necessary performance required to provide smooth integration of our product into the terminals.

For both commercial and military applications, CPI has recently begun to develop a line of GaN-based solid state transceivers, including compact designs light enough for man-pack applications, and high power products suitable for troposcatter communications.

In addition to the more standard BUC offerings, CPI's solid state portfolio offers customized modules for certain specific applications as well as low noise amplifiers and even an LNB series at X-Band. This flexibility allows CPI to engage in many opportunities where other providers may have limitations.

40 dBm X-band GaN Transceiver *courtesy of CPI*

GaN-based Solid State BUC

Customer service and support

CPI Satcom Product's culture of service and support is widely known among its loyal customer base. Although CPI's robust designs, low lifetime cost of ownership, outstanding reliability and quick delivery are elements that play important roles in the selection of products for VSAT applications, customers also appreciate CPI for the company's responsiveness and commitment. With a staff of seasoned application engineers, a network of global repair and service centers, and 24/7/365 support, it is clear that the selection of CPI is the start of a valued partnership rather than a 'won'-and-done deal.

Final word

CPI provides a wide range of established RF BUC, amplifier and transceiver solutions for commercial, military, airborne and maritime communication network needs. Known for its technical innovation, reliable product offerings and unparalleled support, the company is one of the truly outstanding choices one can make for VSAT related products.

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Fax: +1 650 424 1744
Email: satcommarketing@cpii.com
Internet: www.cpii.com/satcom

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World-class operator

Es'hailSat, the Qatar Satellite Company, is a communications satellite operator headquartered in Doha, Qatar. Es'hailSat was established in 2010 as an independent company with the goal to manage and develop Qatar's presence in space. The company provides independent, high-quality, advanced satellite services to broadcasters, businesses and governments in the MENA region and beyond.

Vision

Es'hailSat aims to be a world class operator who effectively contributes to the success of Qatar's National Vision 2030 by adding a new dimension to the diversifying economy.

Mission

Es'hailSat will provide advanced satellite services to strategic stakeholders and commercial customers, who value broadcasting and communications independence, quality of service and wide geographical coverage. With a goal to be a truly global satellite operator and service provider, Es'hailSat started operation of its first satellite Es'hail-1 at 25.5°E in 2013 supporting key broadcasters in the region, beIN SPORTS and Al Jazeera Media Network. Es'hail-2, the company's second satellite is expected to be launched in 2018 and will be co-located with Es'hail-1 at the MENA broadcast hotspot of 25.5°E / 26°E orbital location. Es'hail-1 is successfully supporting the strong demand for broadcasting services, telecommunications and critical data distribution in the region. Having started service on Qatar National Day, 18th December 2013, with Al Jazeera Media Network and beIN SPORTS, it has gone from strength to strength with coverage of the Rio Olympics 2016, UEFA Euro 2016, FIFA World Cup 2014 and the launch of new niche Arabic channels over the last few years. Having both Ku-band and Ka-band capacity at the 25.5°E and 26°E hotspot position enables Es'hailSat to provide the region with the most advanced and sophisticated services in broadcast, telecommunications and broadband. Es'hailSat's expansion plan is set to continue with new satellites in prime hotspot locations, offering customers the most flexible and reliable service. Es'hailSat also adopts the concept of "world-wide footprints" through partnerships with leading regional and international satellite operators around the globe. Es'hailSat aims to bring a new dimension to Qatar's diversifying economy by building a world-class company and a center of excellence in the region. As well as developing satellite systems in space, the company is also investing in local infrastructure and talent, ensuring that it nurtures and grows satellite technology for Qatar, key to providing a secure, independent communications network to meet the needs of stakeholders, customers now and in the future.

Es'hail-1

Es'hail-2

Es'hail-2

Es'hailSat is on its way to delivering on its plan to provide additional premium satellite capacity in the MENA region with the expansion of the Es'hailSat fleet. The

Ali Ahmed Al-Kuwari, President and CEO of Es'hailSat receiving the Satellite Operator of the Year Award during Global SatShow

manufacturing of Es'hail-2 is on schedule and it is scheduled for launch in 2018, which will further boost broadcasting and global connectivity for Qatar and the entire Middle East and North African region. Es'hail-2 is a high-powered, advanced satellite with both Ku-band and Ka-band capabilities to provide TV distribution, telecoms and government services. The satellite footprint covers the Middle East and North Africa and will be positioned at the 26°E hotspot location.

New teleport for MENA

The new Es'hailSat Teleport, under construction, will be a state-of-the-art facility providing satellite Telemetry, Tracking and Commanding (TT&C) facilities and capacity management, together with a wide range of teleport services such as uplink, downlink, contribution, multiplexing, encoding, playout and broadcasting, tailored for its customers and business partners. The high-tech teleport will also provide back-up studios for TV channels and serve as a disaster recovery facility for broadcasters. The site will be connected to key media broadcasters in Qatar and the region, and to the international fiber gateway by means of a redundant, dedicated and diverse fibre-optic link. The teleport is a custom built facility for Es'hailSat fleet of satellites and will be fully owned, operated and controlled by Es'hailSat.

Solving challenges of interference for MENA broadcasters

As secure transmissions continue to be of paramount importance in the MENA region, Es'hailSat is working with various parties to reduce and eliminate satellite interference and provide a secure transmission network for our customers. With Qatar hosting the 2022 FIFA World Cup, Es'hailSat is encouraging its customers to use Carrier ID as part of its cooperation within satellite community for interference reduction and identification. Es'hailSat satellites have been designed and built with state of the art anti-jamming capabilities that help it avoid any intentional or unintentional interference. This feature is critical for customers using the company's satellites for mission critical work and for broadcasters who greatly value uninterrupted signals reaching their customers. In addition, it has a geo-location system installed in its teleport to accurately identify origins of any interference and take appropriate action with or against the interfering party.

Products/Services

Premium content on Es'hail-1

Es'hail-1 continues to go from strength-to-strength, demonstrating the value of Es'hailSat's offering in terms of technical capabilities and performance, and also in terms of independence and security of content we broadcast. In addition to providing transmission for established news, sports and entertainment channels, a growing number of new Arabic channels are choosing Es'hailSat to launch in the MENA region. And with an increased subscriber growth since starting transmission on Es'hail-1, beIN Sports continues to roll out new HD channels via Es'hailSat satellites, seeking to diversify and expand its audience with new content including film, entertainment and TV series such as travel, lifestyle, kids and documentary programming. In addition, Al Jazeera commenced transmission of a new bouquet of HD channels on Es'hail-1, making 25.5°E a truly hotspot for quality high definition channels.

Broadcast services

Operating from the MENA orbital hotspot of 25.5°E/26°E, covering key consumer markets in GCC and North Africa, Es'hailSat's high powered satellites provide the key infrastructure to media networks and broadcasters to distribute TV channels directly to consumers via small satellite dish. Customers are able to leverage on Es'hailSat's satellites and teleport infrastructures to provide services such as linear TV, video on demand, high definition TV and 4K TV among others. Es'hailSat's highly efficient and cost effective solutions for Digital News Gathering (DSNG), playout, content transfer, uplink, occasional use services, etc. can be tailored to specific customers' requirements.

VSAT services

Es'hailSat signed a major development and collaboration agreement with Ooredoo that allows both companies to work together on a range of new satellite and world-class communications services for Qatar and the region. Partnership with Ooredoo helps drive home grown innovation and stimulate the development of a full portfolio of solutions to support VSAT business. In line with this, new products and services are scheduled to be launched jointly with Ooredoo over the course of this year.

Growing demand for Ka-band

With a growing demand for Ka-band services across the MENA region, especially in hub based solutions and mobility services, Es'hailSat developed a Ka-band hub located in Doha, which provides flexibility to service providers, allowing them to choose a style of engagement and commitment to suit their business needs. Through the hub's high-tech infrastructure, Managed Service Providers (MSPs) can provide telecom solutions that support a range of satellite-based data communications applications, ensuring their customers benefit from flexible and efficient technologies providing higher compression with lower latency, WAN optimization and bandwidth optimization for OPEX savings. The main services provided by the new Es'hailSat hub are internet Services, VoIP Services and Corporate Network Connectivity.

Artist's impression of the new teleport

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All photos courtesy of MEASAT

Premium supplier of services

The MEASAT group is a premium supplier of services to leading broadcasters, Direct-To-Home (DTH) platforms and telecom operators. With capacity across six (6) communication satellites, MEASAT provides satellite services to over 150 countries representing 80 percent of the world's population across Asia, Middle East, Africa, Europe and Australia.

Satellite fleet

The MEASAT satellite fleet includes the state-of-the-art MEASAT-3, MEASAT-3a and MEASAT-3b satellites co-located at 91.5°E, supporting Asia's premium DTH and video distribution neighborhood; MEASAT-2 at 148.0°E; and, MEASAT-5 at 119.5°E. In Africa, the AFRICASAT-1a satellite at 46.0°E provides satellite capacity across the African continent with connectivity to Europe, the Middle East and Southeast Asia.

The MEASAT fleet supports leading DTH platforms in Malaysia, Brunei, India and Indonesia, providing DTH multi-channel television services to over 20 million subscribers. The fleet is also used by many leading international channel operators to distribute television programming to pay television platforms, and by telecommunications operators to support remote connectivity, cellular backhaul, IP trunking and corporate VSAT networks.

Working with a select group of world-class partners, MEASAT also provides a complete range of broadcast and telecommunications solutions. Services include UHD/HD and SD video play-out, video turnaround, co-location, uplinking, broadband and IP termination services.

Satellites in Orbit

AFRICASAT-1a
Orbital Position: 46°E
Transponders: 16 C-band
Geographical coverage: Africa, Middle East, Europe and Southeast Asia

MEASAT-2
Orbital Position: 148°E
Transponders: 6 C-band, 6 Ku-band
Geographical coverage: C-band: Asia-Pacific and Hawaii
Ku-band: West Malaysia/Indonesia (Sumatra & Java), Taiwan, Eastern Australia, Vietnam and the Philippines

MEASAT-3
Orbital Position: 91.5°E
Transponders: 24 C-band, 24 Ku-band
Geographical coverage: C-band: Asia, Australia, Middle East, South Eastern Europe and Eastern Africa
Ku-band: Malaysia, Indonesia and South Asia

MEASAT-3a
Orbital Position: 91.5°E
Transponders: 12 C-band, 12 Ku-band
Geographical coverage: C-band: Asia, Australia, Middle East, South Eastern Europe and Eastern Africa
Ku-band: Malaysia and Indonesia

MEASAT-3b
Orbital Position: 91.5°E
Transponders: 48 Ku-band
Geographical coverage: Malaysia, Indonesia, South Asia and Australia

MEASAT-5
Orbital Position: 119.5°E
Transponders: 1894 MHz/7 spot beams
Geographical coverage: Malaysia

measat

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Photo courtesy of Sonema

Your trusted telecommunications service partner

Delivering and maintaining reliable communications and business continuity is a major challenge for any company running operations in remote locations and harsh conditions, where limited infrastructures and power issues can hamper communications. A solid strategy is essential to keep critical business applications running without interruption between the headquarters, remote offices, fixed installations and mobile operations.

Sonema - your trusted telecommunications service partner

Sonema selects the best-suited technologies and architectures to deliver services that meet and exceed your requirements, thereby guaranteeing an optimal quality of service. From simple internet connectivity to more advanced mesh architecture for multisite communications, Sonema delivers solutions and services tailored to your operations whatever your business activity. Whether it is for Banking, Energy, Maritime, or Industry sector, keep your operations connected at all times, wherever you are with Sonema's robust telecom services.

30 years of expertise

Since 1985, Sonema has been providing mission critical communications services. It leverages state-of-the-art high-performance technologies – satellite, terrestrial and wireless – to provide high quality and reliable telecommunications services, even to the most remote areas of the planet. Our engineers have designed, implemented and maintained solutions integrating wireless and voice over IP technologies for customers across 50 countries, with major emphasis on Africa.

Over these 30 years, Sonema has developed an extensive network of local partners, at least one in each country where we operate; each partner is trained at our premises on our solutions and procedures.

This means, they can intervene in major cities within 4 hours of an incident.

Engineering end-to-end communications

Each customer we serve has its own set of distinct requirements but share the common need for reliable communications, anywhere. The combination of our strong network designs, 24/7 NOC and extensive network of certified local partners across the world provides the highest performance and quality you can expect.

Our experts deliver tailored solutions to allow you to benefit:

- Lower operating costs and investment;
- Enhance daily productivity with faster decision-making; and
- Accelerate growth and innovation.

Our services

Sonema aims to be your One-Stop Shop service provider for all your communications' needs. It provides a wide range of services split across three core themes:

- **Connectivity Services:** Satellite, terrestrial, hybrid and backup solutions;
- **Security:** Protection of data, applications, networks and systems (including network and mail protections);
- **Facilities:** Colocation & hosting (including virtual servers and data storage) and Managed Services (including emailing and videoconferencing service).

Our Mission

"We serve large enterprises operating in regions of the world where telecom infrastructures are limited. We aim to enhance their productivity and accelerate their growth by providing highly resilient and unrivalled quality telecommunication services and bespoke innovative solutions."

Our infrastructure

- Sonema owns and operates two redundant teleports in Fréjus (South of France) and Lognes (Paris Area). Being completely in dependent and having multiple PoPs guarantees worldwide con nectivity through multiple satellite and terrestrial operators. The Fréjus site has seven antennas of various sizes and the infrastructure can host a large quantity of client equipment and servers, whilst maintaining excellent security and performance through dedicated and private data rooms with access control and anti-intrusion system. The building also hosts the 24/7 Network Operations Center (NOC). The Lognes site has also a dozen antennas, and is connected to several terrestrial operators, providing a vast choice of interconnections (VPN/MPLS/Internet).
- In 2015, we have unveiled our new high-tech training center in Fréjus, providing multiple rooms for seminars, presentations, con ferences, training and workshops, with an amphitheater seating up to 50 people.

Our teams

Our teams are committed in accompanying you in all phases of your project; from network design, installation and commissioning, to the operation and maintenance of your telecom infrastructure, with our experts guaranteeing the availability and performance of your networks.

To provide efficient project management, Sonema has a multidisciplinary team of highly qualified people:

- Responsive Engineers;
- An experienced and creative project team that carries out net work deployments;
- A competent technical team servicing clients 24/7; and
- Reliable and certified Local Partners trained to Sonema's Best Practices, operating in 47 countries.

Photo courtesy of Sonema

sonema
your future, our commitment

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Nittedal, Telenor Satellite's largest teleport located in Norway

Increasing Telenor Satellite's international focus

Telenor Satellite has continued to grow as a key European satellite operator, providing communication services for customers in the broadcast, maritime, and oil and gas markets.

Our investment in new satellites – most notably our latest satellite THOR 7, which launched in 2015 – has provided the additional growth capacity needed to expand our overall business and to extend our services capability within the mobility VSAT market.

Located at 1°West, Telenor Satellite's THOR satellite fleet provides high-powered and high quality satellite capacity throughout Europe, the Middle East and Africa. We pride ourselves in achieving high customer satisfaction and strive to deliver service excellence in everything we do – it's quite simply what sets us apart.

Optimised broadcast coverage from 1°West

In a fast-changing communications environment, satellite continues to play an important role in the distribution of content. Satellite is a first-class platform for delivering new bandwidth hungry TV applications, including HDTV and 4K Ultra HD.

Transmitting more than 700 digital TV and radio channels and reaching close to 18 million TV homes across Europe, 1°West offers one of the fastest growing platforms for video distribution in Europe and is the leading provider of satellite broadcast services in the Nordic region.

Telenor Satellite is uniquely placed to serve the broadcasting needs of our customers, thanks to the combination of extensive ground based systems- operated from our main teleport in Norway and our UK teleport- and our high powered satellite coverage. We combine the broad reach of our satellite capacity with end-to-end broadcast services, adapting our solutions to address your chosen markets.

The Pan European nature of the capacity at 1°West is attractive to broadcasters throughout, particularly in the Central and Eastern Europe (CEE) region, where operators need to satisfy demand in a highly competitive multi-channel environment, provide more local channels in their bouquets and increase their international channel line-up.

Providing reliable communications on land and at sea

Demand for reliable connections continues to grow rapidly as a result of the increased use of IP applications- such as broadband, internet access, VOIP, video streaming, email and improved access to corporate networks- which enables passengers and crew alike at sea to stay in touch.

Telenor Satellite provides high powered satellite capacity to facilitate ever increasing industry demands for both bandwidth and reliability.

Our existing Ku-band beams deliver strong signals and provide optimal coverage in busy shipping lanes, including the Mediterranean, the North Sea, the Baltic Sea and the Barents Sea.

Thanks to the configuration of our High Throughput (HTS) Ka-band payload on our latest satellite, THOR 7, designed specifically for the maritime market, Telenor Satellite is also able to deliver cost-effective solutions supporting higher speeds for use with smaller antennas.

telenor | satellite

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THOR 7 launched successfully, April 26, 2016

What do you want from your PR?

	Yes	No
Industry knowledge and experience	✓	
International reach	✓	
Multimedia capability	✓	
Creative, proactive people	✓	

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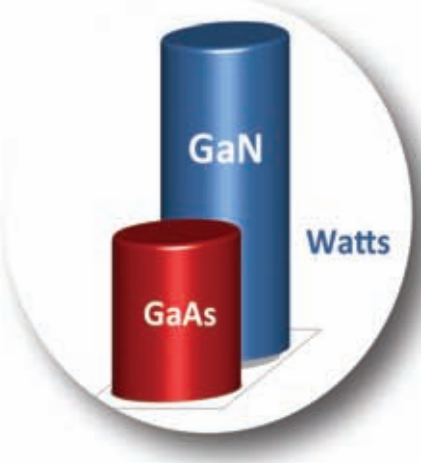

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