



## The Communications Revolution

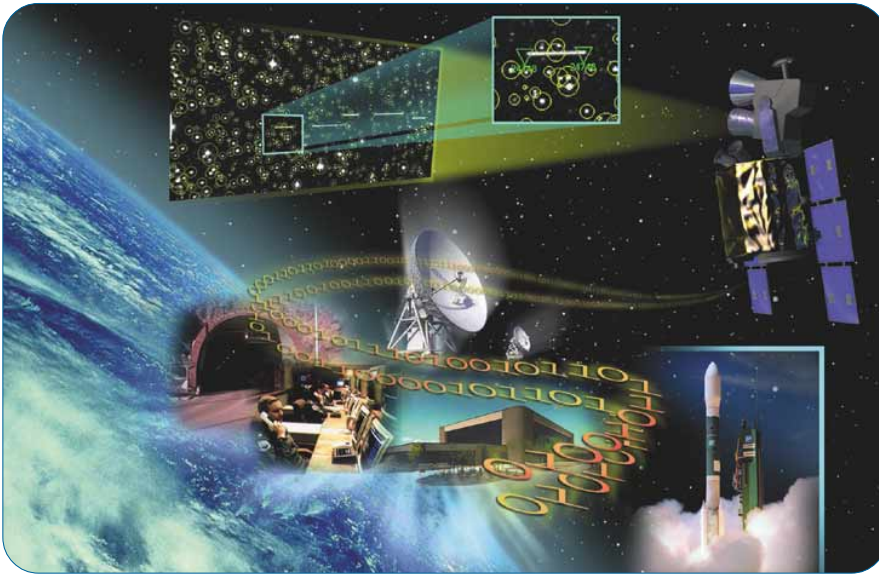


Photo courtesy of Boeing.

### Taking defence to a new level

Over the next few years, the defence sector is set to bolster its position as one of the principle customers for the satellite industry.

**The military sector is arguably one of the best customers** for the satellite industry: from communications systems to Earth Observation (EO) platforms, and from navigation and positioning systems to broadband capability on the move, practically all satellite applications are currently being utilised in one form or another by military forces from all over the world. It could even be argued, without fear of exaggerating it, that space and satellite technology is already vital for the functioning of today's Armed Forces and that it will be even more so in the future.

No wonder then, that the US President George W Bush has been looking at space as one of the key technology areas for its country's future. In January 2004, he opened the debate by stating that the US should reinvigorate its country's space programme and even aim to send a man to Mars. However, that headline-grabbing announcement on manned space exploration belied a wider plan to develop space applications in the twenty-first century that are far closer to earth. Things have become clearer in recent months, when President Bush announced that the US would not allow access to space to forces that are hostile to the US. This should be read as the enunciation of a policy that is more comprehensive than the development and deployment of a 'simple' missile defence plan. The role of satellite-based systems for the future of the Armed Forces, in fact, is and will remain crucial. By stating that the US will not allow hostile forces to access space, President Bush was de facto saying that the US aims to retain global military dominance through the enforcement of space technology superiority.

The reason for this growing importance of

space technology can be found in the technological developments taking place in the space sector. This is far from being a static environment: new technologies are being introduced literally every day, creating capabilities and opportunities that even a few years ago would have been inconceivable.

The communications revolution that has transformed sectors such as broadcasting, telecoms and Information Technology (IT), is also having a profound impact on the military sector, of which the feature of netcentricity is perhaps the most prominent outcome. An example? The 2003 US military campaign in Iraq, which amongst military circles is known as Iraqi Freedom, would have not been possible without the netcentricity capability of the US Armed Forces.

#### Tomorrow's military communications: netcentricity

So what is exactly netcentricity? Speaking at MilSatCom 2006, Colonel Patrick Rayermann, Chief, Space and Missile Defense Division, US HQDA, defined it as the ability to get information to forces on the ground: the information they (ie, the warfighters) need, when they need it.

This process is made up of two stages. The first, a relatively-speaking simple one, is the ability to distribute information at all levels in the field, be it to battalions, platforms or even the individual soldier. The second level, on the other hand, requires elements on the ground gathering information (crucially, not necessarily elements who are specifically designated as information gatherers), which is then sent to a central unit. This information is analysed, incorporated with existing intelligence, and then re-broadcast to units deployed on the

ground or channelled to targeted units via secure communications. This process is a more complicated feat that only a highly-sophisticated netcentric architecture can enable.

Given the increasing sophistication of netcentric information, there is little room for doubts: there is an ever-escalating demand for satellite communications in the military field. Data traffic is growing exponentially, and it has been doing so for quite sometime now.

However, netcentricity is far from being the only application putting a strain on military satellite communication providers: there is a whole breed of new and old bandwidth-hungry applications that are growing at least the same rate: imagery, both terrestrial and space-acquired, video conferencing (which in military jargon is called collaborative planning), graphics and media-rich data, as well as data relating to the so-called blue force tracking, an information system developed to prevent friendly fire. Interestingly, the requirement for military communications is, and in the future increasingly will be, extremely varied and articulated. Some of the capacity is needed for battlefield communications or protected military circuits. Other capacity is needed for plain unencrypted communications, while the rest could be used for logistics and administration purposes. All this can be extremely difficult to handle.

To this purpose, Rayermann explained, the US Armed Forces have come up with the so-called transformational communications architecture 2.0, a comprehensive architecture that facilitates improved allocation of bandwidth requirements and forecasting of needs. The system indicates which type of frequency band provides the optimal support for the systems/applications that are needed so that the military authorities can source it from the best supplier, be it a military-run system or a civilian architecture.

#### A commercial partner

One of the new phenomena in military communications is the emergence of partnerships between the military and the commercial satellite environment.

Naturally, such a partnership can take several forms: from the procurement of a satellite from a civilian manufacturer, to the running of hybrid military/civilian dedicated platforms, to the lease of transponder capacity from a commercial operator.

Whilst this trend has its origin in the scarcity of transponder resources on dedicated military platforms, it is now becoming something of a choice for the Armed Forces around the globe. The advantages of leasing capacity from a civilian commercial operator, in fact, are obvious: there is no need, on the military part, for committing large capitals in order to purchase a satellite platform. Besides, the lease of transponder space is also an extremely flexible tool: a contract can be signed very quickly, and it can be terminated with similar ease, with no need for long term commitment on the procuring party.

However, whilst attractive financially, commercial lease of satellite transponder space presents some problems. Firstly there is no guaranteed availability of resources. While it



## The Communications Revolution

is true that as of now there is a significant redundant capacity on commercial systems, this cannot be assumed to last forever. Especially in a long-term, cyclical market such as the satellite industry this could be a serious problem as a severe shortfall in supply could arise sometimes in the future.

Secondly, commercial capacity does not always provide the coverage needed by the military. This is a problem of radiofrequency band, of course, but it also involves the possibility of deploying capacity at short notice in a certain areas of the world, something that current commercial satellite systems are not particularly good at.

Besides, there are long term problems of a technological nature. As Jerome Bendell of Alcatel Alenia Space said: whilst useful, commercial systems have severe limitations, especially in view of future developments such as network-centric warfare. The limitations for such systems based on commercial capacity are evident: in an all-encompassing architecture, security of access might not be always guaranteed.

### Take your pick: PPPs and PFIs

The relationship between the military and the commercial satellite environments is not limited to the lease of commercial capacity. Following a trend initiated by the UK years ago with the Skynet 4 programme, military customers and governments are increasingly favouring the purchase of services over the ownership of assets.

Financial and business instruments such as Public Private Partnerships (PPPs) and Private Finance Initiatives (PFIs) are key enablers for tailored service solutions to governments, and should be seen as a long-term partnership between the public and the private sectors.

But what is exactly the difference between PPPs and PFIs? This is simply explained. With the first a Ministry of Defence or other government agency is not procuring an asset but a provision of services. With the second, on the other hand, the financial risk of the operation is transferred to the private sector. This is a hot topic because countries all over the world have severe military budget constraints they are forced to work with.

The leading examples of PPP/PFI initiatives in Europe are the Skynet programme run by contractor Paradigm for the UK's Ministry of Defence; the Satcom BW in Germany; and the pan-European Galileo Concession. Interestingly, even within such a relatively short list of initiatives, it is possible to see that not all PPPs/PFIs contracts are the same. Indeed, the key for the success of all kinds of partnerships is that solutions should be tailored to meet the specific requirements. Each case is different in that it responds to the different needs of the agency looking for a procurement, which makes it very difficult to compare and judge two PPPs initiatives.

Likewise it is often extremely difficult to compare PPP/PFI projects with other procurement schemes. There are several reasons for that: in a classic asset-purchase procurement scheme, many costs are hidden, insurance and Operating Expenses (OPEX)

being the classic examples.

While PPP/PFI tools are becoming increasingly popular with governments and government institutions alike, there are some fundamental considerations to be made when taking them into account. First and foremost, the procuring party should have clear in its mind what it is that it is looking for. Without a clear idea of the ultimate goal in mind, things can easily lead to an unsatisfied party. Therefore, there are some requirements that should be met if the PPP/PFI initiative is to be a success.

According to Eric Beranger, Chief Executive Officer (CEO) of Astrium Services, the first criterion that needs to be satisfied is the political will to outsource. Perhaps unsurprisingly, this is one of the most difficult hurdles to overcome, due to the mindset of many governments that are prejudicially opposed to the outsourcing of military assets. Secondly, the size of the project should also be taken into careful consideration, as it takes a long time to negotiate a successful partnership - the devil is in the detail, as they say. The project, in other words, should be large enough to make sense in being outsourced.

The third crucial element is the fact that the separation between Capital and Operational Expenditures (CAPEX and OPEX) should be clear in the mind of the procuring party. Finally, Beranger concluded, partners should be at the same level: it is important to choose a partner that has the capability of delivering the project.

Once these hurdles and issues have been addressed properly, however, the benefits of adopting this procurement model are vast. For example, Beranger said, in less than one year Paradigm was able to switch the costs of insurance, renegotiate a longer contract and launch a third satellite to mitigate risk - something the MoD would have found impossible to do with its own resources in the same time scale. A long term prospective on the part of the contracting party, and a flexible framework to work within, enabled additional resilience at no extra costs for the UK's MoD.

A PPP/PFI approach, in other words, allows more efficient solutions and more rapid implementation, but it takes a lot of planning and effort to reach a successful PPP/PFI agreement.

### Next-generation miltatcom: total intelligence

In such a technology driven environment as military satellite communications, the characteristics of tomorrow's satellite systems are central to the definition of today's strategies on the part of the military agencies. But what will be the characteristics of future military communications? For an answer to his question it is worthwhile looking at the fundamental requirements of the military in the future. These can be expressed as the ability to develop defence and warfighter communications capability within austere budgets - as well as develop emergency communications for national and international consequence management such as natural disaster and pandemics.

According to Frank Prautsch, Director at

In a nutshell, network centricity invites interdependency and complexity as systems become more sophisticated.

Raytheon, over the years the development of communications in the military environment has evolved from the acquisition of data, to the handling of information, through to knowledge management to finally arrive at the full understanding and management of an environment situation. The aim of future miltatcom, in other words, is to get to the point where systems are smart enough to interact independently with each other, ie, an architecture where every element in the network has the ability to interact and communicate with everything else.

This scenario is better understood with an Internet analogy: every element in the network has an IP address and can communicate independently with other elements of the network. Similarly, the ultimate goal of next-generation miltatcom is a system where every single element in the network is addressable. Unsurprisingly, the adoption of IP in military communications is taking place at ever increasing speeds.

Naturally, such networks are extremely complex, as they require hundreds of parts, often mobile parts, with different levels of access. In a nutshell, network centricity invites interdependency and complexity as systems become more sophisticated.

Military satcom systems of the future will need to be able to cope with an explosion of throughput demand due to the deployment of network centric warfare. Networks will be global, and will need to cope with multiple theatres and missions, as well as multiple applications. The era of total intelligence is just around the corner.

### Conclusion

There is little doubt that military satellite is an area in strong expansion. In the future, we will see a growing demand not just for simple military communications dedicated to the military sector; the sophistication of future systems will play a central role as well.

With the introduction of a rising number of unmanned units deployed on land, in the air, and on the seas, we are going to witness a growing need for state-of-the-art satellite capacity.

However, and this is a crucial point, satellite communications systems of the future will not be just about gathering information and re-distributing it to deployed units. Information is essential, but unless managed properly it becomes a burden. The deployment of intelligent systems is the area in which we will witness real developments in the future, and what we have seen so far is just the beginning. ●