

**BATTLESPACE MANAGEMENT  
MARKET OVERVIEW**





## SUMMARY

Battle Management Systems (BMS) are increasingly important components of the digital battlefield, where networked command and control is an essential 'battle-winning' asset. The global market for Battle Management Systems is forecast to be worth more than \$50 billion over the next 10 years. There are many BMS systems being introduced or planned for procurement worldwide. This report provides an insight into just some of the national holdings, requirements and programmes that those involved in this market should be following.



Battlespace Management (BM) is 'the adaptive means and measures that enable the dynamic synchronisation of activities.' BM is seldom absolute, however, and it is for commanders to determine, in any given situation, when more or less BM is required. A commander, whose Force Elements (FEs) are operating independently in separate areas, has little need to synchronise their activities (except where limited resources need to be shared). That said, a commander who envisages high levels of interaction between FEs, working in close proximity to one another, will synchronise their activities closely. He will require extensive BM. In practice, as military forces realise effects across an expanding volume of battlespace, the potential for interference between FEs, and between a joint force and other actors, increases.

Technology is very much at the forefront of BM development and the implications of emerging technology for BM vary from one functional area to another. Information Management (IM) is a key enabler for Situational Awareness (SA) and depends on the effective use of Information Technology (IT). Joint forces are increasingly, though not uniformly, network-enabled. Air and Maritime Components currently benefit from extensive networking, largely enabled through their ability to operate from relatively

few, secure locations. The Land Component has somewhat more limited access to IT-based systems, albeit a variety of operational and tactical level systems are currently being introduced into service. In the interim, while higher-level headquarters may use IT to maintain their operational picture, individual battle pictures may be plotted manually at lower tactical levels.

Of course, technology cannot replace the human element; seemingly efficient IT can diminish a commander's effectiveness if he becomes inundated with information. While forces should have access to all available information on demand, it should only be 'pulled' forward when required, and 'pushed' only when mission critical. As such, proper training to adapt to the technological evolution is vital.

An individuals' ability to assimilate information and to maintain SA lies at the heart of BM. Even within the same battlespace, two individuals can have markedly different levels of SA. One may glean vital information that the other has missed or simply apply superior intellect or intuition to interpret information available to both of them. The cognitive ability to operate effectively within a rapidly changing battlespace can be developed and reinforced through training and experience.



*Source: JDP 3-70 Battlespace Management*

## Denmark

The Danish military will roll out the full suite of the SitaWare battlefield management and frontline command and control (C2) software force-wide over the next 12 months. The high number of injuries and fatalities suffered by the Danish armed forces in Afghanistan, and government initiatives to improve troop safety, are driving the investment in programmes to improve battle management, situational awareness, and soldier and vehicle protection.

## Germany / NATO

Experience in Afghanistan has forced a rethink in Germany's approach to its command systems, which can in future be expected to conform to NATO's emerging FMN Concept. In November 2011, an 18 month study was initiated on an alternative commercial sitcom-based convoy communications solution, using a vehicle-borne Thrane & Thrane Explorer 727 BGAN INMARSAT satellite terminal in combination with military WLAN or cellphone 4G/LTE communications capabilities, and a SINA virtual server and virtual workstations. Such a solution could provide mobile users with a level of AMN access closer to that of their static counterparts. Germany is expected to take full account of NATO's emerging 'Future Mission Network (FMN)' concept, to ensure it does not again find itself driven to buying a new set of equipment for every future coalition operation it might find itself in. During an unclassified September 2012 presentation, an ACT representative outlined the baseline operational requirements for FMN as human-to-human communication, a single view of the battlespace, allowing equal access of NATO, a NATO country or mission partners to the same underlying data and related information, timely provision of a mission network, provision of consistent, accurate and reliable mission data; community of interest capabilities that align with the mission requirements, and well trained staff. Founded on these requirements, the aim of the FMN Concept is to provide guidance for establishing federated MN's, based on an association of NATO alliance, NATO country and mission partners' capabilities.

## India

The Indian Defence Ministry has decided the Army's new battlefield management system (BMS) will be acquired as a "Make India" programme, under which only domestic companies are allowed to participate. Producing the \$5 billion project continues the MoD's policy of boosting the local defence industry. The BMS, which is part of the Army's network-centric warfare programme, will link infantry-level troops on the battlefield to command headquarters. While the BMS programme has been under consideration by the MoD for more than four years, policymakers were weighing whether to acquire the systems on world markets or to nominate state-owned Bharat Electronics Ltd. (BEL), which had been lobbying for the big-ticket programme.

Expressions of interest (EOIs) will be sent to more than a dozen Indian defence companies, private and state-owned, inviting them to participate in the programme. The EOIs will be sent to BEL, Electronics Corporation of India, Computer Maintenance Corporation, ITI, domestic private-sector major Tata Power SED, Rolta India, Wipro, Larsen & Toubro, HCL, Punj Lloyd, Bharat Forge, Tata Consultancy, Info Systems and Tech Mahindra. While only domestic defence companies will be allowed to compete for the BMS, these companies will forge ties with overseas defence majors to acquire advanced technologies. The overseas defence companies expected to compete include Israel Aerospace Industries, Rafael and Elbit of Israel; Thales and Nexter of France; Rhode & Schwartz of Germany; BAE Systems of the UK; Lockheed Martin, Raytheon and General Dynamics of the US; and Selex of Italy. The government expects to select two vendors after four months of evaluation of the EOIs. Each of those two companies will be asked to develop four BMS prototypes for mountain, jungle, plains and desert operations. The development of the prototypes is projected to cost about \$67 million with the MoD covering 80 percent of the expense and the shortlisted domestic company 20 percent.



### Malaysia

Systems Consultancy Services has begun delivery of an upgrade to its PX2000 joint command and control system, which is in service with the Malaysian Armed Forces (MAF). The latest upgrade will give the Royal Malaysian Navy an improved common operational picture by providing a PX2000 installation in platforms afloat. SCS has also delivered enhancements to its Battle Management System.

These included an improved human/machine interface, developed as a result of user feedback, together with better data manipulation capabilities.

### Turkey

Aselsan revealed the BATUR Battle Management System it has developed as part of the Turkish ALTAY main battle tank project at IDEF in 2013. The system includes digital mapping, provision of the tactical picture, planning and preparation of orders functionality, tactical overlays, movement planning, and reports and messages. The user interface has been designed for mobile use.

### U.K.

The UK MoD is engaged in studies and technology demonstration programmes (TDP's) aimed at enhancing the coherence of the British armed forces' current and future tactical communications systems.

For UK land forces, this initially embraces, among others, the Bowman ComBAT (Common Battlefield Application Toolset) Infrastructure and Platform BISA (Battlefield Information System Application) battle management and tactical radio system, otherwise known as BCIP. Bowman replacement is a key programme, where replacement equipment numbers have not been cut in recent defence reviews.

### U.S.A.

Radical changes are in prospect for the operator interfaces and data throughput of the U.S. Army's Force XXI Battle Command, Brigade and Below (FBCB2) battle management system. The moves are coming as the system evolves from the interim enhanced FBCB2 JCR (Joint Capabilities Release) standard into the joint U.S. Army/U.S. Marine Corps JBC-P (Joint Battle Command - Platform) system from 2013-2014.



### U.S. DARPA seeking automated decision aids for pilots and battle managers in contested environments [Feb, 2014]

*Advanced algorithms, software and human-machine interfaces are needed to help operators manage the scale and complexity of operations in near-peer contested environments.*

As commercial technologies become more advanced and widely available, adversaries are rapidly developing capabilities that put our forces at risk. To counter these threats, the U.S. military is developing systems-of-systems concepts in which networks of manned and unmanned platforms, weapons, sensors, and electronic warfare systems interact over robust satellite and tactical communications links. These approaches offer flexible and powerful options to the warfighter, but the complexity introduced by the increase in the number of employment alternatives creates a battle management challenge. Current battle management systems often lack the benefit of automated aids to help comprehend and adapt to dynamic situations. Further complicating matters, in future conflicts U.S. forces may face degradation or denial of critical communications capabilities essential for coordination and shared situation understanding. With both the complexity of coordinating innovative systems of systems, and the sophistication of adversary capabilities expected to grow, automated decision aids become vital.

DARPA's Distributed Battle Management (DBM) program aims to address these challenges. The program aims to develop control algorithms and demonstrate robust decision-aid software for battle management at the tactical edge.

"We're looking for innovative algorithms from the planning and control theory communities that go beyond current algorithms, many of which assume assured communications in the tactical environment," said Craig Lawrence, DARPA program manager. "Advanced human-machine interaction technologies for cockpits and battle manager stations are also an area where we're looking for novel approaches to enable greater comprehension and quick decision making in an increasingly contested and complex battlespace."

The program envisions two phases. Phase 1 focuses on technology development—planning, control, and situation understanding algorithms, and design of appropriate human-machine interfaces—and system engineering. Phase 2 plans for a team to build an integrated DBM capability to manage air-to-air and air-to-ground combat in a contested environment and to demonstrate that capability in large-scale simulation and live fly events.



Source: *darpa.mil*

**Primary Land Battlespace Management System  
Manufacturing Companies (27)**

Aselsan (Turkey)  
 BAE Systems (UK)  
 Airbus Defence & Space (France/Germany)  
 Elbit Systems (Israel)  
 Elektrobit (Finland)  
 ELISRA (Israel)  
 General Dynamics (USA)  
 Harris Systems (U.S.A.)  
 Israel Aerospace Industries; ITT Exelis (U.S.A.)  
 Kongsberg (Norway)  
 Lockheed Martin (U.S.A.) Nexter (France)  
 Northrop Grumman (U.S.A.)  
 Rafael (Israel)  
 Raytheon (U.S.A.)  
 Rheinmetall (Germany)  
 Rhode & Schwartz (Germany)  
 Saab (Sweden)  
 SAP (Germany)  
 Sapura Technologies (Malaysia)  
 Selex Galileo (Italy)  
 Sierra Nevada Corporation (U.S.A.)  
 Systematic (Denmark)  
 Systems Consultancy Services (U.K.)  
 Teleplan (Norway)  
 Thales (France)

**Indian BMS Companies (14)**

BEL (India)  
 Bharat Forge (India)  
 Computer Maintenance Corporation of India  
 Electronics Corporation of India  
 HCL (India)  
 Info Systems (India)  
 ITI (India)  
 Larsen and Toubro (India)  
 Punj Loyd (India)  
 Rolta India  
 Tata Consultancy (India)  
 Tata Power SED (India)  
 Tech Mahindra (India)  
 Wipro (India)



**Aselsan Batur**

The Battle Management and Unit Tracking System (BATUR) is a C2 and Information System providing a common tactical picture and 'seamless' battle command information.

**BAE Systems Battle Management System**

This System provides Tactical C3 from Battle Group level to Dismounted Soldiers.

**Airbus Defence & Space Army Weapon Command and Control Systems**

The FUWES and FUES C2 Systems are functional elements of the FUINFOSYS HEER C2I System of the German Army.

**Airbus Defence & Space BMC4I**

This provides a set of solutions for wing-level operations centres for the management of surface-to-air missiles.

**Airbus Defence & Space SIR**

Regimental Information System (SIR) is the Tactical C2 System of the French Army. 750 Command Vehicles are planned to be equipped with SIR.

**Elbit Systems WINBMS**

Weapon Integrated Battle Management System (WINBMS) is deployed as an integral part of the Israeli Digital Army Programme.

**ELISRA Citron Tree BMD C2BMC**

Citron Tree is the C2 System which controls the Israeli Arrow Weapon System.

**General Dynamics BFT**

Blue Force Tracking (BFT) tracks 'friendly forces' and provides situational awareness capabilities.

**HARRIS FalconCommand**

This is a Dismounted C2 System providing real-time situational awareness.

**ITT-STBMS**

SINGCARS Tactical Battlefield Management System (S-TBMS) is a map-based, real-time position tracking and command management system.

**Kongsberg ComBatt**

This is a C2I system developed in close co-operation with the Norwegian Armed Forces. NORTaC-C2IS is the Norwegian variant of this system and has been in operation since 2002.

**Lockheed Martin TBCMS**

The Theater Battle Management Core Systems (TBCMS) links U.S. Air Force, Navy, Marine Corps and Army C2 Systems for integrated air battle management.

**NEXTER Finders**

Operational since 1995 and selected as part of the SIT programme, Finders equips LeClerc MBTs, AMX-10RCs, VB2Ls, LAVs and ICVs in the French Army.

**Northrop Grumman C2PC Kodiak**

This is a Blue Force Tracking (BFT) System which connects HQ formations to tactical vehicles.

**Northrop Grumman FBCB2 JCR**

The Next Generation Force XXI Battle Command Brigade and Below (FBCB2) System, Joint Capabilities Release (JCR) was approved for fielding by the U.S. Army in February 2011.

**Rafael C4I Connect**

This is a voice communications system which manages all voice sessions in the tactical battle area.

**Raytheon BTID**

The Battlefield Target Identification Device (BTID) is a secure, real-time, Combat ID and BFT system.

**Rheinmetall LINCE**

Developed for the Spanish Army, the Leopard Information and Navigation Control Equipment (LINCE) is an armoured vehicle C2 system.

**Saab BMS**

This Battle Management System supports in-theatre Manoeuvre Warfare at tactical levels.

**Saab VBMS**

The Vehicle Battle Management System (VBMS) provides BFT and network management for vehicles.

**Thales Comm@nder Battlegroup**

This is a C2 System providing connectivity from tactical command levels to vehicle platforms. Likewise, Comm@nder Fire is an artillery C4I System, Comm@nder Intel is an intelligence C2 system and Comm@nder Training simulates tactical C4I.





# Land Battlespace MANAGEMENT







**09 - 10 July, 2014 - London, United Kingdom**

## **Commanding the digital battlefield**

*Defence IQ* is delighted to announce our brand new **Land Battlespace Management** conference, the first dedicated forum focused on battlespace management of land operations.

At a time when future character of conflict (FCOC) debates, information security, user functionality and changes in force structures are redefining military requirements for communications devices and data exchange systems in the land domain, the conference provides a vital forum for military and industry officials to benchmark their strategies and plans in an informal and collaborative environment.

### **Benefit from discussions on key issues such as:**

-  How is the FCOC evolving strategic doctrine and government classification systems affecting military requirements for data exchange and information security in the land domain?
-  How are handheld communications systems likely to develop, and what are their current priorities?
-  What applications and data should be integrated into the core of future battlespace systems based on lessons learned in Afghanistan?
-  How far and in what ways will smartphone technology impact on the functionality, processing capabilities and usability of future battlespace comms systems?
-  Should the battlespace spectrum be managed as a sovereign asset, and how can information security across areas of operations be enhanced to meet rapidly advancing cyber and EW threats?
-  What can be done to mitigate and transform the human factor in battlespace management and information security?

**If you could benefit from key insight on leading programmes and concepts informing tactical communications in the land battlespace, then make sure to join us this year.**