

The future of tactical situational awareness: user-centric information routing

An integrated mission picture, incorporating information sourced from the land and air domains, has long been an aspiration in the land tactical space, championed under the banner of Network Enabled Capability. In this feature, Shaw Green of Roke Manor Research Ltd discusses the benefits of this approach and how technological capability is being developed to make this aspiration a reality.



The development of a Mission Operating Picture (MOP) incorporating tactically relevant information concerning own and enemy forces drawn, as required, from the land and air domains has long been a capability championed under the banner of Network Enabled Capability (NEC).

After provision of reliable voice communications, an ability to communicate positional information of own forces locally between members of a patrol, convoy or section, and more widely with supporting air assets, is the highest priority requirement within the overall requirement for tactical situational awareness. The tangible military benefits of accurate own force positional information are direct and multiple and include the ability to reduce collateral damage both friendly and civilian as well as the more accurate prosecution of enemy forces.

In order to make this capability aspiration a reality, a number of key technological challenges must be overcome.

Firstly, controlled integration of information from disparate sources, carried over a variety of links, is required in order to pull together air-sourced and land-sourced information elements in a unified picture necessary for efficient decision making at the tactical command level.

Secondly, the robust distribution of these information products via high-bandwidth, low-latency communications down to lower levels of command is required in order to support the range of full motion video, stills imagery and other complex information products available from today's suite of sensor assets.

Thirdly, bandwidth on current and planned Tactical Data Links (TDLs) remains a scarce and precious resource. It is necessary to prevent, where possible, congestion of networks and cognitive overload of TDL operators especially at the local deployed level. User defined forwarding behaviour can be focused to meet individual operational needs, minimising data and information loads while still achieving the necessary information dissemination capabilities.

Finally, information sharing across military domains is a key intent of NEC which is frustrated by necessary security restrictions. However, localised reporting based on spatial and temporal parameters may realise a cross-domain accreditable solution.

A technical solution situated within this problem space is being developed by researchers at Roke Manor Research that meets the challenges identified above. This solution integrates tactical military 3G handsets with extant TDLs via a gateway and military 3G base station.

The architecture equips tactical battlefield decision makers with multi-modal handsets that are networked using 3G mobile data links provided via a modified off-the-shelf 3G base station.

The leveraging of existing 3G standards and equipment offers a cost-effective mechanism for providing the desired mix of voice, video and other data required by modern soldiers. This technology integration has been well proven within the commercial marketplace. The use of 3G handsets is ubiquitous in modern society reducing the training burden associated with the base User Interface capability.

The capability to interoperate with existing data links and networks is provided by an information-oriented, tactical situational awareness gateway that allows for intelligent two-way transfer of information from other existing land/air CIS systems.

The gateway delivers interest-based filtering capability, allowing the intelligent transfer of information based on need to know criteria. The filtering criteria are driven by geographical and mission-specific tasking profiles. The role of filtering is important from security and network/cognitive resourcing perspectives.

An initial field demonstration concept has been proposed focusing on a Combat Logistic Patrol (CLP) scenario. The role of the 3G network is to provide situational awareness across the full range of vehicles and dismounted/mounted personnel. The tactical gateway provides an interlinking capability with both supporting air assets (for example Link 16/VHF connectivity) as well as other geographically relevant land based systems.

The demonstration is focused initially on blue force location provision supplemented with additional filtered situational awareness information. The information presented to the various terminals is focused on the range of potential own/enemy force elements of relevance to the CLP as it moves through the tactical battlefield. The gateway is tasked with enforcing both geographical and interest-based profiles established by CLP operations officers within the context of extant security classifications.

The technology demonstrator as described is based largely upon modified off-the-shelf technology and is ready for user base field trials in 2010. Subsequent fielding of capability in theatre would then be achievable against UOR timescales.

Further information

For further information, please visit:

Web: www.roke.co.uk/defence