

Royal Marines of 40 Commando during live firing training for a FIBUA (Fighting In Built Up Area) attack conducted in the USA.
Photo: PO(Phot) Sean Clee © MoD/Crown copyright 2013

The thickening fog of war

John Kedar offers a soldier's perspective on an evolving defence landscape and the challenge it poses for commanders and geospatial specialists alike

What is Defence? 70 years on from VE Day we still think of it in terms of conventional warfare, but equally it is counter-insurgency, stabilisation and capacity building. US General Krulak's now little-used 1999 metaphor '3 Block War' described this multi-dimensional nature of different operations running in parallel in the same town on the same day. This multi-dimensional approach, by definition, presents challenging geospatial data requirements.

In the Internet age, threats to deployed military forces are increasingly threats in our home communities, adding yet another dimension - the security agencies. It is the successful combination of the effects of all defence, diplomacy and security agencies that deliver national security. National and Defence mapping agencies will be drawn ever closer as a result. Wider security - e.g., food security and land tenure - requires reliable, accessible geospatial information. And while such issues are not considered in this article, Britain's Department for International Development in partnership with Ordnance Survey International is investing in this area.

Shared understanding

The UK and its allies work in *ad hoc* or formal coalitions such as NATO. Add this dimension and it becomes clear that hundreds or even thousands of different agencies will be contributing in some way to military outcomes. Within political and cultural constraints

they should share a similar understanding if they are to achieve success. Location and 'the map' provide a common and transferable language in understanding the operation.

To maintain control in the quagmire of this large multi-dimensional environment, leaders and commanders must come to grips with agile threats and enemies with ever greater speed and understanding. Geospatial tools help deliver this edge but require reliable geospatial data as the basis with which all relevant location information can be linked and analysed. Equally, interoperability of systems, services and data for multi-national forces in austere operating environments is fundamental and is a recognised challenge for policy-makers and industry.

54% of the world's population lives in urban areas, a proportion that is growing. The metropolitan area of Tokyo houses 38 million. Baghdad, seven million. Even Fulljah, where the US Marine Corps conducted urban operations in 2004, houses 300,000. These cities are jungles physically, ethnically and culturally. The 'enemy' hides in this complex 3D terrain, to quote Rupert Smith, 'amongst the people' using physical and virtual networks to plan and execute attacks. And while traditional 1:50,000 scale mapping is of scant help for tactical purposes in tower blocks or shanty towns, the emerging Smart Cities solutions being adopted by other security and national mapping agencies may provide more effective assistance.



Members of 135 Geographic Squadron, Royal Engineers, were busy at this year's GEO Business event in London reinforcing links between industry and the armed services. Photo: GeoConnexion

Seeing through the fog

Defence geographers face a particular challenge at a time of budgetary constraint as maps and data are not scalable – rather they are dependent on the mission, geography and risk appetite. A fighting force of 10,000 operating in a defined geographical area will have different GI and intelligence needs to those of special forces groups in the same area, and their requirements will be different, again, to those of a cruise missile unit.

Defence has a unique opportunity, collectively with other national security and mapping agencies, to re-examine GI requirements. The approach starts with determining the questions that will need answering - the concepts and systems that will need supporting in the operating environment of the future, particularly in urban environments. Only when these are understood can requirements be determined. By defining accuracy and assurance levels, Defence will also be able to utilise some crowdsourced and Open Source data – solutions to better understand the reliability of such data would be welcome. Clever requirements assessment enables prioritised collection and production that focusses on data, not mapsheets.

The requirements for the urban environment are increasingly 3D in nature, from buried utilities through mobile communications infrastructure to shopping malls (remember the 2013 attack on the Westgate shopping Mall in Nairobi?). They include networks, addressing and useable 3D coordinate systems. Experimentation is essential to this and will also help determine the inevitable compromises and associated risks. Ordnance Survey has established a geospatial innovation centre that brings people together to encourage innovation such as solutions for smart cities; Defence could do likewise. It also appears logical that 'real world' geospatial data should be incorporated into training simulation, allowing operational modelling and mission rehearsal to save on cost.

Clearing the fog

Meeting increasing demand is a challenge, but an achievable one. Achieving collaboration across stakeholders is, in the first instance, a human behavioural challenge. The US National System for Geoint addresses this; in the UK, a legacy of the London 2012 stakeholder teamwork has been a growing desire for a national security framework that has geospatial at its core.

Burden sharing across national agencies and nations remains fundamental. Defence geospatial information organisations already collaborate, e.g. in the Multinational Geospatial Co-production Programme. The need for such sharing will increase.

Standards arguments are well understood. The Defence Geospatial Information Working Group has laboured long and fruitfully to deliver military geospatial standards. Its increasing coordination

with the Open Geospatial Consortium will help ensure that Defence can share and use Open Standards geospatial and location data from a wide variety of national security (and wider) sources. The whole Defence Industry should embrace this; system-bespoke GI standards generally create problems – not solutions - in military operations.

Following leadership by Ordnance Survey and the UK MoD, London 2012 set a new baseline in collaboration by geospatially-enabling a major international event in an urban environment. From extending the Ordnance Survey precision GPS network, OSNet, to speed construction and to manage all relevant location data in the Cabinet Office during the event, stakeholders worked together to enable the Olympics. Requirements down to feature currency and attribute level were driven out and collected; a coordination group formed; data and products shared, and a single version of the truth created. It may be a microcosm for a national approach but it shows that it can be done and has provided a legacy for the nation, including Resilience Direct, a service that combines many sources of data to give Britain's leadership and public bodies a common understanding for resilience.

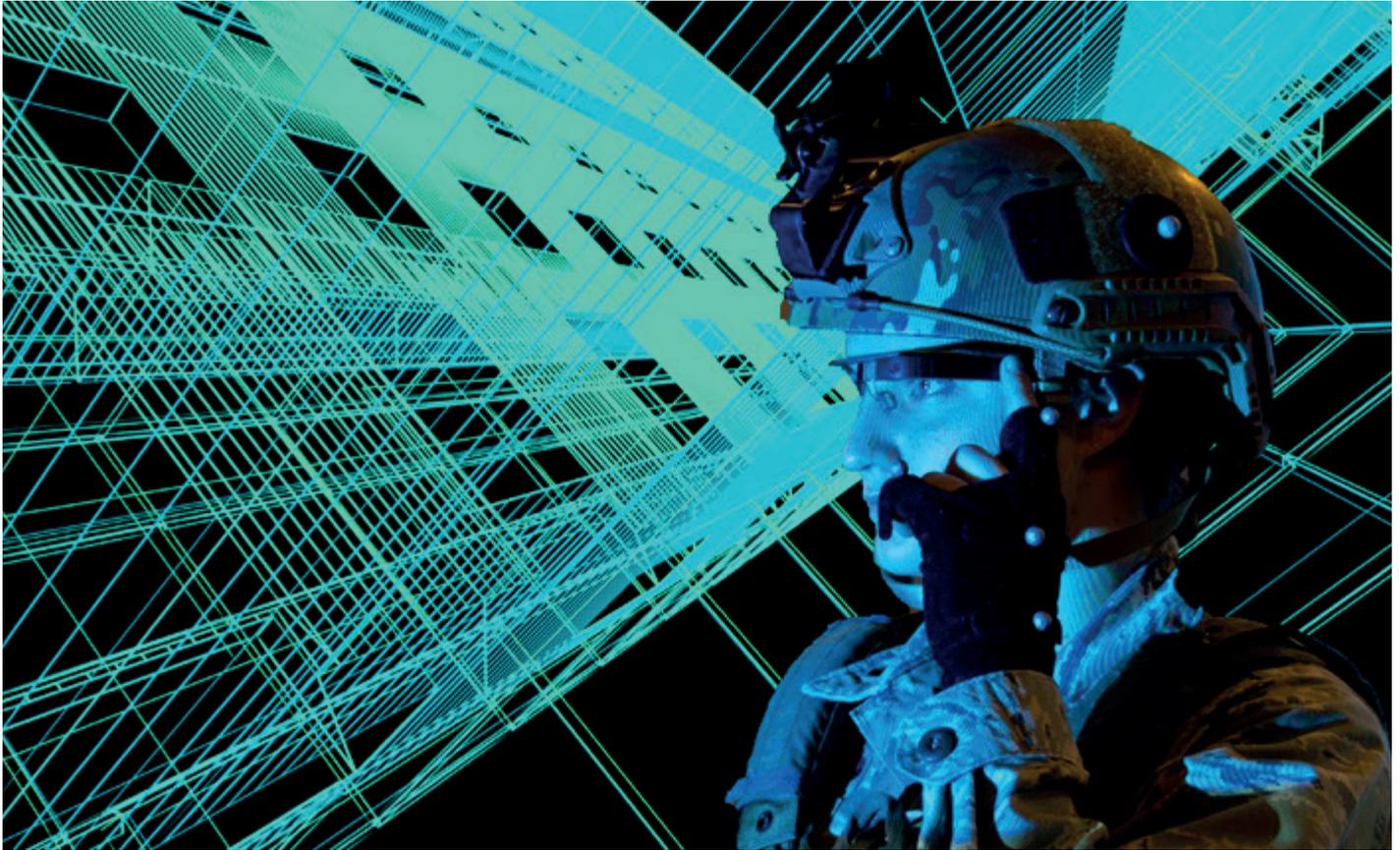
At the sharp end

The responsibilities, values, intent and time-pressures placed on commanders at all levels must be understood by the geospatial community. On operations, geospatial specialists support the mission and the commander. First and foremost it is about solving the problem, not producing products; experience is uncompromising in expecting that the geospatial specialist breathes the same hot dusty air as the commander. Reach-back to home-based organisations reinforces but does not replace this capacity. The geospatial specialist must enable everyone to get the best from all relevant location data. He or she must present analysis in a way that meets the commander's needs; a simple 'left' or 'right' may suffice to answer a multi-dimensional question such as, 'What is the best attack route after tomorrow's storms, taking account of engineering and logistical resources, aid agency operations, and the commander's plan for maritime landings in order to demonstrate Force versatility?'

The geospatial skills needed in a multi-dimensional military environment must be based on education. Every soldier needs a basic understanding and many must create, consume and analyse location data. The geospatial specialist ensures that all relevant geospatial and wider location data is available across the network; supports all users, and delivers complex and time-critical outputs. By understanding the ever changing data, mission, force, tools, systems and personal limitations the specialist can provide the information edge to the force. The UK leads the world in this respect, with its Royal



Accurate and timely GEOINT is no less important for the humanitarian missions mounted by Britain's armed forces. Here, a Royal Navy Medical Assistant from HMS Bulwark cares for a rescued child in the Mediterranean during Operation Weald, a mission that succeeded in rescuing some 2,700 individuals at the time of going to press. Photo: POA(Phot) Carl Osmond



As urban conflict, counter-insurgency, cyber and asymmetric warfare continue to shape military thinking and action, the need for commanders and GEOINT specialists to be ever more agile and responsive poses fresh challenges. Technology, such as the Google Glass headset being trialled here by the US Air Force, plays a key role in extending their capability. Image montage: Shutterstock / Richard Eldridge, 711 Human Performance Wing, U.S. Air Force

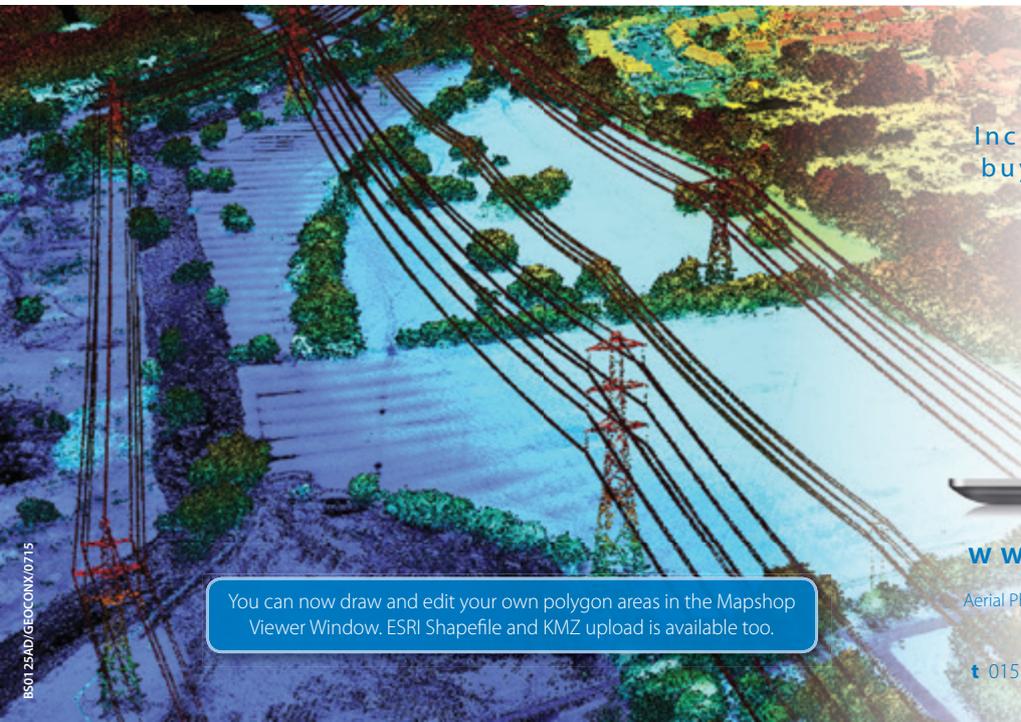
Engineer (Geographic) profession and the Royal School of Military Survey. But be aware of geospatial education not backed by continuous professional development.

Geospatial analysis has limitations. Position is not necessarily the best way to analyse information and other forms of analysis may be equally relevant. Geospatial teams may need to caveat their work; provide a probability factor, or advise that 'live' information gathering is necessary to reduce risk. Experience helps in this judgement and, thus, maximises peacetime training, as does exercising with wider Defence forces.

UK Defence has long recognised that Geospatial Information and services are critical. Location data is now omnipresent, most

people are unaware of quite how many decisions are made and lives enriched - or ended - based on geospatial and wider location information. In the first decades of this century, nations have no option but to redefine the way location enables Defence and wider national security.

Colonel (Ret'd) John Kedar, FRGS, FInstRE, C.Geog (GIS), was latterly Commander of the Joint Aeronautical and Geospatial Organisation (JAGO) at the UK Ministry of Defence and is currently Director of Strategic Relationships at Ordnance Survey International (www.ordnancesurvey.co.uk/international). He can be contacted by email at john.kedar@osi.os.uk.



LiDAR

Increased coverage now available to buy online on the Bluesky Mapshop



www.blueskymapshop.com

Aerial Photography | LiDAR | Height Data | Thermal Imagery | OS MasterMap
Heighted MasterMap® Buildings | NDVI | Open Data

t 01530 518 518 e info@bluesky-world.com



You can now draw and edit your own polygon areas in the Mapshop Viewer Window. ESRI Shapefile and KMZ upload is available too.