

DIGITAL battlespace

TARGETING THE
GLOBAL **C4ISTAR**
COMMUNITY

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C4ISTAR DOWN UNDER

Australia's ambitious AWACS and maritime surveillance programmes are fighting through headwinds



FOLLOWING LAND WARRIOR

US industry is vying for places on the Ground Soldier Ensemble programme to update Land Warrior



FRANCE NETS ARMY C2

The SICF, SIR, SIT and FELIN networks can now talk to each other effectively

ISTAR DATA OVERLOAD?



Paul Parkinson considers the dangers arising from operators being overwhelmed with huge volumes of ISTAR data and the options available to minimise this problem of information overload.

ABOUT THE AUTHOR

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In the last decade, there has been a remarkable transformation of armed forces through the digitisation of battlespace ISTAR systems. Although some sensors had started to embrace digital technologies in the previous decade (radar, for example), some airborne reconnaissance systems had been reliant on analogue technologies, such as wet film, until quite recently before transitioning to digital

electro-optical/infrared (EO/IR) devices.

The performance of processing systems has increased geometrically while semiconductor footprints have continued to diminish, which has led to the point where the high processing density required to perform sensor fusion on an airborne platform (characterised by space, weight and power, or SWaP) has become both technically feasible and economically viable.

Sensor fusion is a highly desirable capability, as data are taken from a range of different types of sensors covering different wavelengths within the electromagnetic spectrum, and are integrated to provide a more coherent situational awareness picture to the pilot or end user of the ISTAR asset. Some ISTAR systems now even perform the streaming of imagery in real time over secure communications links to ground-based assets, which could provide a tactical advantage within the theatre of operations. The continuing advances in technology have enabled the development of ISTAR systems with increased sensor resolution; this, of course, places even greater demands on processing subsystems to be able to process vast volumes of data at increasing rates – with the need for a corresponding increase in storage capacity.

However, with this huge amount of ISTAR data, is there a risk of overload for the pilot, ISTAR asset operator or end user?

Let us first consider a scenario involving the pilot of a modern fast military jet: he or

she is no longer just presented with standard avionics displays and a radar, but also with digital moving-map displays which integrate geographic map information with terrain radar data and airborne radar information showing the position of other aircraft and targets. This is placing an increasing workload on the pilot, forcing him or her to interpret information and assess whether it is of primary or secondary importance. This, of course, increases the risk of the pilot facing information overload and failing to notice an event which requires immediate action to be taken, and which could endanger the aircraft – for example, the warning of an incoming missile.

FIND BURIED DATA

One innovation which has been developed in a missile approach warning system is to provide an audible warning as well as a visual indication using a system similar to surround sound. Such 3D audio warnings seem to come from the same direction as the threat – a technique proven to minimise response time.

If we also consider a high-altitude, long-endurance (HALE) unmanned air vehicle (UAV) on a reconnaissance mission, this may loiter over a theatre of operations for many hours, streaming enormous volumes of data to other ISTAR assets and/or ground stations for processing, analysis and interpretation. This creates tremendous challenges for the storage and filtering of ISTAR data, as high-value target information may effectively be hidden amongst a huge amount of data for the surrounding geographic areas, which may not be of specific interest.

When this is considered within the context of a large number of ISTAR assets, the scope of the problem becomes evident. If this trend continues, more intuitive interfaces will need to be developed in conjunction with software agents to reduce the burden on the end users by intelligently processing the sensor data streams, and selecting the most appropriate information for presentation to them.