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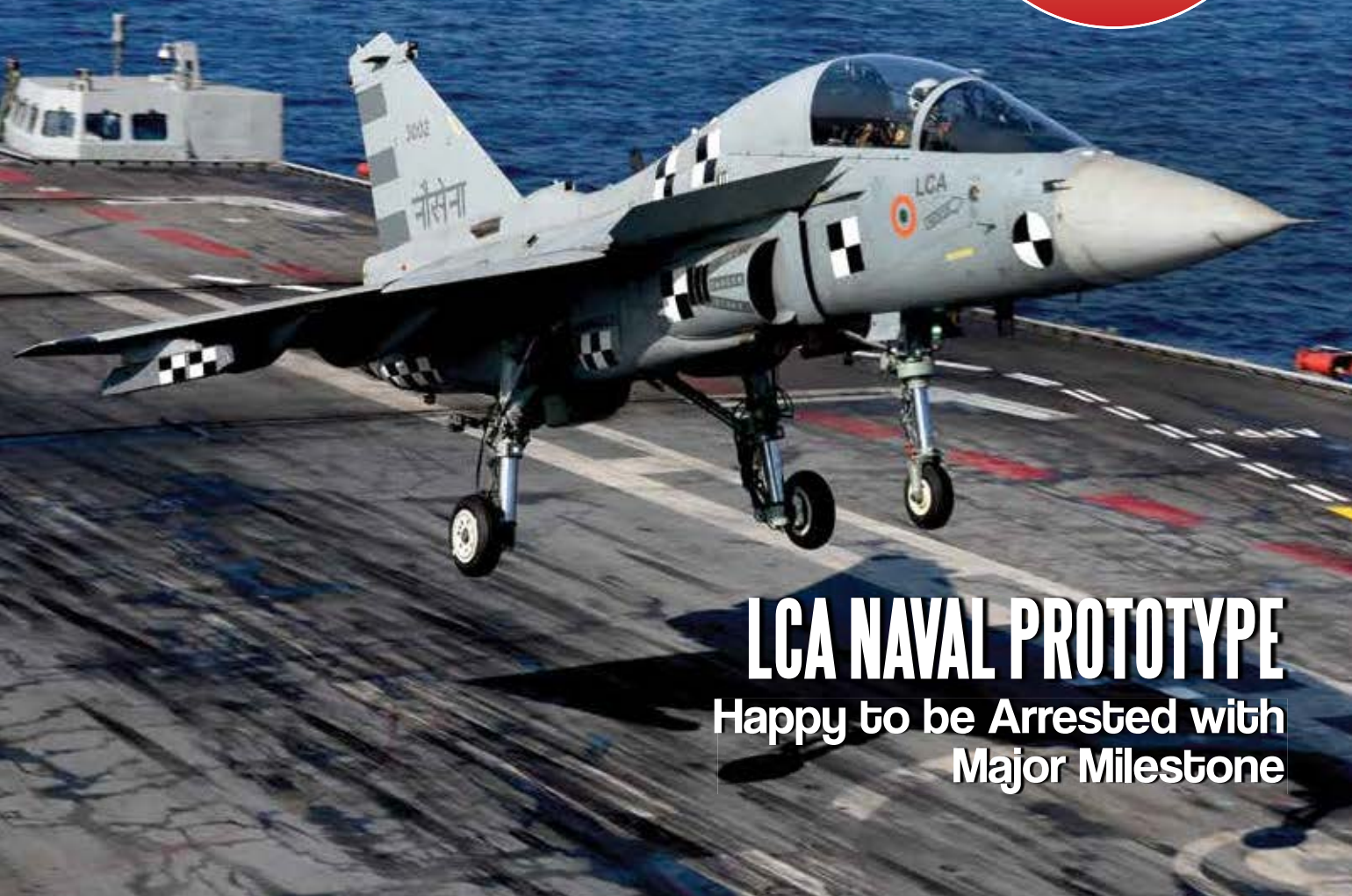
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PURSUING SELF RELIANCE IN DEFENCE



SPECIAL



LCA NAVAL PROTOTYPE

Happy to be Arrested with
Major Milestone

**Interview: Dr Ajay
Kumar, Def Secretary**

Tech Leadership a Determining
Factor in Self-reliance in Defence

**A Digital
DefExpo 2020**

With Motto to Bring Digital
Transformation in Defence

**Re-imagining Make
in India**

Through immersive, transparent
and collaborative partnership

ROLE OF GIS IN NATIONAL SECURITY IS UBIQUITOUS

The utility of GIS services in strategic realm, especially in the defence sector are multitudinous. The monitoring of border and related security aspects, regions of influence in the country's vicinity, have become an imperative, and thus role of GIS in national security has become ubiquitous

By **AMIT MUKHERJEE**



Geospatial technologies have become synonymous with their application in all aspects of national resource management. It is thus a foregone conclusion that its usefulness in aspects of national security is ubiquitous, essential and that it shall evolve, both intrinsically, through the manifests of various disciplines that engages its usage, and also explicitly where design and development of GIS products and processes are specifically created for the purpose of national security.

Geographic Information System (GIS) finds its utility in both traditional and non-traditional aspects of national security.

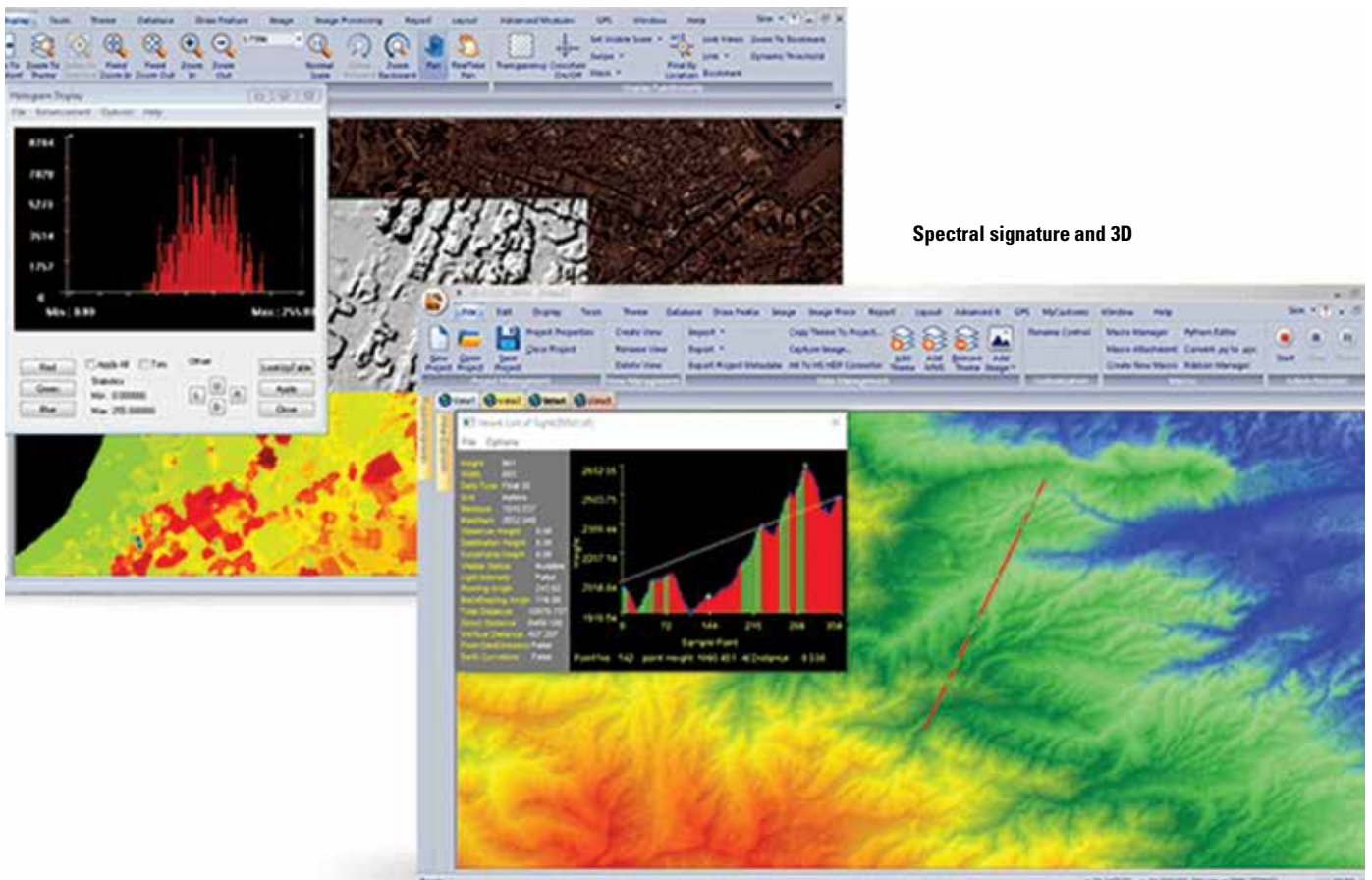
These include elements from the realm of military and sovereign interests to the recent rise in addressing aspects of human security and elements of nation building. Resource security, economic security, border management, disaster management and mitigation, energy security,

information security, food and health security, environmental security, cyber security, find their stakes better managed and protected using geospatial systems.

GIS services in strategic realm especially in the defence sector are multitudinous. The monitoring of border and related security aspects, regions of influence in the vicinity has become an imperative. To manage the increase in the amount and

type of information and analysis that may be required to keep a constant watch is facilitated by geospatial systems especially where movement of forces or strategic equipment is involved. Geospatial technologies help manage issues related to territorial disputes. The disputes related to land and water resources specially when an international river or water body is concerned the role of GIS becomes an omnipotent tool for mapping all aspects of geopolitical play in that area.

Due to rapid advancement in Revolution in Military Affairs (RMA) there is a tremendous reduction in reaction time in the battlefield events. With these rapid changes in the way warfare is evolving, both in tactics and



Spectral signature and 3D

methods, makes availability of processed information a vital necessity. Asymmetrical warfare is fusing with hybrid warfare making the battlefield a complex mesh of unknowns and rapid dynamic developments. To counter such fluidity, GIS enabled systems can provide information and analysis that can reduce time cycle in higher decision making.

Application wise, strategic or military use will become mostly automated. Although the big debate on who should control the future of Artificial Intelligence (AI) is still hung between man and machine, several renowned technologists have already indicated that man should be

the ultimate decision maker. Results based on complex analysis should be within reach for most automation and AI based GIS systems within the next decade.

Critical infrastructure like government facilities, hospitals, transportations control centers, economic hotspots, nuclear facilities and major transport links and networks need active monitoring and response drills. Identification of hazardous zones, coastal areas with vulnerability of floods and cyclones, landslide prone areas and forest fire are some of the areas that are, and can be better served during an emergency with GIS enabled systems and processes.

RESOURCE SECURITY, ECONOMIC SECURITY, BORDER MANAGEMENT, DISASTER MANAGEMENT AND MITIGATION, ENERGY SECURITY, INFORMATION SECURITY, FOOD AND HEALTH SECURITY, ENVIRONMENTAL SECURITY, CYBER SECURITY, FIND THEIR STAKES BETTER MANAGED AND PROTECTED USING GEOSPATIAL SYSTEMS

Non-traditional areas of security such as food, health, environment, national resources, have become as important as traditional elements of security because of the vulnerabilities that they pose, and intrinsically embedded in the realm of national security. Such vulnerabilities that can be caused due to inadequate or unavailability of critical

INSIGHT

INDIA'S RAPID GROWTH AND RESOURCE CONSUMPTION WILL REQUIRE IT TO BE BETTER MANAGED FOR PROPER DISTRIBUTION. GIS HAS THE POTENTIAL TO DELIVER SAFETY AND SECURITY AT AN INDIVIDUAL LEVEL, FOR ELEMENTS OF HUMAN SECURITY. THIS PROCESS IS ALSO NOT A FAR-AWAY VISION

resources can be exploited for damaging national interest. India's rapid growth and resource consumption will require it to be better managed for proper distribution. GIS has the potential to deliver safety and security at an individual level, for elements of human security. This process is also not a far-away vision.

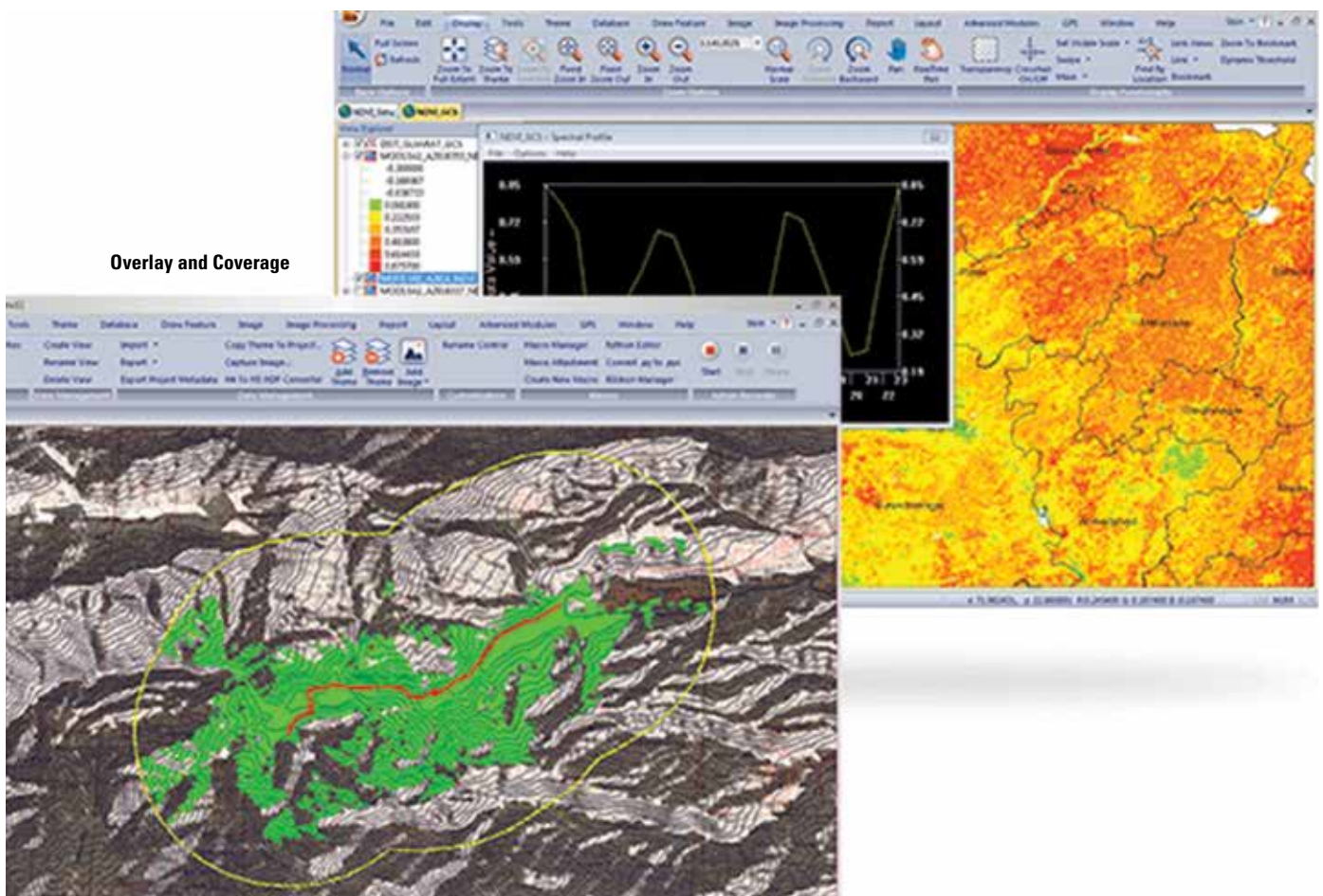
To create an information

base about national resources, a model for collection, processing and dissemination is required. These processes are now being provided by polices and regulating bodies. The national spatial data infrastructure with its updated version 'NSDI v2' under the present government has laid out the aims and objectives for managing national spatial data infrastructure to be used for all aspects of mapping and geospatial analysis. It has laid out the five domains for achieving the overall objective of economic growth. These include governance, data, access, interoperability and product space, as strategic

goals. To make GIS data more accessible the NSDI has laid out its framework based on OGC standards. All databases and information infrastructure related to non-traditional areas of security mentioned above will gradually form under the guidelines of the NSDI.

In the rising threat of terrorism, GIS has decisive role to play when combined with the technological forerunners like Artificial Intelligence. GIS and remote sensing technologies have also come to the area terrorism. The methods generally include data collection via monitoring and surveillance, risk assessment of target

Overlay and Coverage



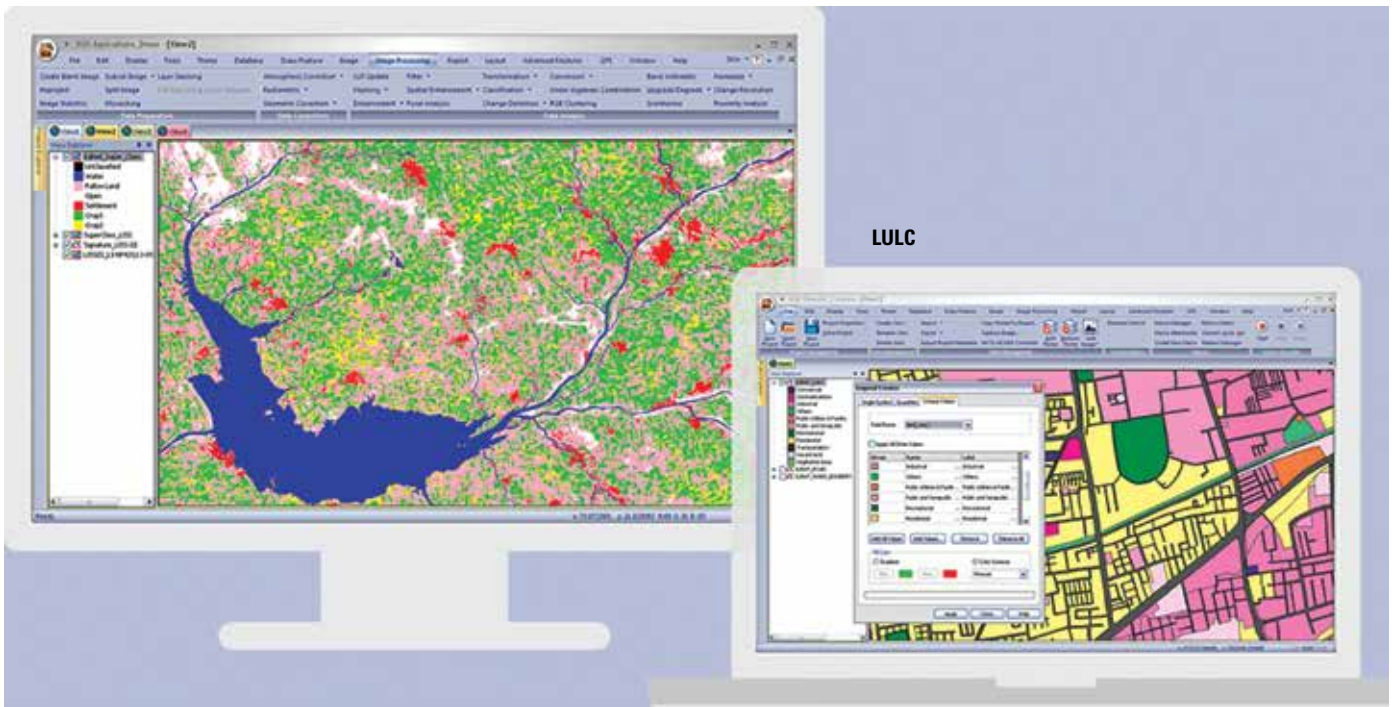


IMAGE SOURCE: SGL IGIS-MADE IN INDIA GIS SOFTWARE

location and carrying out target identification, response measures, and prediction. The inclusion of Artificial Intelligence in GIS is making predictive analysis a leading area of GIS application in counter terrorism methodology. The characteristics of such an activity usually entails an amalgamation of various processes. These include steps from surveillance to analysis with GIS. It provides for an enhanced situational awareness system.

GIS systems are under a parabolic rise that new technologies find themselves in. The rapid developments in computer sciences and artificial intelligence are transforming how GIS will evolve as smart and fully automated systems for higher decision making. Its sub processes will also see automation built

THE INCLUSION OF ARTIFICIAL INTELLIGENCE IN GIS IS MAKING PREDICTIVE ANALYSIS A LEADING AREA OF GIS APPLICATION IN COUNTER TERRORISM METHODOLOGY. THE CHARACTERISTICS OF SUCH AN ACTIVITY USUALLY ENTAILS AN AMALGAMATION OF VARIOUS PROCESSES, WHICH INCLUDE STEPS FROM SURVEILLANCE TO ANALYSIS WITH GIS. IT PROVIDES FOR AN ENHANCED SITUATIONAL AWARENESS SYSTEM

into the system. Another avenue for development is interoperability will become open ended and open access at a later stage of development. Given that GIS has an all permeating ability to integrate with all walks of life, the data sources will become multitudinous. As such data conversion and data type accessibility will become

complex. To address this interoperability will become paramount. Location based services are already intelligent enough to show shortest path and least cost path analysis in our ubiquitous travel and taxi services and so much more.

Major area of development in the future will be portable platforms of GIS services and features. Though much has become mobile, major functions are still in the process of converting to become mobile. So while GIS development moves from stand-alone systems to distributed systems to integrated systems in the horizontal hierarchy it is also moving towards platform independence and mobility. ■

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