

A topographic map showing contour lines and elevation markers. The map is oriented with a peak in the center, surrounded by concentric contour lines. Elevation markers include 4300, 4400, 4500, 4600, 4700, 4800, 4900, 5000, 5100, 5200, 5300, 5400, 5500, 5600, 5700, 5800, 5900, 6000, 6100, 6200, 6300, 6400, 6500, 6600, 6700, 6800, 6900, 7000, 7100, 7200, 7300, 7400, 7500, 7600, 7700, 7800, 7900, 8000, 8100, 8200, 8300, 8400, 8500, 8600, 8700, 8800, 8900, 9000, 9100, 9200, 9300, 9400, 9500, 9600, 9700, 9800, 9900, 10000. The text "CHALLENGES IN MAPPING FOR DEFENCE FORCES" is overlaid in the center in a large, bold, blue font. The text is underlined and the background is a topographic map with contour lines and elevation markers.

CHALLENGES IN MAPPING **FOR** **DEFENCE FORCES**

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MAPS

- **MAPS HAVE BEEN THE BASIC INGREDIENT OF ALL MILITARY PLANNING, THROUGHOUT THE HISTORY.**
- **MILITARY STRATEGISTS USE MAPS TO LOCATE OPPOSING FORCES, PLAN OPERATIONS AND TO COORDINATE LOGISTICS.**
- **MAPS FOR MILITARY USE HAVE EVOLVED FROM BASIC HAND-DRAWN FIELD CHARTS/PANORAMA DRAWINGS TO DIGITAL MAPS GENERATED USING HIGH RESOLUTION AERIAL PHOTOS/SATELLITE IMAGERIES.**
- **SINCE TOPOGRAPHY IS VITAL FOR OPERATIONS, DEFENCE FORCES PREFER TOPOGRAPHIC MAPS OVER OTHER TYPES OF MAPS.**

MAPS USED BY DEFENCE FORCES

- 1:25,000

- 1:50,000

TACTICAL
PLANNING

- 1:2,50,000

- 1:0.5M

STRATEGIC
PLANNING

- 1: 1M

- 1:2M

REQUISITES OF DEFENCE FORCES

- **CONTENT (AS PER MILITARY REQUIREMENT).**
- **SCALE.**
- **DATA.**
- **FORMAT.**
- **ATTRIBUTE INFORMATION (MILITARY SPECIFIC).**
- **ORTHO PHOTO/IMAGERY.**
- **DEM.**
- **CURRENCY OF THE DATA/REGULAR UPDATES.**

CHALLENGES IN MAPPING

OWN SIDE MAPPING

- ACCURACY.
- CURRENCY.
- QUALITY.
- SCALE.
- CONTENT.
- COST & TIME.

ACORSS THE BORDER

- ACCURACY.
- SCALE.

TECHNOLOGY PRESENTLY AVAILABLE

TRANSFRONTIER MAPPING

- IMAGERIES. SUB-METRE RESOLUTION SATELLITE IMAGERIES
- GCPs. SPACEBORNE GCP PROVISIONING WITH UP TO 1M ACCURACY
TerraSAR-X, Tan DEM-X.
- DEM. UPTO 5M ABSOLUTE HEIGHT ACCURACY AND 10M GRID SPACING.
- HEIGHT. GLOBAL GEOIDAL HEIGHTS FROM EGM.
- CONTENT. UNLIMITED SOURCES.

MAPPING: TACTICAL REQUIREMENTS

- FOR TACTICAL REQUIREMENT, LARGE SCALE MAPS ARE REQUIRED.
- DUE TO THE TIME FACTOR INVOLVED IN GENERATING LARGE SCALE MAPS, SOME OF THE ARMIES ARE SWITCHING OVER TO OTHER HIGH RESOLUTION GEOSPATIAL DATA SOURCES.
- REALTIME IMAGERY/AERIAL PHOTOS COUPLED WITH HIGH RESOLUTION DEM.
- SUPPORTS MISSION PLANNING, REHERSAL, ROUTE RECONNAISSANCE, INTELLIGENCE ANALYSIS, PRE-DEPLOYMENT TRAINING AND ROUTE MAPPING etc.
- PROJECT BUCKEYE 3D GROUND. PROVIDES UNIQUE GROUND-LEVEL TACTICAL GEOSPATIAL INFORMATION TO THE SOLDIER.
 - HELICOPTER/FIXED WING BASED UNMANNED PLATFORMS FOR OBTAINING AERIAL PHOTOS BETTER THAN 20 CM RESOLUTION, COUPLED WITH SUB-METRE LIDAR DEM.
 - BEING USED BY NATO IN AFGHANISTAN.

PROJECT BUCKEYE



SPATIAL DATA INFRASTRUCTURE

REQUISITES OF A DEFENCE SPATIAL DATA MODEL INFRASTRUCTURE

- **DATA MANAGEMENT & LOADING SERVICES.**
- **THIN CLIENT/SERVER SIDE APPLICATION.**
- **WMS ACROSS MULTIPLE NODES.**
- **XML BASED METADATA SEARCH.**
- **DATA DOWNLOADING CAPABILITY.**
- **GEOPROCESSING WEB SERVICES.**
- **DATA FUSION CAPABILITIES.**

FUTURE OF MILITARY GEOSPATIAL APPLICATIONS

- **FUSION & INTEROPERABILITY OF DIFFERENT GEOSPATIAL DATASETS OF VARIOUS WEAPON PLATFORMS.**
- **REALTIME INTEROPERABILITY WITH UAV DATA.**
- **MIGRATION FROM DESKTOP TO MILITARY WEB FOR SPATIAL DATA ANALYSIS.**
- **CONVERSION OF LEGACY DATA.**
- **AVAILABILITY OF NSDI NODE AND NGIS NODE FOR DISASTER MGMT etc.**