

Sample Problem Statement for CoE in GIS Applications (Including Drone Technology)

A geographic information system (GIS) is a system designed to capture, store, manipulate, analyze, manage, and present spatial or geographic data. GIS applications are tools that allow users to create interactive queries (user-created searches), analyze spatial information, edit data in maps, and present the results of all these operations. It is attached to many operations and has many applications related to engineering, planning, management, transport/logistics, insurance, telecommunications, and business. GIS and location intelligence applications can be the foundation for many location-enabled services that rely on analysis and visualization.

Modern GIS technologies use digital information, for which various digitized data creation methods are used. The most common method of data creation is digitization, where a hard copy map or survey plan is transferred into a digital medium through the use of a CAD program, and geo-referencing capabilities. With the wide availability of imagery (from satellites, aircraft and UAVs), heads-up digitizing is becoming the main avenue through which geographic data is extracted. Heads-up digitizing involves the tracing of geographic data directly on top of the aerial imager.

In addition, drone technology has many interesting possibilities for proper monitoring of projects in the NER Region. Accordingly, the CoE for GIS Applications (in Itanagar) will also engage itself with this area, as GIS and drone technology have many intersecting possibilities.

Some of the sample problem statements where GIS and Drone Technology can make a difference are given below.

1. Bamboo processing

Assam Rajiv Gandhi University of Co-operative Management is providing necessary support to Numaligarh Refinery Limited for sourcing, processing and growing Bamboo for upcoming BioRefinery project of Numaligarh Refinery Limited, a joint venture with Chempolis, a Finnish biorefining technology company, ceremony of which was done by Hon'ble Prime Minister of India on 9th February, 2019. As estimated the proposed Bio-Refinery will require supply of 5 lakhs metric ton of Bamboos per annum. As per survey, the existing resources will get exhausted in 3 to 4 years. The challenge is therefore to stop the destruction of Bamboo due to various diseases and increase in production through plantation and harvesting in forest areas. Very extensive use of IoT and drone technology is therefore envisaged for pest surveillance and

control, aggregation, canopy estimation, plant population counting and inventory management in aggregation and supply chain.

2. Geospatial domain in planning, monitoring and management of natural resources

Geospatial domain can help in improving the developmental planning, monitoring and management of natural resources in Arunachal Pradesh.

3. Geospatial technology with the State Remote Sensing Application Centre (SRSAC)

Geospatial technology with the State Remote Sensing Application Centre (SRSAC) can help village level survey using spatial data module structure developed for mobile mapping application, mapping of five major river basins, currently taken up for the Brahmaputra basin under National Hydrology Project funded under World Bank assistance.

4. Digital Elevation Model (DEM) generation

It can also provide technical expertise for Digital Elevation Model (DEM) generation with vertical as well as horizontal accuracy for flood modelling geo database of 1.2 K scale, flood forecasting, observation of water reservoir in real time, creation of Geoidal Model of 10 cm and establishment of Continuously Operating Reference Stations network sites in Arunachal Pradesh for government agencies that collect GPS data to improve precision and accuracy of positions, which are useful for supporting three dimensional positioning, metrology, space weather and geographical application, to improve infrastructure planning, utilities management, using Geospatial techniques to help the State government identify villages lacking in basic infrastructure and ensuring their all-round development at the micro level.