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ESRI India

AxC India News

ESRI India Magazine

October - December 2009

Vol : 3 Issue : 4

Unique Applications

**GIS BASED NATURAL
DISASTER MONITORING PORTAL**





ESRI India

**TRANSLATING YOUR NEEDS...
BUILDING GEODATABASES...
DEVELOPING GIS APPLICATIONS...
ENHANCING VALUE OF YOUR DECISIONS...**

Infrastructure



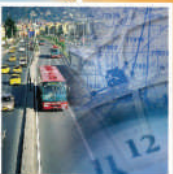
Utilities



Disaster Management



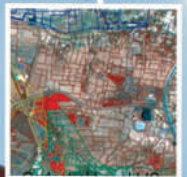
Logistics



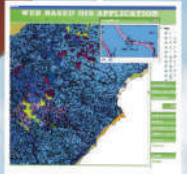
City - GIS



Land Management



Natural Resources



Environment



**Authorised Distributor for
ArcGIS® & ENVI®
Suite of Products**

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ESRI India

From the President's Desk



Dear Friends,

We get into 2010 with a lot of hope and expectation for the GIS community – hope that large projects would get implemented and expectation that GIS technology would embed itself as an important element of governance and development.

ESRI gets ready for ArcGIS 10 release – major version release of recent times. The challenge opens for a wide range of new and more effective applications – thin line between image processing and map processing will vanish and with some unique analytical capabilities and serving capabilities – ArcGIS 10 will be a great platform. Those who joined the Beta Testing programme had a pre-view and have a lot to say.

ESRI India gets ready for ESRI India user Conference during April 21/22, 2010. Jack Dangermond has confirmed his participation this time and all ESRI user community will have a great opportunity to interact with the LEGEND. Joining Jack will be ENVI and Arc FM experts – combinedly providing the best suite of spatial products for major initiatives in India to all of you.

We also took some new initiatives. A ESRI India Help-Desk – DIAL 1-800-102-1918 and get instant technical support. The Help Desk is now working office hours but soon would extent late into the evening. In the past 3 months more than 300 calls have been supported and turn-around times have reduced. Soon we shall position a Test Bench and help simulate test conditions on different platforms and provide instant solutions. All users can verify their licenses at the Help-desk and get any support that they need for their licenses. As of now, we do not make a distinction of the status of license and will provide technical support – but soon the streamlined system will verify maintenance licenses and provide support. On the other hand, the Help Desk is also a method for license verification and encouraging maintenance compliance. Through the help desk, we shall contact all users and remind them of Maintenance advantages and benefits and encourage them to get on. We also undertake post-facto analysis of all help Desk calls and this helps us to measure our performance and improve efforts at best efforts to our user community. We are planning more newer initiatives - start a Mobile Service for GIS queries; licensed software download services and an enhanced GIS Training programme soon. After all, we strive to bring value to OUR USERS.

We positioned a special initiative for educational institutions and universities. They get a one-time offer to get licensed ESRI software and upgrades at never-before terms.

We start a new initiative – In Conversation where my senior team will meet government, academia, corporate and international leaders and discuss with them key GIS issues and bring to focus what the nation should be doing using GIS better. We will be a platform for voices – a network of voices which when in an ensemble will make a great GIS meaning in the country. This time we converse with Dr Shailesh Nayak, Secretary of Ministry of Earth Sciences read on his views and what his Ministry will use GIS for. Dr Nayak also has a suggestion or two for ESRI – we take that to ESRI Inc and hopefully some new ideas for modules in coming days.

I mention all these snippets to bring to you the value that we bring to our users – better and better technology-suite backed by continuous improvements, high-level services, bring together experts interaction, new user services, publications, exhibitions and outreach and marketing and also a major thrust to many GIS initiatives in the country. To us the software is just the means, the goal is end-to-end GIS. All of this to sustain India's Tryst with GIS and a thrust for development.

We belong to our users and exist because of our users. Thanking all of you for reposing faith in ESRI – we will do much more for you in the coming days.

Look forward to meet each of you at ESRI India user Conference.

(Mukund Rao)
President & COO

ESRI India Celebrates its 13th Year

On 13th November 2009 ESRI India completed 13 years of its existence as a GIS Solutions company that endeavors to provide end-to-end GIS based solutions ranging from software products, application development, training, data conversion and technical support. The day was marked with celebrations across all offices of ESRI India.



"We are and will continue to be a team that is seamless – seaming through sales, marketing, delivery, finance, HR, support etc into ONE ESRI and this large nucleus embracing large number of clients to make the GIS COMMUNITY." said Dr. Mukund Rao, President & COO, NIIT GIS Ltd.

ESRI India announces its 11th User Conference

The Eleventh Annual User Conference will be held on 21st and 22nd of April 2010 at Hotel Radisson MBD, Noida. The theme for this User Conference is "GIS : Designing the Future". Designing our future, a vision that combines the wealth of data available about our world with sophisticated analysis and management tools is the prescription for understanding and shaping the future of our planet—an anthropogenic future where advances in human society, technology, etc., are designed in close collaboration with nature, resulting in the best of possible future worlds.

ESRI India User Conference is designed and dedicated to the users of ESRI technology in India who implement GIS work in their organization and beyond. The User Conference is a platform for all users of ESRI technology and business partners to share knowledge and understand the new advancements in ESRI Technology and Solutions. The conference will host events like Map Galleria, Technical Quiz, Technology Workshops and Technical Shows. For more details please visit our website www.esriindia.com

ESRI India announces Call for Papers and Posters, inviting its users to submit their abstracts for User Presentation and Poster



Presentation. To submit your abstracts please visit the following link <http://www.esriindia.com/event%20website/Default.htm> or write to papers@esriindia.com or posters@esriindia.com

Mumbai Selects ArcGIS Server for Citywide Enterprise GIS Solution

Municipal Corporation of Greater Mumbai (MCGM), the primary agency for urban governance in Mumbai, India, has selected ESRI ArcGIS Server technology as its citywide geographic information system (GIS) enterprise management solution. ArcGIS Server will integrate images, detailed maps, and property-level maps and link them to a wide range of enterprise data used for various city functions.

NIIT GIS Limited is working with MCGM to develop a large-volume GIS geodatabase and 12 custom ArcGIS applications, which will assist the city in its property taxation, utility management, vehicle tracking system, and land-use development.

MCGM is one of the largest local governments in the Asian continent. The organization caters to a service area of approximately 437.71 square kilometers, including seven islands and four island suburbs. The MCGM jurisdiction area houses about 11.9 million people, with a population density of about 27,209 people per square kilometer. Like most city organizations its size, MCGM requires fast and easy access to digital maps and data.

ArcGIS Server will provide a common platform for authorized and secured access to data to harmonize the workflow of respective

departments and disseminate information for the public's benefit.

"MCGM considers GIS as a solution that brings in greater efficiency by promoting information sharing across multiple departments, speedy decision making, and transparency in the functioning of corporations," says Shantaram Shinde, joint municipal commissioner, MCGM. "GIS is part of creating an information infrastructure needed for providing effective government services in the twenty-first century as a stable governance-oriented decision support system."

"NIIT GIS will work closely with MCGM to establish and support its very critical endeavor," says Mukund Rao, president and chief operating officer, NIIT GIS Ltd. "It is a mission to make the city benefit from the use of GIS technology. With the ESRI platform as its core, we will work with all stakeholders in the city and bring the best value to the city of Mumbai."

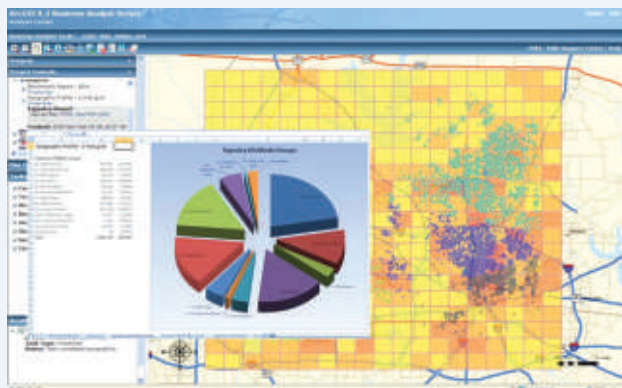
In the past, MCGM has used GIS as a desktop solution but not as an enterprise solution to support governance. With the ability of ArcGIS Server to handle large-scale maps and networks and integrate with management information system solutions, MCGM believes it can use ArcGIS to better serve the people of Mumbai.

ESRI Business Analyst Server

With ESRI Business Analyst Server, you can collaborate and share models and analyses within your organization and use dashboards to quickly publish the most important and pertinent information. Business Analyst Server combines GIS server technology with extensive business, demographic, and consumer spending data to provide users with a complete business geointelligence solution. You can quickly implement out-of-the-box Web applications and services to help you solve complex business problems via a browser-based, thin-client interface.

With Business Analyst Server, you can

- Develop repeatable processes and workflows across an organization, creating more consistent and effective analysis for site evaluation, customer analytics, and competitive and market analysis.
- Leverage ready-to-use data and prepackaged functions for rapid workflow creation, reducing the amount of development overhead and time to deployment.
- Easily customize Web-based applications for different end-user scenarios to create relevant and regionalized workflows.
- Generate maps and reports that visualize your analysis and support your strategic planning objectives.
- Eliminate silos by collaborating on workflows and data findings throughout an organization, increasing visibility



and usage of geographic business intelligence and reducing costly business errors.

Visualize data in its geographic context throughout your organization.

Key Features

With Business Analyst Server, collaboration on models and analyses are enabled across the enterprise. Analysts can build and customize models for regionalization, accessing a common data repository, and create dashboards to share information with executives and key stakeholders.

Collaborative and Distributed Applications

Create browser-based business applications that support a large number of users from a central location without requiring individual desktop applications or GIS knowledge. Through these applications, dashboards, analyses, and models can be shared across the organization and provide a common platform for the decision-making and planning process.

Workflow Frameworks

Develop your own custom business workflow templates that link common tasks together and provide a wizard-driven approach to help reduce time needed for modeling and analyses.

Application Development Tools

Use APIs and Application Development Framework (ADF) for .NET, JavaScript, and Flex, as well as Web services for mapping, imagery, locators, and geoprocessing to build custom applications.

Advanced Spatial Analysis

Perform customer and store market analysis and competitive and site evaluation using simple rings, threshold rings, data-driven rings, drive times, and desire lines.

Customer Prospecting

Identify characteristics for targeting profitable new customers by analyzing the demographic variables in the areas that contain target customers. Locate desired areas using Principal Components Analysis (PCA) or Floor and Ceilings values.

(Continued to page 8)

(Company News continued from page 06)

GIS Day Celebrations at NIIT GIS

Pioneered and championed by ESRI, GIS Day is an annual grassroots event that encourages geographic information system (GIS) users and vendors to connect with local schools, businesses, and the general public to showcase the real-world applications of this important technology. In celebration of GIS Awareness Week, ESRI India hosted the annual GIS Day 2009 on 18th November 2009. A series of technical interactions were organized on the occasion which was followed by a GIS Day Quiz.

Speaking in one of the technical interactions, Dr. Mukund Rao, President & COO of NIIT GIS Ltd. said, "GIS technology is becoming a part of every day life of citizens, society, private enterprise and government. In fact, the way things are happening we shall see GIS and IT becoming closely seamless and integrated and complementing each other in a major way. The technology of GIS is progressing on 2 paths – one, making it easier and easier to use and second, becoming more and more complex as part of a multi-technology Enterprise solution. GIS seems to be driving citizens to know more about their lives and surroundings and making them aware of THINKING GLOBALLY and GIS is also driving large systems of map and geo-tagged attributes – thus making a new visualisation of information."

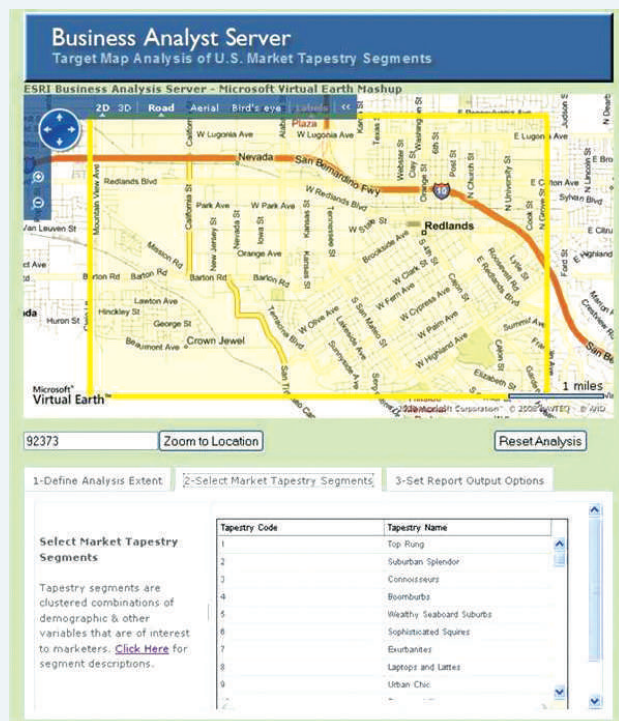


Facility, Asset and Supply Chain Management

GIS network tracing can determine and optimize product routing, as well as provide data management and reporting support for sophisticated product transaction management systems. Business Analyst Server enables the visualization of current inventory status, locations, travel distance, and drive times between suppliers and distributors.

Business Continuity and Risk Management

Business Analyst Server helps businesses perform business continuity planning by modeling what-if scenarios for natural or man-made disasters, supplier disruptions, and transportation options; optimizing driving routes inside and between facilities; and determining facility vulnerabilities due to response times.



Simple Web applications can be created for basic analytic tasks.

What's New in ESRI Business Analyst Server 9.3.1

Upload and Run Custom Report Templates

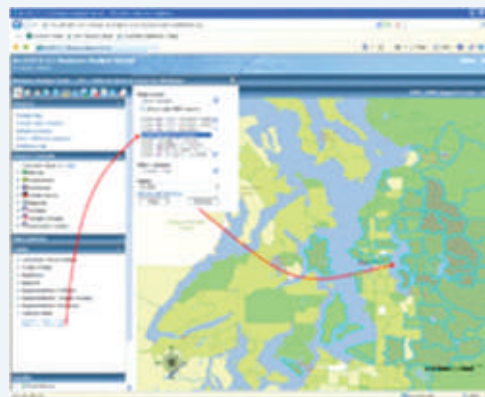
Custom report templates are created with Business Analyst Desktop Advanced Editor, then uploaded for use in Business Analyst Server. Once a report template is published to the repository, Business Analyst Server client applications can consume this template to generate reports using Business Analyst. Developers can also consume the report output in XML format to supply data for application features.

Usability Improvements : New Select by Attribute Tool

The Select By Attribute tool allows you to select features in a layer based on an attribute value. For example, you can select all the ZIP Codes in a given market that have a median household income greater than \$74,999, or select all the stores that have more than 100 parking spaces.

New Create Store / Customer Layer Using a Table of X,Y Coordinates

If your data is already geocoded, you can take advantage of those values directly. Whether you upload a dBASE file (.dbf), Excel 97–2003 file (.xls), or Excel 2007 file (.xlsx), it is now possible to include the latitude-longitude value pairs for the points.



New Select By Attribute tool allows analysts to quickly focus on an attribute of interest and redirect their analyses and maps accordingly.

New MSD Used instead of MXD as the Default Background Map Service Definition

Optimized Map Service, a new map service type available beginning with ArcGIS 9.3.1, significantly boosts the performance of dynamic operational layers in Web maps. The Business Analyst team has completely optimized the earlier map document (.mxd) file that was used as the background map service. Business Analyst Server takes advantage of the improved cartography and drawing speed of the new optimized map service definition (.msd) file.

Import Excel 2007 Files (Upload Custom Table)

It is now possible to upload and use Microsoft Office 2007 Excel (.xlsx) files as input to create store or customer layers, supply the list of items to be included in a standard geography trade area, or create segmentation profiles. The spreadsheets should have data arranged in columns that include field names in the first row.

New Methods in SOAP / REST API : Address To Geography Levels

Use this new method to return the standard geography areas for an address location. For example, you can use this method to find out what county, state, and ZIP Code an address is located in. This method can be used in conjunction with the Benchmark Reports API to compare trade areas around a location against one or many standard geography areas.

Import Shapefiles

This method can be used to import trade area polygons to be used in other Business Analyst Server methods. For example, you may have a model or other analysis that produces a service area polygon. This shapefile can then be uploaded to Business Analyst to be used with other methods such as Benchmark and Summary reports.

Simplified XML Output for Summary Reports and Benchmark Report

A new format is available for integrating or repurposing report output in Business Analyst Server applications. The hierarchy of the previous XML output has been removed in favor of a flatter structure that is easier to process programmatically. The XML files can also be imported into Microsoft Excel through the Get External Data tools. This new simplified structure makes it easier to bind Business Analyst Server XML directly to chart, table, and other Web programming controls.

For more details, please visit

<http://www.esri.com/software/arcgis/ba-server/index.html>

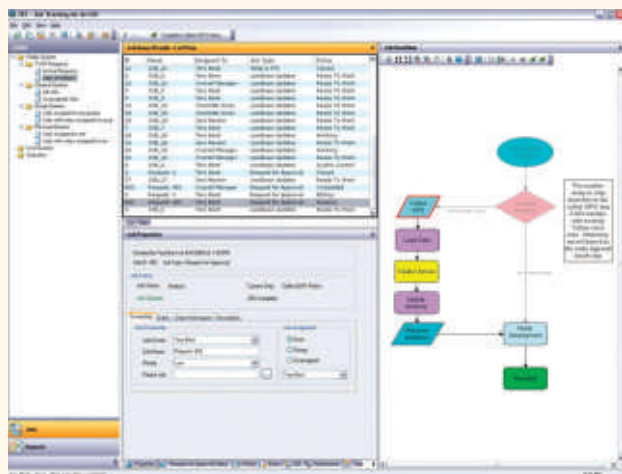
Job Tracking for ArcGIS (JTX)

An Enterprise GIS Workflow Management

Data production and maintenance projects, both large and small, have a vital need to have their project information (e.g., staff allocation, progress and status, changes to data) tracked as well as to have the work completed in the most efficient and timely manner possible. Being able to monitor these efforts in a way that does not encumber the production process and that is tightly integrated with the software has traditionally been the primary challenge when it comes to job tracking. Now, with ESRI's Job Tracking for ArcGIS (also referred to as JTX), there is a tool designed to help organizations overcome this challenge.

Job Tracking for ArcGIS (JTX) is a workflow management application designed to improve the efficiency of any multiuser GIS project. Job Tracking for ArcGIS (JTX) provides advanced job tracking and workflow management tools to help your organization save time and money.

JTX benefits data maintenance managers and engineers, GIS technicians, mapping engineers, and QA/QC analysts with up-to-date information from project inception to quality control and deployment. It is also available as an extension to ArcGIS Server.



Create jobs and execute workflows with the JTX client application for the desktop.

With JTX, you can

- Organize, standardize, and streamline project workflows.
- Improve user productivity by automating multiuser tasks and reducing repetitive setup procedures.
- Save time by completing enterprise GIS tasks while tracking staffing, time schedules, and more.
- Easily create and assign work to appropriate resources.
- Simplify creation, management, and tracking of geodatabase versions and simultaneous editing.
- Centralize, update, access, and maintain consistency for all job-related information across your organization.
- Maintain and track feature edit transactions after each job has been completed.
- Easily manage and distribute work for geographically dispersed workforces.
- Seamlessly integrate your GIS and other business applications.

- Access the capabilities of JTX through an easy-to-use Web application on the desktop or in the field (server version only).

Key Features

Workflow Management

You can define, organize, and standardize the individual tasks within a workflow; allocate staffing resources; automate tasks; and track the status and progress of jobs from beginning to end using Job Tracking for ArcGIS (JTX).

You can easily identify

- Who is working on what
- What the status is
- Individual, group, and project progress
- Resource use and allocation
- Data changes
- Project updates



Create jobs and execute workflows with the JTX client application for the desktop.

Job Tracking

Any action performed on the job, such as executing an edit feature step, is captured and logged in the administration database. This gives you a complete chronological registry of job-related information such as

- All interactions with a job
- Changes to the state of the job
- Execution of a step or task
- Time-stamped comments

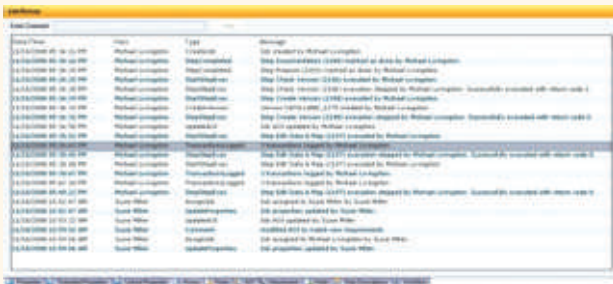


Associate a geographic area with your jobs.

Version Management

JTX includes a comprehensive set of version management tools to facilitate simultaneous project workflows from a centralized geodatabase. It ensures the execution of

- Long and complex geodatabase transactions safely
- Version assignments for the life of the job
- Data referencing
- Individual feature edit tracking
- Versioning maintenance

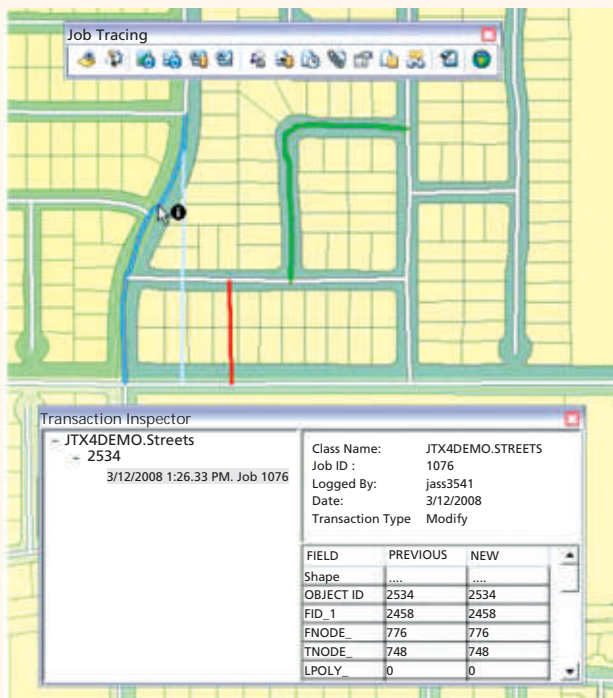


A log of all user interactions with the job is automatically recorded in the job's history.

Multiple Data Warehouse Support

Using the multiple data workspace functionality, you can

- Manage data distributed across multiple ArcSDE geodatabases with one JTX repository.
- Use data from varying departments or data stores within your organization to complete tasks within your JTX system.
- Configure each geodatabase connection as a data workspace in the JTX system.



Choose to store a record of feature changes within the system.

History Tracking and Change Detection

JTX delivers rich support for the capture and storage of feature-level transactions, which are ascertained when the job version is reconciled and changes are posted back to the master database. These records give you

- Details stored in an Open Geospatial Consortium, Inc. (OGC)-based XML format that leverages industry-standard models for features
- Query access by job number, date, date range, or Global Feature Identifier to support QA process requirements

- E-mail notifications when changes are made in the geodatabase

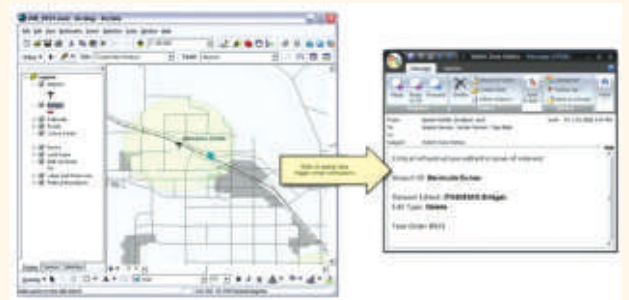
Spatial Notifications

You can use the automatic e-mail notification tools to

- Alert key people within your organization when changes are made to features within your database.

Configure rules for how the e-mails will be triggered such as by changes to certain features,

- certain updates to a specific feature, or changes within a specified



Receive automatic e-mail notifications when changes are made to your spatial data.

Reporting

A reporting engine gives you the ability to define and produce summary reports for your projects that are managed with JTX. The report output is stylized using XML style sheets (XSLT).

Status Report (All Jobs)			
Status	Champion	Priority	Count
Analysis	Peter Parker	High	1
Total Jobs:			1
Status	Champion	Priority	Count
Cartography	Suzie Miller	High	1
	Suzie Miller	Low	1
Total Jobs:			2
Status	Champion	Priority	Count
Closed	Michaels Livingston	High	1
	Michaels Livingston	Low	1
	Suzie Miller	Low	8
	Suzie Miller	Medium	2
Total Jobs:			12
Status	Champion	Priority	Count
Created	Suzie Miller	Low	3
Total Jobs:			3
Status	Champion	Priority	Count
Done Working	Suzie Miller	Medium	2
	Terry Bent	High	1
Total Jobs:			3

Design and execute reports in the JTX system summarizing job information.

Key Benefits

JTX saves time and enables you to more efficiently utilize your resources by allowing you to

- Automatically record a detailed history of job actions, track edits to individual features and associated metadata, and manage versions for simultaneous editing.
- Allocate staffing resources, automate tasks, and track the status and progress of jobs from beginning to end.
- Automatically capture and log actions performed on jobs in the administration database with time-stamped comments.
- Manage data distributed across multiple ArcSDE® geodatabases with one JTX repository.
- Capture and store feature-level transactions ascertained when the job version is reconciled and changes are posted back to the master database.
- Notify key people via e-mail when changes are made to features in the database.

(Continued to Page 11)

Introducing ENVI 4.7 – The Next Step in Workflow Integration

E NVI – the premier solution to extract information from geospatial imagery – delivers innovative ways to streamline your image processing and analysis workflows. Recent releases have introduced new workflow innovations including integration with ArcGIS®, and automation of essential image processing tasks.

Now, ENVI 4.7 delivers the next level of workflow innovation by introducing powerful new integration between ENVI and ArcGIS. This release allows you to easily drag and drop any data file to ENVI, to display vector layers with your imagery with consistent styling and symbology, and to easily output results as map products. In addition, ENVI 4.7 includes support for more file formats, continuing a longstanding ENVI tradition of helping you get information from the newest imagery and data types as they become available.

Integration with ArcGIS for an End-to-end Image Processing Workflow

Today there is a growing convergence of imagery and Geographic Information Systems (GIS) applications in the fields of government, commercial, and research. As image scientists and analysts, you need to be able to move seamlessly between GIS and image processing applications, with the ability to share files and data – not just to improve workflow efficiencies, but to get the most information you can about a geographic area of interest.

ENVI 4.7 makes it easy to incorporate GIS data and layers with your image processing workflow. Now you can seamlessly drag and drop ArcGIS files from Microsoft® Internet Explorer®, from your desktop, or from the ArcGIS interface directly into the dynamic ENVI Zoom display while maintaining the robust native symbology and styling that ArcGIS is known for. Once vector layers are available in ENVI, you can display and visualize the layers along with your imagery, perform further analysis on your imagery, and output processed results to a map, a printer, or a report to share with colleagues.

Easily Create Maps and Print Your Results

ENVI 4.7 integrates native ArcGIS mapping tools and templates, making it easy to create and edit maps and other types of output from directly within ENVI. To create a map, simply choose print preview, open any of the ArcGIS template files that offer different layout choices, then apply that template to the data you want to map. Data is easily accessible via the ENVI Zoom layout manager. And titles, textboxes, and the layout of the map are all easily editable and can be printed or exported to a variety of file formats, including geoenabled PDFs, Microsoft PowerPoint® slides, and more. A screenshot of your work at any step can easily be sent to a printer or PowerPoint slide using new “chip to” capabilities.

Quickly Edit Features

Frequently, vector data needs to be edited to make features appear more true to life. Editing vector data in ENVI is easy. ENVI 4.7 has a set of feature editing tools available both in a highly visible toolbox, or by simply right clicking your mouse for a context menu. Feature editing tools included with ENVI 4.7 include:

A Rectangulator Tool that allows you to select one or more polygons and run an algorithm that will make shapes more rectangular. This option is great for identifying rooftops as well as larger polygons, such as fields, and smaller ones, like cars

A Smoothing Tool that allows you to select one or more polygons and make the outline smoother by removing vertices. This produces a rounder, less jagged shape

All feature editing tools, including these two are easily accessible during vector editing. Simply select one or more polygons and right click to bring up a context menu of all your feature editing tools.

Image Processing Support for More File Formats

In addition to workflow improvements, ENVI 4.7 also introduces additional file format support to help you get the information you need from new data formats as they are introduced to the marketplace. ENVI now supports:

Landsat GeoTIFF with Metadata (MTL)

Open, process, and analyze Landsat Geotiff MTL files using a more powerful calibration tool that will allow you to open and calibrate Landsat files quickly

COSMO-SkyMed

Access data collected from the COSMO SkyMed satellite system using ENVI 4.7, and geocode it using the add-on SARscape® Modules for ENVI, which allows you to create a high precision product without the need for ground control points

RapidEYE

Data from the RapidEye satellite is now supported in ENVI in both GeoTIFF and NITF formats

ERDAS Imagine

ERDAS® Imagine image files are now supported in ENVI. Both compressed and non-compressed formats are available for viewing and for use in processing and analysis routines

Fully integrated with ArcGIS to streamline image processing and analysis. An end-to-end workflow that allows you to output print quality maps. And support for the file formats you use for information.

(Continued from page 10)

- Query, filter, sort, and group data and display the results of queries in formats that suit organizational needs.

Who need Job Tracking for ArcGIS (JTX)?

Organizations that need to complete GIS tasks while tracking changes to data and manage staffing resources and time schedules benefit from Job Tracking for ArcGIS (JTX). This includes users such as

- Data maintenance managers and engineers
- GIS technicians
- Mapping engineers

- QA/QC analysts

For example, a data maintenance manager or a mapping engineer may need to keep multiple staff members working on different aspects of the same project while tracking changes to the database. With Job Tracking for ArcGIS (JTX), this process is simplified, providing both the manager and the users up-to-date information from project inception to quality control and deployment.

For more details, please visit :

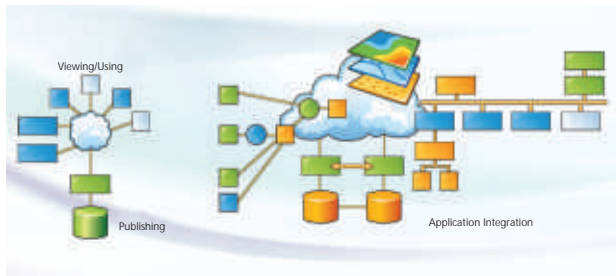
<http://www.esri.com/software/arcgis/extensions/jobtracking/index.html>

Geospatially Enabling Information

GIS, the Web, and Better Government

There has rarely been a greater need for better government than at the present. The economic, social, and environmental challenges facing government require innovation and collaboration.

Web 2.0 provides a collaborative environment that has changed the way businesses and individuals interact. Some government leaders have recognized that a Web 2.0 approach could also be used to change the way government and individuals interact. Gov 2.0 is a concept that advocates making government information widely available through Web technology to increase both the transparency of government and the participation of citizens in decision making.



interactive presentation of Web 2.0.

This movement has support at the highest levels. U.S. President Barack Obama has said, "We must use all available technologies and methods to open up the federal government, creating a new level of transparency to change the way business is conducted in Washington, and giving Americans the chance to participate in government deliberations and decision making in ways that were not possible only a few years ago."

This is not news to GIS users. Most of the information that governments deal with has a strong connection to place—property taxes are assessed by parcel, garbage trucks are routed on city streets, and polling place locations are related to the home addresses of voters. GIS has evolved from a tool for managing projects to a framework that governments use for understanding and responding to problems on scales ranging from local to global.

Not only do governments benefit from considering geographic factors in the decision-making process, but these agencies also use the geographic framework supplied by GIS for organizing, analyzing, visualizing, and displaying all types of data that are germane to solving a problem, making a policy, or improving a process.

Making Government More Available

Using the Web as a means of improving the responsiveness of government is not new either. In its first iteration, the marriage of the Web and government produced e-Government, or e-gov. Designed to improve the level and quality of services that government provided citizens, businesses, and other government agencies, government Web sites quickly evolved from billboards with phone numbers and mission statements to more interactive sites with querying capabilities, online forms, and payment capabilities.



The GeoWeb is a vision of Web GIS that incorporates the interactive presentation of Web 2.0

However, providing an intuitive interface for accessing information proved challenging. Governments turned to a relatively new technology that had been used internally for improving processes through organizing and managing information by its geographic location: GIS. In the mid-1990s, in the midst of what has come to be called Web 1.0, online map services were adopted as a way for governments to supply maps on demand for many topics—planning, school district locations, legislative districts, and trash service areas. A single server broadcast map services to many clients.

On the Web, GIS became a tool for collaboration, communication, and service that streamlined interactions between the government and its citizens, businesses, and other government agencies. From a business operations standpoint, Web GIS frees staff from repeatedly answering the same questions about where a polling place is located or which day trash is picked up and allows them to work on other tasks while shortening the time needed to accomplish processes. From a customer service standpoint, Web GIS provides specific information; is available 24 hours a day, seven days a week; and does not require a visit to a government office.

The Impact of Web 2.0 on GIS

The Web has been evolving from a static, published media to the dynamic, database-driven, collaborative environment now referred to as Web 2.0. Applications for Web 2.0 recognize that value is added by users. The Web functions powerfully because it is both decentralized and collaborative.

In the Web 2.0 environment, there are many new ways to use GIS that empower users and take advantage of the collective intelligence of the Web—collaborative computing, integration of user-contributed content, mashups, and shared distributed data management—to name a few.

Distributed global GIS has been dubbed the GeoWeb by ESRI president Jack Dangermond and described as "a large, widespread, distributed collaboration of knowledge and discovery that promotes and sustains worldwide sharing and interoperability." Instead of providing wide access to a single source of data, the GeoWeb is bringing together vast stores of authoritative, transactional data, much of it maintained by government, and the geospatial services that can be used with it to create new information.

Focused server-side applications supplies the benefits of geospatial tools, data, and processes to end users who may be unaware they are using GIS. In this new development environment, Web developers can incorporate GIS functionality in Web applications. ArcGIS Server supplies a strong development environment that includes .NET and Java APIs and hosted mapping APIs for JavaScript, Adobe Flex, and Microsoft Silverlight. This has greatly increased the number of Web applications that use GIS and made the collaboration tools in GIS available to a much larger audience. Many kinds of clients—smart clients, Web clients, and mobile clients—can consume the data, information, and visualizations produced.

The Geoservices Explosion

Widespread development of geoservices would leverage government's huge investments in data and connect government to citizen and government to government. The result would be a geospatial framework for Gov 2.0. In characterizing the effect of geoservices, Dangermond said, "Exposing these services will bring about as much change as

PLTS for ArcGIS-Foundation: Meeting the needs of GIS organizations

Production Line Tool Set (PLTS) for ArcGIS – Foundation, an extension to ArcGIS Desktop, enables efficient, cost-effective cartographic and geospatial data production with tools that automate production, improve data quality, and manage GIS workflows. Included in PLTS for ArcGIS – Foundation are tools to manage enterprise workflows, enable smart editing and attribution, perform spatial data review, and publish professional cartographic products. Foundation also supports the implementation of your organization's unique data and map specifications for on-the-fly validation, further improving productivity and quality. Foundation enhances the end-to-end production workflows at a variety of organizations including mapping agencies, local governments, utilities, engineering firms, GIS services companies, transportation agencies, and many more.

With PLTS for ArcGIS – Foundation, you can:

- Enhance user productivity by standardizing feature collection and validation, cartography, workflows, and data management.
- Facilitate a streamlined workflow process by simplifying many aspects of job management and tracking.
- Ensure data integrity by creating and maintaining geospatial data using smart editing and intelligent attribution tools.
- Streamline database development with single-click editing tools, and on-the-fly feature attribution and validation.
- Implement an efficient and consistent review process by automating spatial data quality control tasks.
- Significantly reduce map production time while maintaining high-quality via automated map book, atlas, and grid creation.

Some of the key features and tools included in PLTS for ArcGIS – Foundation include:

- Powerful data editing tools - The PLTS editing interface is designed to maximize usability and utility for a data production environment. This editing environment consists of a variety of single-click editing tools to enhance productivity and data quality. Features are validated as they are created or edited to ensure data integrity.

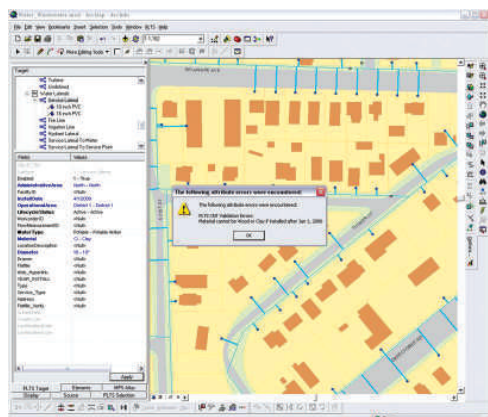


Figure 1 - Efficient feature attribution using PLTS on-the-fly validation

- Load data in batch mode - The data load automation tools assist with loading data into a geodatabase. It uses a

cross-reference database to direct how the source data is loaded into the data schema for your current project and provides a repeatable way to bulk load data into your personal or enterprise geodatabase.

- Complete set of QC/QA tools – GIS Data ReViewer, the quality control component within PLTS for ArcGIS – Foundation, simplifies automated and visual review processes by providing tools to assess, document, correct, and verify the overall quality of spatial data. Data checks can be run individually or as a group in a batch job. Errors are collected and managed in a central table that stores the error properties and correction status of the features. Checks can be scheduled to run at set intervals - eliminates the need to manually run the batch job - to further free up resources and reduce the time needed to obtain high quality data.

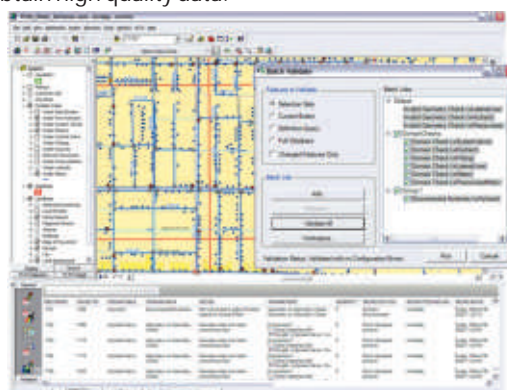


Figure 2 - Tools to assess, document, correct, and verify the overall quality of your data

- High-volume digital and hard-copy map production – Map Production System-Atlas, the cartographic component within PLTS for ArcGIS – Foundation, is a powerful tool for batch creation of cartographic products. It provides the ability to create a map series or atlas where pages share a common layout and symbology, or thematic maps where each map sheet has unique properties. Elements such as text, tables, and legends can be dynamically updated and placed based on the data in the map. Visual specification rules encapsulate cartographic specifications and allow users to apply representations consistently across databases. The application also provides capabilities for batch printing and exporting maps inside of ArcMap, with Python scripts, or through the command line.

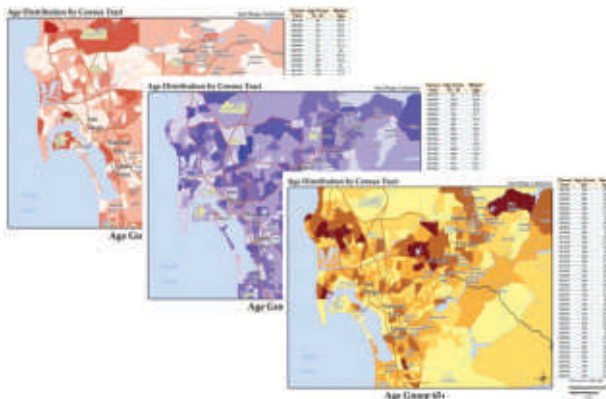


Figure 3 - Batch print and export map sheets in a map series

- Workflow management – Job Tracking Extension to ArcGIS, the workflow management component within PLTS for ArcGIS – Foundation, simplifies many aspects of job management and tracking and streamlines the workflow, resulting in significant time savings for any implementation. It provides tools for allocating resources and tracking the status and progress of jobs. A detailed history of job actions is automatically recorded for each job to give managers a detailed account of how the job was completed. Complex geodatabase tasks are handled behind the scenes by assisting the user in the creation and management of versions. A comprehensive transaction management infrastructure is provided to support historical tracking of feature edits.

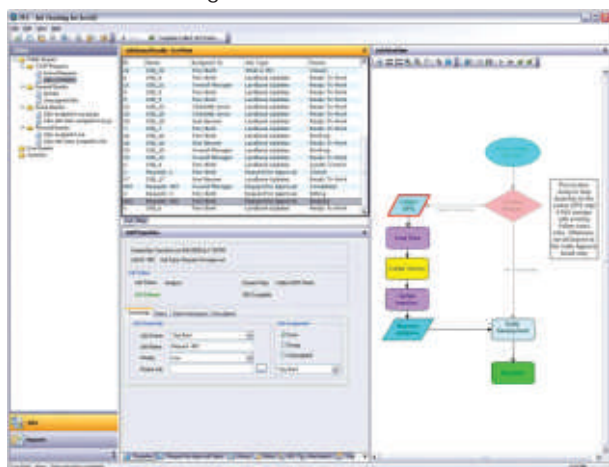


Figure 4 - Create jobs and execute workflows with the JTX application for the desktop

- Micro-level workflow management - The Task Assistant Manager can be configured to streamline the production process even further. Task Assistant Manager allows you to configure and distribute workflows that guide users through defined processes within ArcMap. Task Assistant Manager workflows can execute ArcMap commands or geoprocessing tools and set layer properties such as visibility and snapping. Using these workflows can reduce the number of button clicks and help users execute common processes consistently.
- Manage data and map information – The Product Library allows you to manage collections of digital data and maps for the variety of products your organization produces. Product library can be used to manage changes to documents by having users check out files and check in the changes. When configured in an SDE environment, users can be granted permissions to access specific parts of the product library and perform various actions.
- Customize the Solution to Meet Your Needs – PLTS for ArcGIS –Foundation provides a flexible environment to allow for the custom implementation of your organizations specifications and business logic. Users can customize data validation rules, feature symbology, data representations, and batch jobs.

For more information, visit www.esri.com/plts

Compiled by

Shree Rajagopalan

ESRI PLTS Team

(Continued from page 12)

„GIS itself has brought.“ Existing services could be combined into new services. This would remove impediments between organizations currently using geospatial data and allow them to work in a loosely coupled environment that favors collaborating and encourages synergies.

The Foundation Exists

ESRI has been evolving ArcGIS as a complete platform for geoenabling organizations. ArcGIS Desktop provides tools for authoring maps, managing data, building analytic models, and generating metadata. ArcGIS Server publishes that data to a variety of clients, from Web browsers and mobile devices to desktop GIS applications. This has enabled hundreds of government organizations to make data available to businesses, other government agencies, and individuals.

With the creation of ArcGIS Online, ESRI moved from being primarily a software company to a software-plus-services company. Each copy of ArcGIS includes free access to millions of dollars of content services—basemaps, imagery, demographic data, and other resources—that are immediately available from ArcGIS Online. Additional premium content is available from partners such as Microsoft, DigitalGlobe, and GeoEye on a subscription basis.

ArcGIS Explorer is a GIS visualization tool for intuitively exploring, sharing, and presenting geographic information. It can combine locally created data with the continually updated basemaps and layers, shared maps, and tools from ArcGIS Online.

Toward a Societal GIS

As governments have been demonstrating for 40 years, applying geography improves the decision-making processes by addressing problems and evaluating proposed solutions in a holistic, comprehensive, systematic, analytic, and visual manner. With GIS, the analysis of problems can have greater depth, as many layers of data relating to the physical and cultural world can be considered together. GIS is a platform for optimizing systems, whether the system is a utility network, transportation system, or government.

While the use of GIS by the government, e-Government, GIS applications on the Web, and Web 2.0 are not new, the urgent need to find new ways to deal with old problems combined with increasing geospatial awareness and the desire on the part of government to pursue new technology are new.

The ArcGIS platform—combined not only with the government's authoritative data but also its high-quality maps, visualizations, spatial analysis, models, and other rich applications made available as geoservices—would lead to the creation of government-to-citizen, government-to-business, government-to-education, and government-to-government applications that would integrate all levels of government and support open access, collaboration, and transparency.

Source : ArcUser Online (<http://www.esri.com/news/arcuser/1009/geoweb20.html>)

In Conversation.....

Dr. Shailesh Nayak, Secretary, Ministry of Earth Sciences, Government of India.



Policy-makers are key for any technology to get utilized effectively and all the more so when GIS technology has tremendous potential to reach out in various aspects of governance. The Ministry of Earth Sciences has been a pioneering user of GIS technology and has applied GIS in key areas of Tsunami Monitoring, Ocean State Forecasting, weather predictions, climate modeling and many other areas of Earth System Sciences. In Conversation Dr Shailesh Nayak, Secretary, Ministry of Earth Sciences had a detailed conversation with Dr Mukund Rao, President/COO of ESRI India and gave his perspective of GIS in Earth Science and articulated on the potential applications of GIS for India and the technology needs of coming days – especially as he visualizes the needs of Earth Sciences and information delivery for a service-oriented approach for his Ministry.

Q. What is your perspective of GIS in the field of Earth Sciences and what are the initiatives you are taking in this direction?

The Ministry of Earth Sciences has initiated various programmes where GIS will be used extensively. Basically what we have established is a large system of measurements and observation of the atmosphere, ocean and the land – a series of temporal measurements from in-situ as well as satellite platforms. We collect a large amount of data on the oceans – temperature, sea-state, waves, chlorophyll; atmosphere – winds, temperature, humidity, and so on. We also have now a committed observation and data collection activity for the Antarctica. GIS based techniques play an important role in this data acquisition activity – planning its collection, using modern spatial techniques for geo-tagging and referencing. The next thing we need to do is to organize these data observations into systematic geo-databases – for which we basically use the GIS platform. Next, we use GIS for data processing and data analysis and developing temporal GIS visualisations. Not only the observations, but also the output of the models needs to be archived and visualised. For example, for tsunamis you can't just run the model after the earthquake has occurred, as it takes 90 minutes for getting travel time and run-up height at various locations along the coast. So we have simulations which are pre-run and stored

into database so that it is used with respect to the relevant earthquake. Thus, we also use GIS extensively in simulations and modeling and depend on many of the statistical and spatial models that GIS provides. In my view, for any scientific service to be provided, GIS definitely comes in to picture at every stage – from data acquisition to data processing, creation of databases and to the delivery to the user, whether it is a web based service or a location based. Practically GIS is being used in every field of earth science. Today geospatial technologies have become crucially significant and for any efficient service in this field.

Q. How do you think the 4th dimension of time, which is very critical in atmospheric, oceanic and many other data, can be handled in GIS?

Time is a very crucial factor, but if you look at atmospheric and oceanic information, I would say that fourth dimension is not really taken care of in present day GIS as we don't have the technology and sufficient expertise. But, indirectly, the visualization techniques do take care of the fourth dimension, it will show how features are changing over time but what we need is GIS modeling in 4th dimension. But I feel that 4th dimension of data handling in GIS has a lot to develop.

I also would like to add that actually in the 3rd dimension itself we see a challenge. In coupled models, we need to worry

about the depth of the ocean as well the elevation – 2 different aspects of the 3rd dimension. The changes between these two are so diverse that one has to take the differential of time between them, which is actually the major issue to be taken care of. Thus, an ingenious way of looking at 3rd dimension – above and below and inclusion of 4th dimension of time is the challenge we see ahead.

Q. What are the projects of the Ministry of Earth Sciences which are of key relevance and how GIS can play the role?

There are many projects that the Ministry of Earth Sciences has initiated and will be in focus. One of the important focus-area is in the area of oceanic research where GIS has an important role to play. We all know that sea bed data covers 70% of the Earth's surface. Till now the focus of data collection has been on land masses, but in future the attention will be on ocean, as we are aware more and more energy resources are coming from the deeper oceans that are providing us with gas, petroleum, etc. Hence we need to have more data on seabed to understand the topography and properties of the seabed, for which we have to map the seabed in 3 dimensions like we map the land. This will be definitely a critical when we are looking for resources from the ocean.

The next major focus is on the climate change. To understand the climate variability that works on the global scales, we need to have global framework for climate changes. This will help us to collect data regionally and nationally, so that these data is integrated and run on the various models developed and further it is downscaled to regions so that region specific climate predictions can be done.

Third focus has been the Antarctica where lot of research has been carried out and data has been collected over 25-27 years now and needs good documentation. We now plan to organize this data and GIS has a significant role to play here. There have been many expeditions as well as coordinated programs to Antarctica but till now the data is not available at a single place. Many laboratories have come and taken measurement. The data relevant to oceanography, geophysical properties, changes in thickness of the ice, GPS measurements, etc collected by individual scientists from different organizations.. In Antarctica, nature rules and there is no visible impact of human intervention. Since the man impact is miniscule, we need to integrate and organize the data spatially to understand what happened to the Antarctica in past and what will happen in future.

In the near future our another major focus and initiative will be earthquake research. We are trying to measure the various changes in different precursors like radon gas, ground water, magnetic property or gravity property which are crucial for earthquake prediction. Currently we have all the instruments together at one place for measuring these entire suite of precursors, but in near future we plan to have such system in another five places. At the moment, we don't know which precursor, signal will indicate for the occurrence of an earthquake, when, where, and what magnitude. Hence we need to spatially link these precursors to earthquakes. This area has not much been explored and is crucial where GIS has an important role to play.

We also have worked on the creating information portals such as weather where we have organized the weather data and made it available on the portal for weather forecast, but we are yet to organize the climate portal which will take in place in couple of years.

“I feel that building image processing capability – coupled with the extremely efficient map/tabular data handling in GIS, ESRI's technology will be “complete” and fulfill in one platform the entire spatial data processing capability”

Q. GIS for Global framework for Climate change is an interesting concept - could you elaborate on this in terms of technology associated and impact it can make in managing climate change diplomacy and policies.

There is no such framework defined yet and we decided last September that we need to have a global framework. Now to answer the need of framework we need to answer several questions first that are related to different fields such as Agriculture, water resources, health etc. and you need an expertise in these areas to know what kind of information is required. So there is a global task force of 16 members who are experts in these different fields including climate science and social aspects as well. We are looking at this task force which will be developing a framework. From our side we will be providing inputs that are relevant and important, for example in Agriculture; supposingly we need the monsoon prediction for next twenty five years. Firstly, whether such information is feasible, if it all feasible then what kind of data and information models are needed. It may not be possible to get such perception every year but a decadal projection will be fair enough to plan. These are such major issues which are yet to be sorted out and the basic idea is we need to have a climate service like weather service. Even if we do not worry about climate change, the variability in climate need to be addressed that can be a great help to any government.

Technical capabilities required for developing such climate service and long term modeling needs to be build up. We would require couple of technologies to develop with basic framework and no doubt with geospatial technology we can do it. The models and projections for each field and its impact on them, for example in water resources – if the rainfall is going to be 30% less and will ground water is also become 30 % less, then how the water cycle is going to behave. We need to understand the water cycle, how much rain is going to be spatially distributed, how much ground water is going to flow through the rivers, and how much will percolate. If happens that the most of the rain is going to occur in Rajasthan than in Uttar Pradesh and Bihar then its totally a different issue because the rainfall in Rajasthan is not going to help us if the water resources are required in UP and Bihar. There are several issues with such scenarios but If we are able to do this then this will help me to construct different models to translate reduction or increase rainfall rate for a region. Crops do not use all nutrients available in fertile, some will get washed away in water ways river and ultimately transfer to the ocean. How much will stay back and will get washed way is something which is not known to us. If we can model this that is the quantity of fertilizer, this is the rainfall, drainage and terrain how its going to be distributed at par. To understand this we definitely want to develop models and GIS has a major role to play. GIS based spatial models are required to understand these properties of water, land and natural resources.

Q. The National Tsunami Warning System is a unique system in the world with most modern architecture. You have pioneered GIS in this way

back and it is now operational. Could you just elaborate on this system and its future developments.

The tsunami warning centre has been working very well. It is the system where seismic and sea-level data are continuously monitored in the warning centre, using a custom-built software application that generates alerts in the warning centre whenever a pre-set threshold is crossed. Tsunami warnings are then generated based on pre-set decision support rules and disseminated to the concerned authorities for action. This year there were four incidents where tsunami could have occurred but all the four times fortunately our warning system was dead accurate that tsunami is not going to occur and not affect India, and this information was sent across all the centres of tsunami monitoring within minutes. Though the other tsunami Warning Centres, both PTWC and JMA, had warned that tsunami will occur but later on they had to withdraw. We were able to give this information on time so there was no panic. Over the period of three years now we have build a confidence among the people about tsunami advisories.

In a global scenario definitely our warning system is no less than any other warning system and we are proud about this. In fact, this was one of the 26 thrust areas identified by the Prime Minister during his first term. This project of Tsunami Warning System was well executed within the time frame and budget allotted and no doubt it is one of the best in the world today.

Q. Dr. Nayak you have been associated with various projects at INCOIS, Tsunami Warning System etc, what do you think about ESRI GIS technology in these kinds of projects and how has it helped.

ESRI GIS has been one of the major backbone of the entire system. We had lot of challenges with respect to the kind of performance we required from different software packages whether it was ESRI GIS or others. The challenges like the system performing within minutes and integration of packages for a unified result was taken care which was not done before. The kind of support given by ESRI to INCOIS during its development was extremely good – I must say that commercial considerations have not driven this support but as something to learn and contribute for the nation. The spirit of team-work was fantastic and the relationship even after three years has been strong and result-oriented. I know that even recently there were some major issues of integration of GIS in the total solution and you directed the ESRI team for immediate action – the issue was discussed and resolved very efficiently and this, I think, is phenomenal for tsunami warning system.

I firmly believe the Ministry of Earth Sciences requires such GIS solutions. India does have the capability to render it. We have such capability that we can leverage it to other countries as well; basically the fundamentals of warning system remains the same, whether tsunami or any other hazards.

I feel that the initiative can be taken to take this technology to different countries across the Indian Ocean as well. Basically

“Software is a commodity that constantly evolves – improving efficiency and capability – thus bringing more and more ease-of-use for various applications – which then become tremendous benefit to the society at large”

the test is in integration between domain expertise and the technology, because the technology is available that can be used for monitoring tsunami and other hazards as well. How to use this GIS technology in more beneficial way is important to address. This is only possible when there is a continuous dialogue between the user and technology provider, rather it should be a partnership to address that initiative and I am happy to mention that we share a very good partnership with ESRI in this regard.

Q. What's your view on the initiative taken by India towards NSDI?

NSDI as a concept is extremely good for development of any nation. But I personally feel that implement of this NSDI is much delayed in India, it should have been implemented about a decade back. I feel this delay had been due to much emphasis in sharing the data and putting on to centralized database. But today we need not worry on this issue - we need to worry more on distributed database and now that computing and communication systems are extremely good, this can be easily done. Probably we need to change our thinking and provide a infrastructure to implement the NSDI as a virtual system rather than as a physical system. Rather than trying to centralize everything, we should give the opportunity to all the individuals who are creating the data to share with all the users through a single “virtual” window. Thus, I feel that we need to change the concept and have a fast implementation of NSDI in India. The government is working towards the sharing of spatial information and to handle the data through NSDI team at DST and I am sure that they will be working on this.

Q. Do you want to give any suggestion to ESRI – from a technology perspective for the future. Maybe this can be good suggestions for newer capability in future versions of ESRI software.

I am not a technology expert but I am not sure that we have fully addressed the issue of Image database and processing in ESRI. I feel that building image processing capability – coupled with the extremely efficient map/tabular data handling in GIS, ESRI's technology will be “complete” and fulfill in one platform the entire spatial data processing capability. As you are aware we get lot of images from different satellite resource – much of it images of oceans every year which is about 10-12 terra bytes. How we can create a system by which irrespective of satellite data from different sources and formats and irrespective of types of information, one can get the analyzed information of a particular area such as – ocean color, salinity, temperature etc in a single shot. It is like an intelligent image analysis feature extraction from different sources of data. I wish if ESRI technology could have such capabilities with its product would be highly beneficial.

(Dr Mukund Rao then explained the ArcImageServer in ArcGIS 9.3 and how it is already being used in the Tsunami Warning System – though as an image server. Dr Rao also explained the philosophy of ESRI to now bring in immense image handling and processing capability in ArcGIS 10 – which is the path for feature extraction and intelligence building to image handling. He also mentioned about the strong coupling of ArcGIS and ENVI image processing that brings tremendous image integration and automatic feature extraction capability. Dr Rao also suggested to Dr Nayak that ESRI India would be willing to bring this image expertise from ArcGIS 9.3 and 10 to demonstrate and build this Intelligent Image Analysis capability for MOES)

I also feel that ESRI could look into the 4th dimension more critically and see how future models can embed time-processing and also integrated 3rd and 4th dimension

Continued on page 19

GIS based Natural Disaster Monitoring Portal

Introduction

Karnataka, an important state of India, has been a pioneering state in setting up a disaster monitoring (established way back in 1988) through its Karnataka State Natural Disaster Monitoring Centre (KSNDMC), an autonomous body under the Department of Science and Technology, Government of Karnataka.

The KSNDMC has the major responsibility to monitor and proactively provide advanced information on natural disasters in the state of Karnataka. The Centre integrates the data collected by in-situ measurements, imaging and secondary data from various state and central Government agencies - Meteorology, Agriculture, Horticulture, Surface and Ground Water Resources, Dry Land Farming, Water-shed Development, Soil Survey, Surface Water Resources, Command Area Development and many others. The Centre has been in operation from 1988 and has large volumes of historical records and data, which when integrated with current data, serves as a major dataset for developing empirical and mathematical models for prognostic and diagnostic characterization of natural hazards.

KSNDMC primarily collects and analyzes data of various indicators of drought, such as rainfall, land use pattern, agricultural condition, groundwater and surface water details, reservoir water levels, socio-economic details etc. Reports on rainfall and agricultural status, crop conditions and reservoir levels are prepared on daily, weekly, monthly, seasonal and annual basis and sent to various developmental departments and user agencies. Further core activities of KSNDMC involve.

- Maintaining, updating data base on drought indicators.
- Preparation and issuance of periodical reports on drought in the State.
- Integrated studies on Drought Management in the Drought prone districts of Karnataka.

KSNDMC generates data from its own monitoring systems and also receives data from various sources like IMD, DES, and AWS etc on day to day basis. The datasets are sometimes on hardcopy sheets, or in digital formats. These datasets are processed at KSNDMC for day to day reports and bulletins

KSNDMC provides Decision Support information on disasters to various government agencies and community agencies in the form of graphs, maps and tabulated data. Keeping the vision of sharing information and decision support, the KSNDMC decided to establish a Disaster Portal – by taking up a major initiative of converting all their data holdings into a real-time geodatabase and analysis systems. With their powerful empirical models, KSNDMC envisaged the Portal to be a GIS service that will provide real-time estimates of drought, rainfall, crop status, earthquake monitors and many other parameters. The Portal is a sophisticated project that embeds the geodatabase on a powerful map and imaging server software to be able to model and estimate the disaster and provide alerts thru web, SMS and also in conventional maps/reports.

The key Users of the KSNDMC GIS portal includes -

- Citizens
- KSNDMC Scientific Officers
- KSNDMC GIS Staff
- Decision Makers such as the District Collectors, Tahsildars, Divisional Officers, etc.
- Other Government organizations such as IMD, ISRO, WRDO, CGWB with which KSNDMC is associated

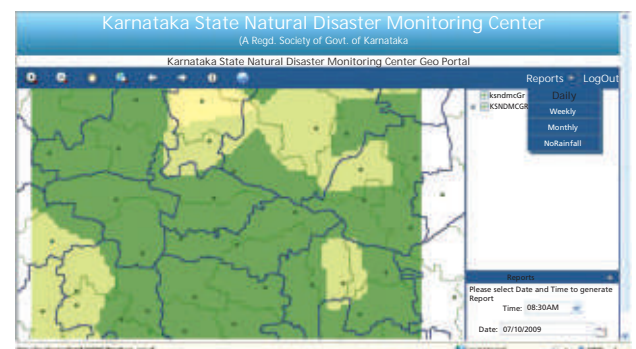
Technology Adoption

The KSNDMC adopts the ArcGIS Server technology to power their GIS portal for Disaster Monitoring. As the real-time collection, modeling and dissemination of disaster related information is of utmost importance, KSNDMC has established Web-GIS based Disaster Monitoring portal. The architecture is server-based and has laid the foundation for hosting and serving images and data information. ESRI's globally utilized and accepted ARCGIS Technology was chosen to be at the core of this GIS portal.

The ArcGIS Server technology used to establish a customized geodatabase ingest method using historical and real-time networks of automatic weather station data, earthquake seismograph stations data and a host of other base data of disaster. Customised ArcGIS modeling tools will integrate and “crunch” all the data to be able make empirical estimates using the already available KSNDMC models for drought and floods etc. ArcGIS Server technology is most suited for this as it is able to “mash-up” real-time data, images and integrate the models as an “application service” and serve the application (with data) on demand to a variety of platforms – web, hand-helds and also in paper maps

KSNDMC intends to automate the process of data analysis and reporting and hence is looking into aspects of centralization of database and datasets received from above sources and further to automate data base management, data analysis, map generation and early warning.

Automation and centralization of database, mapping and reporting activity is an inevitable process considering the existing volumes of data and future growth. Here the proposed automation shall be continuously monitored and authorized by the administrator on a regular basis to overcome overheads arising on account of technical and data related errors.



Advantages of GIS System

Traditionally the complete process of data collection, collation, analysis and reporting has been primarily manual with limited amount of automation incorporated in certain parts of the process flow. This manual system is cumbersome, slow and causes a lot of redundancy in database management.

In contrast, IT based automated system reduces redundancy and increases efficient management of resources. It also enhances the effectiveness of the decisions through better analysis and visualization of data. Better data management also helps in quick search and retrieve saving huge time and cost and eventually improving efficiency.

The Key advantages of a GeoPortal for DMS are:

1. Effective data management: Data is catalogued, indexed and metadata generated aiding is fast and easy search and

retrieval of data

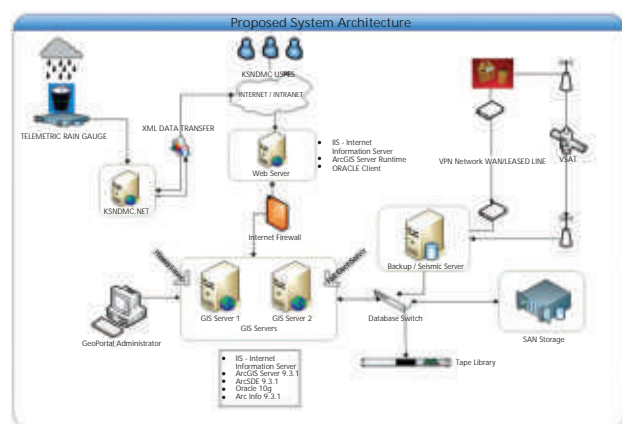
2. Automation of workflows: Minimal human intervention
3. Automated data processing, analysis and result display
4. Wide range of tools for spatial analysis
5. High data visualization quality: map based display, thematic maps and excellent cartographic outputs.
6. Faster data processing and output generation

Application Architecture

KSNDMC solution is a combination of desktop based system as well as web based system.

Desktop based system

1. Rain fall data is being capture and the exported to the database
2. Automated Report Generation
3. Data entry Module
4. Metadata management
5. Disaster Alert Management
6. Computation



Web based System

1. Map navigation
2. Query/Search
3. Print

Road Ahead

Disaster Monitoring requires real-time spatial data and integrated non-spatial attributes and powerful tools of spatialisation for modeling. KSNDMC has established simple and empirical models but this needs the power of a good database to be able to be predictive and cut down time of manually analyzing and dissemination of paper maps. Further, the technology has been able to incorporate real-time measurements from a variety of instruments and observations

This unique and first-of-its kind GIS Application project using ESRI software technology gives a new hope to GIS users in the world that GIS has a major role to play in Disaster Monitoring and dissemination. NIIT GIS envisaged that this unique GIS application would serve as major reference within all the government agencies especially those who deal with dissemination and use imagery and related data information in the field of disaster management. Thus with a vision to strengthen its overall capabilities and keeping sustainability in mind in near future KSNDMC proposes for this automation and centralization initiative.

As per the KSNDMC Action Plan, encapsulating real-time data, maps and images acquired, and provided by various organizations in KSNDMC Web-GIS is the need of the hour and the emphasis has to be on information transparency and sharing, with the recognition that spatial information is a critical resource.

Authored By

NIIT GIS Applications Team

(Continued from page 17)

processing. I am sure the larger Earth Science community would find it very interesting and useful.

Q. What is your perspective on India's position for UN convention on the Law of the sea (UNCLOS) towards extending the seaward boundaries?

We have already been a part of this convention and already surveyed about 31000 line km of gravity, magnetic, seismic and bathymetric data, and organized in GIS. The various output is made available in GIS formats and the first phase is already been submitted to UN. This data collection, mapping and processing of the huge data efficiently would not have been possible without GIS and its proper organisation into a complete database. This data has been kept restricted until claim is finalized and is available for limited research use.

Q. What's your view on Open Source GIS Software – many a times we hear of some government agencies that campaign for Open Source software and operating systems?

I think the concept of open source is quite good, more so in research arena and non-critical applications, but there is a practical issue. In all our project requirements, we need immense support and upgradation of software – we cannot have a system built on static modules and models. Software is

a commodity that constantly evolves – improving efficiency and capability – thus bringing more and more ease-of-use for various application – which then become tremendous benefit to the society at large. When somebody is using open source software for operational applications and encounters difficulty – either in using or some extra special needs to be met then where should he go and get help and support - that structure is not clear and hazy in open source usage. As a result, project applications are impacted and run into problems. In all our usage, we have seen that software needs regular support, updation and maintenance and unless we can resolve these issues on a constant day-to-day basis the application becomes difficult.

At the same time, I also look at a different angle that any application or hardware should not be driven by a particular software or hardware. If I want to develop an application, I must have a choice of architecting the solution on any available hardware or software combination. So, for me the issue is more of interoperability between software and hardware systems, and having the flexibility of architecting the application to my needs and also more of constant support and upgradation of technology. In my perspective, I feel that these are being efficiently met by technology and thus I have no problem in using COTS software or hardware.

GIS Applications in Statistical System and Micro Level Planning Strengthening for the State of Uttar Pradesh



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Introduction

India has undertaken measures towards globalization, liberalization and decentralization at micro level, to achieve vibrant economy, growth and development. The benefits of technology revolution need to permeate at micro level, which calls for a Bottom-Up approach. The on-going decentralization process initiated by the 73rd and 74th Amendments of the Indian Constitution which gives greater responsibilities and powers to the local bodies as a third tier of governance offers a new era of opportunity for local planning, effective implementation and monitoring of various social and economic development programmes. The National Statistical System should assist the various developmental agencies in this challenging endeavour. Sustainable development of any region can only be the result of successful implementation and integration of spatial and non-spatial data into the GIS domain, with proper micro level planning (MLP). It would provide a clear picture of any attribute, as it would help the planners associate various parameters together to gauge the effects of any plan and to effectively monitor the utilization of funds. It would also help in sensitizing the people and the community about the problems and their solutions. Another major challenge would be to counter the forces of the vested interest groups, corrupt politicians and bureaucracy, who would lose their power when this MLP gets operationalized. In order to bring a radical change, we have to initiate MLP on a large scale, so as to influence the government. We also need to involve local bodies, NGOs, etc. so that the importance and relevance of the process could be realized and reflected in different sectors. We have to bring an attitudinal change among these key players.

GIS has brought a paradigm shift in the approach for management of spatial and non-spatial information for planning purposes. It has emerged as a powerful integrating technology for e-governance cutting across many disciplines. The technology and application services have major stake and impact on content industry sector and location-specific services. This applies not merely to issue of dissemination of various information but also to ensuring better and more transparent and responsive governance by making available the information about local endowment in terms of natural resource and infrastructure. India has rich and prestigious organizations representing "Information Generation System for Spatial Data", using various surveys & mapping techniques. These techniques cover conventional ground surveys, aerial photography and satellite remote sensing. Out of the various spatial data information generation agencies, SOI provides topographic maps, which are used as base map to overlay any thematic information from ground survey as well as from satellite data interpretation, around geo-referenced system.

GOI is all set to empower citizens with the technology-driven applications, tools, and services through National e-Governance Plan (NeGP) at the micro level. A State Wide Area Networks (SWAN), State Data Centres (SDC) and Common Services Centres (CSC) are being established under NeGP programme. All the districts, tehsils and blocks of Uttar Pradesh are being connected through the SWAN, SDC is under establishment which will cater the services to all government departments and CSC scheme is being implemented through a Public Private Partnership (PPP) model to provide ICT infrastructure in rural areas at par to urban regions. CSCs are envisioned as the front-end delivery points for government, private, and social sector services to rural citizens. In this context, the missing link is "Process of Integration of Information Generation Systems of Spatial as well as Non-Spatial

Data as per the comprehensive needs of Planning". This process of integration demands identification of data gaps, as per the needs of data for planning for different user agencies and then filling it through process of integration using state of the art GIS, through multi-disciplinary and multi-institutional approach, covering entire gamut of planning process. In this respect, NIC, an ICT application and service organization has a key role in providing integrated spatial and non-spatial data services, facilitating grass-root delivery of GIS – Based Decision Support System for planning at micro levels. This demands use of interoperable data standards and specifications for content, accuracy, quality and exchange for planning purpose using Open GIS specifications around National Spatial Data Infrastructure Framework. ESRI Technology has been successfully deployed to generate various spatial datasets at different levels.

Development of Spatial and Non-spatial Databases

A decentralized statistical system already exists in India. Data flows from grassroots level to block level and tehsil level and from there to district and state/national levels and vice-versa. GIS provides a powerful means for mapping and analyzing many types of information which is obtained from conventional sources, such as census data, socio-economic information, questionnaire surveys and government records. Directorate of Economics & Statistics (DES) has exclusive responsibility for producing and disseminating official statistics in Uttar Pradesh. Actions must be taken to improve, to profit and to minimize the negative aspects, notably by reducing costs and duplication of efforts.

Spatial Databases

The process of development of spatial databases has begun in the country and it may further improve with the use of latest technology. NIC has set-up a spatial data infrastructure at central & state levels and developed a "National Spatial Database" on the initiative of PC. Administrative boundaries, locations of state capital/district-hqrs/sub-district-hqrs, major towns, villages/habitations, transportation and landuse/ land cover databases, water bodies, forest, soil, wasteland, drainage, watershed, geology & geomorphology layers and raster data are available with NIC.

Non-spatial Databases

There is a Village proforma (VP) having information of all the 97942 inhabited villages, updated annually and are maintained in all the 820 blocks of the state. District and divisional Sankhyikiya Patrika (SP) having information on more than 3500 parameters of village, block, district and divisional levels in the form of more than 100 tables, are updated and published annually since the year 1976. It covers major sectors like Agriculture and Allied Activities, Industry, Social Sector, Power, Transport and Communication, Banking, Urban Facilities, Rural Infrastructural Facilities etc. There are 15 sections in VP covering information on Introductory details of Village, Population Census, Livestock Census, Agricultural Census, Educational Facilities, Medical & Health Facilities, Drinking Water Facilities, Transport, Communication & Miscellaneous Establishment Facilities, Marketing, Stores & Loan Facilities, Other Facilities, Availability of Establishment Facilities in Different Habitations of the Village, Different Economic Information, Household Industry, Agricultural Statistics and Total & Irrigated Area Under Main Crops. Village Level Basic Amenities (VLBA) data on 41 indicators i.e. Block Headquarter, Village Development Officer Centre, Fare

Price Shop, Source of Drinking Water, Agriculture Service Centre, Rural Bazar/Hat, Agricultural Mandi, Cold Storage, Seed Sales Centre, Fertilizer Sales Centre, Insecticide Sales Centre, Veterinary Hospital/Animal Husbandry Centre, D-Category Animal Dispensary, Animal Service Centre, Artificial Breeding Centre/Sub Centre, Co-Operative Milk Collection Centre, Primary Agricultural Loan Cooperative Society, Sales/Purchase Cooperative Societies, Government/Cooperative Purchase Centre, Primary School (Combined), Senior Basic School (Boys), Senior Basic School (Girls), Higher Secondary School (Boys), Higher Secondary School (Girls), Non-Conventional Education Centre, Allopathic Hospital/Dispensary/ Community Health Centre/ Primary Health Centre, Ayurvedic Hospital and Dispensary, Unani Dispensary, Homeopathic Hospital/Dispensary, Family Welfare Centre/Sub Centre, Mother Child Welfare Centre/Sub Centre, Pakka Roads, Post Office, Letter Box, Telegraph Office, Public Telephone/PCO Centre, Railway Station/Halt, Bus Station/Stop, Agricultural Cooperative and Rural Development Bank, Commercial Rural Cooperative Bank and Post Office Saving Bank are available in every Village of Block. Computerization of SP was started in the year 1993. SPs are prepared at four levels (Village, Block, District and Divisional).

A web enabled SPIDER (Sankhyikiya Patrika : Internet based Data Entry & Retrieval) system using ASP as front end and SQL server at the backend has been implemented for data feeding/updation directly from the districts on a centralized server located at the Data Centre in Lucknow in a decentralized manner from the year 2004 and retrieval from the year 2000 on 24 X 7 basis from anywhere. Block and Village Panchayat level SPs have been added in the SPIDER System from the current year. This will enrich the local level databases tremendously.

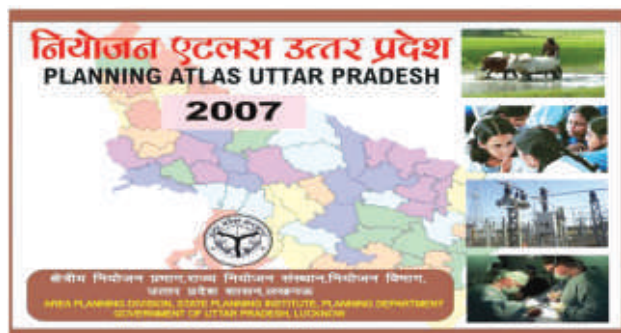
About 2-3 MB data is being generated per year per district and till today about 3 GB data is available in digital form for the years 1995-2007 and updation for the year 2008 is in progress. A map based query system giving comparative status of districts and blocks in different years on the various parameters and another query system on VLBA based on 41 parameters along with state level query based on all the parameters are available through the Planning Portal (<http://planning.up.nic.in>). There are many more attribute databases are also available with NIC related to various other sectors.

Thematic Planning Atlases

Inter-regional disparities are persisting as a problem in the development process even after continuous efforts by the government. State Planning Atlas (SPA), District Planning Atlas (DPA) and Block Panchayat Atlas (BPA) have been realized and attempted to generate.

State Atlas

First time in the year 2003 a bilingual SPA (inter district & interstate comparison) using GIS tools was prepared and since then the atlas for the years 2003-06 have been published in the book forms as well as on the web. SPA has 3 sections containing about 100 thematic maps. Two sample maps are given below:



Sample-1



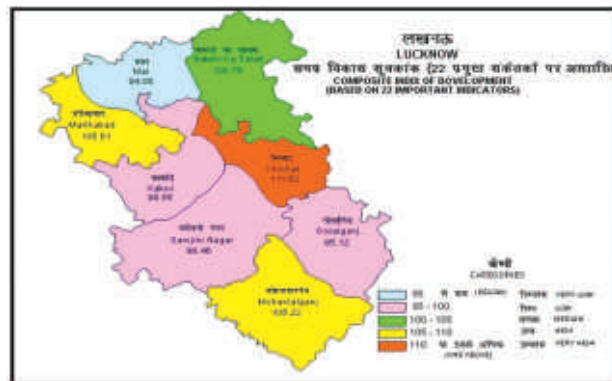
Sample-2

District Atlas

On a pilot basis, Lucknow DPA (inter block & inter district comparison) has been prepared using GIS tools for the year 2006 at the first time in the book form as well as on the web. It consists two sections having about 100 thematic maps. Similar atlases will be replicated in all the 71 districts. Two sample maps are given below:



Sample-1



Sample-2

Block Atlas

In recent years planning process has been switched to the Block and VP levels, hence, it was thought that preparing a BPA will be of immense use for the planning purposes at the grass-root levels. Thematic maps will be prepared using block, village panchayat & village boundaries and non-spatial socio-economic data will be taken from Block & Village Panchayat SPs.

Spatial Data Infrastructure

In recent years, GIS has gained a momentum in India and various GIS programmes have been initiated in Public, Private, Universities and Research Organizations. Therefore technical knowledge and knowhow about GIS is steadily improving. Success will also require a government initiative in data management and in the integration of data flows within and between agencies. Many agencies use remote sensing data to provide various levels of input to the GIS database. PC has launched a Central Sector Scheme on Spatial Data Infrastructure (SDI) for Multi-Layer GIS for planning to facilitate the work on national GIS with emphasis on minimum multi-layer GIS

implementation at district level. Under this scheme National GIS Facility has been established at NIC-HQ. with its Mirror Facility at PC, Gol and other Nodes spread across the country. A hierarchical spatial database & application services over supporting SDI at district, state & national level for all G2G domain applications has been established. A State GIS server has been set-up at Lucknow under this scheme. For strengthening MLP in U.P., Rs. 5 crore has been released in the current year for establishing GIS infrastructure & applications at the state and district levels by GoUP. Following activities have been envisaged:

- Creation of GIS infrastructure at the state and district levels.
- Creation/updation of digital base maps of state, district, block, village panchayat/village.
- Development of Thematic Planning Maps at state, district, block and panchayat levels.
- MIS for facility planning and monitoring the functional status of various VLBA.
- Development of State Spatial Database (SSDB) for its access in G2G domain.
- Simultaneous access of spatial & non-spatial databases available through NIC, RSAC etc. for decision-makers & planners.
- Development of State GIS Portal.
- Human Resource development for executing GIS activities.

GIS infrastructure at the state and district levels:

There is a plan to set-up a mirror GIS server in DES. This server will have linkages with the district GIS units. DES will have GIS server with clients, color laser printer, A0 color scanner, plotter, UPS, Windows Server, ArcInfo 9.x, Arc GIS Publisher, Image Web Server and districts will have one client with color laser printer, UPS and Arcview 9.x as well as open Source GIS tools.

Creation/updation of digital base maps at micro level :

The digitized boundaries of state, districts, blocks and villages already available with NIC and RSAC-UP will be used to create micro level maps. The village boundaries are un-verified with the ground reality. These available boundaries have been prepared some time back which needs to be updated. After correction of the village boundaries, village panchayat, block, district and state boundaries will be developed. Spatial data has been developed through adoption of uniform codification and non spatial data from RGI for census 2001 linked with various layers up to the village level.

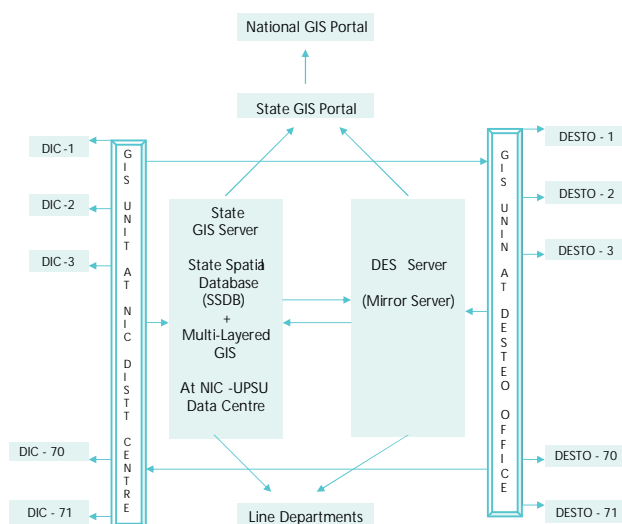


Figure-4.1 GIS Infrastructure Frame Work Diagram

GIS Applications at Micro Level:

Creation of Geo-databases:

Geo-databases of 41 VLBA facilities available in the villages, will be developed. These geo-databases will be used for developing GIS based MIS for Facility Management and generating web based thematic maps at the micro levels. GPS survey will be required for getting location specific VLBA data.

Development of State Spatial Database.

Successful planning of developmental activities at the grass-root level depends on the quality and quantity of data emerging for both natural and socio-economic resources. The principal problem is of data-sharing. Various departments of the government generate different sets of data, which may be repetitive in nature. A State Spatial Database (SSDB) built with the help of the GIS will help to overcome this type of problem and also cut-off considerable economic pressures generated during data compilation and re-compilation. Compiling is suggested so that repetition of the work does not happen and SSDB can be used as a library of spatial information. The SSDB would be like a repository of all data generated along with all ancillary data to get a complete and unbiased picture of the problem. The role and potential of SSDB would be immense in nature. It would be instrumental in the handling, storage and retrieval of data and in turn help analyze different types of scenario with multitude of information generated. Data available in the SSDB would also help in developing predictive models.

GIS based MIS :

- MIS for Facility Management - A MIS based on VLBA geodatabase will be developed for identifying the gaps of basic amenities and to identify the locations where facilities are necessary to be provided.
- Web-based Multi-Layered GIS system - Web-based Multi-Layered GIS based on SSDB will be developed which will be helpful in decision making process.

State GIS Portal

State GIS Portal will be developed for disseminating GIS products and outcomes. SPA, DPA, BPA etc. will be published on this portal. This portal will have linkage with National GIS Portal as well as other GIS websites/portals.

Conclusion

Sustainable development of any region can only be the result of successful implementation and integration of spatial and non-spatial data into the GIS domain, with proper planning at the micro-level. The gross-root level thematic maps would provide a clear picture of any attribute, as it would help the planners associate various parameters together to gauge the effects of any plan and to effectively monitor the utilization of funds. It would be a refreshing approach for individuals and the village community, who till now are totally dependent on government agencies for all kinds of information.

GOI is all set to empower citizens with the technology-driven applications, tools, and services through NeGP at the grass root levels. A SWAN, SDC and CSCs are being established under NeGP programme in all the States/UTs. All the districts, tehsils and blocks of the state are being connected through SWAN, SDC is under establishment which will cater the services to all government departments and CSC scheme is being implemented through a PPP model to provide ICT infrastructure in rural areas at par to the urban regions. CSCs are envisioned as the front-end delivery points for government, private, and social sector services to rural citizens. The policy framework provided by IT Task Force for India to emerge as Global Info tech Superpower in this millennium emphasizes the availability of spatial data to GIS user community and industry and provide a direction for the liberalization to this vital sector. With the evolution of this framework, it is now possible to have Local Level Databases and Spatial Decision-Support Information Systems Network, with distributed Network-Centric Web-Enabled GIS Application Services using NICNET facilities.

Acknowledgement:

We are thankful to Dr. B.K. Gairola, Director General, NIC, Dr. Vandana Sharma, Deputy Director General and Head, Remote Sensing & GIS Division, NIC and Shri S.B. Singh, State Informatics Officer, NIC Uttar Pradesh for their constant support and encouragement.

Tips & Tricks – Advanced Editing Tips

This article supplies ArcMap editing tips and tricks that will make users more productive by helping them take advantage of additional functionality and enhanced workflow features that speed common tasks. It will cover the use of the Sketch tool, Sketch tool constraints, and the Midpoint tool. The material is presented as a series of challenges and solutions.

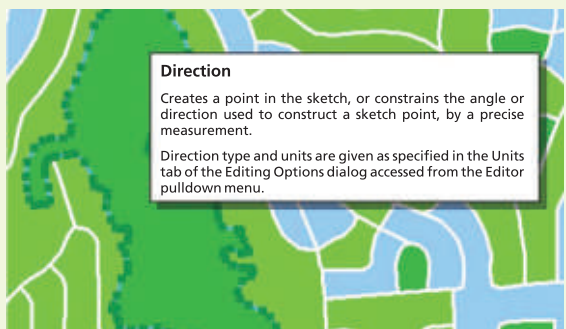
Challenge 1—Getting Help in Context

Scenario: You need specific help about a tool, button, menu command, or dialog box in ArcMap but don't want to invoke the help system.

Solution: Positioning a mouse pointer over a button or menu command causes the name of the item to pop up in a small box. A brief description of the item also appears in the status bar at the bottom of the application window. Access additional help about any command, button, or control in the application by clicking on the item in question with the What's This? tool. For context help, press Shift + F1.



Click on a menu choice or button with the What's This? tool to get context-sensitive help



For help in a context menu, highlight the command and press Shift + F1.

Challenge 2—How Do You Edit in Projected Space?

Scenario: You've collected data from a variety of sources, and not all these layers are in the same coordinate system information. While reprojecting the data into a common coordinate system before editing is a solution, it may not always be practical.

Solution: In ArcMap, the properties of a Data Frame define the context for the data. These properties include measurement units; scale; and, most important for this scenario, the coordinate system. Layers are automatically transformed to the coordinate system set for the Data Frame. Consequently, the shapes and attributes of a layer can be edited regardless of the coordinate system that layer is stored in.

After making and saving edits, the edits will be committed back to the source feature class in its original

coordinate system. Issues to consider when editing features in a projection different from the source:

- Changing the shapes of features
- Snapping to the edge or boundary of features
- Extending or trimming features
- Editing curves in projected space can, in some cases, change the shape of the curve.

Challenge 3—Sketch Constraints

To create a new feature in ArcMap, you create an edit sketch using the sketch construction tools. A sketch is a shape that is used to complete the current edit task. It is composed of vertices (i.e., the points where the sketch changes direction) and segments (i.e., the lines that connect the vertices).

Create a point feature by clicking once on the map with the Sketch tool. Use the Sketch tool to digitize the vertices that make up the line or polygon feature. To create the last vertex of a line or polygon and finish the sketch, double click the mouse. ArcMap will add the final segment of the sketch, and the sketch will turn into a feature.

The Sketch context menu can be accessed while working with the sketch by right-clicking on the sketch. In addition to adding, moving, and deleting vertices, the commands in this menu can be used to switch the direction of the sketch, reduce the length of the sketch, or display the properties of the sketch shape.

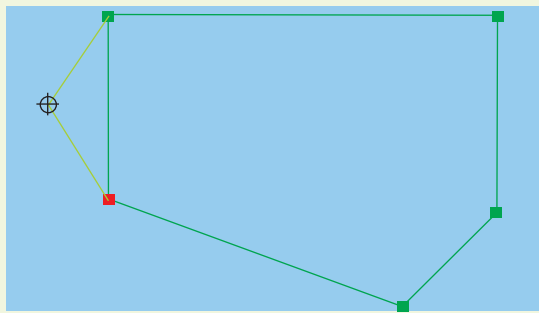
Scenario: New spatial features may have specific construction requirements such as squared corners or a segment with specifically defined directions. Other than using coordinate geometry, how can you construct features that meet these requirements?

Solution: The Sketch tool contains more advanced methods for constructing features—sketch constraints. Sketch constraints are generally employed during sketch construction to limit, restrict, or prescribe how segments of the sketch should be constructed before the last vertex is created and the sketch is finished. Right-click on a segment to invoke the Sketch context menu. The Sketch tools also support many useful shortcut keys that make it simple and quick to apply a specific constraint when needed.

Shortcut key Editing function

Ctrl + A	Angle
Ctrl + F	Deflection
Ctrl + L	Length
Ctrl + D	Delta x,y
Ctrl + G	Direction/Length
Ctrl + P	Parallel
Ctrl + E	Perpendicular
Ctrl + T	Tangent curve
T key	Display the snapping tolerance
F6	Absolute x,y
F7	Segment deflection
F8	Streaming
Ctrl + Delete	Delete sketch
F2	Finish sketch
E	key Toggle between Sketch tool, Edit tool, and Edit Annotation tool

Table of shortcut keys



To create a new feature in ArcMap, you create an edit sketch.

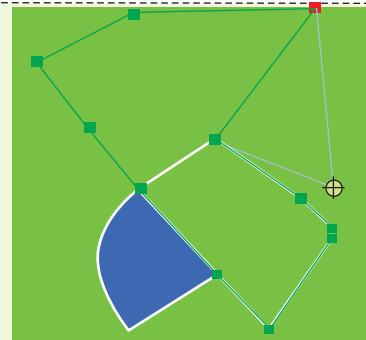
Snap To Feature	
Direction...	
Deflection...	Ctrl+F
Length...	Ctrl+F
Change Length	
Absolute X,Y...	F6
Delta X,Y...	Ctrl+D
Direction/Length...	Ctrl+G
ParallelCtrl+P	
Perpendicular	Ctrl+E
Segment Deflection...	F7
Replace Sketch	
Tangent Curve..	Ctrl+T
StreamingF8	
Delete Sketch	Ctrl+Delete
Finish Sketch	F2
Square and Finish	
Finish Part	

The Sketch tool context menu gives direct access to commands for modifying the sketch.

Challenge 4—Adding New Features Using Existing Features

Scenario: Capturing features representing natural resources, such as soil types, vegetation polygons, lakes, and shorelines, generally doesn't involve the use of sketch constraints. However, creating new features may require the use of existing features as the source for a boundary. For example, a lake boundary forms a segment of the boundary for a vegetation polygon. How can you use the lake boundary to construct the vegetation boundary?

Solution: Creating a new line or polygon feature can be done with the Sketch tool located on the Tool Palette. To use an existing feature from another layer as the basis for the feature currently under construction, add the shape of the source line or polygon feature to the current sketch by right-clicking over the source feature with the Sketch tool and clicking Replace sketch. The current sketch will now contain the shape of the source feature.



You can use an existing feature from another layer as the basis for a new feature by using the Replace Sketch command.

Challenge 5—Squaring a Polygon or Polyline

Scenario: You are capturing building footprints. The angles from the first to the last vertex must be squared so the footprint feature will be squared.

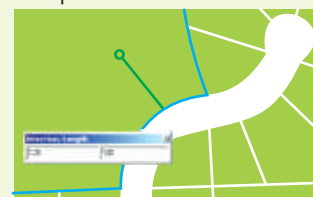
Solution: Use the Sketch tool to digitize at least two segments of the feature. Right-click anywhere on the map and click Square and Finish. The angles from the first vertex and the last vertex are squared. A new vertex is added, and the polygon or polyline is finished where the resulting segments intersect.

Challenge 6—Constraining Sketch Length, Direction, and Curves

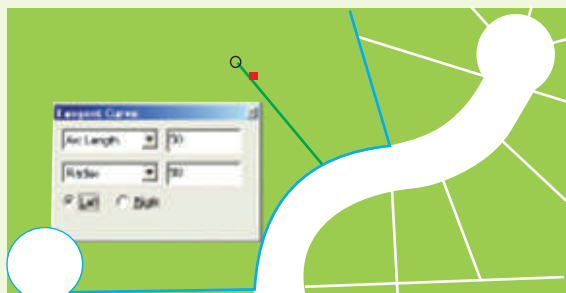
Scenario: You have been tasked with capturing the street casings for a new subdivision. Street casings consist of many straight and curved line segments. Segments are often parallel to each other or perpendicular to existing segments. How best can you incorporate these requirements in the feature creation process.

Solution: To construct straight segments, use the Sketch tool and apply Sketch constraints such as Perpendicular and Parallel to ensure the casements are constructed as required. To construct curves, use the Arc, End Point Arc, or Tangent tools from the Tool Palette or the Tangent Curve sketch constraint. Switch easily between the Sketch tool and the Arc, End Point Arc, or Tangent tool by holding down the keyboard E key to suspend the current tool and choosing the new tool. Use the following tools for specific tasks.

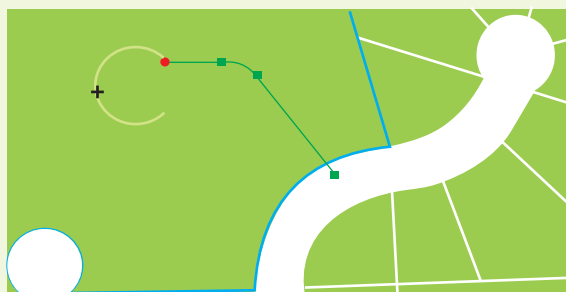
- Use the Arc tool to create a circular arc curve to digitize a cul-de-sac.
- Use the Endpoint Arc tool to place vertices for both ends of the arc and adjust the radius.
- When using the Tangent Curve tool, specify two of the following options: arc length, chord, radius, or delta angle and specify whether the curve will be created to the right or to the left of the line.
- Use the Tangent Curve sketch constraint to add a circular arc curve to an existing segment such as adding a curved segment to extend a centerline along a curved road. Specify two of the following options: arc length, chord, radius, or delta angle and specify the direction of the curve. The curve is created from the last vertex of the existing segment based on the parameters defined.



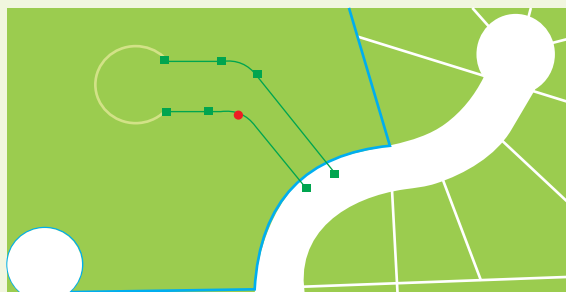
Use the Direction/Length constraint with the Sketch tool to control straight-line segments in a line.



When using the Tangent Curve tool, specify two of the following options: arc length, chord, radius, or delta angle and specify whether the curve will be created to the right or to the left of the line.



Use the Tangent Curve Sketch constraint to add a curve segment to an existing sketch that describes the circular termination of a cul-de-sac.



The Tangent Curve sketch constraint creates the curve from the last vertex of the existing segment based on the parameters defined.

Additional Tips

- To delete a single vertex from a sketch, center the pointer over the vertex until the pointer changes. Right-click and select Delete Vertex.
- To delete the entire sketch of the feature being constructed, position the pointer over any part of the sketch, right-click, and choose Delete Sketch or press Ctrl + Delete.
- To finish a sketch, double-click the last vertex of the feature or press F2.
- Undo the last vertex created by clicking the Undo button on the ArcMap Standard toolbar. Click the button again to undo the second-to-last vertex created, and so on. Click the Redo button to store the vertex.

Challenge 7—Constructing a Segment Parallel or Perpendicular to Another Segment

Scenario: You need to create the lanes for a dual carriage road. These lanes are parallel to an access road.

Solution: The Parallel command on the Sketch tool context menu constrains a segment to be parallel to a specified segment. The Perpendicular command on the Sketch tool context menu constrains a segment to be perpendicular to an existing segment.

To create a segment parallel to another segment:

1. Create at least one vertex with the Sketch tool.
2. Position the pointer over the segment that the new segment will be parallel to and right-click.
3. Choose Parallel from the context menu or press Ctrl + P to make the segment parallel.
4. The segment is now constrained to be parallel to the specified segment.

5. Click once to digitize the endpoint of the segment.

To create a segment perpendicular to another segment:

1. Create at least one vertex with the Sketch tool.
2. Position the pointer over the segment that the new segment will be perpendicular to and right-click.
3. Choose Perpendicular or press Ctrl + E to make the segment perpendicular.
4. The segment is now constrained to be perpendicular to the specified segment.
5. Click once to digitize the endpoint of the segment.

Challenge 8—Creating a Segment Using an Angle or Deflection and a Length

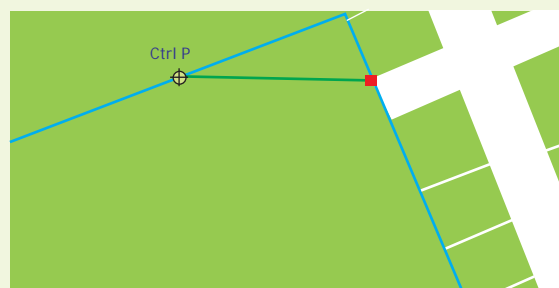
Scenario: While constructing road casings, you need to construct some casing segments at specific angles. Other casing segments must be constructed using a deflection away from the last segment constructed. Some of these segments also need to be a specific length.

Solution: Apply angle and length constraints while creating the road casing segments. Do this by either applying the Angle or Deflection command and a length constraint. Both the Angle and Deflection commands constrain the angle of the segment. Angle uses east as 0 degrees and measures positive angles counterclockwise.

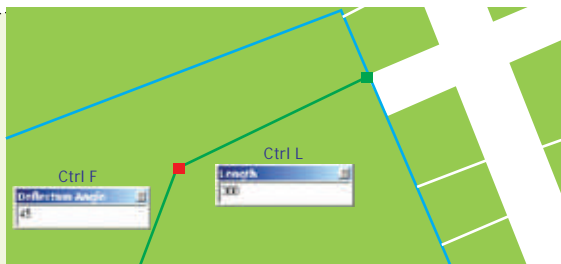
Deflection uses the last segment as 0 degrees and calculates the angle specified from there.

To create a segment using an angle or deflection and a length:

1. Create at least one vertex.
2. Right-click away from the sketch and choose Angle or press Ctrl + A.
3. Type the angle and press Enter. The segment will be constrained to the specified angle.
4. If creating a segment using a deflection angle from the last segment, click on the Deflection tool and type the angle from the last segment and press Enter.
5. Right-click anywhere on the map and choose Length or press Ctrl + L.
6. Type the length and press Enter.
7. Continue sketching. The new segment will be constructed with the desired angle and length.



You can use a deflection away from an existing segment to create a new segment.



Both the deflection angle and the length of the segment can be specified.

If you want to change the length of a segment you have already created, choose Change Length from the Sketch tool context menu. This will undo the last vertex but keep the angle constraint. To set the angle and length at the same time, choose the Angle/Length command from the Sketch tool context menu or press Ctrl + G.

Tip: Press Ctrl + F to set the deflection angle.

Challenge 9—Creating a Segment at an Angle from Another Segment

Scenario: You are constructing a new road casing feature that must be deflected 45 degrees from a previous constructed segment that is not the last segment constructed.

Solution: Use the Segment Deflection constraint to create a segment at an angle relative to any existing segment. The selected segment is 0 degrees, and the deflection angle specified for the new segment is calculated from this segment. Positive values are calculated in a counterclockwise direction from the existing segment, and negative values are calculated clockwise.

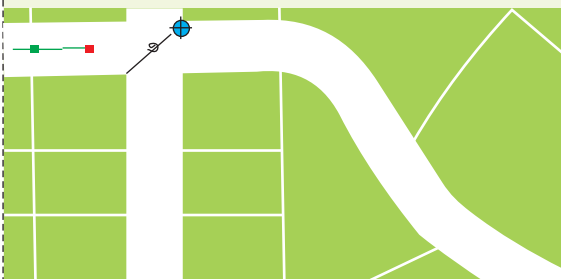
Create a segment at an angle from another segment using Segment Deflection:

1. Create at least one vertex.
2. Position the pointer over the segment you want to create a segment from. Right-click and choose Segment Deflection.
3. Type the desired angle from the selected segment and press Enter or press F7 to set the angle. The segment is constrained to the specified angle.
4. Click once to digitize the endpoint of the segment or choose Length from the Sketch tool context menu.

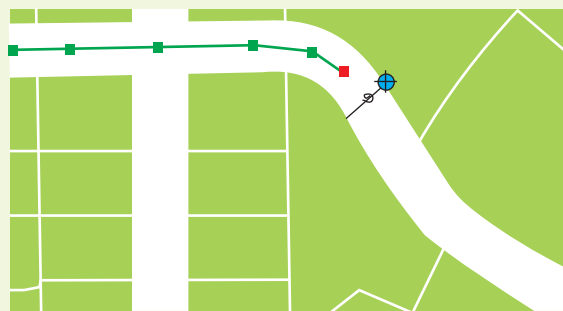
Challenge 10—Constructing Centerlines with the Midpoint Tool

Scenario: If you are constructing street centerlines for existing street casing features, the centerline vertices must be created relative to the street casings. How do you accomplish this?

Solution: You may begin constructing the new centerline features with the Sketch tool. However, the Sketch tool does not allow vertices to be constructed relative to other features. You will need to switch to the Midpoint tool. Using the Midpoint tool, click to set the from point of the segment. Click again to set the to point. The midpoint of that line will be added to the edit sketch.



The Midpoint tool is helpful in constructing street centerlines relative to existing street casing.



With snapping turned on for the edges of the street casings, setting the from and to points for each segment is more precise, making it easier to generate centerline vertices.

Tip: Create a snap agent and set an appropriate snap tolerance before using the Midpoint tool. Press and hold the Z, X, or C key to zoom or pan in the display while using the Midpoint tool. Press and hold the V key to see vertices within three times the snapping tolerance.

Challenge 11—Constructing Features Offset from Other Features

Scenario: The owners of a commercial property have reserved a portion of a land parcel that will be developed for parking. The building inspector has required that the land reserved for parking be increased. Rather than resurvey the reserved portion, the owners want to increase its size by defining a new parking area boundary with the same angles as the old parking area, but offset the boundary to increase its size. What method could be used to accomplish this?

Solution: Using the Trace tool, create new sketch segments by tracing over the segments of selected parcel boundaries. Apply an offset so the segments will follow the angle of the selected parcels but be created away from the boundaries. Offset retains vertices from the selected features in the newly created feature.

More Tips for the Trace Tool

- Press the O key to set an offset distance. Type a value for the offset distance and press Enter.
- Trace directly on top of existing features by entering a value of 0. Enter a positive value to trace to the right of the selected feature or a negative value to trace to the left of the selected feature.
- Press the Tab key to change sides when tracing.
- If the trace went too far or traced too many segments, move the mouse back over the segments to be removed or press the Esc key to cancel the trace.
- Limit the length of the trace using Limit Length in the Options dialog box.
- Change the method for how corners are created.
 - Mitered—extends line segments until they intersect
 - Beveled—adds a line segment to create a beveled corner
 - Rounded—adds a curved segment at the corner
- Change the selected features while tracing by clicking on the Edit tool, making a new selection, and clicking the Trace tool

For more details & tips, please visit www.esri.com

Geoinformatics & Remote Sensing Cell

(West Bengal State Council of Science & Technology)

The West Bengal State Council of Science & Technology (WBSCST), Department of Science & Technology (DST), Government of West Bengal has established its credential as pioneer organization in generating RS & GIS database for spatial information in various scales for land, water resources as well as various applications for developmental planning activities. The council / department have also undertaken several projects at National and State level to meet the needs of the various National and state level stakeholders. It has an energetic group of young specialists in the field of GIS and Remote Sensing and also has a large archive of data and satellite imageries.

The Geoinformatics and Remote Sensing Cell under the Department of Science & Technology and NES, Govt. of West Bengal is equipped with visual interpretation laboratory and Digital laboratory. It offers opportunity for utilization of Remote Sensing (RS) data products to the user departments for very specific up-to-date information on natural resources in combination with societal aspects in GIS platform, in formulating the developmental plans viz. watershed development, disaster (flood/ bank failure) management, waste land/ degraded land management, surface and ground water management etc.

Keeping in view the futuristic implementations of SDI at National level (NSDI) and State level (SSDI) and seeing the growing need to have trained man power to deal with GIS and spatial data collection, assimilation and analysis. WBSCST's Geoinformatics & Remote Sensing Cell to cater the State's need in GIS & Remote Sensing, started a one year PG Diploma Course in Geoinformatics from August 2009.

Facts about the Diploma Program

The total number of seats in the course is 12.

This Diploma course is affiliated to West Bengal University of Technology (WBUT). This course comprise of subjects such as – Principles of Remote Sensing, GIS, Cartography, Digital Mapping, Fundamental of Calculus, Vectors, Matrices & Statistics, Spatial Database & Modelling, Image Processing. It also has focus in the various application domains like – Disaster Management, Water Resources and Resource Management. End of the Diploma program every student has to do a Project Work pertaining to their specialization.

Eligibility Criteria to the Diploma program is Minimum Master's degree in Physics, Maths, Geology, Geophysics, geography, Atmospheric Science, Electronic Science, RS & GIS or Bachelor's degree in Civil and other engineering branches or equivalent will be considered.



For More Details Contact:

Course Coordinator

West Bengal State Council of Science & Technology

Department Science & Technology

Government of West Bengal

Bikash Bhavan (4th floor), Salt Lake Kolkata 700091

PH : 23342969, 23344616/5809/1934(O), (R)2668-5826

Fax : 033 – 23587266

Performing raster interpolation and rendering of the raster layer to a set symbology

```
Imports System.Runtime.InteropServices
Imports ESRI.ArcGIS.Carto
Imports ESRI.ArcGIS.DataSourcesRaster
Imports ESRI.ArcGIS.GeoAnalyst
Imports ESRI.ArcGIS.esriSystem
Imports ESRI.ArcGIS.Geodatabase
Imports ESRI.ArcGIS.SystemUI
Imports ESRI.ArcGIS.SpatialAnalyst
Imports ESRI.ArcGIS.Catalog
Imports ESRI.ArcGIS.Geometry
Imports ESRI.ArcGIS.Output
Imports System.Configuration
Imports System
Imports System.Data
Imports System.Data.OracleClient
Imports System.io

Module Module1

    Private Declare Auto Function
    GetDesktopWindow Lib "user32" () As Integer

    Dim mainDirPath As String =
    System.Configuration.ConfigurationManager.AppSettings("dailyreportPath")

    Public newPath As String = Nothing

    Dim pMapDocument As IMapDocument

    Dim actView As IActiveView

    Dim pMap As IMap

    Public Sub interpolation()

        Dim locationFeatClass As IFeatureClass
        Dim featClassDesc As IFeatureClassDescriptor

        Dim power As Double

        Dim radius As IRasterRadius

        Dim interpolatOP As
        ESRI.ArcGIS.GeoAnalyst.IInterpolationOp

        Dim idwinGeoDataset As IGeoDataset

        Dim idwoutGeoDataset As IGeoDataset

        Dim raster As IRaster

        Dim env As IRasterAnalysisEnvironment

        Dim cellsize As Double = 1887.6058

        Dim rasterFieldName As String = Nothing

        Dim m_AOLicenseInitializer As
        LicenseInitializer = New
        KSNDMCMMapGeneration.LicenseInitializer

        Dim path As String =
        System.Configuration.ConfigurationManager.AppSettings("mapPath")

        Dim folderName As String = Nothing

        Dim workspaceFactory As IWorkspaceFactory

        Dim rasterWorkspace As IRasterWorkspace2

        Dim layer As ILayer

        Dim lyrCount As Integer
```

```
Dim requiredFeatLayer As IFeatureLayer =
Nothing

Dim joinLayer As String =
System.Configuration.ConfigurationManager.AppSettings("sdeFeatureClass")

Dim rasterName As String

Dim symLyr As IDataLayer2 = Nothing

Dim rasterLyr As IRasterLayer

Dim pRLayer2 As IRasterLayer

Dim boundaryLayerName As String =
System.Configuration.ConfigurationManager.AppSettings("boundaryLyrName")

Dim boundaryLayer As IFeatureLayer = Nothing

Dim featCursor As IFeatureCursor = Nothing

Dim queryFilter As IQueryFilter = Nothing

Dim feat As IFeature = Nothing

Dim envelope As IEnvelope = Nothing

Dim symLayerPath As String =
System.Configuration.ConfigurationManager.AppSettings("symLayerPath")

Dim layerName As String =
System.Configuration.ConfigurationManager.AppSettings("sdeFeatureClass")

Dim wsRasterFactory As IWorkspaceFactory =
Nothing

Dim wksRaster As IRasterWorkspace = Nothing

Dim sysTime As String = Nothing

Try

    'Initialize the application
    m_AOLicenseInitializer.InitializeApplication(New
    esriLicenseProductCode()
    {esriLicenseProductCode.esriLicenseProductCode
    ArcInfo}, _

    New esriLicenseExtensionCode()
    {esriLicenseExtensionCode.esriLicenseExtension
    CodeSpatialAnalyst})

    ' Opens the map document from a physical
    location in memory , in which the newly
    created rainfall map is added

    pMapDocument = New MapDocument

    If (pMapDocument.IsMapDocument(path) And
    pMapDocument.IsPresent(path)) Then

        ' Only open if it is a map document and it is
        present.

        pMapDocument.Open(path)

        actView = pMapDocument.ActiveView

        actView.Activate(GetDesktopWindow())

    End If

    'create a folder in the physiocl memory where
    all the temporary rasters will be created

    pMap = pMapDocument.Map(0)

    Dim dir As DirectoryInfo

    folderName = newPath & "\Raster" & dateValue

    dir = New DirectoryInfo(folderName)
```



```

If dir.Exists Then
dir.Delete(True)
dir.Create()
Else
dir.Create()
End If
'Assign the folder created above as raster
workspace
workspaceFactory = New
RasterWorkspaceFactoryClass()
rasterWorkspace =
CType(workspaceFactory.OpenFromFile(folderNa
me, 0), IRasterWorkspace)
requiredFeatLayer = getLayer(pMap,
joinLayer)
boundaryLayer = getLayer(pMap,
boundaryLayerName)
Dim featWks As IFeatureWorkspace
featWks = CType(sdeConnection("Feature"),
IFeatureWorkspace)
locationFeatClass =
featWks.OpenFeatureClass(JoinLayerName)
'Create a feature class decsriptor
specifying the field name on which
interpolation is based
featClassDesc = New FeatureClassDescriptor
featClassDesc.Create(locationFeatClass,
Nothing, "Rain")
''Perform IDW interpolation
'Create a raster interpolation object
interpolatOP = New RasterInterpolationOp
idwinGeoDataset = locationFeatClass
'Set the cell size for the output raster in
the environment
env = interpolatOP
env.SetCellSize(esriRasterEnvSettingEnum.esr
iRasterEnvValue, cellsize)
'' Mask the raster with the BoundaryLayer
featCursor = boundaryLayer.Search(Nothing,
False)
feat = featCursor.NextFeature
envelope = feat.Extent
env.SetExtent(esriRasterEnvSettingEnum.esriR
asterEnvValue, envelope)
env.Mask = boundaryLayer.FeatureClass
'Masking ends here
env.OutSpatialReference =
idwinGeoDataset.SpatialReference
env.OutWorkspace = rasterWorkspace
'Create raster radius and specify the
distance
radius = New RasterRadius
radius.SetVariable(1)
power = 2
idwoutGeoDataset =
interpolatOP.IDW(featClassDesc, power,
radius)
raster = idwoutGeoDataset

```

```

Dim rasterProp As IRasterProps
rasterProp = raster
rasterProp.SpatialReference =
idwinGeoDataset.SpatialReference
' Store the transient raster in the Raster
Catalog in FGDB
Dim pRasterCatalog As IRasterCatalog
pRasterCatalog = saveRasterinCatalog(raster,
rasterName, rasterWorkspace)
''The code below gets the raster dataset
stored in a raster catalog:
Dim pFeatureClass2 As IFeatureClass
pFeatureClass2 = pRasterCatalog
Dim pCatalogItem As IRasterCatalogItem
Dim qFilter As IQueryFilter
Dim fCursor As IFeatureCursor
qFilter = New QueryFilter
qFilter.WhereClause = "Name = '" &
rasterName & "' "
fCursor = pFeatureClass2.Search(qFilter,
False)
Dim feature As IFeature
feature = fCursor.NextFeature
Dim rName As String =
feature.Value(feature.Fields.FindField("Name
"))
pCatalogItem =
pFeatureClass2.GetFeature(feature.OID)
Dim prasterDataset As IRasterDataset
prasterDataset = pCatalogItem.RasterDataset
' Set the Data Source of the symbology Layer
file to the newly generated Raster
rasterLyr = New RasterLayer
rasterLyr.CreateFromDataset(prasterDataset)
rasterLyr.Name = rName
layer = Nothing
lyrCount = 0
Dim gxFile As IGxFile
Dim gxLayer As IGxLayer
gxLayer = New GxLayer
gxFile = gxLayer
gxFile.Path = symLayerPath
symLyr = gxLayer.Layer
pRLayer2 = symLyr
rasterLyr.Renderer = pRLayer2.Renderer
pMap.AddLayer(rasterLyr)
pMap.MoveLayer(requiredFeatLayer, 0)
pMap.RecalcFullExtent()
'Save the rendered raster to the map
document
pMapDocument.Save(True)
Catch ex As Exception
End Try
End Sub
End Module

```

ESRI

Global
Page



ESRI Announces Support for Virtual USA

Initiative Promotes Enhanced Interoperability and Situational Awareness for Emergency Management

ESRI announces support for Virtual USA, an initiative designed to improve decision making for local, state, tribal, and federal homeland security practitioners. Virtual USA integrates existing resources to provide real-time access to operational information from multiple sources and jurisdictions. Data such as weather, traffic, infrastructure, fuel supplies, emergency shelters, and medical facilities can be fully integrated, analyzed, mapped, and disseminated for emergency response. The Virtual USA—where multiple jurisdictions and disciplines interact and share real-time, actionable information—will enable greater interagency collaboration. It will also deliver a new level of comprehensive situational awareness."

The state of Virginia, through its Department of Emergency Management (VDEM), has embraced the Virtual USA initiative and achieved real results. VDEM launched the Virginia Interoperability Picture for Emergency Response (VIPER) using enterprise geographic information system (GIS) software from ESRI. In addition to providing a Web-based common operating picture and analysis tools, VIPER integrates with numerous information systems and links with approximately 250 data feeds. Emergency commanders; first responders; and police, fire, and government officials can tap into a single information resource for better decision making. VIPER recently earned the Virginia governor's IT as Efficiency Driver award during the Commonwealth of Virginia Innovative Technology Symposium. The award recognizes the innovative use of technology to promote efficiency in government.

VIPER is available not only to local, state, and federal agencies but also to the public. Street, satellite, and topographic maps provide a diverse set of basemap data. Feeds from multiple sources supply information related to air incidents, traffic accidents, civil disturbances, earthquakes, floods, terrorist threats, hazardous material spills, hurricanes, reported public health concerns (such as swine flu), power outages, reported suspicious activities, wildfires, and more.

The firsthand project of VIPER has and continues to revolutionize information sharing throughout public safety and across all levels of government. Virtual USA has created a momentum that will enhance this capability exponentially and change the way we see, understand, and share data. As more states participate in Virtual USA, the amount of data sharing, communication, and collaboration will improve all aspects of emergency management including mitigation, planning, response, and recovery.

For more information Visit: <http://www.esri.com> ; <https://cop.vdem.virginia.gov/viper>

ESRI Book Promotes Societal Benefits of Modern Land Administration

Use of GIS and Spatial Data Infrastructure Emphasized for Planning

Government strategies to ensure social equality, economic growth, and environmental protection are among the many global perspectives addressed in *Land Administration for Sustainable Development*, the latest publication from ESRI Press.

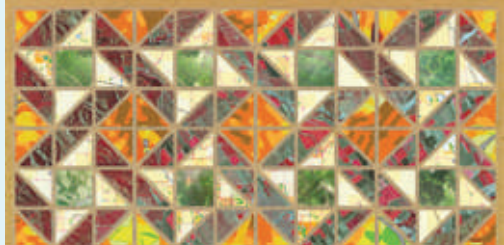
Prepared by leaders in the development of modern land administration theories and practices, the book describes new and innovative policies, systems, and technologies now being applied around the world. A common goal in the different approaches to land administration systems (LAS) is the need to address strategies that support sustainable development in the twenty-first century. *Land Administration for Sustainable Development* examines some of these systems at various levels of development to provide insight into their strengths and weaknesses.

Recognizing that all countries or jurisdictions are unique and have their own legislative policies, the book also highlights the underlying features of land administration that are necessary for the success of any LAS. These fundamental elements include the implementation of geographic information systems (GIS) with spatial data infrastructure (SDI). The authors view this infrastructure as the "key to the spatial enablement of modern land administration."

The book is written for professionals looking for a comprehensive overview of modern LAS strategies, including politicians, senior government officials, students, and land administrators.

Land Administration for Sustainable Development (ISBN: 9781589480414, 512 pages, \$49.95) is available at online retailers worldwide, at www.esri.com/esripress, or by calling 1-800-447-9778. Outside the United States, visit www.esri.com/esripressorders for complete ordering options or contact your local ESRI distributor. For a current distributor list, visit www.esri.com/distributors. Interested retailers can contact ESRI Press book distributor Ingram Publisher Services.

Land Administration for Sustainable Development



Williamson Enemark Wallace Rajabifard

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at
ESRI India



1. Role: Application Developer/ Sr. Developer

Experience: Should have 2+ years experience in GIS Application Development.

Skill Sets:

- Knowledge of .Net/Java/ J2EE/Flex/ Desktop customization using .Net technology database as backend.
- Proficient in designing/developing multi-tiered secured business applications for high availability, scalability and of high performance
- Should have experience EJB, Servlet, JPA, JNDI, JMS, JMX, web services, XML.
- Should have knowledge in GIS domain with specifically ESRI Technologies i.e. Arc GIS Object/Arc Engine/Arc GIS Server.

Soft Skills:

- Very good oral and written communication skills
- Strong team player, flexible yet results-driven
- Ability to Multitask and be able to balance multiple priorities and alert clients & team to project scope changes

2. Role: Web designer

Experience: Should have 1+ years experience

Skill Sets:

- Proficiency in web designing and development.
- Knowledge of JavaScript, HTML Image Editing: Adobe Photoshop CS2.
- Proficiency in Photoshop, Dreamweaver, Flash, Corel Draw or Illustrator and CSS.
- Should have knowledge in working with Windows Vista, XP, 98/ 2K

Soft Skills:

- Very good oral and written communication skills.
- Ability to Multitask and be able to balance multiple priorities and do time management.
- Should be able to assess situations quickly and strong team player, flexible yet results-driven

3. Role: Executive - Presales Support

Experience: Should have 2+ years experience

Skill Sets:

- Assist in pre-sales operations during Due-Diligence, Information gathering, analyzing the requirements of clients, Crafting solutions, Preparing Business Cases and preparing proposal.
- Handle the presales & Bid activities.
- To understand and respond to various RFI, RFQ and RFP.
- Ability to understand client needs.
- Work closely with the Delivery team and support the preparation for customer visits and Practice Capability Presentations.
- Assist delivery teams during post-sales during recruiting right team members, transition, training, and stabilizing the projects

Soft Skills:

- Very good oral and written communication skills.
- Good relationship building skills.
- Should be able to assess situations quickly and drill down to the core of the problem.

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HR Manager, NIIT GIS Ltd.

B-1/H-9 Colosseum, MCIA, Mathura Road, New Delhi - 110044, INDIA.

Kindly mention the position applied for and your current location in the subject line.



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21 - 22, April 2010

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THEME: *GIS: Designing our Future*

ESRI India hosts its 11th ESRI India User Conference from 21- 22 April 2010 at NOIDA (NCR Delhi) and we like to invite you to play an active role by submitting an abstract. The wide range of presentation topics attracts users from all over the country who want to hear about your experiences using ESRI GIS technology—from research activities to enterprise-wide project implementation.

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<http://www.esriindia.com/uc2010.htm>

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For More Details Contact

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Fax: +91 (11) 40570516
Email: UC2010@esriindia.com



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