The explosion in the usage of web and mobile over the past few years and the ability of the geo spatial platform from Esri to leverage these technologies is making huge impact in the way the geo spatial information is accessed and exploited.

These technologies and the recent developments in the cloud computing is making the use of the word "pervasive" very apt when one discusses the trend in the geo spatial industry.

This growth is bound to touch every facet of our lives, and it takes the geospatial technology beyond the conventional and professional users and takes it to the common man.

Today every citizen is able to exploit this technology and also actively participate in the new geospatial revolution that is shaping up. While the user base in the conventional segments such as environment, water resources, telecom, power, health, disaster management etc. is growing up rapidly with more number of personnel in an organization having access to the tools and information, thanks to the ubiquitous nature of the geospatial information, new areas which help manage the day to day activities and transactions are opening up. Content creation and management is also becoming more participative along with crowd sourcing thus keeping the data live, accurate and relevant.

Another facet of this explosion in the exploitation of geospatial technology is the cloud technology. Esri's ArcGIS Online (AGOL) is a tremendous platform for the enterprises to build and manage the geospatial information catering the needs of a very vast range and types of users. From serious users of the technology who need it for their daily decision making to the sporadic users who use the information for specific needs, AGOL is an excellent option which enables tailoring as per individual needs. AGOL gives access to a wide array of content and applications and offers a very flexible and collaborative environment.

For all our users and the consumers of geo spatial information, there are exciting times ahead as the Esri's current and emerging technologies make the geo spatial information really pervasive.

S Sridhar

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Editorial and Content Coordination: Esri India Team

Corporate Office
NIIT GIS Limited Plot No. 223-224,3rd Floor, Udyog Vihar, Phase -1, Gurgaon, Haryana 122002
Phone: +91 (124) 4002702, 4006166 Fax: +91 (124) 4002701
Email: info@esriindia.com

Regional Office

New Delhi : Plot No. 223-224,3rd Floor, Udyog Vihar, Phase -1, Gurgaon, Haryana 122002
Phone: +91 (124) 4002702, 4006166 Fax: +91 (124) 4002701Email: vishal.anand@niit-tech.com; Newdelhi@esriindia.com

Hyderabad : 3rd Floor, Building No.3-6-387/D Harmony Plaza, Himayat Nagar Main Road Hyderabad – 500029, India
Phone:- +91 40-66447300 / 01Email: Sathish.Girinatham@niit-tech.com; hyderabad@esriindia.com

Bangalore : 4th Floor, Ramakrishna Towers, 31/2, Rupena Agrahara, Begur Hobli, Hosur Road (Near Silk Board (Flyover),Bangalore -560 068 Karnataka ;Tel:+91 (80) 30289500, 30289652; Fax: +91 (80) 30289656
Email: Naveen.reddy@niit-tech.com; bangalore@esriindia.com

Chennai : 46, Third Floor, Garuda Building, Cathedral Road, Chennai – 600 086, Tamil Nadu
Tel: +91 44 4591 1050 +91 44 45911050;Fax: +91 (44) 28213206;
Email: chennai@esriindia.com

Mumbai : 106-107, Marwah Complex, Krishanlal Marwah Marg, Off Saki-Vihar Road, Andheri (East), Mumbai-400072, Maharashtra Tel: +91 (22) 40103200; Fax: +91 (22) 40103444
Email: Ketan.Shinde@niit-tech.com; mumbai@esriindia.com

Kolkata : EM4/1, 2nd floor, Sector V (Techno India building); Salt Lake, Kolkata 700 091, West Bengal
Tel: +91 (33) 3038 1000; Fax: +91 (33) 2357 7713 Email: Prabhat.1.Ranjan@niit-tech.com; kolkata@esriindia.com

Ahmedabad : 103 Anhill Complex 88/B, Swastik Society; Off CG Road, Navarangpura; Ahmedabad-380009, Gujarat; Tel: +91 997931313 Email: Maayank.Tiwari@niit-tech.com, ahmedabad@esriindia.com

Branch Offices:

Bhopal: +91 9717677748, **Chandigarh:** +91 9971611366, **Dehradun:**+91 9719406883 **Lucknow:** +91 9717677748, **Nagpur:** +91 9890196005, **Thiruvananthapuram:** +91 9611131891

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NEWS

ISG fellowship conferred to Mr. Rajesh C Mathur

New Delhi, India, 5th December, 2012 – NIIT GIS Ltd., the GIS solutions provider, today announced that Mr. Rajesh C Mathur, Vice Chairman, Esri India was conferred with ISG fellowship the Indian Society of Geomatics for his enormous contribution to the GIS Community in India for last two decades The ISG fellowship was awarded by Dr. S. Ayyappan, Director General, Indian Council of Agricultural Reseach& Secretary (DARE at the National Symposium on 'Space Technology for Food & Environmental Security' & Annual Convention of Indian Society of Remote Sensing & Indian Society of Geomatics will be held at New Delhi during Dec 5-7, 2012. During his long association with Indian GIS industry, Mr. Mathur has established NIIT GIS Ltd., as a GIS focused products and services company, extending technology support to several national projects like NRIS, IMSD, among others and also supported most of the national mapping agencies like Geological Survey of India, Survey of India, NATMO, in capacity building Mr. Mathur has been the President of ISG during 2005 – 2008 and under his guidance, the society outreached to the corporate world associated with Geoinformatics●

Esri and Geoloqi Join Teams and Technology to Bring Next-Generation Location to Mobile and Web Apps

Esri, recently announced that Geoloqi, a powerful platform for next-generation location-based services, will be joining with Esri to form the Esri R&D Center—Portland. The first new product offering will be a geocoding enhancement to the Geoloqi API that gives three new capabilities to developers:

1. The ability to create triggers based on physical addresses rather than map coordinates,
2. Reverse geocoding, and
3. aMapKit alternative for iOS developers based on Esri maps. The flexible, developer-focused nature of Geoloqi, combined with Esri's strong foothold in the industry, will fulfill the growing needs of a field increasingly reliant on mobile technology.Geoloqi's powerful developer platform for mobile applications, combined with ArcGIS, Esri's complete and scalable system for mapping and spatial analysis, will create more powerful geolocation and mapping tools for the development of web and mobile applications. The new technology stack will bring the strengths of ArcGIS to a wider audience without interrupting Geoloqi's current product offering or services, giving developers the best of both worlds for the first time.

"We chose Geoloqi because its technology is a perfect fit with the Esri tool stack," says Jack Dangermond, president, Esri. "Geoloqi's deep location capabilities and relationships with the developer community will allow us to develop more dynamic mobile and web applications for independent developers and large-scale enterprises alike. It's a truly symbiotic union of teams and technology."

"This is a big deal for the location industry," says Amber Case, CEO of Geoloqi, who will become the director of the Esri R&D Center—Portland. "Not only will developers and enterprises have greater access to tools and capabilities, but we'll be able to support larger markets than before and work very hard on providing the best experience for developers. With this merger, we get to build long-term value and solve real-world problems across many industries."

Geoloqi is the first platform that enables rapid development of cross-platform, geography-based applications using a single API in any development language. It also provides specialized algorithms that help preserve battery life while location searches run in the background.

Enterprises and developers will be able to buy Geoloqi's core features and geocoding service, powered by Esri, through the http://geoloqi.com website.In the future, all Geoloqi's features and products will be available in the same form through ArcGIS Online with an improved and developer-friendly pricing model and feature set. For more information on Esri's current ArcGIS offerings, visit esri.com●

Delhi Schools join for GIS Day Celebrations

Centre for Social Welfare Administration and Administration of Justice (CSWA & AJ) of the Indian Institute of Public Administration (IIPA) in collaboration with Geospatial Delhi Limited (GSDL) of Govt. of NCTD and support from Esri India organised a workshop titled "Sensitizing Schools with versatility of GIS ". The workshop was held at IIPA, New Delhi where about 60 students and 20 teachers from various schools of Delhi participated in it.

This workshop was organized by Dr. KusumLata coordinator of CSWA&AJ along with Dr. PK. Srivastava, MD of GSDL with a perspective to honour the concurrence of World GIS Day with Children Day of India, on the 14th November 2012. GIS Day is a global event that enables geographic information systems (GIS) users and vendors to interact with schools, businesses, and the general public to showcase real-world applications of GIS. The workshop was inaugurated by

Honorable ShriTejendraKhanna, Lieutenant Governor of NCT of Delhi. ShriKhanna highlighted the core values as one of the important basic educational concept which needs to be strengthened without any compromise. He mentioned the three characteristics of an Indian as, tolerance for diversity; known for intellect and deep regard for womanhood and these characteristics need to be nurtured by one and all. He shared his experiences of governance in which IT and GIS played an important role in decision-making for crime mapping, to plotting traffic accidents, mapping of Yamuna Flood Plain leading to delineation of "O" zone in Master Plan of Delhi 2021. The workshop focused on thefour technical sessions that were organized with the objective of instilling in students and teachers a sense of direction, orientation, scale and use of GIS for decision –making. Students and Teachers interacted during the workshop by participating the practical exercises on GIS conducted by IIPA and GSDL.

Esri Story Maps Win International Map Industry Association Conference Awards

Redlands, California—Esri is pleased to announce that Esri Story Maps has won the Gold Medal award for Best Digital Map Product and Best Overall Map Product at the International Map Industry Association (IMIA)—Americas conference. Esri Story Maps' ability to easily serve maps and accurate demographic information covering a wide range of topics along with its well-crafted cartography were top reasons the application won the awards.

IMIA held the conference September 9–11, 2012, in Albuquerque, New Mexico, with attendees involved in all aspects of the mapping industry. A select group of industry leaders attending the conference judged the competition.

"Storytelling is rapidly becoming one of the most important reasons that organizations use web maps," said Allen Carroll, program manager for ArcGIS Online content and team lead for Esri Story Maps. "The result is that GIS is emerging from the back office and becoming accessible—and useful—to everyone. The need for GIS to analyze, plan, manage, and support decisions remains vital, but organizations now perceive the need to tell the story of their analyses, plans, and decisions."

Esri's award-winning Story Maps are used by agencies such as USAID to make information more accessible.

Esri Story Maps combines narration and rich media content in interactive maps to help people discover and understand patterns and relationships that exist in the world. Esri began producing the story maps to support storytelling techniques, tools, and best practices. These story maps have spurred the development of templates and other resources, and now GIS professionals, web developers, graphics specialists, and others, build and publish their own story maps.

By displaying information in this manner, complex data can be viewed together, providing better insight for the private sector to explore new areas for collaboration with host countries, researchers, development organizations, and the public.

For details visit –http://http://storymaps.esri.com/home

Letters to Editors

Dear Readers,

This section of Letters to Editors has been an important section of Arc India News and your comments/suggestions are valuable to us. We would like to have the opinion and feedback of all our readers with respect to the content being published and how its has been useful to them in day to day GIS advancement. You may also let us know what you expect to see in terms of application and technology in the magazine.

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Editorial Board

New ArcGIS Data Reviewer for Server Improves Data Fitness across the Organization

Variety of Deployment Options Expands Data Quality Control beyond the Desktop

Esri has released ArcGIS Data Reviewer for Server, its data quality management extension to ArcGIS 10.1 for Server. The extension allows data review capabilities to be deployed over a variety of application platforms, improving data review by bringing more participants into the quality control (QC) process.

ArcGIS Data Reviewer for Server includes capabilities for collecting, managing, and tracking errors submitted through nondesktop workflows. With it, developers can implement data quality feedback as a new function in their existing web applications without the burden of creating a QC workflow from scratch in a separate application.

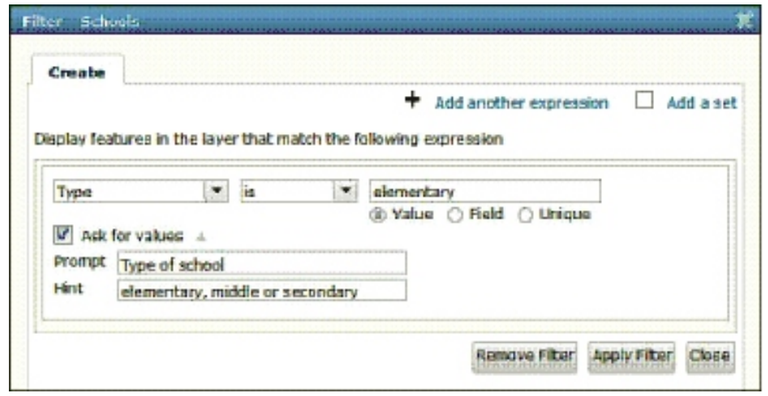
Data quality management is also improved with the following:

- Scheduled and automated data validation
- Easy-to-use tools for error identification
- Increased transparency in data QC

With ArcGIS Data Reviewer for Desktop, organizations are saving time and resources when validating the fitness of the data they use and produce. The new ArcGIS Data Reviewer for Server allows them to deploy the same QC processes across multiple platforms, thereby engaging a broader community of internal and external stakeholders and other interested parties.

For more information, visit esri.com/datareviewer

Whats New in ArcGIS Online



It's time to refresh your browser – ArcGIS Online has been updated with the following new features and enhancements. This is major update, with new capabilities for authoring web maps, publishing hosted services, sharing, and configuring ArcGIS Online organizations.

ArcGIS Online map and layer enhancements

Filtered layer views

Map authors can now create query expressions that can be used as filters for viewing feature data in a web map. Filters can be used to display specific information of interest from a larger collection. For example, from a layer showing worldwide cities you can apply an expression that filters for only cities with populations in excess of 1 million.

Expressions can be applied immediately to the layer, or you can provide prompts for user interaction. You can create one expression, multiple expressions, or one or more sets of expressions. You can create filters on hosted feature service layers, ArcGIS Server feature service layers, and ArcGIS Server map service layers that have associated attribute data.

Attribute tables

An interactive table showing attribute information can be displayed for layers in your map. Features can be selected from the table and highlighted on the map.Table attribute display and formatting is controlled in the same way as pop-ups, and columns can be arranged as desired.

Set visibility scale range on all types of layers

Visibility ranges (maximum and minimum display scale) can now be applied to all layer types. Previously only certain types of feature layers supported this property. If you own the layer, the visibility properties can be saved with your item. For more

information see Setting visibility range.

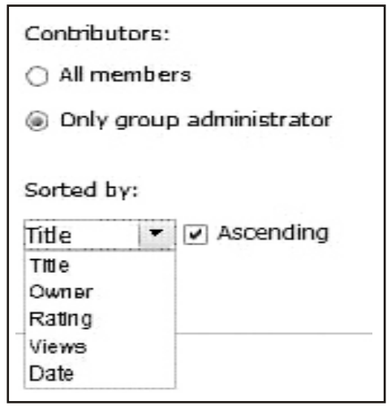
Disable editing on feature layers

As the owner of an editable feature service, you can disable editing on the layer in a web map. This is useful if you want the source service to be editable, but you want to display the data in a web map as view-only features.

Sharing Enhancements

View-only groups

As a group owner with an organizational account, you can now create groups where users can join but cannot contribute content. Members of the group can view and access items added by the group administrator but cannot share their own content to the group.



Item sort options in groups

Group owners can choose the default way that items are displayed in the group. You can sort by title, owner, ratings, views, or date. The order (ascending or descending) can also be toggled.

Directly add members to groups

Organization administrators can now add members directly to a group without the members needing to accept group invitations.

RSS news feeds for item comments

You can now subscribe to an RSS news feed for comments on an item that is publicly shared, allowing better monitoring of feedback for content users and owners.

New web mapping application templates

The template gallery for creating web mapping applications has been updated with a new template for displaying interactive layer filters, and an updated elevations profile template.

Stored credentials

When you register secured ArcGIS services, you now have the option to store authentication credentials with service items. Storing credentials means that ArcGIS Online does not prompt end users for authentication when they access the service via a layer in your web map.

Publishing Enhancements

Publish tiled map services using tile packages

ArcGIS for Desktop enables you to build tiles for your map locally and store them in an easy-to-transfer tile package (.tpk file). Publishers in an organization can now use tile packages to create hosted tiled map services on ArcGIS Online, allowing you to build the tiles using your own computing power rather than consuming credits.

Publish hosted tiled map services from feature services

As a publisher in an organization, you can now create hosted tiled map services from an existing feature service.

Support for time-enabled hosted feature services

As a publisher in an organization, you can now publish time-enabled feature services via ArcGIS Online. You can use your temporal hosted service to create time-enabled web maps.

Organization Administration Enhancements

Configure print service

Organizations can now use their own custom print service, enabling the use of custom layouts for ArcGIS Online web maps.

Custom home page background image

Organizations can now use their own background image for the home page, replacing the default one provided.

Option to hide comments

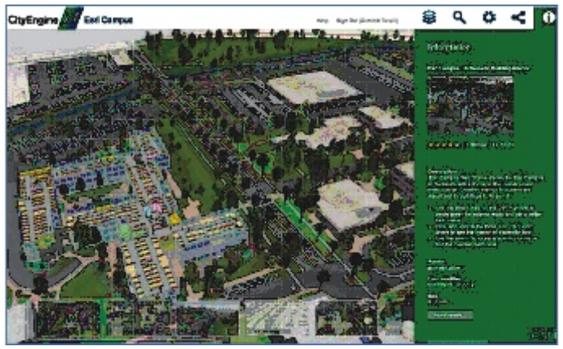
Organizations can now disable comments on items owned by any member of the organization.

Reorganized configuration settings

Some configuration settings have been reorganized into more focused categories.

Enhancements to subscription status reports

Administrators can now see detailed reports about the routes generated by their organization. In addition, the subscription status page has been improved for better viewing performance. CityEngine Web Viewer Esri CityEngine is a stand-alone software product that transforms 2D GIS data into smart 3D city models. CityEngine is integrated with ArcGIS and shares 3D city scenes using the CityEngine Web Viewer. With this update the Web Viewer introduces the following new capabilities:



Bookmark Tours

Play a tour of all bookmarked viewpoints, and view thumbnails of the bookmarks.

Enhanced sharing

CityEngine Web Scenes can now be embedded in websites, using options to display all or partial functionality. Comments and ratings can also be added to Web Scene items. Web Scene item thumbnails can also now be updated directly from the CityEngine Web Viewer.

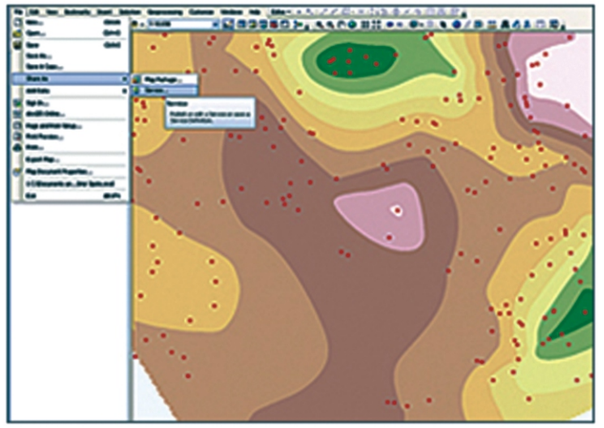
Enhanced visualization

Shadow quality has been improved for visualization under

Contd. On Page.10....

Introducing ArcGIS 10.1

Integrated Platform Enables Greater Collaboration



At 10.1, ArcGIS for Desktop can deliver any GIS resource, including maps, imagery, geodata, and tools, as a web service.

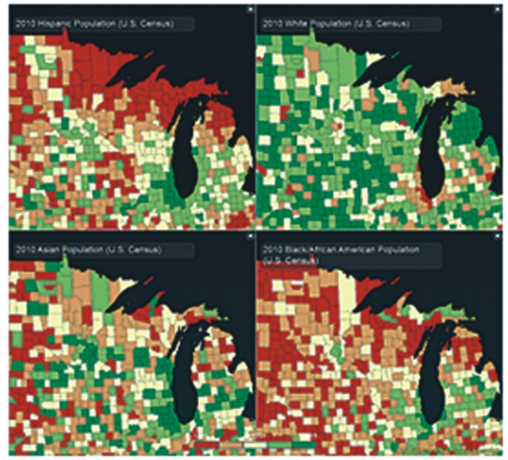
The release of ArcGIS 10.1 signals a major development in the way geographic information will be accessed and managed by GIS professionals and their organizations in the years to come. ArcGIS 10.1 gives GIS professionals a complete GIS that further integrates desktops and servers, as well as mobile and web applications. It provides organizations with the additional tools and infrastructure they need to extend the reach of their existing GIS. It also improves organizations' ability to transition to next-generation GIS concepts and platforms without jeopardizing their current GIS investments.

New to ArcGIS Online is ArcGIS Online for organizations—a customizable, web-based system designed for professionals who want to manage their organizations' geospatial content using cloud tools and infrastructure. It allows administrative control over data creation and access while making geographic information easily available to others within the organization, as well as beyond the organization in collaborative efforts with others.

ArcGIS 10.1 users can customize map templates and deploy them as interactive community dashboards that allow citizens to view and report incidents, such as crime.

ArcGIS Online is now a fully integrated, easy-to-use portal for thousands of GIS professionals around the world. In addition to users, organizations can store and manage their maps, data, and other geospatial information on ArcGIS Online, as well as access thousands of free maps, datasets, services, and tools. Esri continuously updates ArcGIS Online content to deliver new map, image, and task services so that users are always getting the latest, most accurate, and best cartographic basemaps and GIS products available anywhere on the web.

At 10.1, ArcGIS for Server runs natively on 64-bit Windows and Linux operating systems, providing users with high-performance web editing and map caching, on-the-fly analyses, and imagery exploitation capabilities, as well as additional choices for deployment. In addition to being fully certified on VMware and VCE's Vblock platform, ArcGIS for Server can be deployed on Amazon Elastic Compute Cloud in both Windows and Linux. ArcGIS for Server includes new services, such as a print service that allows users to produce high-quality, large-format PDF maps directly from web maps. Also new at 10.1, along with the ability to generate sophisticated GIS and mapping services with Standard and Advanced editions, all editions of ArcGIS for Server, including Basic, will provide simple mapping capabilities from a database.



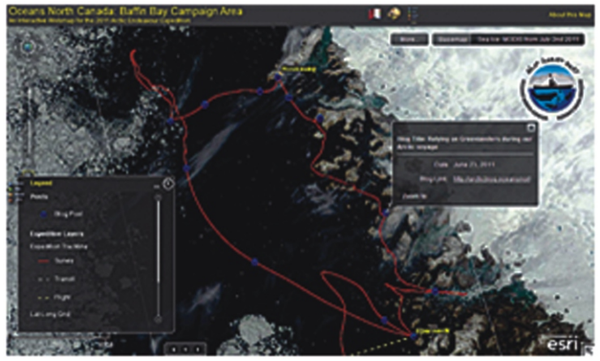
In this example, dynamic layers (new at 10.1) provide web application developers with complete freedom to define how multiple layers within a service are displayed. Here, four synchronized map layers from the same service are individually symbolized and arranged for visual analysis.

GIS professionals will find this release of ArcGIS for Desktop to be the most empowering GIS authoring environment to date. With ArcGIS for Desktop, users can now deliver any GIS resource, including maps, imagery, geodata, and tools, as a web service on both ArcGIS for Server and ArcGIS Online. Desktop users can also easily package their maps and layers and make that content available to staff, stakeholders, partners, or the public via online groups while maintaining complete control and ownership of their content.

Mobile developers now have access to a suite of ArcGIS Runtime Software Developer Kits (SDKs) to create custom

business applications for iOS, Android, and Windows Phone devices. Developers are able to create apps that use the powerful mapping and geocoding capabilities found in ArcGIS for Server and ArcGIS Online. These apps can be deployed within an enterprise environment or to the public via the Apple App Store, Microsoft Marketplace, and Android Market. In addition, a free, out-of-the-box ArcGIS application lets users explore map content, collect and edit GIS features, and use sophisticated geoprocessing tasks. The ArcGIS app is available for download on all major mobile platforms.

At 10.1, developers will gain even greater access to the ArcGIS system via improved APIs and SDKs for web and mobile applications, configurable viewers,



ArcGIS 10.1 will simplify the job of creating interactive, web-based maps that geoenable stories and events anywhere in the world, even for scientific expeditions, such as the one led by Oceans North Canada to track one of the greatest whale migrations in the world.

Even small communities, such as the Town of Groton, Connecticut, can use ArcGIS 10.1 to promote economic development opportunities and provide detailed land record information.

and the new ArcGIS Runtime. ArcGIS Runtime allows developers to create and deploy focused, stand-alone GIS applications for desktop users. The runtime is a small, lightweight deployment that, in terms of capabilities, fits between ArcGIS Engine and the ArcGIS web mapping APIs. The new runtime is designed for both desktop and cloud development. It has a fast display and does not require installation; it can be run directly from a CD ●

Improved web APIs and templates provide ArcGIS 10.1 developers with a rapid development framework for spatially enabling data over time and geography.

Contd. From Page 8

different lighting parameters to provide more realistic rendering.

Task Service Enhancements

Improved support for global addresses

When publishing a hosted feature service or importing a file to a web map that includes addresses, ArcGIS Online geocodes the locations based on your organization's region.

Improved batch geocoding in ArcGIS for Desktop

Organizations can take advantage of the ArcGIS Online World Geocoding Service for batch geocoding. The service matches addresses and places in over 100 countries from a single service.

Enhancements to geocoding API

The World Geocoding Service API has a number of enhancements including improved support for batch geocoding using country codes, improved results based on your current location, support for localized names, and improved field names.

Ready-to-use network analysis services API now available

Developers can add routing, directions and other network analysis capabilities directly to their applications through the Network Analysis Services API. When publishing a hosted feature service or importing a file to a web map that includes addresses, ArcGIS Online geocodes the locations based on your organization's region.

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Ready-to-use network analysis services API now available

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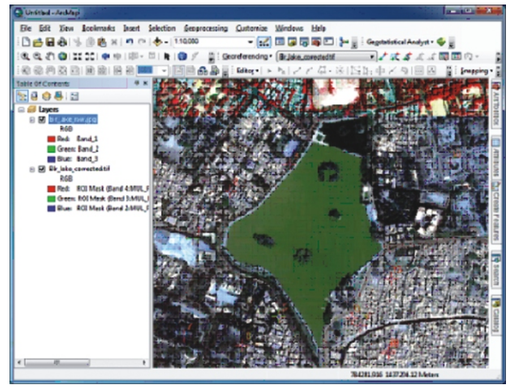
Precise and Rapid Geo-registration using ArcGIS 10.1 and ENVI 5.0

Introduction

Since the successful launch of various earth observation satellites like QuickBird, IRS IC, ID, TES, Oceansat, Cartosat, Resourcesat, GeoEye, WorldView etc, productions of precise and rapid geo-registration are imminently needed by the scientists, researchers and image analysts to explore imagery not only to support the national economy in the areas of agriculture, water resources, forestry, ecology, geology, watersheds and coastal management but also to secure the political boundary of the country using defense applications. Considering the requirements of user's community the high end geospatial software like ArcGIS and ENVI, distributed in India by ESRI India, added auto registration tool for rapid and precise geo-registration where it aligns two images with different viewing geometry into the same coordinate system so that corresponding pixels represent the same objects collecting ground control points (GCP) automatically. In this article we will discuss the principle of auto registration in ArcGIS 10.1 and ENVI 5.0.

Auto Registration in ArcGIS 10.1

The georeferencing user experience has been enhanced with new and improved auto registration added in the ArcGIS 10.1, allows you to automatically georeference your raster dataset to a referenced raster dataset. The automated links are based on spectral signatures, so it is meant for aerial and satellite imagery, which is similar in nature. To use it, you must place the non-georeferenced raster dataset in the generally correct geographic location along with a referenced raster that is in a known coordinate system. The Fit To Display, Shift,

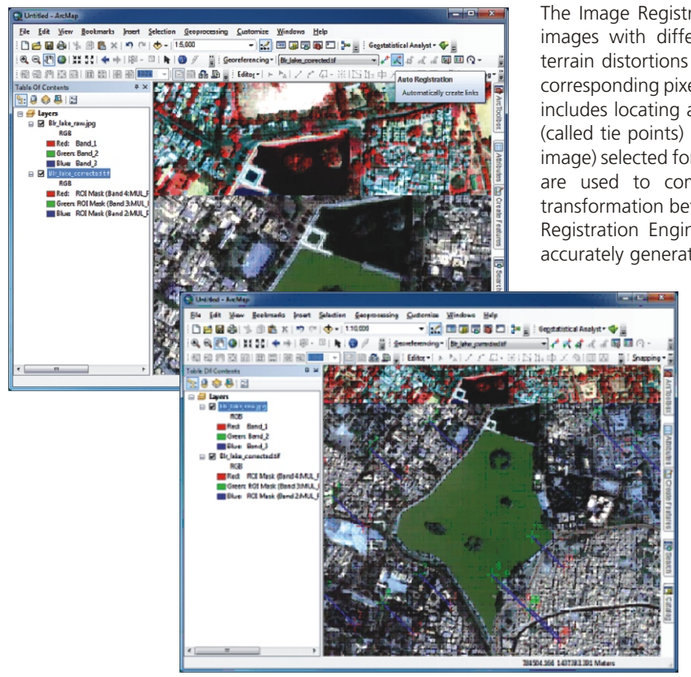


and Rescale tools help you place the raster dataset in the approximate geographic location. When you click the Auto Registration button, the system attempts to create links from your unreferenced raster dataset to your referenced raster dataset. If accurate links cannot be created, you may need to adjust the source raster dataset to better overlap the referenced raster dataset.

To achieve a higher success rate in autoregistration, the two images need to be as similar as possible: geographic location, time and season, image orientation, image scale, and band combination.

Automatic Image Registration in ENVI 5

The Image Registration workflow geometrically aligns two images with different viewing geometry and/or different terrain distortions into the same coordinate system so that corresponding pixels represent the same objects. The process includes locating and matching a number of feature points (called tie points) in two images (a warp image and a base image) selected for registration. The corresponding tie points are used to compute the parameters of a geometric transformation between the two images. ENVI uses a hybrid Registration Engine that allows you to automatically and accurately generate tie points, then uses those tie points to align and resample the warp image to match the base image. It combines available spatial reference information with various auto-registration techniques to improve the accuracy, performance, and automation of auto-registration, and minimizes or eliminates the need for user interaction and editing. The spatial reference information of the Registration Engine may come from the following:



- Standard map or RPC information of input images. Standard map information or RPC information establishes the approximate geometric relationship between a warp image and a base image.

Different viewing geometry

Auto Tie Points Collected

Output of auto registration: Proper Superimposition

- Tie point information you define manually or that is automatically generated from image matching techniques. For most applications, the Registration Engine can automatically generate tie points with no or minimized number of outliers. You can also manually define a few seed tie points and use them in automatic tie point generation to improve the overall accuracy.
- Geo-location geometric constraints to search for and filter tie points. The images should align well in the common ground coordinate space in the orthorectified images or nadir view images; therefore, all the tie points are constrained by a global transform between the coordinates in the base image and the warp image.
- RPC sensor models and elevation used for orthorectification on-the-fly during image registration. This geometrically corrects the data to a common ground coordinate space, and achieves better accuracy in radiometric matching and geometric filtering.
- For images taken at different viewing positions and/or angles, the images of the same scene are related by the epipolar geometry constraint. Two epipolar geometry models are used: one is suitable for the imagery with the frame central projection, and the other model is suitable for the imagery taken with a pushbroom sensor that has RPC information.

The Platform for Success: GIS for Everyone

ArcGIS is at a turning point. It is becoming the platform for the organization.

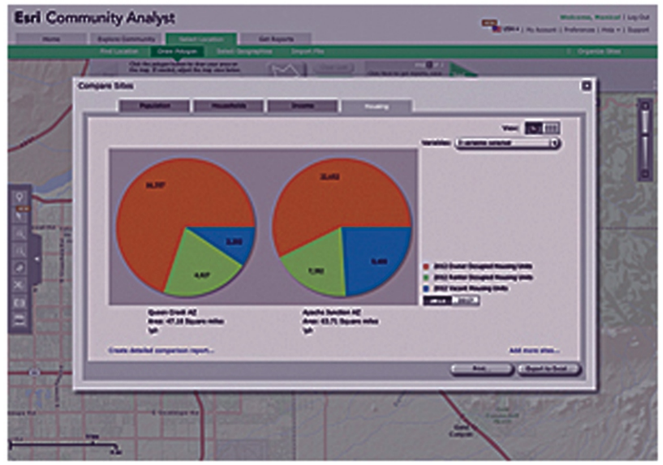
According to The Age of the Platform by Phil Simon, "A platform is an extremely valuable and powerful ecosystem that quickly and easily scales, morphs, and incorporates new features, . . . users, customers, vendors, and partners." It is ubiquitous and tolerant of change. Platforms are all about communication: they help people connect with each other, businesses communicate with customers, and governments stay in touch with citizens.

The platform ecosystem is open so it can work with complementary technologies and constantly expands existing capabilities and adds new ones. It must be agile and "plastic" enough to respond to new opportunities, many of which are generated by the application of business intelligence to various aspects of operations from customer service to supply chain management.

information layer and targeted solutions, templates, and workflows in its business layer. The work of traditional GIS in organizations is enhanced and amplified, not replaced, by this platform.

Unlike railroad and telephone companies that, in the past, dominated because they were monopolies, platforms like Amazon are tremendously powerful because they work cooperatively with other companies. The power of GIS has always come from its emphasis on collaboration, integration, and communication. The difference now is that, as a platform, the scale of collaboration and integration has increased, enabling much broader and more direct communication and interaction.

Applications, based on the Local Government Information Model, can be downloaded at no cost from ArcGIS Online. They help organizations realize benefits from GIS data they already have.



Community Analyst is a web-based solution that provides analysis and mapping of thousands of demographic, health, economic, education, and business data variables, packaged with analysis functionality that meets business and organizational needs.

ArcGIS Platform

ArcGIS has evolved into a platform with an architecture that encompasses technology, information, and business layers. Beyond supplying innovative GIS in its technology layer, the ArcGIS platform provides the data and models in its

Change and Opportunity

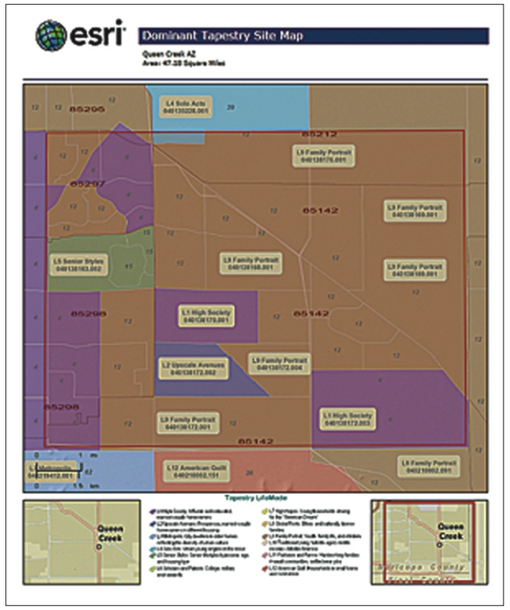
Since its inception in the 1960s, GIS technology has changed with the larger trends in IT, moving from mainframes through mini-computers, workstations, desktops, client/server networks, and web servers. With the move to the

cloud/device architecture, technological foundation for GIS changed more dramatically than at any other point in that long road. This change has been the most disruptive but, using ArcGIS, provides GIS professionals with an opportunity to reach a much larger group of geoinfo consumers in their organization. This new platform architecture brings together the familiar components of the enterprise GIS system—desktop and server—with pervasive applications that make GIS technology available to all kinds of clients through the cloud.

Your Content Management System

ArcGIS Online, the cloud-based system for creating and sharing maps and geographic information, is the infrastructure that leverages the change to the cloud/device paradigm. From an initial inventory of basemaps, it has grown to thousands of maps, applications, tools, and layers that can be shared selectively or with the public. The ArcGIS.com map viewer provides simplified mapping that people with no experience with GIS can leverage. It has unlocked the benefits of GIS to a whole new set of users while supporting and extending enterprise GIS systems.

The integration of ArcGIS Online supports everyone in an organization through readily available tools, applications, basemaps, and operational data that enhance collaboration; improve communication; break down information silos; and support more informed decision making that can be accessed not only by GIS professionals but by knowledge workers, managers, policy makers, and staff, whether on-site or off-site. With hosted services through ArcGIS Online, making these resources available inside or outside an organization no longer requires installing and maintaining a server.



Solutions like Esri Business Analyst and Community Analyst can generate illustrated reports of the results of analysis.

This new GIS pattern is exemplified by the work of the European Environment Agency (EEA). The agency uses GIS to meet the challenge of monitoring the quality of data about the condition of the environment of states in the European Union. EEA transforms terabytes of data into information that guides policy makers in these countries. Online content from ArcGIS feeds more than 80 maps and applications that enable integration of authoritative, citizen scientist, and crowdsourced data that can be contributed and shared in 32 languages.

A New Pattern

One defining characteristic of ArcGIS as a platform has been the adoption of the web map as a new pattern for finding, combining, and using content and functionality. It is not a departure from or replacement of traditional GIS work but a method for extending the value of the GIS work already done within an organization or by other organizations in a shared environment.

What is a web map? It is simple to use but not a simple thing. It can be most usefully defined as a specification for a map that can be used by all Esri clients and on all kinds of devices. It is a way to capture tradecraft and share it. It can encapsulate analytics performed in the background or abstract distributed services. Web maps can be used by the entire range of clients from desktops to iPhones. Map, feature, and image services available from ArcGIS Online, combined with basemaps and operational data using the ArcGIS.com map viewer, answer questions and provide insights without requiring GIS expertise. By allowing interaction with both a map and the data behind it, web maps can be used to crowdsource data.

ArcGIS feeds more than 80 maps and applications produced by the European Environment Agency that enable integration of authoritative, citizen scientist, and crowdsourced data that can be contributed and shared in 32 languages.

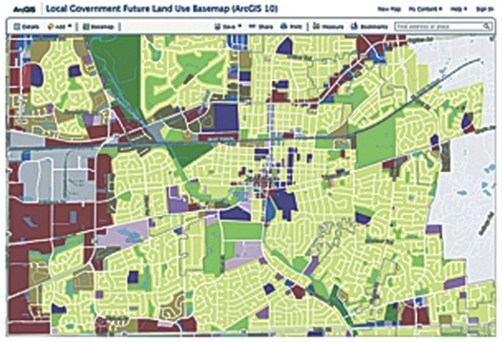
Web maps make the information contained in data layers come alive and generate new insights. Services hosted on ArcGIS Online or on an organization's own machines running ArcGIS for Server can be combined with basemaps or other types of operational data and persisted in a web map that can be shared by saving it to ArcGIS Online or by e-mailing it so it can be viewed using any device. Web maps support visualization, pop-ups, queries, and analytics and can be used to edit the original data on the server. A shared map can become the basis for additional annotation or analysis.

Story maps, a specific format for a web map, can reach new audiences. They combine web maps with web applications and templates to incorporate text, multimedia, and interactive functions to make maps that inform, educate, entertain, and inspire. Story maps can provide insight into an organization's operations and plans. Esri provides a form that users can pour their own and shared data into to communicate a specific message in a manner that is engaging and compelling.

Web maps tranform organizations by getting rid of organizational stovepipes and enabling collaboration. The World Bank, a cooperative of 187 member countries that provides financial and technical assistance to developing countries to reduce poverty, uses web maps to improve transparency, communication, and collaboration. The institute's Innovation Team geocoded and mapped more than 30,000 geographic locations for more than 2,500 bank-financed projects worldwide under its Mapping for Results initiative, and all new World Bank projects are georeferenced. Development planners can track and deliver resources more efficiently and effectively and avoid work duplication. This publicly accessible data empowers citizens to follow the progress of projects and service delivery in their countries.

A Little Help

Configurable templates and applications can enhance the value of web maps by giving rapid and valuable insights. Existing web maps can be converted to web applications. An application available from the EEA website uses crowdsourcing to validate readings from monitoring stations on the quality of air and swimming sites. Feedback from citizens gathered using this application will be used to improve the quality of biodiversity, coastal erosion, and other types of environmental data.



Organizations can use configurable maps and applications, such as this Local Government Future Land Use Basemap, to make their own data more useful and accessible with any programming.

Many configurable applications that incorporated local data have been shared on ArcGIS Online. Applications, based on the Local Government Information Model, can be downloaded at no cost from ArcGIS Online. These applications help organizations realize benefits from GIS data they already have. "Better Than Scratch" in this issue describes how Lake County, Florida; the City of Fort Lauderdale, Florida; and Cabarras County, North Carolina, have met common web mapping needs using configurable applications from the Local Government Resources Center.

It's All about the Data

For most GIS practitioners, the most challenging aspect of any project has been finding, vetting, and massaging data by normalizing, reprojecting, and harmonizing it. Although Esri has always provided data resources with software and worked for decades promoting and facilitating data sharing and reuse, the process was time-consuming and complex. Now access to authoritative content is much easier, and the requirement that users assemble all or nearly most of the data needed for any project is significantly reduced or, in some cases, eliminated.

As its GIS technology continues to improve, Esri has also become a data company. ArcGIS Online makes accessible rich content that is constantly updated. This resource is a rapidly growing part of the ArcGIS platform. Ready-to-use, high-quality imagery, streets, shaded relief, topographic, and other geospatial data, as well as demographic data, is freely available from ArcGIS Online. Updated demographics, US Census, consumer spending, business, and marketplace data is included in some business solution products, such as Esri Business Analyst, or can be purchased separately.

In addition to simplifying access to structured data, ArcGIS is coevolving along with other information technologies to deal with ever-increasing quantities of data from sources such as sensor networks, crowdsourcing, and the digitization of historic records. A world of two and a half billion people connected with devices is creating an explosion of sensor and behavioral data. The original Big Data technology, GIS is uniquely suited as the platform for organizing and communicating knowledge about anything on earth.

ArcGIS GeoEvent Processor, a new ArcGIS for Server extension, can connect to real-time data streams from a wide variety of sensors, perform continuous processing and analysis of those data streams, and sends relevant information to users or other systems. (See "Sensor to Service: ArcGIS Enables Real-Time GIS.")

The World Bank geocoded and mapped 30,000 geographic locations for more than 2,500 bank-financed projects worldwide under its Mapping for Results initiative. This map and many other maps and layers have been shared on ArcGIS Online.

Intelligence Now

ArcGIS technology and information architecture are the foundation for the business layer, which targets organizational needs. The business layer enables people across the organization to accomplish work more efficiently and effectively. Organizations that don't have the time or expertise to build a solution using Esri tools can benefit from GIS using Esri solutions. Solutions like Community Analyst, web-based technology that provides analysis and mapping of thousands of demographic, health, economic, education, and business data variables, package appropriate data with the functionality that meets specific business and organizational needs.

Location has always been part of business analytics, often for site analysis and customer intelligence applications, but with the explosion of location-based data collected through smartphones and other devices, it is increasingly a source of competitive advantage. Esri location analytics software can provide invaluable insights to organizations and business. Location analytics is about dynamic, interactive mapping; sophisticated spatial analytics; and rich, complementary data.

Esri Business Analyst, available as desktop and server and software as a service options, delivers data bundled with built-in analytical capabilities that support decision making. Esri Maps for IBM Cognos, Esri Maps for Sharepoint, and Esri Maps for Office directly integrate mapping with common business technologies.

Some Esri solutions solve very specific problems. With Esri Address Coder, an organization can view the locations of US customers on a map and append latitude-longitude, FIPS codes, and Esri demographic and Tapestry Segmentation data to each record. Address Coder can use more than 100 of Esri's data variables. Customers can be grouped by geographic location, demographic characteristics, or consumer type for targeted marketing.

Feeding the Ecosystem

In the past, Esri supplied tools and some content that GIS professionals applied to solving problems at the project, department, and enterprise levels. Now, in addition to core professional GIS software that can be customized and extended with Python scripting and automated with ModelBuilder, the Esri technology layer has support for developers. Using Esri APIs and software development kits (SDK), developers can use just the analysis and mapping capabilities required to solve a customer's problem while working in a mainstream development environment.

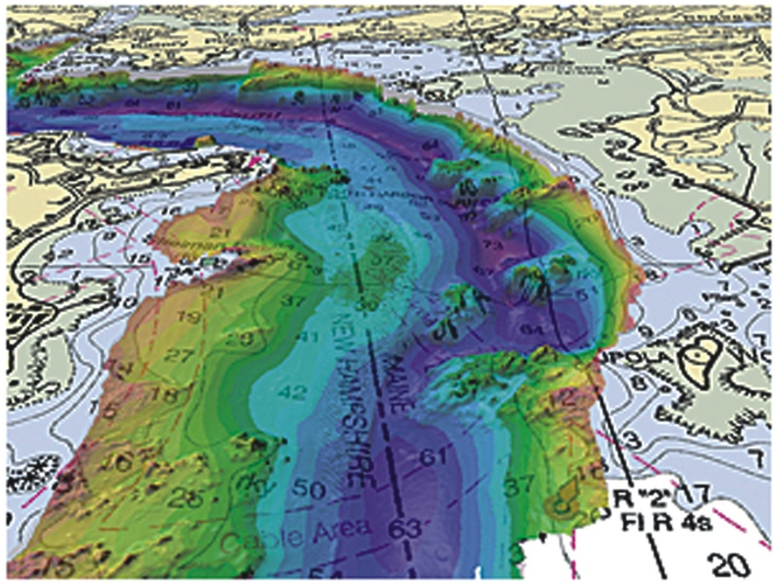
monthly ArcGIS Online pricing for developers and a marketplace for applications on the soon-to-be launched developers.arcgis.com website will be a one-stop site for the development community.

Esri holds Meetups for developers across the United States and participates in events such as the Foursquare Hackathon held in New York City in January 2013. Esri will also sponsor hackathons at the Developer Summit and South by Southwest (SXSW).

Enabling Everyone to Access and Use GIS

The evolution of ArcGIS to the platform is changing organizations even more profoundly than adoption of GIS on the enterprise level did. It enfranchises the entire organization, breaking down the barriers between workflows, departments, and disciplines. Sharing data and collaboration using geospatial information have become much quicker and simpler. With web maps, applications, and solutions, internal customers can use data from inside and outside the organization without knowing the underlying GIS technology.

One effect of the adoption of cloud/device models for GIS is that the growing connectedness of the world makes the knowledge created through traditional GIS on desktops and servers accessible to a much wider audience. Consequently,



ArcGIS for Maritime: Bathymetry, an extension to ArcGIS for Desktop, helps manage and combine massive amounts of bathymetric data and metadata in a GIS environment.

For developers, Esri provides web APIs for JavaScript, Flex, and Silverlight and six service APIs that include ArcGIS for Server REST API, ArcGIS Spatial Data Server REST API, and the ArcGIS Server Administrator API. Native SDKs are also available for building applications for smartphones and tablets or desktop systems: ArcGIS Runtime SDK for Android, ArcGIS Runtime SDK for iOS, ArcGIS Runtime SDK for Java, ArcGIS Runtime SDK for Windows MobileArcGIS Runtime SDK for Windows Phone, and ArcGIS Runtime SDK for WPF [Windows Presentation Foundation].

Another article in this issue, "The Year of the Developer: New program rolls out in 2013," describes developer programs that will be unveiled at the Esri International Developer Summit March 25–28, 2013, in Palm Springs, California. New

rather than limiting the role of the GIS staff in an organization, that role is shifting and expanding into new areas beyond mapping. The work of GIS professionals has never been more important as GIS becomes ubiquitous. They provide the substrate that lets others benefit from GIS.

This platform brings the unique holistic approach of GIS to bear on the formidable problems faced by organizations. GIS has always been a tremendous tool for not only seeing specific aspects of a problem but the problem as a whole in context. Now GIS can be applied to solving problems in all areas more broadly. The result, in the words of Esri president Jack Dangermond, can be "better outcomes for the entire planet".

e-Pathai GIS (Electronic Project, Administration, Traffic, Highway Assets and Information management system) in Tamil Nadu Highways

Abstract:

Tamil Nadu Highways Department (TNHD) is primarily responsible for construction and maintenance of the vast existing road network. There is a need for continuous monitoring and management of this road network to make quick, reliable and rational decisions because it influenced by various factors such as traffic growth, axle loading, environmental impacts, socio-economic changes and availability of funds. Tamil Nadu Highways Department has already established a web based Road Maintenance Management System (RMMS). RMMS being only a database on road & bridge related data can generate a variety of reports but lacks visualization capabilities. TNHD rightly envisioned an e-Pathai (Electronic Project, Administration, Traffic, Highway Assets and Information management system) GIS, a Web based bi-lingual GIS to assist and rationalize decision making in planning, programming, funding, procurement and allocation of resources in road network to make the best use of public funds at an acceptable level of serviceability. The system consists of RMMS data collected using Advanced Data Collection Equipment (ROMDAS) and a mix of digital maps of Tamil Nadu consisting of several layers compiled from different sources such as Survey Of India, National bureau of Soil Survey and Land Use Planning, High resolution satellite imagery and attribute data on roads, bridges etcand also other attribute data of interest such as demographic details from Census of India, average annual rainfall data. The web GIS system is dynamically linked to RMMS and P&FMS (Project & Finance Management System) database which means the latest data on roads and bridges as and when updated in RMMS is available for query, analysis and reporting in the

e-Pathai GIS.

The e-PathaiGIS is based on client-server architecture with the main part of the application on a centralized server and any user across the globe can use or access the server application after authentication using a client software i.e., browsers like Internet Explorer, Mozilla Firefox, etc.

Introduction

Transportation network is the back bone of all developmental activities in the state of Tamil Nadu. There is a need for continuous monitoring and management of this vast road network to make quick, reliable and rational decisions on upgrade and maintenance.Road network maintenance and management is a complex task influenced by a variety of factors such as traffic growth, axle loading, environmental impacts and availability of funds. The task of setting a realistic complex criterion to decide which roads to repair on priority has today become more difficult with limited funds for road maintenance and an ever increasing road network and the related voluminous data on roads. The Tamil Nadu Highways Department (TNHD) primarily responsible for construction and maintenance of roads has a vast existing road network along with its voluminous data on existing roads & related infrastructure. In order to keep abreast with technology, TNHD established a web based Road Maintenance Management System (RMMS) consisting of a database on the condition and related data of each road collected through specialized data-collection vehicles. RMMS consists of a web enabled Road Information System and PMS - a pavement management system for prioritization of roads to suit the budget. RMMS being only a database on road & bridge related data can generate a variety of reports but lacks visualization capabilities. Geographical Information System (GIS) is the right solution to enhance the analytical, problem-solving, and decision-making capability of TNHD. A GIS map with data on roads & bridges can retrieve and analyze visually to help decision-makers in planning, monitoring and maintaining of roads and related assets in a better way anytime, anywhere.

e-Pathai GIS

TNHD rightly envisioned ane-Pathai GIS: a Web based GIS to assist them to rationalize decision making in planning, programming, funding, procurement and the allocation of resources in road sector in order to make the best use of public funds in preserving the road networks at an acceptable level of serviceability. The system will also improve the technical capacities, skills and management capabilities of TNHD and other related agencies.

GIS allows us to view, understand, question, interpret, and visualize data in many ways that reveal relationships, patterns, and trends. The system is a mix of digital base maps for Tamil Nadu consisting of several layers (spatial data) compiled from different sources such as Survey of India (SOI), National Bureau of Soil Survey and Land Use Planning (NBSS&LUP), Wikimapia, High Resolution Satellite Imagery etc. and attribute data (non-spatial data) on roads, bridges etc. from RMMS database besides other attribute data of interest such as demographic details from Census of India, average annual rainfall data from India Meteorological Department.The Web GIS based Road & Bridge Information System developed for TNHD under e-PathaiGIS is a web based system for

- Readily accessible, relevant and valid information on the road network and related infrastructure.
- Effective decision making in planning, programming, funding, procurement and in the allocation of resources in road sector.

- Effective prioritization of works as well as reporting on its condition.
- Improved support for decision-making through GIS analytical tools.
- Evaluating the roads and related infrastructure for planning & programming purposes…

Client Server Model

e-PathaiGIS is based on client-server architecture. Client-server architecture is a way of designing software that takes advantages of the ability to distribute data and processing chores across a network. The main part of the application runs on a centralized server and any user across the globe can use or access the server application using a client software i.e. browsers like Internet Explorer, Mozilla Firefox, etc. designed for this purpose.

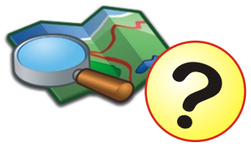
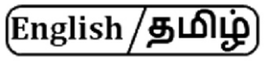
***e-Pathai* GIS Components**

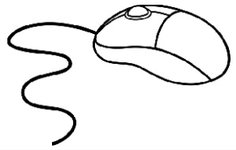
The Web GIS built using ESRI® ArcGIS®for Server (Advanced Edition), Microsoft® Silverlight and Microsoft .NET framework is supported by a set of powerful customised query and analysis tools. Spatial& Non-Spatial Data in e-Pathai GIS

Several spatial and non-spatial data have been integrated into e-Pathai GIS from several sources. The key sources for spatial and non-spatial data are Survey of India (SOI) Open Series Maps (OSM) and RMMS. Spatial data for 20,000 Km (SH and MDR) based on GPS data stored currently in RMMS has been used to create a graphical representation of the roads in e-Pathai GIS. The spatial layer thus created has been linked with the related non-spatial or attribute data in RMMS after cleanup of the graphical data for various inconsistencies.In addition to the OSM digital data,several other spatial and related non-spatial data have been compiled as additional layers (MLA, MP constituency boundaries, soil boundaries, etc.) in the e-Pathai GIS. Several other spatialand non-spatial data of relevance to TNHD have been identified along with the probable source for the data for inclusion in e-PathaiGIS in future.

***e-Pathai*GIS: Overview of Key Features**

e-Pathai GIS is a web-based application written in .Net / Silver light technology which is a cross-browser, cross-platform technology. It runs on all popular Web browsers including Microsoft Internet Explorer, Mozilla Firefox and Google Chrome. The Web GIS built using ESRI® ArcGIS® Server, Microsoft® Silverlight and Microsoft .NET framework is supported by a set of powerful customised query and analysis tools developed specifically for TNHD. Some key features of the Web GIS application listed below have been developed based on the data currently available with the department:

	**Locate:** Spatially locate various elements on the GIS map such as Boundary (District, Taluk, MLA, MP etc.), Road, Bridge, Culvert (Quick locate and by TNHD Circle, Division and Sub Division). **Query Roads, Bridges and Culverts:** Query Roads by CW Surface Type, CW Width, Drain Condition, Pavement Composition, Category, CBR, IRI, Inventory Details, Shoulder Type, Shoulder Width, Soiltype, Terrain Type, Work History, Traffic (ADT & AADT) etc. Culverts can be queried by Culvert Types and Condition and Bridges by Bridge Condition and Type.
	**Thematic Maps:** A thematic map is a GIS map that focuses on a specific theme or subject. The Web GIS application will automatically paint or re-color the road stretches based on any of the road characteristics such as CW Surface Type, CW Width, Drain Condition, Pavement Composition, Road Analysis, Category, CBR, IRI, Road Inventory Details, Shoulder Type, Shoulder Width, Soil type, Terrain Type, Work History, Traffic (ADT & AADT) etc. Reports can also be generated for these maps.
	**Bing Maps** is a web mapping service provided as a part of Microsoft's Bing suite of search engines and powered by the Bing Maps for Enterprise framework is also available in the application as a backdrop layer besides Open Series Maps of Survey of India. Bing aerial view overlays satellite imagery onto the map and highlights roads and major landmarks. Using Bing services it is possible to locate a point or address of interest, find shortest route between two places by distance or travel time.
	**Bi-Lingual Interface:** Web sites and web applications in local language have become the order of the day. The Web GIS for TNHD currently has a bi-lingual interface allowing users to switch between English and Tamil language.
	**Identify Selected Features:** Hidden attribute information pertaining to the selected features in only a mouse click away. If the feature belongs to more than one layer, user can select the desired layer from the 'Identify From' tool bar.

	**Mouse over info:** Hidden attribute information can also be quickly accessed for a user defined layer such as taluk, district, road, culvert, bridge etc. by just moving the mouse over the feature after selecting a layer of interest.
	**High Resolution Map Printing:** Generate high quality PDF files of your GIS analysis/ maps for most common paper sizes and download them for sharing.
	**ROMDAS Video:** ROMDAS video has been integrated with the Web GIS. Camera icon is displayed at locations where ROMDAS video is available. Clicking on the camera icon at the required location plays back the ROMDAS video for the selected location.
	**Vehicle Damage Factor (VDF)** tool provided can be used to switch on the census stations having VDF information. When the VDF tool is clicked census stations will display the VDF icon on the map. When the VDF icon at a census station is clicked the relevant VDF information is shown to the user.

e-Pathai GIS: Snap shots of the Web GIS

Snap shots of some key features of the Web GIS application have been illustrated below:

Fig: 1 – e-Pathai GIS Home Screen

Fig: 2 Identify Selected Feature for SH

Fig: 3 Mouse over features (State Highways) for information

Fig: 4 Thematic for Query on Bridge Condition

Fig: 51 Thematic for Query on Road by IRI

Fig: 6 Report for Query on Road by IRI

Fig: 7 Thematic for Query on Road Work History

Fig: 8 Thematic for Query on AADT

Fig: 9 Thematic for Query on Road Drainage Condition

Fig: 10 ROMDAS Video integration

Fig: 11 Routing by Criteria by Shortest Time/ Distance

Fig: 12 Bing Geocode / Locate

Conclusion:

e-Pathai GIS has been programmed in such a way that the public can also access details about bridges, roads and other projects implemented by the highways department. This new, robust and holistic initiative has been appreciated by the World Bank, is sure to assist them to rationalize decision making in planning, programming, funding, procurement and in the allocation of resources in road sector in order to make the best use of public funds in preserving the road networks at an acceptable level of serviceability.

Er. G. Kumar Chief Officer (IT),
Er.R.Senthil Raj, Er.P.Eshwarmoorthy, Dr.P.RajakumarAssist Divisional Engineers (IT)
O/O The Director General, Highways Department, 76, Sardar Patel Road, Guindy, Chennai – 600 025.
Email: kumarg56@gmail.com

In Conversation with… "GIS is all about integration"

Indian geographic information systems (GIS) market over the years has been witnessing a significant growth. Government's focus on use of GIS in large initiatives is the indicator of GIS becoming mainstream. Esri India (NIIT GIS Ltd) is one of India's leading GIS Software & Solutions provider and enjoys a leadership position in India with a large customer base of Esri suite of software (ArcGIS). Esri India is a joint venture between Esri Inc., USA and NIIT Technologies Ltd. Its extensive customer base spans Government, Private sector and Academia covering various industry verticals such as Land management, Utilities, Infrastructure, Disaster Management, Telecommunications, Urban / Municipal, Transportation, Defence and Natural resources and many more. Worldwide Esri software is used in more than 300,000 organizations including two-thirds of Fortune 500 companies, and more than 7,000 colleges and universities. Esri applications are currently running on more than one million desktops and thousands of web and enterprise servers, providing the backbone for the world's mapping and spatial analysis need.

With this in the backdrop, we reproduce the conversation between Rajesh Mathur, Esri India and Jack Dangermond, President, Esri Inc... The purpose of this conversation is to provide an overview on the GIS technology evolution and its application to National GIS in India. Below are the excerpts from the conversation.

Rajesh: Jack, there's a lot of exciting work going on in R&D at Esri. What do you think would be the impact of these developments on how we should build and deliver National GIS for India?

Jack: Geography, from a scientific perspective, is a kind of common platform for us to understand our world. The challenges that are being faced in India today with respect to resource management and environmental concerns are driving the need for a geographic understanding for planning and decision making and a need for a pervasive platform providing a common operating picture. And, GIS is all about integration. It's about integrating different kinds of data, about integrating organizations and breaking down barriers. So when we think about National GIS or regional GIS or State wise GIS it is all about integration.

Rajesh: You mean information coming from various sources, establishing correlation between them, the cause and impact analysis or what-if analysis – being able to understand that if we could change some parameters, what difference would it make and what would be the impact.

Jack: Yes. Moreover, the theory that is emerging now is that can we build common services which all the different agencies can use rather than redundantly doing it in their stove pipes. Can the Survey of India for e.g. build a common base map that all the agencies can use as a web service, instead of standing it up on their own computers and data servers?

Today, GIS is at a major turning point of technology evolution. We started 43 years back with mainframes, went on to minis, workstations, PCs, client servers, web servers, servers, and now cloud. These were dramatic changes like reengineering and rethinking. But frankly this change that we are building now and putting hundreds and millions of dollars into it is a true transformation.

The idea is that we take all desktop and server technology what we call enterprise GIS and integrate it into cloud environment - making it pervasive. It automatically starts to integrate and share. This pattern is interesting at the same time disruptive but also integrative. End result is not only being able to see a holistic picture but also cost savings. In US & Europe, the underlying GIS cloud platform is based on Amazon and Microsoft Azure cloud, creating the web design pattern where geography is becoming a pervasive. In India, NIC could build a similar platform/cloud.

GIS professionals with all their content can connect and upload into cloud, share information and services - coding, decoding, routing, imagery or data as service. So you can read web maps in real-time. Services will be providing content, maps, lyrics, visualization and even support the idea of sketching and designing in this platform. For example, in India's context, Survey of India provides base maps as a service and forestry uses them. The concept is that as the Survey of India maps are updated they are perfectly dynamic and are available for dissemination via web. In such environment the maps can be overlaid to create relationships.

Rajesh: And this existing process can be reengineered by geo-enabling it.

Jack: Right. We have a common base, common routing, and common imagery. This means GIS becomes pervasive, anywhere, anytime, and on any device - that's the promise of the web itself. That's basically what this platform is all about and this changes user experience. Instead of need to turn all buttons, features, functions or basically exploring with maps, smart information, knowledge in almost real-time - you can zoom in and zoom out also. Such a platform integrates all types of information. The idea is like that of a national living atlas. Social media is part of it. What if this medium of cloud GIS which becomes a platform for National GIS is web maps? The term is easy to misunderstand but it's actually a web map in the platform environment and has a specific meaning – it has a specification – so information is always live. What can we do with a web map? We can visualize it in any device; we can embed it in any device; any website or media environment, thin Clients, e-books, websites etc.

Rajesh: In our country we have a lot of very large government projects with basic objective of providing relief to those who need government intervention. Very often government finds it difficult to determine which areas of intervention to provide support to citizens.

Jack: This is a remarkably simple idea – but because of the evolution of government both here in USA and India we have the stove pipes of the data sets that are kept more or less closed. So National GIS doesn't mean that you publish it for the whole world. It is an information system for using each others agencies, datasets for important policy or decision making. Empowering the bureaucrats, first to use and leverage each other and then, of course, at national level and then goes down to states, regional, districts, villages. So they can capture data and upload or download data. Hence we have a common platform for bringing the country together.

Rajesh: Essentially, everybody contributes and everybody consumes services. It's truly collaborative.

Jack: Yes, it about breaking down the barriers between the stove pipes. The different ministries can keep their data even in their own format. Such a trend is not limited to Mapping. Recently Microsoft showed next generation of PowerPoint called "PowerView" where the objects inside the PowerPoint slides are linked back to databases that are changing – so I can see charts change like hot links. So you can integrate the hot links onto a common slide and do your brief. Distributed organizational components can share and then they start talking with each other differently. They share their services and build on each others knowledge the whole thing gets easier, faster, and more holistic. The ArcGIS online platform which is in cloud today makes one hundred forty million maps a day. A map is a link back to data. You can have Survey of India online or Department of Space online or cities like Mumbai or Delhi online. It is much easier, easy connection and better leveraged. Users have 1 million servers, 1 million desktops; we connect them in network so we have desktop services and clouds which are sharing data. Users can upload data to server access by devices or via web.

Rajesh: So it's a Service Delivery Platform.

Jack: It is. You can do it either way from the server or by online and registering it in catalogue and same can be shared. You can define a group of users depending on nature of users, laws and guidelines and share it with all or limited people. Take advantage of our million desktop users and they can make the best visual maps, they can send it to the cloud and turn it into a web service. So the desktop becomes an authoring environment. How many users do you have in India?

Rajesh: There are around 8000 desktop users.

Jack: All of them can become authors and they can author them to server environments and cloud. You have free access through these web clients where you don't need software. You have apps that are smart and free and extract the service.

Rajesh: Embedding geospatial into functioning government is one of the key of objective of National GIS. This strengthens government system, increases transparency, operational efficiency.

Jack: My country and your country are jointly building – server technology and maps will make that come alive even richer. We are releasing a series of open APIs in March this year. Developers can take these API's and use them. We can have Indian bureaucracy apps for G2G, G2C, G2B, B2C or G2G2B.

Rajesh: They can convert knowledge to apps and services. It's a completely different view of deploying geospatial technology. We did move into services which is a huge transition, shared, collaborative and with easy integration. I see great opportunity for National GIS to adopt this platform and very relevant to our mission.

Jack: GIS is at a major turning point. This kind of technology platform is at a very fast pace realization of a National GIS concept. Emphasis here is not on spending a lot of money on more data or reformatting data, but integrating and providing access and leveraging what India has today.

Rajesh: Thank you Jack for giving an exciting run through the new ArcGIS Online platform●

Birla Institute of Technology & Science, (BITS), Pilani

The Birla Institute of Technology & Science, BITS Pilani is an all-India Institute for higher education. The primary motive of BITS is to "train young men and women able and eager to create and put into action such ideas, methods, techniques and information". The Institute is a dream come true of its founder late MrG.D.Birla - an eminent industrialist, a participant in Indian freedom struggle and a close associate of the Father of Indian Nation late Mr. Mohandas Karamchand Gandhi (Mahatma Gandhi). What started in early 1900s as a small school, blossomed into a set of colleges for higher education, ranging from the Humanities to Engineering until 1964 when all these colleges amalgamated to culminate into a unique Indian University of International standing. This university was christened as the Birla Institute of Technology and Science, Pilani, known to many as BITS, Pilani.

Over the years, BITS has provided the highest quality technical education to students from all over India admitted on the basis of merit. Its graduates may be found throughout the world in all areas of engineering, science and commerce. BITS symbolize the maturing of Indian technical ability and "can-do" entrepreneurial spirit, especially as derived from the private sector. BITS is located in the VidyaVihar campus adjacent to the town of Pilani in Rajasthan.

Department of Civil Engineering

Civil Engineering Department, one of the oldest departments in the country. Over the number of years, the department has produced young bright civil engineers of our country. The department has expertise in almost entire spectrum of civil engineering, apart from three Higher Degree programmes specialized in Structural Engineering, Transportation Engineering and Infrastructure Systems. Our faculty members and students are involved in various research activities in all areas of civil engineering. The department has been constantly involved in various consultancy projects.

The Civil Engineering Department has added this new domain of Geomatics(GIS, Remote Sensing, Image Processing)into its list of Taught programmes &Research areas way back in the year 2001, along with the other domains such as Structural Engineering, Environmental Engineering, Geotechnical Engineering, Soft Computing in Civil Engineering, Transportation Engineering, Water Resources Engineering, Green Buildings, Planning and Management. Geomatics Course

Currently the Department of Civil Engineering is offering the five different degrees under first Degree, higher degree and Doctoral programmes in Pilani Campus. The programmes offered are as follows:

- B.E. (Civil Engineering)
- M.E.(Civil - Structural Engineering)
- M.E.(Civil - Infrastructure Systems)
- M.E.(Civil - Transportation Engineering)
- Doctoral Programme (Ph.D)

The Geomatics course is so designed as to give sufficient theoretical background to the students on remote sensing, GIS and GPS and simultaneously put them on practical training. The Geomatics programmecan be taken as an elective course for the undergraduate students for any programme being conducted at the Civil Engineering Department. The students can further enhance this particular elective in its research in their post graduate and doctoral programmes. The Geomatics course is offered as two separate electives as Geographic Information Science and Remote Sensing/Image Processing. GIS Infrastructure & Faculty

This spacious laboratory is well equipped with high-end hardwares along with the updated versions of GIS& Image Processing Softwares such Esri's ArcGIS. Our faculty has extensive experience in industry, research as well as teaching. Our strength is a reflection of their skills, innovation and drive. Our staff members typically have a high sense of purpose and derive great meaning from working together to ensure BITS Pilani's academic and research excellence is well supported●

For More Details Contact:
Rajiv Gupta, Ph.D.
Professor, Department of Civil Engineering
Birla Institute of Technology & Science, Pilani
Pilani Campus, VidyaVihar
Pilani 333031, Rajasthan, India
Phone: +91 8741959971
Fax: +91 1596244183
Email: rgbits@gmail.com
www.bits-pilani.ac.in

13th Esri India User Conference 2012 : GIS Opening our World

Esri India once again rolled out a successful interaction with all the Esri users at one of the biggest GIS extravaganza at the 13th Esri India User Conference held from 4 – 6 December 2012 at Hotel Radisson Blu MBD Hotel, Noida. Around 850 + delegates from the Geospatial community across public/private sector and academia gathered at The Esri India user conference to share knowledge and collaborate for developing smart technology solutions that can make life better. The user conference was extremely well received by the attendees with the new directions of GIS technology being discussed at all levels. The user conference sponsored by our all-time Partners Trimble as Platinum Sponsors, our media partners – Coordinates, Geospatial Today and Geospatial World and Navteq as Literature Kit co-sponsor. The associated Exhibition where not only Esri India exhibited its upcoming newer technologies but also exhibited our Partner solutions like Trimble and other exhibitors were Map My India, NIIT University, NATMO.

A day prior to the User Conference, Esri India organised a Preconference Seminar on Geodesign and Developer Summit, which was a hit evident from the quality of participants from the geospatial community. The seminar on Geodesign was conducted by our Esri Experts on geodesign Shannon Mclavney, along with our Esri technology users from Reliance. The geodesign seminar presented an approach that transforms the traditional engineering design project lifecycle by synthesizing drawing data, planning applications based on GIS technologies, design workflows and methodologies, creatively to the existing process. The Developer Summit first of its kind was organised bringing together the Software Developers from both the GIS and non GIS community to interact and get cognizant on the latest advancements in GIS technology.The Summit was addressed by Dr. Scott Morehouse, Director of Software Development, Esri Inc.This Developer Summit aspired to help a Software Developer to become more effective at building web/mobile mapping applications and aimed at creating a mechanism that is flexible enough to handle the broad range of dimensions that are actually involved in software development.

The theme of the User Conference this year was "GIS – Opening our World". Today GIS is evolving into a new platform: cloud GIS and thus making geographic understanding pervasive. Everyone is getting more involved in crowd sourcing and social media bringing in real-time information. Mr. S. Sridhar, President &COO , NIIT GIS Ltd. welcomed the delegates and set the ball rolling as he spoke about the fruitful journey of 16 years of Esri India, focusing on the company's vision to offer solutions to enhance the quality of life, Sridhar highlighted some of the successful projects that use Esri software solutions.

The Guest of Honor for the day was Mr. S Subba Rao, Surveyor General of India highlighted on the role of India's principal mapping agency in the development of the National GIS. Emphasizing on the critical role of surveyors in planning and development. He also mentioned on the role of National GIS that aims at opening India for its citizens, though spatial data has a critical role to play in the integration of information. The National GIS version 1.0 will have maps on the 1:50K scale which will be later on replacedwith 1:10k data, as there is scope of providing better information on this data scale Open series maps will be used in National GIS for which software and hardware will need to be upgraded. As crowd sourced data will also be used, mechanism for quality check of such data needs to be set in place. National GIS will play a crucial role in enablingG-governance, assimilating data from public agencies, providing citizen services and management of natural resources.

Mr. Dean Angelides, Director International Operations, shared the technology vision and spoke how GIS is becoming significant infrastructure for information and delivering value in terms of demographics, environment, public safety, business management, disaster response, land use planning, transport, renewable energy. He also mentioned India was very important from the industry point of view because there was so much more happening here than anywhere else in the world. Speaking on the technical advancements Dean said, "Maps help us in integrating, applying knowledge and telling stories, creating spatial understanding which helps in planning for a better future. Today GIS is at a major turning point, dramatically evolving, leveraging and converging with many trends. Cloud platforms forming the new basis that are integrating and extending GIS for connecting everything and making information available anywhere and anytime. Hence breaking down barriers enabling Organisations to rapidly adapt to this platform and liberate their geospatial data.

Addressing the august gathering at the user conference Mr. Arvind Thakur, CEO, NIIT Technologies, said GIS technology is playing an important and significant role in making us understand the various challenges being faced by the human race such as climate change, social unrest, loss of biodiversity, economic slowdown and also expressed hope that the Bill on retail FDI would finally be passed in the Parliament and giving a huge booster for the geospatial industry in India. After addressing the gathering Mr. Arvind Thakur presented the Esri India Awards for the year 2012 to some of its users for outstanding applications of geospatial technology. The ESRI India Special Achievement in GIS Award had three recipients. The first awardee, National Centre of Sustainable Coastal Management (NCSCM) under the Ministry of Environment and Forests used geospatial technology to integrate coastal data and complete the national shoreline coast assessment for the entire coastline of mainland India. The second Esri India SAG award went to National Remote Sensing Centre (NRSC) Hyderabad, for bringing about "every conceivable social relevance" to geospatial technology – from natural resources to environment, weather to disaster management and structural development. The third award was presented to Gujarat Forest Department for developing and implementing a project based on mobile GIS application for effective use of GIS in forest management. The 'Making a Difference Award' is given to people/institutions who are changing the lives in the society. This this award was presented to Orissa Primary Education Programme Authority (OPEPA), the state-level education agency in Orissa with the goals of universal elementary education under the SarvaShikshaAbhiyan, for its use of GIS technology.

The morning session showcased exciting talks by our prominent users. The first Keynote address was given by Mr. NG Siau Yong, Director, GeoSpatial Division, SLA, Singapore. He spoke about how Singapore Government works along with the Community in collaboration to reach the masses for common good. He showed how Singapore One Map is citizen centric service providing better governance in the country.Addressing the eminent gathering of the Esri technology users, Dr Vandana Sharma, Deputy Director General, National Informatics Centre called for increasing public delivery of information and data. She said, "Information is there in the verticals and what we need is a

horizontal exchange of information. Time is now to integrate this information, where GIS is known to be a great integrator and enabler of information."Mr. Rick Gosalvez, Trimble Local Government Portfolio Manager, spoke about how technology is combing with each other changing the world for us and offering a variety of technology solutions for the growing communities and focused on energy distribution, planning and transportation program in India.

The afternoon session began with live application showcase byDr. J R Sharma, Officer on Special Duty & CGM, Regional Centres, NRSConthe Web Enabled Water Resources Information System (WRIS)in the Country. He emphasized about the National need and importance, combating challenges of water availability in the country. He also mentioned WRIS is a single window solution solution for comprehensive, authoritative and consistent data & information of India's water resources along with allied natural resources in standardized national GIS framework with tools to search access and visualize the information for Integrated Water Resource Management (IWRM).

Followed by the Technology Exposition, where the delegates were taken on exciting journey of ArcGIS by the Technology and Solutions team of Esri India showcasing the updates on products and solution available from Esri – ArcGIS 10.1 and latest upcoming developments. This was followed by technology demos and Lightening Talks bringing in a new concept where our users came and spoke about they used Esri technology for the benefit of the society. During this special session Mr. P K Srivastava, Managing Director, GSDL, spoke about the geoenabling governance in Delhi State and how Government of Delhi plans to use GIS for various purposes such as Chronic Water Logging, property taxation and better governance creating better decision support system. Mr. P K Kapoor, Executive Director, Airports Authority of India gave the second lightening talk on the web-based application called NOCAS a completely online system for obtaining an NOC (No Objection Certificate) for height clearance. NOCAS was deployed as e-governance transparency tool and the application has been uploaded for public access to obtain the clearances. The second day of the conference started with great excitement and interactive participation by various users shared their innovative ideas and research work with the GIS fraternity. A total of 49 papers and 23 posters presentation were made by our esteemed GIS users. A seriesof success stories from acrosssectors such as healthcare,forestry and environment,infrastructure, disastermanagement were presentedduring User Presentations. Presentations were also done by our Technology partners – Trimble, Navteq Maps, Telvent and Exelis Vis. They showed with latest developments happening around their technology can be embedded or integrated with Esri GIS giving an improved solutions.

The two day user conference came to an end with an exciting valedictory Address by Prof. N Vinod Chandra Menon, former member of National Disaster Management Authority (NDMA), India. Delivering his valedictory speech he said GIS practice in India is still at a nascent stage but we can see young professionals everywhere. He urged young professionals to think beyond conventional GIS and bring innovation in GIS practices. He appreciated NDMA for its national disaster management information and communications system for informed decision making. He also appreciated Department of Information Technology for the concept of Common Service Centre (CSC), which will be set up for every six villages.

The conference ended with an Award Ceremony for the User Presentations and an invitation to the Delegates for the User Conference scheduled for 10-12 December 2012. Awards were given under the Best Paper, Best Student Paper and Best Poster category.

Category	Author	Title
Best Paper Award	Dr. Y. Pari, L&T Ajay Kumar, NIC Dr. Kishore Kumar, CRRI	Importance of Enterprise GIS in Construction Industry Web based GIS on National River Conservation Plan Geoenvironmental Appraisal of Landslide Hazzards on Highways
Best Student Paper Award	AnusheemaChakraborty, TERI University	Mapping biomes of India using Holdridge life zone model - identifying footprints of climate
	Swarup Kumar Tripaty, IIT Kharagpur	Estimation of Soil erosion around Jadukata Watershed of Uraniferous Sector of Mahadek basin, Meghalaya Using USLE and RS-GIS Technique
	VV Govind Kumar, Roorkee	Monitoring and Analysis of CloudBurst Region using IIT Geomatic Techniques
Best Poster Award	SanjeebMohapatra, NEERI, Nagpur, Anjali Dogra, Student, University	M. Tech. NEERIPerformance Evaluation of Water Nagpur, Distribution System Using ArcGIS 10 and EPANET GIS based Study on Indian Treasure and its Economy : NIIT Tourism "Incredible India"
	Shubhangi Mane, Student, University	Remote Sensing and GIS based Slope Stability Analysis NIIT Using Weighted Sum Method for Part of Himachal Himalayas, India

Tips & Tricks Clip the Data Frame to Make Your Map Polished, Professional

When making a map, it sometimes helps to use multiple data frames to show several areas of interest to make the best use of the available space on the page. For example, in Figure 1, there are two data frames that show various areas of the India: The main data frame on the page shows the conterminous states; one smaller data frames show Gujarat, and other two data frame shows the mapped areas in context of a India view, although A&N Islands and Lakshadweep are too small to be seen well at this map scale.

- A graphic shape you draw with the Draw toolbar in a focused data frame
- The extent of all the features in a specific layer
- The extent of all the features in a specific layer that is visible in the current map extent
- A selected feature in a specific layer
- A rectangle defined by coordinates that you specify

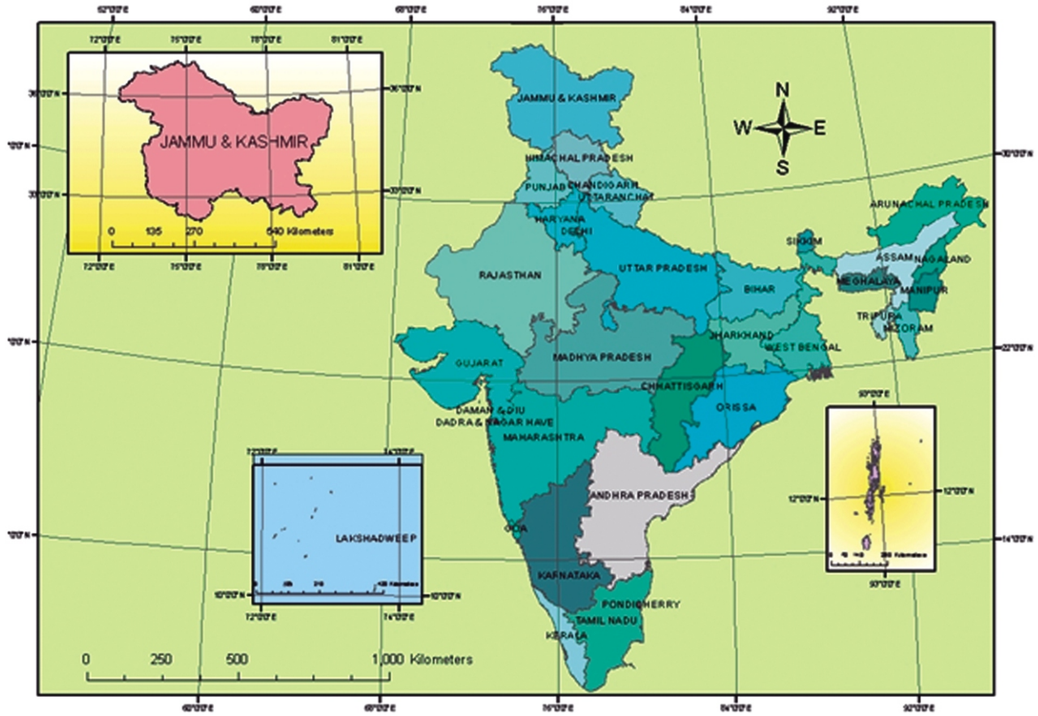


Figure 1. Areas outside the 48 conterminous states are shown in separate data frames on this India map.

The advantages of using this mapping technique are that (1) you can use the page space more efficiently because you do not have to show the entire extent for all areas mapped within one data frame, and (2) you can map each area appropriately, using the proper coordinate system, map scale, grid or graticule settings, and so on.

When using multiple data frames to map the various areas of interest, it often helps to modify the shape of a data frame to better fit the allowable space on the page. You can use a data frame shape that fits into the available area without obscuring other important features that you also want to show. In ArcMap, this is called "clipping the data frame." For example, in figure 2 below, Gujarat is shown in a data frame shaped to fit into the space.

ArcMap can use any of the following as shapes to clip the data frame:

There are essentially three steps to clip a data frame:

1. Create or specify the shape for the data frame.
2. Use the options on the Frame tab of the Layer Properties dialog box to clip the data frame.
3. Specify the way the data frame boundary and associated grids or graticules will look.

Follow are the steps to learn how this is done in ArcGIS 10.1 and above.

Step 1: In ArcMap, open the archive USA.zip and extract the map package.

Step 2: Make sure that you are in layout view and focus the data frame that you want to clip by double clicking it. Step 3: Use the Polygon tool on the Draw toolbar in data view to create the shape you want for the data frame.

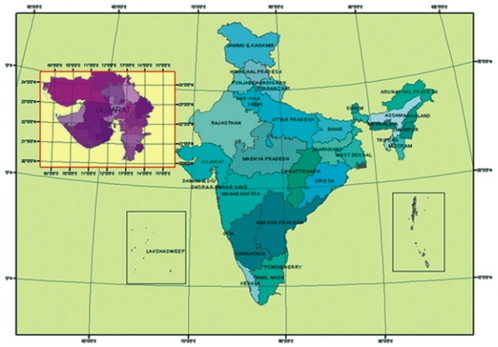


Figure 2. Draw a shape that will be used to clip the data frame.

Step 4: In the table of contents, right-click the data frame you want to clip and click Properties. On the Data Frame tab, under Clip Options, select Clip to shape from the drop-down menu (figure 3).

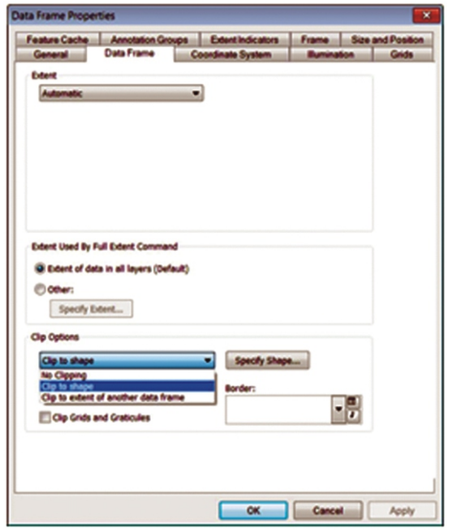


Figure 3. Select the Clip to shape option on the Data Frame tab.

Step 5: Click Specify Shape and select the option to clip to Outline of Selected Graphics(s) (figure 4). The Outline of Selected Graphic(s) button will be disabled if the graphic is not selected.

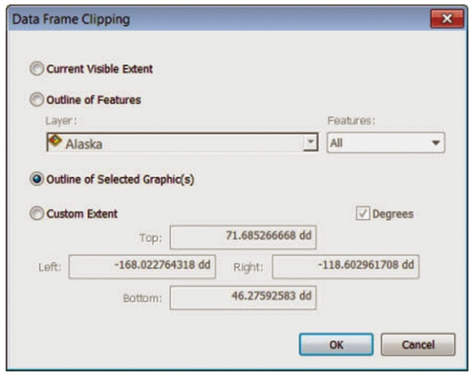


Figure 4. Specify the layer with the converted graphics as the shape that the data frame will be clipped to.

Step 6: Set the background and border frame properties on the Frame tab of the Data Frame Properties dialog box. Right-click the data frame in the table of contents and click Properties. On the Data Frame tab, click the Border drop-down arrow for the border symbol and change the color and width as desired Click the Style Selector button to change the color of the border.

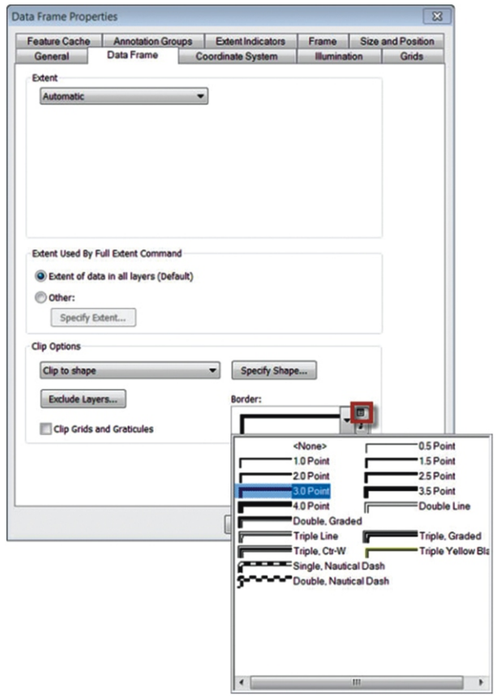


Figure 6. Change the data frame's border symbol on the Data Frame tab of the Data Frame Properties dialog box.

Step 7: If you have a grid or graticule, click the Grid tab and check the box to display a graticule in layout view. Click the Properties button to set properties for the axes, labels, hatching, and intervals.

The final map has the clipped data frame, graticule, and border symbology that match the other data frames on the page.

How to use Drawing tools in ArcGIS API for Flex

DrawToolSample.mxml

```
<?Xml version="1.0" encoding="utf-8"?>
<s:Applicationxmlns:fx="http://ns.adobe.com/mxml/2009"
              xmlns:s="library://ns.adobe.com/flex/spark"
              xmlns:mx="library://ns.adobe.com/flex/mx"
              xmlns:esri="http://www.esri.com/2008/ags"
             pageTitle="Using the DrawTool">

  <s:layout>
    <s:VerticalLayoutpaddingBottom="6"/>
  </s:layout>
  <fx:Style>
    @namespace mx "library://ns.adobe.com/flex/mx";
    mxlToolTip
    {
       font-size: 14;
    }
  </fx:Style>
  <fx:Script>
    <![CDATA[
       importcom.esri.ags.events.DrawEvent;
       importmx.events.ItemClickEvent;
       importspark.events.IndexChangeEvent;
       protected function
tbb_itemClickHandler(event:ItemClickEvent):void
       {
          if (tbb.selectedIndex< 0)
          {
             // when toggling a tool off, deactivate it
             myDrawTool.deactivate();
          }
          else
          {
             switch (event.item.label)
             {
                case "MAPPOINT":
                {
myDrawTool.activate(DrawTool.MAPPOINT);\
break;
                }
                /* case "MULTIPOINT":
MyDrawTool.activate(DrawTool.MULTIPOINT);
Break; */
                /* case "Single Line":
myDrawTool.activate(DrawTool.LINE);
 break; */
case "POLYLINE":
 {
myDrawTool.activate(DrawTool.POLYLINE);
Break;
 }
case "FREEHAND_POLYLINE":
{
MyDrawTool.activate(DrawTool.FREEHAND_POLYLI
NE);
Break;
}
case "POLYGON":
{
myDrawTool.activate(DrawTool.POLYGON);
Break;
}
case "FREEHAND_POLYGON":
{
MyDrawTool.activate(DrawTool.FREEHAND_POLY
GON);
Break;
}
case "EXTENT":
{
myDrawTool.activate(DrawTool.EXTENT);
Break;
}
case "CIRCLE":
{
MyDrawTool.activate(DrawTool.CIRCLE);
Break;
}
case "ELLIPSE":
{
myDrawTool.activate(DrawTool.ELLIPSE);
Break;
}
          }
       }
    }
```

```
protected function DrawTool_drawEndHandler
(event:DrawEvent):void
        {
            // reset after finished drawing a feature
            myDrawTool.deactivate();
            tbb.selectedIndex = -1;
        }
    ]]>
</fx:Script>
<Fx:Declarations>
    <!-- Symbol for all point shapes -->
    <esri:SimpleMarkerSymbol id="sms"
                    color="0x00FF00"
                    size="12"
                    style="square"/>

    <!-- Symbol for all line shapes -->
    <esri:SimpleLineSymbol id="sls"
                    width="3"
                    color="0x00FF00"/>

    <!-- Symbol for all polygon shapes -->
    <esri:SimpleFillSymbol id="sfs"
                    color="0xFFFFFF"
                    style="diagonalcross">
        <esri:outline>
            <esri:SimpleLineSymbol width="2"
color="0x00FF00"/>
        </esri:outline>
    </esri:SimpleFillSymbol>

    <esri:DrawTool id="myDrawTool"

drawEnd="drawTool_drawEndHandler(event)"
                fillSymbol="{sfs}"
                graphicsLayer="{myGraphicsLayer}"
                lineSymbol="{sls}"
                map="{myMap}"
                markerSymbol="{sms}"/>
</fx:Declarations>

<s:controlBarLayout>
    <s:HorizontalLayouthorizontalAlign="center"
                paddingBottom="7"
                paddingTop="7"/>
</s:controlBarLayout>
<s:controlBarContent>

    <Mx:ToggleButtonBar id="tbb"
                itemClick="tbb_itemClickHandler(event)"
                labelField="null"
                selectedIndex="-1"
                toggleOnClick="true">

<Fx:Objectcon="@Embed(source='assets/i_draw_point.png')"
label="MAPPOINT"/>

<fx:Object icon="@Embed(source='assets/i_draw_line.png')"
label="POLYLINE"/>

<fx:Object
icon="@Embed(source='assets/i_draw_freeline.png')" label=
"FREEHAND_POLYLINE"/>

<fx:Object icon="@Embed(source='assets/i_draw_poly.png')"
label="POLYGON"/>

<Fx:Object icon="@Embed(source='assets/i_draw_freepoly.png')"
label="FREEHAND_POLYGON"/>

<fx:Object icon="@Embed(source='assets/i_draw_rect.png')"
label="EXTENT"/>

<fx:Object icon="@Embed(source='assets/i_draw_circle.png')"
label="CIRCLE"/>

<Fx:Object icon="@Embed(source='assets/i_draw_ellipse.png')"
label="ELLIPSE"/>

        </mx:ToggleButtonBar>
    </s:controlBarContent>

    <esri:Map id="myMap"
            level="3"
            wrapAround180="true">
        <esri:ArcGISTiledMapServiceLayer
url="http://server.arcgisonline.com/ArcGIS/rest/services/World_
Imagery/MapServer"/>
        <esri:GraphicsLayer id="myGraphicsLayer"/>
    </esri:Map>

    <s:Label width="100%" text="The DrawTool can be used
to draw new features which can then either be used as input
for a task or saved as new features in a feature service (using
FeatureLayer.applyEdits)."/>

    <s:Label width="100%" text="Use the EditTool to edit
existing geometries. The Editor component combines both
these tools for an easy user experience."/>


</S:Application>
```


Miele Turns to Esri to Drive Growth

Location Analytics Propels Orange County, California, Dealer to 70 Percent Increase

Redlands, California—Miele, Inc., a premium provider of domestic appliances and commercial machines, has streamlined its distribution network in the United States using Esri technology. Esri's software and data are used to better understand which markets are best for the company's high-quality products. By focusing on specific segments of the marketplace, Miele can pinpoint customers and help its dealers be more successful.

"GIS has been an important tool to help us navigate the American economy in the last few years," said Matt Kueny, senior business analyst in sales at Miele. "Just because someone might have the income to spend on one of our products doesn't necessarily mean they are a realistic target for our brand based on other lifestyle variables. Using Esri technology, we have been able to better analyze patterns and share this information with our dealer network so we can get the needed item to the customer."

Using the ArcGIS platform, Miele was able to better gauge the health of its dealer network and ensure that products were available in the most appropriate market segments. Esri Business Analyst Online helps Miele communicate key marketing activities to its dealers and work in a collaborative environment. By being able to visualize and analyze sales information and business data through maps, one Orange County, California, Miele dealer achieved a 70 percent growth in sales.

"Miele has done an astounding job of responding to a changing and highly competitive marketplace by applying technology and expertise in an innovative manner," said Simon Thompson, director of commercial solutions at Esri. "Miele really is inspirational in that it has helped its dealers grow their businesses in an environment where many businesses are failing."

Miele continues to adapt to its customers' evolving retail sophistication and help its dealers keep up their revenue by applying location analysis to online shopping. "By tracking search engine hits in our gap markets, we are able to geotarget the nearest dealer to that Internet shopper," said Kueny. "We are making the shopping experience more convenient by helping the customer find the nearest product. It's all about customer service."For more information on how retailers use GIS to help their business, visit esri.com/business.

Esri Supports Development of UCSB Ocean Use Application

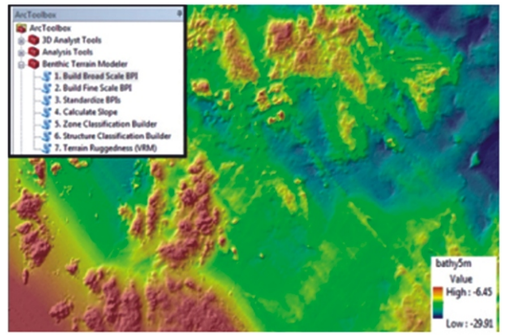
ArcGIS and SeaSketch Provide a Platform for Organizations to Design Sustainable Ocean Management Plans

Redlands, California—The University of California, Santa Barbara (UCSB), has now officially launchedSeaSketch, an ocean planning tool supported by Esri, the world leader in GIS. Conservationists, planners, and ocean resource managers will use the GIS application and Esri's ArcGIS Online to plan sustainable ocean use management.

"Helping people make better decisions in the environmental space is extremely important to me," said Jack Dangermond, president, Esri. "Our support of the UCSB SeaSketch project is a component of the Esri Ocean GIS Initiative, which allows people to positively impact the future through a deeper, geographic understanding of the ocean."

Researchers from the UCSB McClintock Lab designed SeaSketch to study human impacts on the ocean environment and plan responsible resource management. An agency that buys a SeaSketch subscription from UCSB can set up an online workspace and invite planners and stakeholders to design and study plan elements such as marine protected areas, aquaculture sites, and permitted fishing.

ArcGIS Online, which is a cloud-based, collaborative content management system for maps, applications, data, and other geospatial information, plays a major role in SeaSketch. It enables project managers to discover an enormous amount of geospatial data that may be helpful for their projects. Because SeaSketch incorporates Esri's ArcGIS web development technology, project managers can easily move from ArcGIS environments into SeaSketch. Organizations can leverage existing investments in ArcGIS by directly pulling published map services into SeaSketch, ensuring the application uses the most current data available. Adding GIS



tools and applications to SeaSketch extends its capabilities. For example, adding Esri and the National Oceanic and Atmospheric Administration's (NOAA) Benthic Terrain Modeler (BTM) gives users a set of geoprocessing tools to analyze benthic terrain and classify surficial seafloor characteristics.

The United Nations Environment Programme World Conservation Monitoring Centre (UNEP-WCMC) will use SeaSketch to facilitate dialog among businesses, organizations, and governments regarding the use of the high seas.

"SeaSketch is a great step forward in interactive marine spatial planning," said Damon Stanwell-Smith, acting head, marine assessment and decision support program of UNEP-WCMC. "Marine data can be complicated and complex to many people who need it. SeaSketch provides a friendly, intuitive tool to help people understand ocean resources and work together to create a plan".

Did you Know that…

Georeferencing and coordinate systems

Georeferencing is about using map coordinates to assign a spatial location to map features. All the elements in a map layer have a specific geographic location and extent that enables them to be located on or near the earth's surface. The ability to accurately locate geographic features is critical in both mapping and GIS.

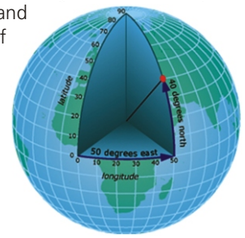
Describing the correct location and shape of features requires a coordinate framework for defining real-world locations. A geographic coordinate system is used to assign geographic locations to objects. A global coordinate system of latitude-longitude is one such framework. Another is a planar or Cartesian coordinate system derived from the global framework.

Maps represent locations on the earth's surface using grids, graticules, and tic marks labeled with various ground locations—both in measures of latitude-longitude and in projected coordinate systems such as UTM meters. The geographic elements contained in various map layers are drawn in a specific order (one on top of another) for the given map extent.

GIS datasets contain coordinate locations within a global or Cartesian coordinate system to record geographic locations and shapes. In this way, multiple GIS data layers can be overlaid onto the earth's surface.

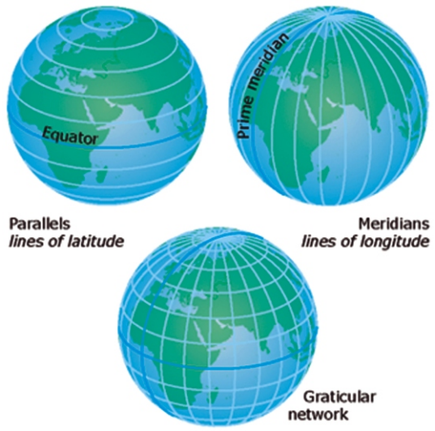
Latitude and longitude

One method for describing the position of a geographic location on the earth's surface is using spheri cal measures of latitude and longitude. They are measures of the angles (in degrees) from the center of the earth to a point on the earth's surface. This type of coordinate reference system is often referred to as a geographic coordinate system.



Longitude measures angles in an east–west direction. Longitude measures are traditionally based on the prime meridian, which is an imaginary line running from the North Pole through Greenwich, England, to the South Pole. This angle is longitude 0. West of the prime meridian is typically recorded as negative longitude, and east is recorded as positive. For example, the location of Los Angeles, California, is roughly plus 33 degrees, 56 minutes latitude and minus 118 degrees, 24 minutes longitude.

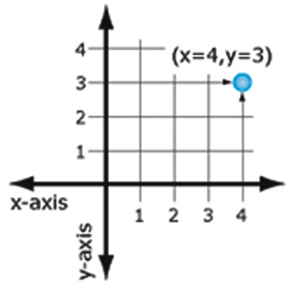
Although longitude and latitude can locate exact positions on the surface of the globe, they do not provide uniform units of measure for length and distance. Only along the equator does the distance represented by one degree of longitude approximate the distance represented by one degree of latitude. This is because the equator is the only parallel as large as a meridian. (Circles with the same radius as the spherical earth are called great circles. The equator and all meridians are great circles.)



Above and below the equator, the circles defining the parallels of latitude get gradually smaller until they become a single point at the North and South Poles where the meridians converge. As the meridians converge toward the poles, the distance represented by one degree of longitude decreases to zero. On the Clarke 1866 spheroid, one degree of longitude at the equator equals 111.321 kilometers, while at 60° latitude, it is only 55.802 kilometers. Since degrees of latitude and longitude don't have a standard length, you can't measure distances or areas accurately or display the data easily on a flat map or computer screen. Using many (but not all) GIS analysis and mapping applications often requires a more stable, planar coordinate framework, which is provided by projected coordinate systems. Alternatively, some of the algorithms used for spatial operators take into account the geometric behavior of spherical (geographic) coordinate systems.

Map projections using Cartesian coordinates

A projected coordinate system is any coordinate system designed for a flat surface, such as a printed map or a computer screen.



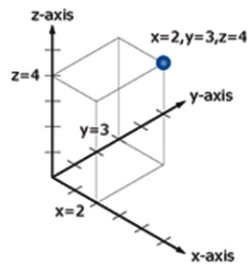
Both 2D and 3D Cartesian coordinate systems provide the mechanism for describing the geographic location and shape of features using x- and y-values (and as you will read later, by using columns and rows in rasters).

The Cartesian coordinate system uses two axes: one horizontal (x), representing east–west, and one vertical (y), representing north–south. The point at which the axes intersect is called the origin. Locations of geographic objects are defined relative to the origin, using the notation (x,y), where x refers to the distance along the horizontal axis and y refers to the distance along the vertical axis. The origin is defined as (0,0).

In the illustration below, the notation (4,3) records a point that is four units over in x and three units up in y from the origin.

3D coordinate systems

Increasingly, projected coordinate systems also use a z-value to measure elevation above or below mean sea level.

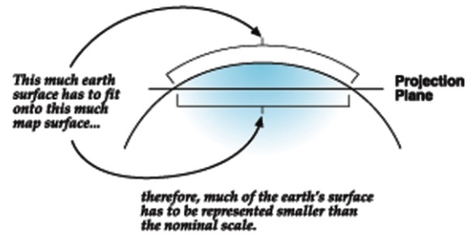


In the illustration below, the notation (2,3,4) records a point that is two units over in x and three units in y from the origin and whose elevation is four units above the earth's surface (such as 4 meters above mean sea level).

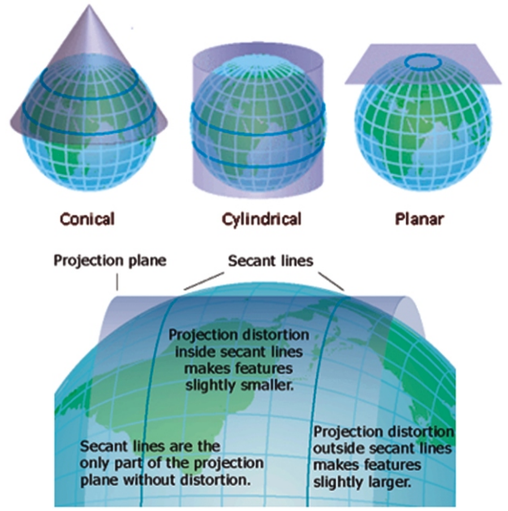
Properties and distortion in map projections

Since the earth is spherical, a challenge faced by cartographers and GIS professionals is how to represent the real world using a flat or planar coordinate system. To understand the dilemma, consider how you would flatten half of a basketball; it can't be done without distorting its shape or creating areas of discontinuity. The process of flattening the earth is called projection, hence the term map projection.

A projected coordinate system is defined on a flat, two-dimensional surface. Projected coordinates can be defined for 2D (x,y) or 3D (x,y,z) in which the x,y measurements represent the location on the earth's surface and z would represent height above or below mean sea level.



Unlike a geographic coordinate system, a projected coordinate system has constant lengths, angles, and areas across the two dimensions. However, all map projections representing the earth's surface as a flat map create distortions in some aspect of distance, area, shape, or direction.



Users cope with these limitations by using map projections that fit their intended uses, their specific geographic location, and extent. GIS software also can transform information between coordinate systems to support integration of datasets held in differing coordinate systems and to support a number of critical workflows.

Many map projections are designed for specific purposes. One map projection might be used for preserving shape while another might be used for preserving the area (conformal versus equal-area projections).

These properties—the map projection along with spheroid and datum—become important parameters in the definition of the coordinate system for each GIS dataset and each map. By recording detailed descriptions of these properties for each GIS dataset, computers can reproject and transform the geographic locations of dataset elements on the fly into any appropriate coordinate system. As a result, it's possible to integrate and combine information from multiple GIS layers regardless of their coordinate systems. This is a fundamental GIS capability. Accurate location forms the basis for almost all GIS operations.

ENVI FAQs

Q. Name the different products from ENVI & IDL family along with their add on modules?

A. Below are the products along with add on modules.

Sl. No.	Product Name and Version	Add on Modules
1	ENVI 5.0	ENVI Feature Extraction (ENVI Fx) ENVI Atmospheric Correction (ENVI ACM) Digital Elevation Models (DEMs) ENVI Orthorectification ENVI NITF ENVI 4.8 for ArcGIS Server
2	ENVI LiDAR 3.2	ENVI LiDAR
3	IDL 8.2	IDL Dataminer IDL Advanced Math & Stats IDL DICOM Solutions IDL Virtual Machine

Q. What are the operating systems supported in ENVI?

A. See the table below:

Platform	Vendor	Hardware	Supported Versions [a]
Windows	Microsoft	Intel/AMD 32-bit	XP SP2, Vista, 7 XP, Vista, 7
		Intel/AMD 64-bit	
Macintosh	Apple	Intel 64-bit	OS X, 10.6b, 10.7b
Linux	Various	Intel/AMD 64-bit	Kernel 2.6.9, glibc 2.3.4, GTK+ 2.4.13

[a] Supported versions indicate that ENVI was either built on (the lowest version listed) or tested on that version. You can install and run ENVI on other versions that are binary-compatible with those listed.

[b] The IDL Workbench (included with ENVI + IDL) on Macintosh OS X requires Java 1.6. The Apple X11 X-Windows manager is required for Macintosh. If X11 is not already installed, install it from the Mac OS X installation disk.

For optimal performance, your video card should have a minimum of 1 GB RAM and should support OpenGL 2.0 or later. Also be sure to install the latest drivers for your video card.

Q. ArcGIS tools aren't showing up in ENVI—why not?

A. If tools such as Send Image to ArcMap, Print, or Save to ArcGIS Geodatabase are unavailable, check to make sure that you are using 32-bit ENVI.

ENVI must be in 32-bit mode to communicate with ArcGIS. If you are using a 32-bit operating system, then the 32-bit version of ENVI will be the only version available. However, the default installation on 64-bit systems is 64-bit ENVI. In this case, 32-bit ENVI can be found in the ENVI menu group in the 32 bit folder.

Q. ENVI Tools aren't showing up in ArcMap—how do I install them?

A. If ENVI is installed after ArcMap, these tools should be installed automatically. However, if they are not then you'll need to right click in the ArcToolbox area of ArcMap and select Add Toolbox. Then navigate to the following location and select ENVI Tools.tbx

ENVI 5.0: C:\Program Files\Exelis\ENVI50\gptools\arctoolbox\toolboxes

ENVI 4.8: C:\Program Files\ITT\IDL\IDL80\products\envicommon\envigptools\arctoolbox\toolboxes

Q. Which versions of ENVI and ArcMap are compatible?

A. ENVI 4.8 is compatible with ArcMap 9.3 and 10.0 and ENVI 5.0 is compatible with ArcMap 10.0.

Q. Can I open an image from an ArcGIS Geodatabase?

A. Yes. First, connect to the geodatabase using the Remote Connection Manager found under File on the main ENVI menu (in 4.8, under Window). Once the connection is established, use File > Open Remote Dataset (in 4.8, File > Open Remote File) to open the image.

Q. Can I access images that I've published on ESRI Image Services?

A. Yes, as of ENVI 5.0 Service Pack 1. These images can be accessed via the Remote Connection Manager and File > Open Remote Dataset.

Q. How do I compose a map from ENVI?

A. Under File, select Print or Chip View To > Print. This will open a new dialogue window in which you can compose your map. However, this does require ArcGIS to be installed. If ArcGIS is not installed then the print option will not be available.

Q. What are the modules are required for hyperspectral image processing

A. Base ENVI 5 has all hyperspectral image processing capabilities. But atmospheric correction is very much important for spectral analysis so Atmospheric Correction (ACM) add on module is recommended.

Q. How to create ROI in ENVI 5

A. Create vector layer in ENVI 5 and convert the same to ROI. Alternatively use ENVI 5 Classic.

Q. Are licenses backwards compatible?

A. All Exelis VIS product licenses are backwards compatible, with two caveats:

Due to the encryption technology used in ENVI and IDL licenses that are version 4.8/8.0 and above, you must be using lmgrd version 11.6 or greater for server based licenses. This is installed by default with ENVI 4.8 and 5.0, as well as IDL 8.0, 8.1, and 8.2.

While licenses are backwards compatible, the default directories that the license manager looks in are different versions, so you will want to make sure that you place a copy of the license file in the default installation directories used by the older versions. Those locations are listed below:

ENVI 5.0, IDL 8.2 and above:
Windows - C:\Program Files\exelis\license
Linux/Solaris - /usr/local/exelis/license
Macintosh - /Applications/exelis/license
ENVI 4.3 - 4.5, IDL 6.4 - 7.1:
Windows: C:\Program Files\itt\license
Linux/Solaris: /usr/local/itt/license
Macintosh: /Applications/itt/license
ENVI 4.2 and older, IDL 6.3 and older:
Windows: C:\RSI\license
Linux/Solaris: /usr/local/rsi/license
Macintosh: /Applications/rsi/license

Q. Can we install more than one version of ENVI/IDL on a single system?

A. It is possible to have more than one version of the software installed at any given time, and they should not conflict with one another (for example, using ENVI 4.8 and ENVI 5.0 on the same system).

Q. I am getting an error message that ENVI Orthorectification license is available but Orthorectification module is not available on my ENVI?

A. ENVI orthorectification module delivers a trusted, rigorous orthorectification method with robust capabilities. It comes with separate installer, which needs to be installed after installation of ENVI