



The Esri User conference held in San Diego was a very exciting event- exciting both from the technology that was showcased as well as from the sheer number of participants.

This year also, the GIS community in India has great reasons to cheer- two organizations from India won the prestigious SAG awards- Registrar General of India and NIC- Bhopal. Both the programs were outstanding and really deserve the accolades and the awards.

In my last communication, I had written about Arc GIS on line- the full potential of this was very well showcased during the UC- the adaption of this technology in India will go a long way in spreading the access of Geo Spatial Information to a much wider audience.

Month of September was very eventful. We had the privilege of having Jack Dangermond with us. He met with a cross section of GIS users and opinion leaders and his presentation in the event hosted by FICCI in their auditorium, which was packed to its capacity, was outstanding. It was Jack at his best, and he could relate very well to the needs of our country and the role GIS can play. The highlight of his visit was his personally handing over the SAG awards to the winners, during a special session organized for the leaders from the GIS Industry.

Over the last few months, the adaption of Esri technology in various sectors has increased. With the rapid absorption of this technology, the need for qualified personnel is on the rise.

The benefits of this technology cannot be realized unless we have adequate manpower to harness the power of technology and make the information available for use.

I am happy that, we have increased our focus on capacity building. In Esri India, we have taken a mandate to work with leading universities and educational institutions to bridge this gap. We have already signed up with some of the leading research institutions and universities and the response to this program has been very good.

We are also working towards bringing some of the world class solutions which work on Esri platform to the Indian market. We recently announced our tie up with Navteq. Few more solutions will be added to our range of offerings, and these solutions will help address the specific needs of some major domains.

Taking this opportunity I would like to invite you to be a part of the august gathering of GIS users and professionals at the 12th Esri India User Conference scheduled on 7-8 December 2011. I look forward to meeting you all for an informative and interactive conference.

Wishing you all very Happy Diwali!

S Sridhar

President & COO

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Design, Preprint & Production



NIIT GIS Ltd. (Esri India) partners with NAVTEQ to Enhance Location Intelligence Solutions

NAVTEQ, the leading global provider of maps, traffic and location data enabling navigation, location-based services and mobile advertising around the world has announced that it has completed an Enterprise Reseller Agreement with NIIT GIS Ltd. (Esri India), the leading provider of GIS and location intelligence solutions with more than 33 years of experience. With this Enterprise Reseller Agreement in place, Esri India can now offer the complete suite of NAVTEQ-enhanced data solutions to its range of enterprise customers.

Known for their quality, NAVTEQ maps are built to a single data specification allowing customers to easily and cost-effectively optimise processes, manage assets and increase productivity. As an authorised NAVTEQ distributor, Esri India will have the ability to sell NAVTEQ's robust map data and bundle it with Geographic Information Systems (GIS) software to deliver comprehensive location intelligence solutions. NAVTEQ had previously signed a similar contract with the Esri Australia group in October last year.

"We are committed to providing our customers with high-quality solutions to meet their increasing location intelligence

needs," stated S. Sridhar, President & COO NIIT GIS Ltd. (Esri India). "NAVTEQ is known for its unrivaled map data and location content used to enable enterprise solutions. We believe the addition of the NAVTEQ map to our product portfolio will not only provide us with a competitive edge as a location intelligence solutions provider but will deliver to our customers unique advantages as well."

"This agreement represents a significant leap forward for NAVTEQ and NIIT GIS Ltd. (Esri India) in the industry segment. Together we are helping businesses become more profitable and public service agencies become more efficient through a better understanding and analysis of location-based information." says Ogi Redzic, vice president, sales & business development, Asia Pacific, NAVTEQ. "The combined capabilities of NAVTEQ and NIIT GIS Ltd. (Esri India) are certain to deliver huge benefits for the broad range of enterprise spatial customers in this region." he added.

Clients of Esri in India will benefit through access to the full suite of NAVTEQ Enterprise digital map-based products and services. This includes high quality digital mapping data for enhanced mobile asset management, internet applications, GIS applications, geomarketing applications, call centre applications and telematics services. ●

Inspiring Interaction with Dr. K. Kasturirangan @ NIIT University

Recently on 3rd September 2011 NIIT University in collaboration with Esri India hosted a distinguished lecture series and technical workshop at the university, Dr. K Kasturirangan, Padma Vibhushan, Member Planning Commission, former head of ISRO and now an MP Rajya Sabha, delivered a profound lecture to the packed NU auditorium with an interesting and informative talk on "SPACE - A Multi-Dimensional Enterprise". The inspiring lecture by Dr. Kasturirangan took all the listeners to an exciting historic journey of Satellite innovation and beginning of Space program in India.

Dr Kasturirangan said that this topic is very close to his heart. While taking the audience through the journey of ISRO he explained how we can use our failures as stepping stones for our success. He explained how Indian space technology is one of the best in the world in many ways.



As a former Chairman of ISRO and under his esteemed leadership, the various ISRO programmes witnessed several major milestones including the successful launching and operationalisation of the India's prestigious launch vehicles, the Polar Satellite Launch Vehicle and the Geosynchronous Satellite Launch Vehicle. He also led the initiative for India to enter the planetary exploration era by an extensive studies leading to the definition of Chandrayaan-I. As an astrophysicist he also mentioned how India's most ambitious space based High Energy Astronomy observatory and its related activities took an important milestone in building the various Space Program. He also enlightened the students with the new era of future prospects in GIS and Remote Sensing technology and applications.

The lecture was followed by a dynamic Q/A session. After the lecture, he walked around the campus, interacting with NU faculty and students. All at NU, were highly inspired by having such an impressive personality around and he also planted a sapling at the NU campus. ●



Jack Dangermond gives a Visionary talk on GIS: Opening the World for Everyone at FICCI.

September 13, 2011 an insightful and a day of enriching experience when Dr. Jack Dangermond, Founder and President, Esri Inc. was invited by FICCI, New Delhi to give the Visionary talk on GIS: Opening the World to Everyone. GIS professionals /users, students, GIS professors, from different domains and walks of life had assembled to listen to the man

who has been always an inspiring personality in the field of GIS.

He started his talk with the importance of GIS technology and its powerful way of communication. He emphasized that today, our confidence in GIS is built on the belief that geography matters—it connects many cultures and societies and influences our way of life. GIS leverages geographic insight to ensure better communication and collaboration. We're moving towards a world where geographic logic and thinking will be available to everyone via the Web. Geographic knowledge will become pervasive, and people will use it in every part of their work and their lives. GIS is providing citizens with unprecedented access to data about their communities as well as opportunities to voice their opinions and volunteer their own data. This is the realization of an evolution that started with GIS for researchers, to GIS for professionals, to GIS for knowledge workers, and now to GIS for everybody.

He also talked about the various challenges the world is facing today and emphasized on one such change the climate change, where GIS can be the most practical system for problem solving. He then mentioned how social networking is changing the way decision makers take decisions. Talking about the varied GIS usage and application in India, he emphasized the Indian market has a huge potential both for application development and export. He also talked about the ArcGIS features and the Interactive website Change matters (<http://changematters.esri.com/compare>)

Concluding his talk he mentioned that the future of GIS technology belongs to intelligent web maps and 3D GIS along with Cloud Computing that is considerably going to change our world rapidly and make it available to us for easier decisions. ●

Esri India participates at Health GIS 2011

The 4th International Conference on Health GIS 2011 was held from 5 - 6th August, 2011 at New Delhi India. The theme of the Conference was "Managing Health Geospatially". The conference focused on the use of GIS and related Information and Communication Technologies in health sector for exploring the various causative factors for diseases and deliberates on better planning of healthcare systems.

Esri Inc. being the lead sponsor of the Health GIS 2011, had exhibited in collaboration with Esri India showcasing the GIS capabilities for the health sector. Dr. Bill Davenhall, Health & Human Services Industry Solutions Manager from Esri Inc. was the Keynote Speaker at the conference who advocated the use of GIS to help solve the challenges in health and human services. He also mentioned how Geography is helping organizations and communities everywhere better understand and improve human health. From examining environments to managing projects, GIS technology is being used to face today's changing world and advance health and human services across the globe.

Esri India also collaborated with Teri University and conducted a day long workshop on Health GIS that was conducted on 4th August 2011. The aim of this workshop was to promote



GIS awareness in the field Health sector and the use of GIS in the various aspects of the Health Management System. Dr. Lauren Scott, Esri senior spatial statistical product team member presented the spatial statistics concept on how Esri technology has been significantly used in the Health Sector worldwide. Mr. S. Sridhar, President & COO of Esri India also gave a talk on the Vision and Overview of GIS technology. Taking this opportunity an MOU was signed between Esri India and Teri University with the aim of synergizing GIS education based on Esri Technology. ●

Intouch 2011

ESRI India hosted its annual communication get together for employees in the month of June - July. Popularly known as IN TOUCH program, this event is a time when all the staff members get together and are given a perspective of the future vision of the organization and the last year by the senior management. A series of meetings were organized in Delhi, Parwanoo, Mumbai, Bangalore & Singapore. For overseas locations the IN TOUCH program concluded in August.

Speaking on the occasion Mr. Rajesh Mathur- Vice Chairman, ESRI India, presented the Vision and the perspectives of GIS market in India and the niche areas. Mr. S. Sridhar, President & COO, ESRI India gave a perspective about the companies last year's performance & presented his thoughts on the road ahead for achieving the goals set for the organization. He shared his plans for carrying the momentum forward and crossing the important milestones set for the company. Mr. Rakesh Raina and Dr. Deb Jyoti Pal presented the highlights of the past year in Sales and technology services domain



respectively. Mr. Prakash Menon (marketing) and Ms. Surabhi Sharma (human resource) highlighted the Key initiatives taken in the past and to be taken in the current financial year. ●

Indian Organisations receives Esri Special Achievement in GIS (SAG) Award

Esri Inc. honors Organizations That Use GIS to Improve Our World by giving Special Achievement in GIS (SAG) awards. Some of our Indian organisations who by embracing geographic information system (GIS) technology in their organizations have used GIS to improve our world and set new precedents throughout the GIS community. These awards were given to the awardees during one of the network evenings with Jack Dangermond, during his recent visit to India. This year (2011) two organisations were honored with SAG Awards, these were – Madhya Pradesh state Centre



of NIC and Registrar General of India. Airport Authority of India was also honored with this award for the year 2010.

The National Informatics Centre (NIC) – Madhya Pradesh State Centre was awarded for the development of i-GeoApproach, a G2G web-based GIS application, by which the entire road network of the state of Madhya Pradesh in India can be viewed in detail to analyze and query various associated information. This was developed for the M.P Rural Road



Development Authority (MPRRDA), the nodal agency for rural roads in Madhya Pradesh.

Registrar General of India was awarded for making the country's most important contributions through Mapping India Census through GIS. Census has been the only organization in the country producing GIS based Thematic Maps for all kinds of valuable information on Demography (Population characteristics), Economic Activity, Literacy & Education, Housing & Household Amenities, Urbanization, Scheduled Castes and Scheduled Tribes, Language, Religion, Migration, Disability and many other socio-cultural aspects. This is evident from Census 2011 that has collected data down from large cities to village, town and ward level.

The Airports Authority of India (AAI) were awarded the Special Achievement in GIS (SAG) Award for the GIS application of No Objection Certificate (NOC) for height clearance issued by AAI is required for construction projects, such as high-rise buildings or communications masts, that fall within 20 km of an airport. The No Objection Certificate Application System (NOCAS) project automates the prioritization and processing of NOC applications based on criteria established by AAI, which will greatly streamline the approval process. ●

What's New in ArcGIS 10.1

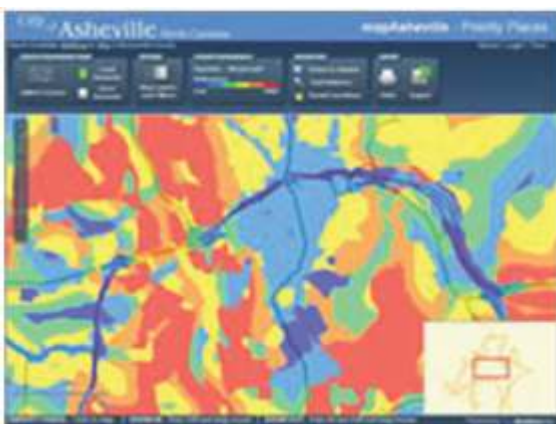
ArcGIS 10.1 will make it simpler to put mapping and geospatial analytics into the hands of more people without requiring that they be GIS experts. One of the most important aspects of this release is that ArcGIS users will be able to deliver any GIS resource, such as maps, imagery, geodatabases, and tools, as a web service.

FEATURES



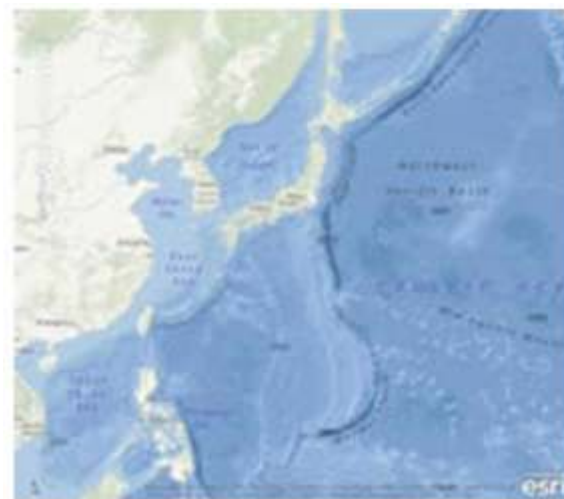
Cloud

- The cloud becomes central to the ArcGIS system.
- Tighter integration between ArcGIS for Desktop and ArcGIS Online, allowing you to access a large collection of high quality basemaps and analytical cloud GIS services.
- Create map services in the cloud directly from ArcGIS for Desktop.
- Upload your own GIS resources to ArcGIS Online. You can choose to keep them private or share them with everyone.
- Support for ArcGIS for Server in Amazon EC2 and Microsoft Windows Azure.
- Simplified publishing of any GIS resource such as maps, locators, globes, or geoprocessing tasks to your cloud GIS servers. GIS services are then ready to use from any ArcGIS application or API.
- Streamlined deployments in on-premise cloud environments.



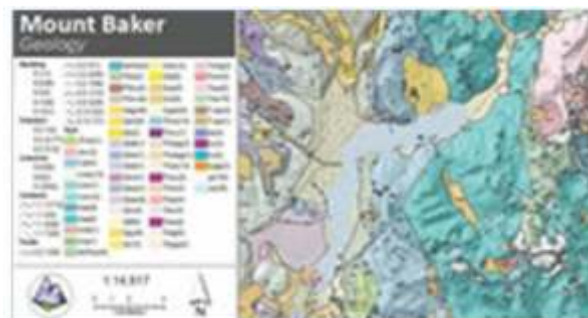
Sharing

- Easily create data, maps, locators, and analysis that you can upload to ArcGIS Online or Portal for ArcGIS.
- Maps, geoprocessing models, locators, etc., shared from ArcGIS for Desktop are analyzed to ensure that they'll work optimally when published.
- Deliver GIS resources, such as maps, imagery, geodatabases, and tools, as web services. Users can then access these web services through any ArcGIS application or API.
- Easy-to-configure web apps for Silverlight and Flex.



Access to Spatial Information

- Tighter integration between ArcGIS for Desktop and ArcGIS Online, allowing you to access a large collection of high quality basemaps and analytical cloud GIS services.
- Quickly make map services available via the cloud directly from ArcGIS for Desktop.
- Directly access spatial database tables.
- Better KML support.
- Easier to work with GPS data.



Productivity

- Enhanced map automation (symbolology, reporting, and data access).
- New administration tools for managing enterprise

geodatabases.

- Improvements to map layout (dynamic legend, scale bars, and North arrows).
- Spatial search for data and maps.
- Editor tracking—Record information about who made changes to datasets and when the edits were performed.
- New editing tools for integrating datasets and working with shared boundaries.



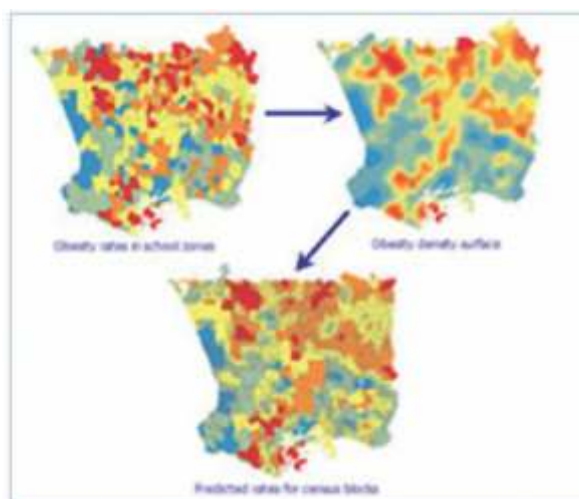
Mobile

- Access the new ArcGIS for Android application directly from the Google and Amazon marketplaces.
- Build focused native applications using the ArcGIS Runtime SDK for Android.
- Display, edit, query, and share intelligent maps across all major smartphone platforms (iOS, Android, Windows Phone).
- Enhanced integration with ArcGIS Online including support for popups, bookmarks, changing basemaps, dynamic legends, and the ability to share via SMS, Facebook, and Twitter.
- Offline capabilities on the iOS and Android platforms.
- Map offline and update existing GIS data with high accuracy GPS systems using ArcGIS for Windows Mobile.
- Simplify your offline mobile project deployments to rugged devices using the Mobile Project Center.
- Support for Portal for ArcGIS and ArcGIS for Organizations.

Developers

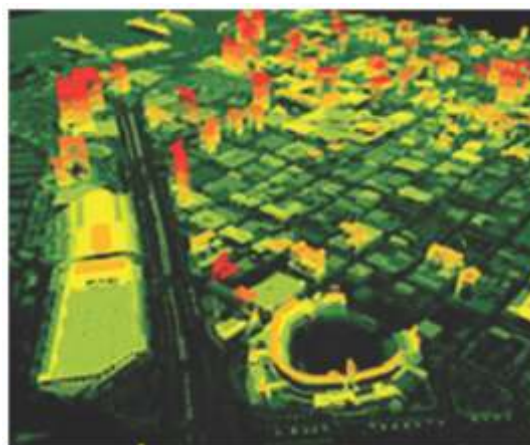


- Use Python scripting to write add-ins for ArcGIS for Desktop applications.
- New ArcGIS Runtime—Developer SDKs for building custom solutions (native 64-bit with small install size).
- Enhanced WPF API for developing connected and disconnect Windows applications.
- New native Java SDK for creating applications on Windows or Linux.



Analysis

- Geoprocessing packages let you share analysis and workflows.
- Geodesic buffer.
- Integration of time into spatial statistics (space-time cluster analysis).
- Discover relationships in your data using Exploratory Regression.
- Areal interpolation in ArcGIS Geostatistical Analyst extension.



Imagery

- Simpler to add multiple image products into ArcGIS.
- Automated image enhancements for color display and image interpretation.
- Improved, easy-to-use georeferencing capabilities.
- New tools to measure heights from sensor imagery.

- Ability for mosaic datasets to manage massive Lidar (LAS) datasets.



Administration

- New administration tools for enterprise geodatabases.
- New server administration (REST based) allows you to easily script common tasks.
- Rewritten ArcGIS for Server web administrator—Faster, more intuitive, and more powerful.
- Simplified ArcGIS for Server architecture—Lets you license, manage, and provision new servers more quickly and through accepted IT standards.

Whats new in ArcPad 10.0.3 ?

ArcPad is mobile field mapping and data collection software designed for GIS professionals. It includes advanced GIS and GPS capabilities for capturing, editing, and displaying geographic information quickly and efficiently. Critical data can be checked in and out of a multi-user or personal geodatabase and shared across your organization.

ArcPad is part of an enterprise GIS solution and integrates directly with ArcGIS for Desktop and ArcGIS for Server.

ArcPad 10.0.3 is now available. It extends customization options and increases access to key geographic data.

New Extensions—A new ArcPad AXF Reader allows the import of AXF feature layers into compatible formats using the FME Extension for ArcGIS.

Improved Customization Capabilities—Python scripting is now recognized in ArcPad. Create a new Python source file using ArcPad Studio or your preferred script editor. Requires use of the Python programming language and the PyWin32 Python Extensions for Windows.

Enhanced StreetMap Premium Data Sets—ArcPad 10.0.3 includes the latest North America and Europe Street Map data sets from TomTom.

Enhanced Customization Capabilities—Add, delete, or modify standard ArcPad tools more easily. Create a custom ArcPad toolbar or multiple toolbars for various projects and tasks.

Improved Graphics Layer and Support for Annotation Targets—ArcGIS map annotation groups are now exported as individual graphics layers.

Shortcut to Create ArcPad Apps—Create a shortcut to launch ArcPad projects from the desktop or Today (main menu) screen.

Updated Help System—The ArcPad help system has been improved with new topics and enhancements to menus and features.

Free ArcGIS App for Microsoft's Windows Phone



Platform

Microsoft Windows Phone users can access sophisticated mapping capabilities on their phone with the ArcGIS for Windows Phone app. ArcGIS for Windows Phone lets you find, use, and share maps as well as deploy GIS data and functionality on Windows Phone devices. The free app is now available and can be downloaded directly from the Windows Marketplace.

ArcGIS for Windows Phone serves as a mobile gateway into the ArcGIS system to:

- Explore and navigate maps.
- Find places and addresses.
- Query map layers and data.
- Collect, edit, and update features and attribute information while performing field data collection and inspection projects.

In addition to this free application, Esri previously released the ArcGIS API for Windows Phone. Using the API, developers can create custom applications for Windows Phone devices that can be deployed within an enterprise or to the public via the Windows Marketplace.

ArcGIS provides a great way to discover and use maps on your Windows Phone.

Using the ArcGIS application you can:

- Use maps authored on ArcGIS Online



- Navigate map galleries with the Map Hub
- Access your own GIS data
- Display and zoom to current location
- Perform linear and area measurements
- Retrieve detailed map metadata
- View feature attribute information
- View the legend
- Change the visibility of layers
- Attach photos to features
- Run pre-defined queries
- View pop-ups, map notes, and bookmarks
- Access popular maps faster by adding them to your favorites list
- Use your GPS or tap on the map to collect and update GIS data
- Perform keyword search and get access to relevant information
- Change basemaps on the fly
- Bookmark areas of interest for use with any map ●

Get more Information From Imagery and Data

ENVI – The premier software Solution used to extract information from geospatial imagery

ENVI for ArcGIS Server – Author, publish and distribute image analysis tools to the ArcGIS enterprise

E3De - addresses user needs across industries to quickly and accurately get 3-D products from LiDAR data.

IDL – The Scientific programming language used to create meaningful visualizations from complex data

EXELIS

Visual Information Solutions



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Esri CityEngine

Introduction

CityEngine is a standalone desktop software application for the design, planning and modeling of urban environments in 3D. CityEngine is an ArcGIS application that provides professional users with a unique conceptual design and modeling solution for the efficient creation of 3D cities, buildings, and streetscapes. CityEngine can be used to compile, use, and manage geographic information, and includes native support for many data formats including shapefile and file geodatabase. It also supports many GIS tasks, including: mapping, data compilation, analysis, geodatabase management, and geographic information sharing. CityEngine can be used either in isolation or as part of existing workflows, and it is an essential tool for anyone working with 3D urban environments.

Features

Available for All Platforms

CityEngine is available for Windows (32/64bit), Mac OSX (64bit), and Linux (64bit). It can be licensed either for single (node-locked license) or concurrent use (floating license, including license borrowing).

Python

Streamline repetitive or process-specific tasks with the integrated Python® scripting interface, such as, writing out arbitrary meta-data or instancing information for each building, import FBX® cameras etc.

Data Interoperability

The CityEngine supports the Industry's most common formats for both import and export. The user is able to transport line data, shape data (footprints) and 3d geometry to and out of the CityEngine. Whether you work in the field of Urban Planning, Architecture, Entertainment or Simulation, we provide a way to transport your data.



Industry-Standard 3D Formats

CityEngine works with many 3D formats, including Collada®, Autodesk® FBX®, DXF, 3DS, Wave front OBJ, and e-on® software Vue. Constructed 3D content can also be exported out to Pixar's RenderMan® RIB format and NVIDIA's mental ray® MI format.

Map Controlled City Modeling

Parameters of buildings and streets can be controlled globally using maps (e.g., land use), allowing for easy city modeling and quick changes. Terrains can be imported, aligned, and exported

Rule Based Modeling Core

Procedural modeling offers the ability to generate and texture detailed 3D buildings and street geometries out of 2D data. Many example rules are included with CityEngine and new custom rules can be authored using your own textures and 3D assets.



Parametric Modeling Interface

CityEngine exposes a set of interactive controls to adjust rule parameters, allowing experimentation with model construction settings such as the height, roof form or age of a building. Parameter modifications will automatically invoke regeneration of the 3D model.



Dynamic City Layouts

The Dynamic City Layouts give the user a powerful tool to create interactive street networks which automatically update in real-time. Streets, Sidewalks and whole Blocks, which form the specific urban context adapt efficiently to the user's input and give the user an intuitive way to design the layout of complete cities.

And of course, all the Geometries which depend on the layout of the underlying Dynamic City Layout are also updated on the fly! Watch your buildings getting rebuilt while you edit the width of the surrounding streets



Facade Wizard

Create rules from an image or textured mass model with an easy-to-use facade authoring tool. The resulting facade rules

are size-independent, contain level-of-detail and can be extended.



Street Networks Patterns

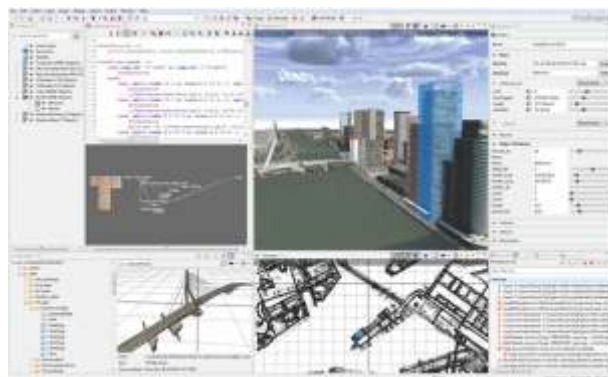


CityEngine offers unique street growth tools to quickly design urban layouts. Street patterns such as grid, organic or circular are available, and the topography of the terrain is taken into account.

Generating Large-Scale Urban Layouts

The CityEngine consists of several procedural and interactive tools to Layout Street networks align and subdivide shapes. On the one hand, streets can be grown according to different patterns and edited in an interactive way. For example, street-crossings can be moved, streets can be deleted or selected and the street growth wizard can be applied again on the selection. On the other hand, tools for the editing of lot

shapes are available, such as aligning building lots to a terrain etc. The tools usually work on the selection done in the 3D view window, the viewport, or operate on the whole layer.



Customizable User Interface

The User Interface in the CityEngine can be adapted to any task at hand. Whether this is rule creation, working on the street network, editing attributes with real-time feedback or studying the statistical reports of your current city's development: "anything goes".

For users who want to have control over repetitive tasks, create formatted reports in file format or automating other specific actions, Python Scripting is available to further streamline the workflow in the CityEngine.

Reports

Customized rule-based reports can be generated to analyze urban designs, including the calculation of important urban properties such as GFA (Gross Floor Area), FAR (Floor Area Ratio), and so on. Reports are updated automatically and instantaneously. ●

ArcGIS for Mobile

Esri understands the value of mobile GIS to organizations needing immediate access to up-to-date, real-time information, regardless of location, and offers a range of mobile field mapping applications that help you make more informed decisions in the field. These applications include

- ArcPad®
- ArcGIS® for Windows Mobile and Windows Tablet
- ArcGIS for Smartphones and Tablets

ArcPad

Arcpad is Mapcentric Windows Mobile and Windows Tablet-Based Field Mapping and Data Collection for GIS Professionals. It includes advanced GIS and GPS capabilities for capturing, editing, and displaying geographic information quickly and efficiently. Critical data can be checked in and out of a multiuser or personal geodatabase and shared throughout your organization.

ArcPad is part of an enterprise GIS solution and integrates directly with ArcGIS for Desktop and ArcGIS for Server to



- Perform reliable field data collection and inspection projects.
- Share enterprise data for rapid decision making.
- Integrate external GPS, range finders, and digital cameras.
- Increase the accuracy and validity of your GIS database.
- Improve the productivity of your field staff.

ArcGIS for Windows Mobile and Windows Tablet

Task-Driven Mobile GIS Applications for Windows Mobile and Windows Tablet Devices. ArcGIS for Windows Mobile helps organizations deliver GIS capabilities and data to a range of mobile devices. You can use ArcGIS for Windows Mobile to deploy mobile GIS applications that increase the accuracy and improve the currency of GIS data throughout your organization. These applications provide an accurate, reliable common operating picture for field staff.

ArcGIS for Windows Mobile comes with ready-to-deploy applications and a configurable software development kit (SDK) to create stand-alone mobile applications, embed GIS functionality into existing applications, and build custom tasks and extensions.

ArcGIS for Windows Mobile Applications

ArcGIS for Windows Mobile applications integrate with ArcGIS for Server and ArcGIS for Desktop to provide central management and deployment of mobile GIS data, maps, tasks, and projects.

- View and navigate mobile maps.
- Collect, edit, and update GIS data in real time and share information with colleagues immediately.
- Search and manage tasks or plan future work.
- Rapidly deploy mobile GIS without needing to develop your own solution.



ArcGIS Runtime SDK for Windows Mobile

The included runtime SDK lets developers use simple tools to create lightweight, GIS-focused applications customized to users' needs:

- Create and deploy focused mobile applications that can operate in a connected or disconnected environment.
- Build geocentric applications that provide GIS functionality including map display, navigation, GPS support, and GIS editing.
- Enhance line-of-business applications, such as customer relationship management and field service automation systems, with geospatial capabilities.
- Get comprehensive developer support through the online Mobile Resource Center.

ArcGIS for Smartphones and Tablets



Map Navigation, Data Collection/Reporting, and GIS Analysis from Your iOS, Windows Phone, or Android Device

ArcGIS apps for smartphones extend the reach of your GIS to a wider audience. These are free applications that you can download from the Apple® App StoreSM, Windows® Marketplace, or Android™ Market. All three apps include a developer-focused SDK that you can leverage to build your own custom applications.

- Find and share maps from ArcGIS Online.
- Use tools to search, identify, measure, and query.
- Collect and update GIS features and attributes.
- Perform GIS analysis by accessing geoprocessing tasks.

For Developers

The ArcGIS Runtime SDK for smartphones enables you to build applications that utilize the powerful mapping, geocoding, geoprocessing, and custom capabilities provided by ArcGIS for Server. You also have the ability to embed ArcGIS maps and tasks into your line-of-business applications.

- Use and display services from ArcGIS Online and ArcGIS for Server.
- Execute sophisticated geoprocessing tasks and display results.
- Create applications that collect and update data. ●

Understanding Our World

At the dawn of humankind, people made crude sketches of geography on cave walls and rocks. These early maps documented and communicated important geographic knowledge our ancestors needed to survive: What is the best way to get from here to there? Where is the water at this time of year? Where is the best place to hunt animals? Our ancestors faced critical choices that determined their survival or demise, and they used information stored in map form to help them make better decisions.



Early man used cave walls and rocks to communicate and share geographic knowledge.

Fast-forward to the 1960s. The world had become significantly more complex than it was for our early ancestors, and computers had arrived on the scene to help us solve increasingly complex problems. The 1960s were the dawn of environmental awareness, and it seemed a natural fit to apply this powerful new computer technology to the serious environmental and geographic problems we were facing. And so the geographic information system (GIS) was born.

Today, GIS has evolved into a crucial tool for science-based problem solving and decision making. People who use GIS examine geographic knowledge in ways that would be extremely time-consuming and expensive when done manually. The map metaphor remains the dominant medium for sharing our collective geographic intelligence, and development of a GIS-based global dashboard will lead to a revolution in how we understand our world and plan for the future.

Geographic Knowledge Leads to Geographic Intelligence

Geographic knowledge is information describing the natural and human environment on earth. For our ancestors, geographic knowledge was crucial for survival. For our own survival, geographic knowledge plays an equally fundamental role. The biggest differences between then and now are that our problems are much more complex, and the sheer volume of data—of geographic knowledge—at our disposal is daunting. And whereas passing down geographic knowledge in the past was limited to a few

cave paintings or rock drawings, GIS technology now enables a collective geographic intelligence that knows no spatial or temporal bounds.

Today we have more geographic data available than ever before. Satellite imagery is commonplace. Scientists are producing mountains of modeled data. And an ever-increasing stream of data from social media, crowdsourcing, and the sensor web are threatening to overwhelm us. Gathering all this

information—this geographic knowledge—and synthesizing it into something actionable is the domain of GIS. More data does not necessarily equate with more understanding, but GIS is already helping us make sense of it, turning this avalanche of raw data into actionable information.

Human-Made Ecosystems

Our traditional understanding of ecosystems as natural landscapes is changing. Anthropogenic factors are now the dominant contributor to changing ecosystems. Human beings have not only reshaped the physical aspects of the planet by literally moving mountains but also profoundly reshaped its ecology.

And it's not just landscape-scale geographies that can be considered human-made ecosystems. In modern society, buildings are where we spend the vast majority of our waking and sleeping hours. Our facilities are themselves man-made ecosystems—vast assemblages of interdependent living and nonliving components. Facilities have become the primary habitat for the human species, and this is changing the way we think about collecting, storing, and using information describing our environment.

A key aspect of our social evolution is to recognize the effects we have already had on ecosystems, as well as to predict what future impacts will result from our actions. Once we achieve this level of understanding, we can direct our actions in a more responsible manner. This type of long-term thinking and planning is one of the things that make humans human.

Recognition of the overwhelming dominance of man-made ecosystems also makes us cognizant of the tremendous responsibility we have—the responsibility to understand, manage, and steward these ecosystems.

"Only when people know will they care.

Only when they care will they act.

Only when they act can the world change."

—Dr. Jane Goodall

Designing Geography

We humans are no longer simply passive observers of geography; for better or worse, we are now actively changing geography. Some of this change may be intentional and planned, but much of it is unintentional—"accidental geography." As we grow more knowledgeable, become better stewards, and obtain a greater understanding of our world and how humankind affects it, we need to move away from this "accidental geography" and toward what Carl Steinitz calls "changing geography by design." As GIS professionals, we can accomplish this through the integration of design into the GIS workflow.

The GIS workflow starts with a decision that needs to be made. We first gather background information about the geography of that decision and organize it on a digital map. We then use the map to evaluate the decision. Once we fully understand the geographic consequences of the decision, we can act.

When an idea is proposed with geographic consequences—a housing development, a shopping center, a road, a wildlife preserve, a farm—it first goes



through a design process. After it is initially designed, a project is vetted against geography using this approach.

A typical project will go through many iterations of design and evaluation. As the constraints of geography on the project—and the impacts of the project on geography—are revealed, the design is continually refined. Because design and evaluation have traditionally been separate disciplines, this phase of a project can be time-consuming, inefficient, and tedious.

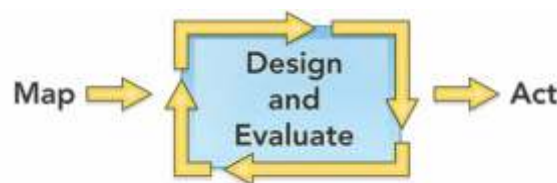
What if we could reduce the time and tedium of these iterations by integrating design directly into the GIS workflow?

This integration—what we refer to as GeoDesign—is a promising alternative to traditional processes. It allows designers and evaluators to work closely together to significantly lessen the time it takes to produce and evaluate design iterations.

Bringing science into the design process without compromising the art of design will require new tools and enhanced workflows. Most of all, it will require a

new way of thinking about design. And it will allow us to more easily move from designing around geography to actively designing with geography.

We must manage our actions in ways that maximize benefits to society while minimizing both short- and long-term impacts on the natural environment. GeoDesign leverages a deep geographic understanding of our world to help us make more logical, scientific, sustainable, and future-friendly decisions. GeoDesign is our best hope for designing a better world.



Toward a Global Dashboard

An important tool for understanding our dynamic planet is a global dashboard. This tool would operate as a framework for taking many different pieces of past, present, and future data from a variety of sources, merging them together, and displaying them in an easy-to-read-and-interpret format that indicates where action needs to be taken. That such a dashboard would use the map metaphor seems obvious; our long history with map representations means that people intuitively understand maps.

GIS helps provide this framework by allowing users to inventory and display large, complex spatial datasets. When people see all this geographic knowledge on a map, and they see environmental problems or economic issues in the context of their neighborhood, their street, or their house, this leads to a new level of understanding. They get it right away. The ability to take all this data and put it in context on a dynamic, personalized map is very powerful.

GIS can also be used to analyze the potential interplay between various factors, getting us closer to a true understanding of how our dynamic planet may change in the coming decades and centuries.

A better world is the common goal all of us—geographers, planners, scientists, and others—have been striving for. Although we've made a lot of progress in building the technological infrastructure to help us accomplish this monumental task, we're still not quite there yet.

I'm a firm believer that we have the intelligence and the technology—the ability—to change the world. We can make it better. We must make it better. But we first need a firm and complete understanding of our world before we act to design our future. ●

"Understanding precedes action." – Richard Saul Wurman

Source: <http://www.esri.com/news/arcnews/summer11/articles/understanding-our-world.html>

GIS: A Language for Understanding

By Jack Dangermond

Esri has just completed another amazing International User Conference. The theme of the conference was "GIS—Understanding Our World." For those who were unable to attend the conference this year, I'd like to share a few thoughts on this theme.



Jack Dangermond delivers the keynote presentation "GIS—Understanding Our World" at the 2011 Esri International User Conference in San Diego, California.

Today our world is changing rapidly and is facing many challenges. Climate change, urbanization, security, poverty, inequality—these are difficult problems we must deal with, and they're affecting us as individuals, as well as impacting our organizations and governments. We are also increasingly aware of the role humans are playing in that change. It's my sense that in order for us to really address these things, we can't just keep doing the same things; we need a different approach. We need collective intelligence, and our actions need to be based on this intelligence. This informed, science-based approach is our best hope for confronting these unprecedented challenges. As GIS professionals, you will play an increasingly important role in helping create a better understanding of our world.

What Is Understanding?

Understanding is about knowing. It's quite human, built on real experiences, reasoning, and thinking about things. Knowing enables us to understand, think, predict, explain, add meaning, and have insight. Our minds are the framework within which all of this happens. They organize and synthesize information for us, then integrate it into our lives. This is understanding.

GIS as a Language

Geography has always been a critical type of information that humans—in fact, all animals—collect, organize, and use. Place-based information is vital to survival on our planet. As our world has become more complex and our ability to understand has grown, GIS technology has evolved to help us process information about place and put it in a context that allows us to act.

GIS is actually extending our minds by abstracting our world into the knowledge objects that you create and maintain—data, imagery, models, maps, and apps. GIS is facilitating a systematic framework for knowing, and our shared work is leading to a collective understanding.

This is not just theoretical; remember that from the very beginning, GIS has always been a very practical technology. When Roger Tomlinson and his colleagues began to implement these ideas, it was about harnessing the power of information technology to gain an understanding of geography that the human mind could not deduce without the assistance of computers.

Today, GIS integrates and synthesizes information from many sources and does it in volumes we could not have imagined 30 years ago. The availability of new technologies and the growing concern for our planet mean that we are producing an ever-increasing store of data describing our earth. We're being bombarded with data from a combination of old and new sources—satellites, sensors, crowdsourcing ("human sensors"), models, digitization of historic records, and much more. Only when these billions of bits of information are combined and organized can we achieve a higher meaning—a true understanding of our world. This will require the right technology and culture for sharing our data and building a common geospatial infrastructure.

As a kind of language, GIS also facilitates communication and collaboration, breaking down barriers between individuals, organizations, institutions, and the world. This is part of its power. With the number and severity of problems facing our modern world, much of them having to do with place, GIS is becoming an essential new language for understanding. My sense is that our new ArcGIS Online platform provides such a framework and will enable our users, both in their organizations and beyond, to fully leverage the language of GIS.

An Evolving Ecosystem

GIS is changing rapidly. This evolution is not linear; it is organic and means that GIS is evolving alongside other components of the technology ecosystem. Measurement technologies and crowdsourcing are creating huge volumes of geospatial data. The data itself is growing in volume, and we have to find new ways to handle that volume. There are new issues, such as privacy and access, that we need to address.

And of course, computing technology itself continues to evolve. Connectivity is enabling new kinds of networking—social networking. Our science is also changing, becoming more quantitative in every discipline—more integrated, analytic, real time, and predictive. It also becomes more collaborative. These are very interesting progressions that we see in the computing ecosystem. And GIS itself is evolving within



A new pattern is emerging that will open and extend GIS.

this ecosystem, becoming more adept at managing large datasets, multidimensional (3D/4D), and much easier to use.

So how can we evolve GIS so that anyone can leverage its power? It's an important question, because this evolution is the foundation for understanding our world.

A New Pattern

A new pattern for GIS is already emerging, making GIS available to everyone. A long progression of efforts is bringing our work—substantial, authoritative source information—to the web and blending it with social network and crowdsourced information. This new pattern is making all this work available through lightweight viewers and mobile devices, providing a

broad context of understanding to individuals, organizations, and governments—to everyone.

But will this new pattern be broadly adopted? Is it of interest just to GIS professionals, or will it be adopted by a broader audience? I think this pattern will be broadly adopted because the benefits are so great. It will connect you—the GIS professional—with knowledge workers, managers, policy makers, and citizens, extending your reach. It will empower citizens to participate in the same network environment, using the same infrastructure and sharing common services to create a collective understanding.

A Path Forward

I meet with hundreds of GIS professionals over the course of the year and am continually amazed at the creativity they display in using GIS to solve complex problems and support critical decisions. The User Conference is like magnifying this 100 times and condensing it all into one short week. The applications on display, the papers presented, and the maps shared exhibit an overwhelming case for the value of GIS. From sea-level rise to deforestation, from disaster recovery to disease monitoring, and from vehicle routing to demographic analysis, it's clear that GIS is already being widely used as a tool to help us understand.

Esri remains firmly committed to building tools you can use to understand and solve the pressing geographic problems the world is facing, because we firmly believe that acting responsibly requires understanding. ●

Source: <http://www.esri.com/news/arcnews/fall11/articles/gis-a-language-for-understanding.html>



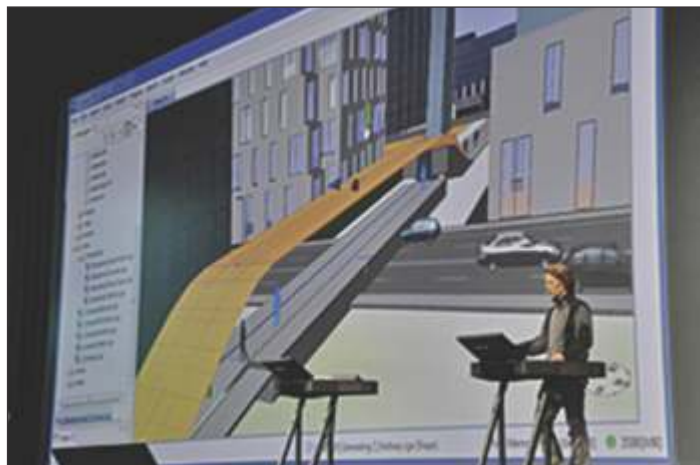
GIS extends our minds, abstracting our world and providing a systematic framework for understanding.

The Future of Urban Design

Those who attended the Plenary Session at the Esri International User Conference in San Diego, California, this year saw Jack Dangermond announce the acquisition of an innovative company called Procedural. Its CityEngine product makes it easy to create high-quality 3D content using nothing more than a combination of 2D data, attributes, and procedurally defined rules. This means that any GIS organization will be able to create visually stunning 3D urban environments using the data it already has.

This is an exciting new capability for many GIS users, and the upcoming release of CityEngine is designed to tighten the link between GIS and 3D urban landscapes even further. However, the fact remains that CityEngine is aimed more at professionals in 3D content creation than at everyday GIS users. Urban planners, in particular, actually need a combination of the best elements of CityEngine (rule-based, high-end 3D content creation) and the best elements of ArcGIS (data management, analysis, and sharing), all made available in a workflow-based solution. Esri started work on a new solution to meet this need.

The primary goal of this new solution is to make it simple to visualize, design, and understand urban environments, especially as cities explore more vertical solutions for people to live and work within. This new application will allow users to experiment with internal designs, proposals from developers, and even fundamental zoning laws (like maximum building heights and offsets) and get immediate visual and analytic feedback regarding the impact of these decisions. For example, approving a proposed high-rise development could impact many existing residents with increased shadows or reduced views. Or, changing zoning laws to increase the maximum building height could result in more residents than the current road or sewer network could handle. Designing urban environments, especially in the higher-density cities of



the future, is a complex and critical problem GIS can help solve.

To remain as easy to use as possible, this solution will leverage two other Esri initiatives—templates and GeoDesign.

Applications that integrate with Esri's templates, such as the Local Government template, are "smarter" because they know which features and feature attributes to expect from the data. They also have information about how to symbolize and render the data and often even have access to rules about how to create and maintain valid GIS data. This knowledge empowers an application to automatically configure itself to work in an optimized manner while still remaining extensible. The new solution will have this advantage, meaning that it will be plug and play for many existing ArcGIS users and will only need an initial configuration phase for those with a more customized geodatabase design.

GeoDesign is another concept that will play a crucial role in the development process. The fundamental idea behind Esri's GeoDesign initiative is that designing is an iterative process. That is, by incrementally designing,



These 2D and 3D views of an urban proposal were generated from the same GIS data.



This pedestrian bridge was generated using CityEngine.

evaluating, and comparing designs, planners from all industries can have confidence that their blueprints for the future are the best possible. GeoDesign also implies a workflow to the GIS process, from gathering data, defining goals, and creating alternative solutions to the final analysis, reports, and presentations of the designs attempted. Urban planners make up one group of people who can benefit from using this pattern, and the new solution will make the process seamlessly available to them.

This solution will also be about sharing urban plans with others. The release of ArcGIS 10 demonstrated Esri's commitment to making it easier to share GIS content,

both within an organization or with large audiences through the cloud.

To be clear, there's still a fair way to go for this solution. There are a lot of decisions to be made along the way, but many of the pieces needed are already in place, and Esri's development team—including the talented additional pool of people coming from Procedural—are champing at the bit to make the design of 3D urban areas easier and more effective than ever before. Look for more news on this new solution in 2012. ●

Source: <http://www.esri.com/news/arcnews/fall11/articles/the-future-of-urban-design.html>

CityEngine Adds a New Dimension to Your GIS



Future view of Rotterdam, the Netherlands, with content created from ArcGIS and CityEngine.

3D Content Creation and Urban Design

In the weeks since Esri announced the acquisition of Swiss company Procedural—and its flagship product CityEngine—many users have been exploring how they could leverage this new product for their GIS work. The key functionality provided by CityEngine—high-end 3D content creation from simple 2D GIS data—is simple enough to understand, but how does it work? Perhaps more importantly, what do you, as a user, need to make it work?

CityEngine relies on three ingredients: features, attributes, and defined rules. The more detail you can provide in each of

these elements, the greater the complexity and real-world accuracy you will get in the generated 3D content. While CityEngine can potentially create many kinds of 3D content from these three ingredients, it is currently focused on the construction of urban environments through integrated sets of buildings; building interiors; streets; and scene-filling objects, like trees, light poles, cars, and people.

For simplicity in understanding how CityEngine works, consider how it generates the exterior of buildings.

As a GIS user, you already have access to the first two parts of the puzzle (features and feature attributes) in your

geodatabase. Suppose you're lucky enough to have polygon features that directly represent building footprints, and each feature has some information about the size and type of building it represents. By connecting a building construction rule in CityEngine to this data, a 3D representation of the physical building can be created.

First, the base 2D polygon of the building footprint is extruded upward—using a BuildingHeight attribute—to make it a 3D block. This is a common and simple representation of a building, but in CityEngine, you've just started the construction process. If you have more information, like the roof type of each building, the rule can construct different rooftops, such as hip, flat, or gable. If you have a field containing FloorCount, you can use the rule to split up your extruded blocks into floors and split each floor into windows with windowsills or balconies. Very advanced 3D building geometries, all driven by GIS data, can be constructed using this workflow.

To add realism to 3D buildings, CityEngine also supports rules to define textures. Textures are the imagery draped on the roof and sides of the generated models. For example, the texture of a building's roof could be defined by a field called RoofMaterialType containing values such as Tile, Concrete, or Corrugated Iron. Alternatively, you could take a different approach and have the rule extract a piece of satellite imagery and drape a real-world texture on the roof. Then, for the sides of the buildings, you can define different textures for the ground, intermediate, and top floors and have your buildings automatically "painted" with the applicable construction material, like wood, brick, or stone. CityEngine also contains styles you can use to define a whole suite of these options in one step.

This all sounds amazing, but what if you don't have building footprints with all these attributes? Can you still make buildings using your GIS data?

The answer is absolutely yes—CityEngine can construct representative buildings using as much, or as little, information as you provide. Highly detailed urban environments can be generated from landownership parcels



A block-building representation of the city's zoning regulations.

with information on zoning laws or even something as simple as a street network. The detailed examples and tutorials that come with CityEngine demonstrate how this is done.

You can use the models created in CityEngine in many different ways. Urban designers can bring them back into their GIS database for in-depth analysis using all the geoprocessing power provided by ArcGIS and the ArcGIS 3D Analyst extension. Professional users in entertainment and security simulation might use them as part of a larger workflow with other 3D rendering and gaming packages. It's also likely that innovative users in other fields will find ways to use these new tools; one example already being discussed is the creation of 3D volumes for the maximum swing-and-sag zone for transmission lines, making it possible to better protect against major outages from line damage.

So what's the catch? It comes down to the level of effort and understanding required to make all the different elements come together. CityEngine is a highly professional and adaptable piece of software and will perform best after some investment in learning how it works. Simply put, CityEngine has powerful capabilities to create an incredible variety of 3D content from often very simple GIS data. It makes it easier than ever to add that extra dimension to your GIS and move you into 3D. ●

Source: www.Esri.com/cityengine

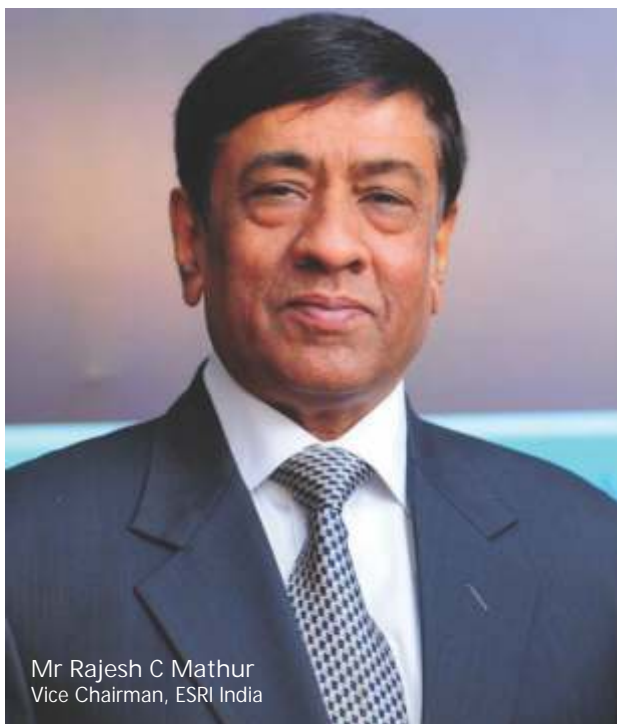
Letters to Editors

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 it 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



Mr Rajesh C Mathur
Vice Chairman, Esri India

Learning to Think Spatially: Committed to expanding spatial literacy via GIS technology

The geospatial growth is at par with the growth of ICT in the country, What's your view on GIS Education in India?

There are several academic institutions offering GIS courses in India. In most cases it is a two year program leading to M tech or M Sc degree. WE visit several of these campuses and hire freshers. Our experience has been generally good with the students graduating from these institutions. The students are bright, energetic and keen to learn. Usually after they join us we put them through a 5-6 week program to further sharpen their skills and prepare them for the role assigned in our company.

The quality of education and training given in some of the institutions is very good. However, in some others there is scope for improvement. In my opinion universities must build strong links with the industry so that the course curriculum is aligned to the current technology trends and students are imparted skills expected of them by the employers. They must focus more on projects and internship in the industry. They should also equip their labs with the state of the art GIS software so that students get good hands on experience of working on popular packages.

You have seen the growth of the Indian Geospatial Industry from early days when hardly the professionals were educated on GIS. How do you foresee the M.Tech (GIS) program proposed by NIIT University to be different from other Universities?

I expect NIIT University to focus more on projects which will give the students better exposure to GIS applications across domains. I understand NU is planning one year internship in the industry. It is a good initiative and will help students in acquiring deep understanding of the role of GIS in dealing with various issues like improving operational efficiencies, increasing transparency, strengthening government citizen interface et al. NU is also planning to include IT training and courses on project management as part of the course curriculum. These skills are extremely essential and often GIS professionals are found to have gaps in their knowledge in this area.

The M. Tech(GIS) program at NU has industry Collaborations with Esri India . Please elaborate.

Esri India will support by way of adjunct faculty. Our technical staff will regularly visit the NU campus and deliver talks and conduct workshops to expose students to the current technology trends and future directions. Esri India also has excellent experience of implementing GIS projects across domains in India and overseas. We will leverage this experience and knowledge to develop projects to be assigned to NU students. Esri India is also supporting NU in building the course curriculum and the GIS Lab. We will also support NU in identifying and developing research projects. Esri India will also induct interns from NU on a regular basis. This will enable students to get exposure to GIS projects and strengthen their understanding of the technology and its applications.

GIS Education is trickling down to grass root levels in India and its application is wide spread in the country. Will the M.Tech(GIS) program be able to facilitate the latest and robust technology to the students?

I think so. The purpose of the collaboration with Esri India is for precisely the same reason. Our relationship with NU will be, in a way, similar to that between a medical college and hospital. The college provides education on medical science and hospital exposes the students to way this education is applied in dealing with diseases. With Esri India guidance and support NU will be able to set up GIS labs equipped with the state of the art GIS software. They will have access to the extensive project experience of our consultants and their deep knowledge of the technology and its applications.

What will be the role of the geospatial industry in shaping the GIS professionals undergoing this M.Tech(GIS) program?

NIIT University is launching the M Tech (GIS) program to participate in building a pool of world class GIS professionals who will enable our users to deploy this exciting technology and leverage its full potential. Successful implementation of this technology in mission critical projects will go a long way in expanding its use and growing the market. India is also emerging as a hub for geospatial services with discerning clients looking towards India for end to end GIS projects. As we move up the value chain in our customer engagement, the profile of the GIS professionals required by the industry is also undergoing a paradigm shift. Today GIS is being implemented in multiple patterns like desk top, client server, federated, Web/Cloud and Mobile devices. The Indian Geospatial industry needs technical professionals with deep understanding of these patterns, knowledge of IT tools like RDBMS, ERP, et al. The GIS professionals should also have good understanding of various domains like utilities, urban, transportation, et al. Good project management skills would be another key requirement.

NU program is being built keeping in mind the needs of the industry. Geospatial industry can leverage this effort by sponsoring their technical staff to this program in order to enhance their knowledge of the technology and its

applications. They can also hire interns and deploy them in projects. The industry should regularly interact with the faculty and keep them abreast of the needs of the industry so that NU can align the course to the needs of the industry. ●

How is the M.Tech (GIS) Program different from the other Masters program on GIS of different Universities and what are its benefits?

How it is different?

In India, several Universities face severe resource crunch and lack partnerships with global organizations to update their GIS facilities and course curriculum that is relevant to the industry. In contrast, NU M.Tech GIS Programme is research driven and offered with support from esri Inc, California, USA, the world's leading organization in development of GIS software and esri India. Several other GIS organizations involved in GIS development in India and abroad are also expected to join and support this unique research driven and industry linked programme in the near future.

Benefits

This Programme will enable professionals to start a challenging and rewarding career in the rapidly emerging area of GIS. Professionals pursuing this Programme will get a comprehensive exposure to GIS components like Geospatial modeling and database, Cartography, GIS programming, Remote sensing for GIS and relevant elective courses like GIS and Urban Planning, Advanced GIS platform programming (Mobile, Web and Cloud), Geoinformatics for environment, etc. The Programme will focus on spatial thinking, technology and applications of GIS, GPS fundamentals and techniques, Geospatial project management and field techniques, exploring geospatial nature of regions, economy, demography, occupation profile, applications of GIS for humanities, etc. Graduates will be fully prepared for positions as GIS Project Managers, Applications Specialists, Systems Engineers and GIS Business Development Managers. They will also have the option to pursue doctoral research at NU.

In the era of Information technology with rapid advancement in computing, decision making has become more informed and scientific. How do you think the M.Tech program is going to make a difference?

The program's curriculum is based on a unique model called The Geospatial Technology Competency Model (GTCM). This helps a GIS professional more sound in his concepts and

equips him with different abilities/competencies like academic competencies, workplace competencies, industry wide technical competencies, industry sector technical competencies and management competencies. This results in a professional getting NU GIS degree more informed and adept at decision making process.

With the growing needs of the industry for World Class GIS professionals, the institutes offering GIS programs have gone up in the last few years. What is the unique feature of the program that can attract students across the domains?

Unique features: Program offered in support with World's GIS Leader (Esri) and a consortium of companies.

Creative structure: The 2-Year, 73-Credit Programme consists of 4 semesters. The courses are categorized into University Core (to inculcate NU's core principles), Professional Core (to gain proficiency in domain area), Professional Electives (for specialization in an industry-specific domain), R&D Project (to inculcate a strong research bent of mind), Open Elective (for management competencies) and Internship (to build linkage with Industry-work or Industry-oriented research).

The first two semesters are devoted to theoretical and hands-on practical training of foundation and advanced courses at NIIT University. This is followed by Industry Internship with virtual classroom instruction in the third semester. Students continue Industry Internship working on real life projects in the fourth semester leading to the completion of the programme. Thus, students stay at NIIT University campus only for the first two semesters.

Stipend

During internship (in the third and fourth semester), all enrolled students will get a stipend at par with the MBA graduates from the organizations that have supported this Programme.

Placement

All enrolled students in the founding batch will be placed at par with the MBA graduates in GIS organizations that have supported this Programme.

Tell us more about NU and how is the university shaping up differently than other universities in the country

NU is nestled in the foothills of Aravali, in Neemrana, Rajasthan the picturesque 100-acre fully residential Green Campus of NU is equipped with the state-of-art technology-enabled teaching methodology backed by a strong research-foundation backed by a strong research-focused curriculum for facilitating a continuous process of learning and development. It was set up in 2009 as a not-for-profit institution, with the vision of being the leading center of innovation and learning in emerging areas of the knowledge society, NU has been developed as an institute of excellence based on the four founding principles of providing industry-linked, technology-based, research-driven, seamless education. Our key differentiator is that every course of ours is current and in alignment with the industry needs. In fact the key industry players are partner to us in all our Programmes. ●

Dr Rajeev Shorey
(Ph.D, FNAE)
President, NIIT University



ESRI International User Conference 2011

All about Understanding Our World

The week long technological extravaganza organized by Esri Inc. US – 2011 Esri International User Conference from 11 – 15 July 2011 at San Diego, California describing the technology advancements in geographic information systems (GIS) that have changed the global geospatial landscape. Attended by 15000+ delegates arrived from 126 countries, representing almost every discipline, with one-third of them coming from outside the U.S. These attendees participated in talks, watched software demonstrations, and attended paper sessions describing the ways that geospatial information and analysis are available to everyone.

It's all about understanding

The vision of this year's user conference: "GIS-understanding our world" suggested the need for a different approach, as the world meets various challenges such as climate change, urbanization and land use, loss of biodiversity and many other issues.

Geography is the science of our world. It provides us with a framework for bringing together our knowledge and experiences about the natural and human worlds. It organizes measurements, inventories, datasets, and observations and allows them to be brought together in models that describe how our world works. GIS is advancing geographic science in many ways by providing a quantitative platform that can be used for integration, scientific analysis, and visualization. Clearly, the integrative nature of GIS is facilitating better and more systematic understanding in almost all fields. It's a language that is increasingly recognized as a powerful means for reducing complexity and quickly understanding the dimensions of a situation.

Plenary Session

Welcoming the GIS user community to the Esri UC Plenary, President Jack Dangermond laid out his GIS vision for the coming year and years ahead. Leading with the conference theme, "Understanding Our World," he presented the work the GIS community is doing and how ArcGIS is evolving.

The Work of the ArcGIS User Community

This year 15,000 people registered for the conference representing 126 countries, sharing a passion and opportunity to use GIS for a better world. Their work ranges from understanding oceans, building ocean basemaps, and marine spatial planning apps, to exploring alternative energy frontiers, planning for the future, and looking at land use change. Organizations are tracking transportation in real time, studying cellular coverage and network speeds, and using business intelligence for supply chain optimization. New apps have been designed for planning for and responding to natural disasters for situational awareness. Local governments are now engaging citizens to provide crowd-sourced information such as storm reporting. Cities around the world, including Geneva, Singapore, and Abu Dhabi have put ArcGIS systems at the heart of management. And, at a larger scale, nations such as China, Russia, and India have implemented national infrastructures.



Jack recognized 140 Special Achievement in GIS (SAG) award winners and awarded Esri's Enterprise GIS Award to Singapore GeoSpatial Collaborative Environment that put GIS at the core of local government. He presented the President's Award to the Federal Service of State Registration Cadastre and Mapping of Russia that built a national cadastral system for the entire country. A Making a Difference award was given to Research Center for Disaster Reduction Systems, Kyoto University's for providing support maps that surrounded Japan's earthquake, tsunami, and fallout disasters. A second Making a Difference award was given to Geneva International Centre for Humanitarian Demining, which was accepted by director Daniel Ericksson.

ArcGIS Innovation and Enhancements

Setting the stage to introduce the collaborative abilities being built into ArcGIS technologies, Jack explained, "Our world is changing rapidly and humans are causing it, which is creating many challenges. We need collective intelligence and understanding that helps us meet these challenges." He further noted that GIS is changing rapidly and is coevolving with other enabling technologies for measurement, data, computing, connectivity, science, GIS virtualization, bandwidth, collaboration, social networking, and cloud platforms. He presented the following innovations and enhancements in ArcGIS 10 and the soon-to-be-released ArcGIS 10.1.

- A growing collection of basemaps and content including Landsat services, imagery, a world street map, an ocean basemap, a national geographic world map, and census data.
- New statistical and spatial analysis tools that include space time cluster, auto correlation analysis, and exploratory regression.

- Scientific Empirical Bayesian Kriging, exploratory regression, areal interpolation and geodesic buffers
- Mapping and editing workflows with dynamic legends, map automation with Python, and temporal support.
 - Improved database management that adds native SQL access, enhanced geodatabase, and open API for the file geodatabase.
 - Improved image integration and exploitation that supports visualization, analysis management and dissemination, dynamic mosaicking, automatic enhancements, 3D measurement, and integrated video FMV.
 - Support for Lidar to read LAS files, dynamic integration, and on-the-fly views of Lidar as raster, TINs, and point files.
 - Expanded 3D GIS performance and new tools such as shadow analysis and buffers.
 - Content creation. Esri has acquired the visualization company Procedural. Its product CityEngine builds content creation by integrating GIS, urban design, and advanced visualization tools. It is sold as a standalone product now, but Esri will eventually integrate it into ArcGIS.
 - Support for all popular mobile devices including Windows, iOS, and Android to connect field workers with the enterprise system.
- ArcGIS Runtime is a new lightweight platform for developers that is easy to deploy and provides 64-bit native and developer environments of WPF/Java/QT. It will be sold in license.
- ArcGIS Server architecture enhancements that improve performance and make it easy to install. Users can easily create services with strong Linux support and high scalability. It supports on-the-fly symbology, improves support for standards, is responsive to new web standards, and offers web printing.
- Simplification for sharing your work. Create an analysis in ArcGIS Desktop such as a geoprocessing package and turn it into a map service or process for use on your organization's server or to ArcGIS Online for a cloud environment.
- ArcGIS is now available for home-use to help you develop your skills and to use in your volunteer work. It includes ArcGIS Desktop and extensions at a nominal cost.

ArcGIS Online Is a New Platform for ArcGIS

Esri is about to release a new version of ArcGIS Online that is a complete open platform in the cloud. Intelligent web maps enable you to share your work with others. Intelligent maps allow basic services to be visualized, shared, and edited, has integrated popups, and supports spatial and temporal analysis. Intelligent maps are open and accessible through an API. Integrate it into smart phones, social media, and websites. This technology unlocks an organization's geospatial assets. You can publish web maps for others to discover, access, and visualize. This open system runs Esri files as well as open datasets of CSV, GPS, and KML so that you can create an open web-mapping environment.

ArcGIS Online is a cloud-based GIS that can be supported online and on-premise. It is a complete SaaS solution for individuals, departments, and communities. Some users need help deploying to the cloud so Esri is providing managed services for cloud-based ArcGIS infrastructure support, such as map and applications hosting, caching, image processing, management, and monitoring.

Technology Demonstrations

The City of Boston presented how its enterprise GIS is bringing together local government services and engaging its citizens.

Clark Magnet School science teacher Dominique Evans-Bye and her senior student, Yeprem Chavdarian, presented the high school's award winning GIS projects that tracked toxic runoff from and to sea, chemical impacts on marine life, and fast water flood channel analysis for at-risk school children.

Esri's developers and specialists demonstrated new products and enhancements including

- ArcGIS for Local Government that provides 50 templates for building apps and creating maps.
- Enterprise integration using ArcGIS for SharePoint and SpotOn Vantage Maps for IBM Cognos.
- Community Analyst, an Esri GIS cloud service.
- Spatial Analysis space time cluster, auto correlation analysis, and exploratory regression tools.
- Imagery mosaic datasets, services raster production, and measurement.
- Lidar and 3D enhancements.
- ArcGIS productivity enhancements such as search, editor tracking, geodatabase administration tools, configurable Silverlight viewer, dateline panning, social media sharing, mobile platforms for Android, Windows, and iOS, and offline capability.
- ArcGIS Runtime, a service platform for web developers.



Keynote Presentations

Green Living Project, presented by Timothy T. Schilling and Michéle Adesir-Schilling, is a model for lifting the economy of a nation. Their work with Rwandan coffee farmers brought a quality product to the international industry. Schillings worked to bring individual farmers together and developed a method and standard that would raise the quality of their coffee to be one of the world's most outstanding coffees. By raising quality, they raised demand, and raised their prices, which, in turn, raised the economic levels of the country.

European Environment Agency director Jacqueline McGlade explained how just one degree of temperature change impacts the earth. We must change our behavior and adapt to the realities of climate change.

Senior Executives discuss How GIS Can Solve Real-World Problems

The Esri Senior Executive Seminar was held a day prior on July 10, 2011 to the Esri International User Conference. It was attended by 350 senior executives from various organisations from different countries. Dr. Roger Tomlinson who is also known as "Father of GIS" welcomed the audience and moderated the whole seminar introducing the Speakers.

Speaking on the occasion Mr. Jack Dangermond insighted the potential of geospatial technology becoming societal infrastructure. He also mentioned that "GIS is evolving and enabled by many things including computing networks, cloud and mobiles devices etc., software is becoming multidimensional." He also visioned how GIS is rolling into cloud environments providing a network of services, portals and applications by integrating distributed information using geography. "This is cause for pause because its new for many organizations," said Dangermond.

And then Dangermond continued with an additional cautionary message: "Successful GIS implementation is not just technology; Management needs to be involved. They need to have a governance and a finance model; many organizations don't get this right; it has to be planned as to what you can get out of these systems," he said. He emphasized that there must be a clear business value and systematic planning.

Raphael Bostic calls himself a non-technical federal policy leader. An assistant secretary of the US Housing and Urban Development (HUD), the Stanford University-trained economist wasn't shy about stating that fact "I'm an odd

person to be speaking. I'm the least technical person in the room," Bostic said. He offered the perspective of a policymaker who understands the real-world solutions needed from a technology like GIS. He said geospatial technology holds great potential but needs to be simple and speak to people's lives. "What are the everyday questions the data can answer? (When we know that,) we can be extremely successful."

Secretary Ivan John E. Uy, chairman of the Philippine Commission on Information and Communications Technology provided an in depth look at how the government of the Philippines manages all information technology to support their e-government initiatives that includes GIS technology. "GIS is very important to achieving national government goals," said Uy. He also envisioned a new generation of Filipinos who are becoming merely consumers of technology and its products to becoming creators that help to build and improve on technology that results in improved personal productivity. The Philippine Digital Strategy (PDS) will hopefully bring better education and stronger economies as well as a better quality of life for all Filipinos. Uy goals include creating a high level leadership, upgrade and improve the government's IT infrastructure; and improving intergovernmental coordination to enhance government services.

Speaking on the occasion NIIT Group and NASSCOM Chairman Rajendra S Pawar provided a perspective of building a smarter nation through GIS. He insighted that India has embraced information technology for the past 30 years in their quest to bypass the industrial revolution for the betterment of their people. GIS has played a very important role in this transformation.

He also highlighted the recent successes over a decade of the power of geospatial technology in the country – as examples he cited the telecommunications industry the growth in subscriber base has expanded from 28 million in 2000 to 826 million in 2011 with spatial enablement used to improve services and to bring down the time to resolve problems. In addition, Kanpur city in the largest state of India used GIS to increase tax revenues by 300% just by making the list of taxpayers more correct. But perhaps the most impressive use of GIS has been in the management of India's 2011 Census, the largest census ever taken in the world organizing the data for use by functionaries at all levels. The data organized in GIS will be far more helpful and useful.

GIS became an integral part of national planning with many geo-enabled projects in infrastructure, urban planning, land records management, power generation, etc. Pawar said that GIS in India 20 years ago was just about data conversion. Now there is much more confidence in solving problems and looking for solutions. A national GIS is in the process of being designed with a great deal of emphasis on a national spatial data infrastructure

Earl E. Devaney, chairman of the US government's Recovery Accountability and Transparency Board, spoke at the Senior Executive Seminar about the use of GIS for recovery.gov. According to him GIS-enabled applications have been able to answer questions such as "Where are federal stimulus dollars being spent and to what effect?" Devaney also said, however, that more outreach needs to be done to promote Recovery.gov because many people and civic organizations seem unaware that all this data is available. He believes transparency is important in government because it provides accountability and promotes self corrective behavior.

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HEALTH GIS:

A STRATEGIC SHIFT TO HARMONISE HEALTH CARE INEQUALITIES IN MAHARASHTRA STATE, INDIA

Ubiquitously, healthcare systems are struggling with the burden of 21st century public health problems. In the light of growing concerns about the sustainability of the health care system, interest has been risen in exploring, how different types of spatial health designs can promote equity in health care systems and its accessibility in the context of rural scenario. Inequities in health are unfair, and are avoidable. Rather, inequities in health are a breach of basic principles of justice since they imply inequities in opportunities for people to live and deliver to their fullest. In these circumstances, reduction of these disparities becomes the prime responsibility of the exchequer and the geo-spatial experts.

Health GIS exemplifies how a local government and its citizens can use geographic knowledge to revamp health care services. The area of GIS and public health has risen to prominence in the past decade as surveillance practices and health service allocations need to be more sensitive to the needs of people, geographically. The collection, storage and manipulation of geo-information is undergoing a revolution with the development and widespread availability of GIS software. GIS supports a pervasive geo-spatial platform that encompasses desktop, mobile, server and web services. Many health professionals are benefiting from further education in this area, thereby influencing the progress of health surveillance, environmental health assessment and the geographic allocation of health resources.

Public Health Department, Govt. of Maharashtra, took firm stride in this direction to analyze the regional imbalances of health care services to cater rural poor in particular. Master plan of Health Department, intends to eliminate disparities in health care services and aim to redistribute them based on criteria pertaining to geographic parameters such as spatial

distance, population, proportion of minority communities, road connectivity and accessibility etc.

Providing Spatial Dimensions to health sector: Until recently, maps and / or information; usually in paper/table form, has been mainstay for a wide variety of applications and decision making. Converting this wealth of information and adding a spatial dimension to it, is a gigantic but crucial task in the light of devising health GIS. Mapping available health facilities spatially has changed mere data into information through visioning and technology, so that healthcare needs and issues can be more effectively realized. GIS provide ideal platforms for the convergence of area specific information and their analyses in relation to population, settlements, health services and the natural environment. Maharashtra Government is the firm believer of the fact and benefited largely with the use of spatial technology in e-governance.

Making Problem Visual: In view of optimizing the health services in the state and to achieve the harmonized regional balance in terms of catering healthy live being, following objectives are set forth, as good medical care should be scientific, rational, affordable, accessible and with a human face.

- Map existing healthcare facilities at different administrative levels
- Map administrative, cultural and natural boundaries viz district / taluka / village boundary, village settlement location, roads, rail, forest, river, tank reservoir etc.
- Generate district-wise map showing existing Primary Health Centre (PHC) and its service jurisdiction.
- Generate taluka-wise map showing existing Sub-Centers (SC) along with its service area.

- GIS analysis incorporating demographic data, distance and accessibility to health centers from settlement.
- Visualize and understand regional imbalance and inequalities of health care services by highlighting areas of surplus, optimal and deficit healthcare services for master plan preparation.

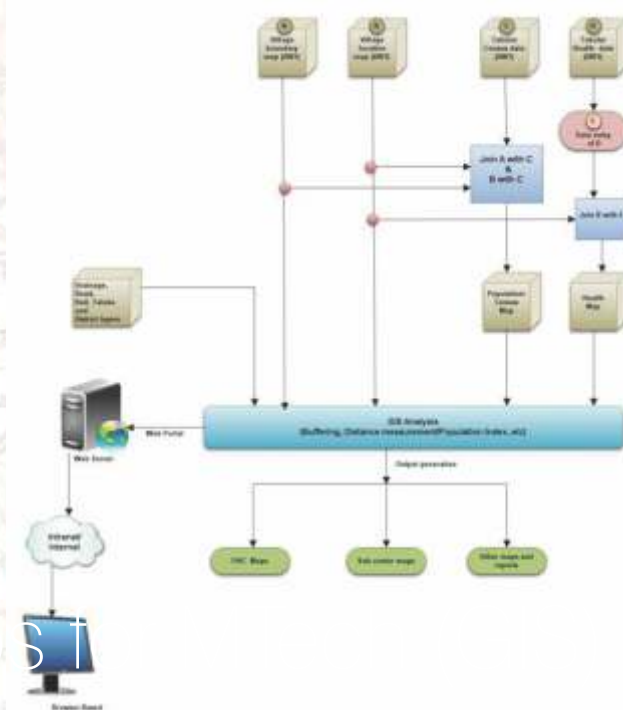
Spatial technologies are powerful tools to make the problem visual. It helps to balance social, demographical and natural aspects with economic considerations while devising the master health plan. This would certainly be helpful to decision makers to accurately plan, manage and monitor and update the public health system.

Interface and Methodology: The geo-spatial data processing and analysis has been carried out on high-end workstation using ESRI ArcGIS 10 by keying demography data, distance criterion and thematic details to prepare the master plan for health department. Spatial distance by accessible road network has been calculated from village settlement to health facility by writing the script in Arc Objects for VBA. Intense analysis leads to identify clustering of existing health facilities and zonation of service areas to indicate up-gradation /new creation / removal of such facilities as per set norms of health department. This will also highlight the inequalities in distribution of existing health care facilities throughout the state. Additional resources pertaining to trained manpower, facilities and health care centers as based on population criteria can also be assessed.

Health geo-spatial database is planned to be ported to Web GIS Server, being implemented under Maharashtra State Plan Monitoring system, wherein web based application has been published on intranet. Flex framework has been used for building the web application creating an interface between server side data services and the client. ESRI ArcGIS API for Flex is used to serve the GIS based web services from ArcGIS server. The user selects the desired spatial relationship for the spatial query from the available interface and generates various outputs in form of maps, tables and charts. System generates about 12 standard report formats (xls and charts), frequently used by the Health Department.

A Collaborative Multi-user, Multi-source Platform: Spatial inputs such as district / taluka / village / forest boundary, settlement locations, rail, road and drainage network were fetched from different sources. Water bodies (tank / reservoir / river) were interpreted using high resolution satellite image to understand the exact spatial sprawl. The attribute database provided by the Health Department consists of list of villages having PHC / SC / special hospitals and villages served by them. The spatial and attribute database were linked through census code 2001 as a key. The output of the system viz. maps, reports and charts can be exported to pdfs and xls format on the client's desktop, forming viable information base for decision making.

Geo-spatial Dataset Analysis Based on Distance and Demography: ArcGIS Network Analyst allows solving common network problems, such as finding the least cost route, finding the closest emergency vehicle or facility, or identifying a service area around a location. Network Analyst uses standard ArcGIS geoprocessing interface. A model was build using ArcGIS 10, for calculating the shortest distance from a PHC and SC to reach each village settlement under it. The model included route analysis with closest facility. The input required for this model was the spatial locations of



villages, spatial locations of PHC and SC, and a network dataset of road corresponding to each district. This model was exported to VB script and modified to run for all PHC and SC. Based on the distance calculated by the model and demographic data attached, following results could be analysed:

- Villages whose distance was greater than 25 km from its PHC
- Villages whose distance is greater than 6 km from its corresponding SC.
- Villages which are deficit of health facilities.

Higher economic growth in Maharashtra rather has not translated into a strong public health system with equitable access to health care. In view of this accessibility to health care facility in terms of transport network is a key issue addressed in the present solution by analyzing it through network analyst.

Porting Geo-spatial database to Web GIS Application Server: The geo-spatial database of Health Department is being ported to Web GIS Server, being implemented under Maharashtra State Plan Monitoring system, wherein web based application would be published on internet. A web application is developed in Adobe based Flex Builder 3.0. This Flex applications acts as an interface between the server side GIS resources and the client. The mxds being created in ArcGIS 10 are served through ArcGIS server 10 by creating services, which are further consumed in the Flex application. The application developed provides following functionalities:

- Basic functionalities of GIS such as zoom-in, zoom-out, print, identify, spatial and non-spatial query, search, export to pdf / xls

- A Real-World Application:** Unlike other GIS users, Health GIS users (medical practitioners to a large extent) are relatively new to the concept of building environment through computer mapping. The present health GIS intends to impart the knowledgebase of geospatial tools to these users through elaborative training schedules for various levels of implementation. Health being an interdisciplinary and humanitarian subject, data inputs related to natural, environmental and demographic aspects available from all other projects needs to be converges into health GIS system to make it more holistic in nature for real-world application.

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- **Data compatibility and sharing:** Health being an everyone concerned, information generated through allied projects needs to be pulled in for health mapping purposes. Being interdisciplinary in nature needs inputs from socio economic, environment and landuse aspects also.
- **Comprehensive Health GIS:** It is high time we have a national Health GIS system in place. GIS as a planning and



- **Training:** Health administrators should be imparted necessary training in the use of geo-spatial technology.
- **Identification of Hotspots:** Analysis leads to identification of health hotspots in terms of health care facilities and their establishment at place where it needed most.

- Geographic approach helps determine the optimal siting of health care facility
- Decision making solution for Health Master Plan generation and e-governance.
- State web portal provides easy, one-stop access to ready-to-use data for Health Department.
- Mesh-up of ESRI ArcGIS APIs for Flex and ArcGIS services for Health GIS



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Mapping the Cultural Diversity in Biodiversity Context

Anthropological Survey of India and Regional Remote Sensing Centre (ISRO), Kolkata to develop integrated geo-database focusing the human surface within the Indian Biosphere Reserves

Introduction

Human population living within the Biosphere Reserves (BRs) has always been a matter of conflicting interests and debates particularly in India. The widely dispersed nature of human settlement composed of autochthonous tribal population living in harmony with the forest ecosystem within most of these BRs calls for an in depth understanding. The relocation of those settlements, as per the BR norms, has always been a contentious issue. Much of what has been done so far from the point of view of reducing dependence on the biomass but issues of local communities directly linked with natural resource management are yet to receive adequate attention.

The Anthropological Survey of India under the Ministry of Culture, Government of India has given its focus on the issue by launching Man in Biosphere project at national level in 2005. It is planned to cover all the fifteen Biosphere Reserves in India with the main objective to assess the state of human societies living in and around the diverse ecosystem of those to be seen from the point of view of both biodiversity and cultural diversity. Under the Eleventh Five Year Plan project 'Man and Environment' the Survey has already completed eight BRs and three volumes are published. In extension of these publications a comprehensive digital database is also being developed in the GIS environment on each BR to provide an interactive and updateable information trove for the benefit of researchers and planners.

In most of the Biosphere Reserves declared in India, especially in those comprising forested plateaus and hills like Similipal, Panchmari, Nilgiri, Achankmar-Amarkantak, Agasthyamalai, Manas, Dihang Debang, Great Nicobar, and Khanchendzonga, the Core Area is traditionally inhabited by several indigenous tribal communities. Living in the areas rich in natural resource, the people fulfill many of their livelihood requirements from the rich biodiversity around them. The ecosystems such as forest not only meets a variety of livelihood needs of the forest dwelling people, through products such as timber and non-timber forest products, but also sustain traditional agricultural practices contributing to the food security of the people within the BRs. But Biosphere principal necessitates that the core zone of the Biosphere Reserve should be an undisturbed area and free from all human pressure external to the system in order to conserve the genetic diversity and integrity of plants and animals. On the other hand as per the MAB strategy adopted by the Government of India and the State Forest Departments to eradicate any anthropogenic impact within the limit of the Core Area. This implies shifting of those existing human settlements outside Core Area through suitable and amicable rehabilitation and resettlement package to the affected people.

So far Anthropological Survey of India has completed field based study of seven out of fifteen Biosphere Reserves. For the purpose of the present article only the Similipal and Achanakmar-Amarkantak BRs are taken up as case studies mainly to experiment the application of RS and GIS towards establishing a comprehensive methodology approach.

The Similipal BR possesses a rich diversity in terms of terrain, weather, soil, vegetation etc as well as houses several nomadic and semi-nomadic forest dwelling tribal communities like the Kolhas, Santhals, khadias, Bathudis and Makdias along with castes communities like Mohantas and Goudas. In total a staggering 4.5 lakh people in 1186 revenue villages spread within the area 4374 sq. km. are dependent on Similipal.

BR in one way or the other. Needless to say that the rich biodiversity has already experienced depletion and

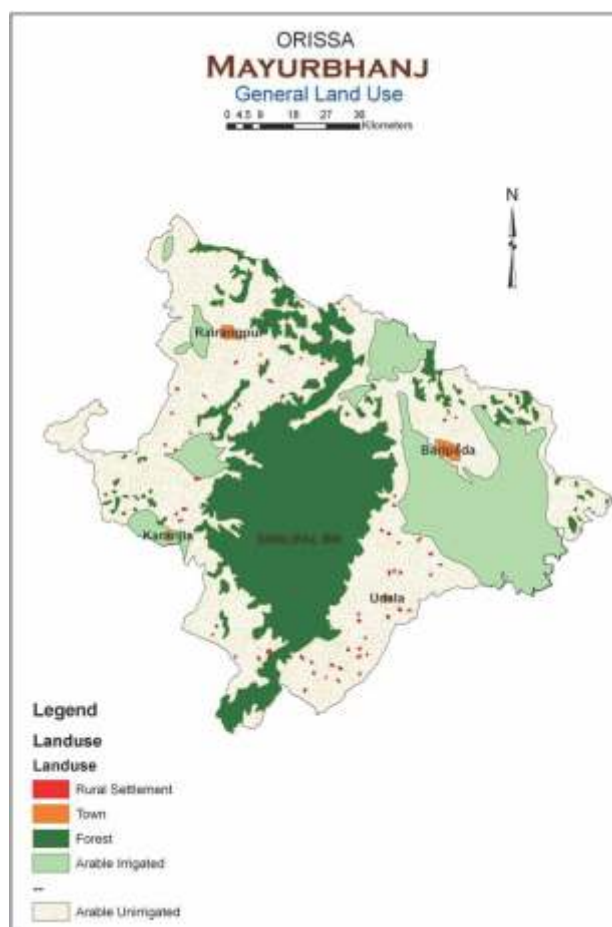


Figure 1: General land use of Mayurbhanj district Orissa based on District Planning Series maps 2001

degradation, even after formation of Similipal Tiger Reserve in 1973. In fact there are four villages inside the core area and 61 in the buffer of the National Park with a steadily growing population.

Achanakmar-Amarkantak Biosphere Reserve (AABR) has an area of 3835.51 sq km. of which 2610.53 sq. km is within

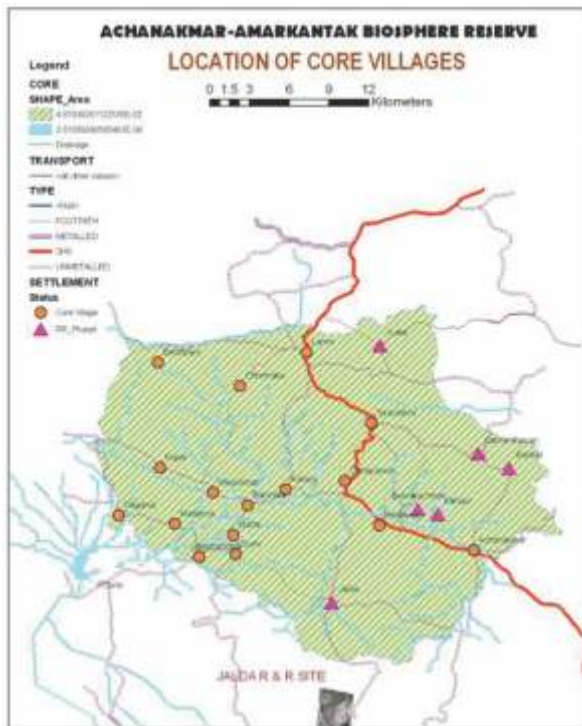


Figure 2: Location of Core Area villages in the Achanakmar-AmarkantakBRR

Chhattisgarh state while remaining 1224.98 sq.km falls in Madhya Pradesh state. The core zone has an area 551.15 sq.km. In fact, the Achanakmar Sanctuary forms the core zone of the AABR. The entire core zone falls in Chhattisgarh State. The remaining 3238.96 sq.km serves as buffer zone of which 1224.98 sq.km falls in Madhya Pradesh and 2058.98 falls in Chhattisgarh. There are 24 forest villages in the core zone of the AABR.

Data and method

Keeping those objectives in view the Survey has already set up a state of the art digital cartography laboratory equipped with

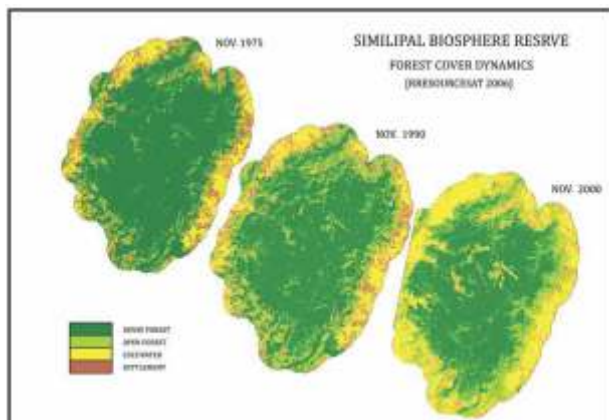


Figure 3: Changes in Land Cover from 1975 to 2000 in Similipal Biosphere Reserve

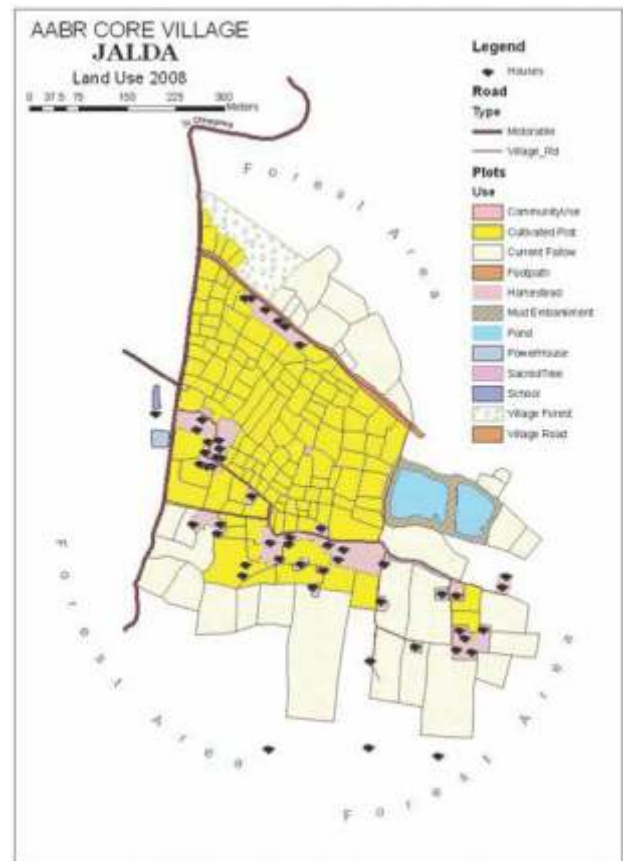


Figure 4: Current village level land use map of Jalda, AABR generated using imagery and ground survey involving villagers active participation

latest hardware and software for RS and GIS applications. Utilizing both the high quality remotely sensed data of good temporal and spatial resolutions and the socio-economic data and information collected through intensive field work, mainly by the geographers and anthropologists of the Survey, we have the potentiality to apply multiple method approach in this project.

In fact the pattern and extent of bio-diversity determines the state of ecosystem stability and resource utilization pattern by the local inhabitants. It is therefore, imperative to develop strategies for resource assessment through detail scientific analysis and mapping of the multiple dimensions of the natural resources. Therefore, an immensely potential and less explored scope of RS and GIS application is found in reaching the Objectives like mapping, inventorying and change detection of the natural resources at both LULC and cadastral level, understanding and monitoring the impact of economic activities, identification of sacred natural objects and traditional ecological knowledge on biodiversity and conservation, measuring the inter-relation between social and cultural system variants and bio-diversity perception and to find the environmental associates of health and nutrition. Further, by conducting Social Impact Assessment (SIA) for those settlements to be shifted the Survey suggests a Resettlement and Rehabilitation policy applying compatibility and suitability analysis in relation to the present habitat of the people to be displaced. Finally to formulate an integrated model involving multiple methods for generating, managing, updating and analysing GIS data base on Biosphere Reserves of India.

The data on environmental components of the biodiversity or the natural resources like air, water, soil, plant and animal are

being provided and enriched by different friendly/ collaborating institutions/organizations like the Forest Department, Biosphere Reserve authorities, the Nodal Agencies for respective BRs, Indian Remote Sensing Organization, Indian Institute of Forest Management and other published research findings.

At the same time a crucial issue often create difficulties in integrating remote sensing and social science field research methods is the constrains in interactions among processes acting at different scales. Spatial resolution of RS data affects which land cover change is recorded and analyzed. Within small holder systems that characterize much of rural India, changes in land use and land cover with major impacts on social system may be difficult to detect with RS system most commonly available/used for LULCC.

While the implications of environmental changes are often discussed in terms of global and regional consequences, there is growing recognition that many of the critical causes arise from societal and biophysical processes at the local level. In short, driving forces of land use and land cover change are many faceted.

They may change in relative influence over time, and their impact will vary as a local context changes. Analysis of LULCC at multiple scales demands conceptual frameworks and analytical methods that are both comprehensive enough to capture the dynamics of society-environment interactions at different scales, and flexible enough to accommodate the temporal dynamics of these processes.

Working Model

- I. Pre-field studies and reconnoitre field visits for Project Designing and Sample Selection at Pre-field level

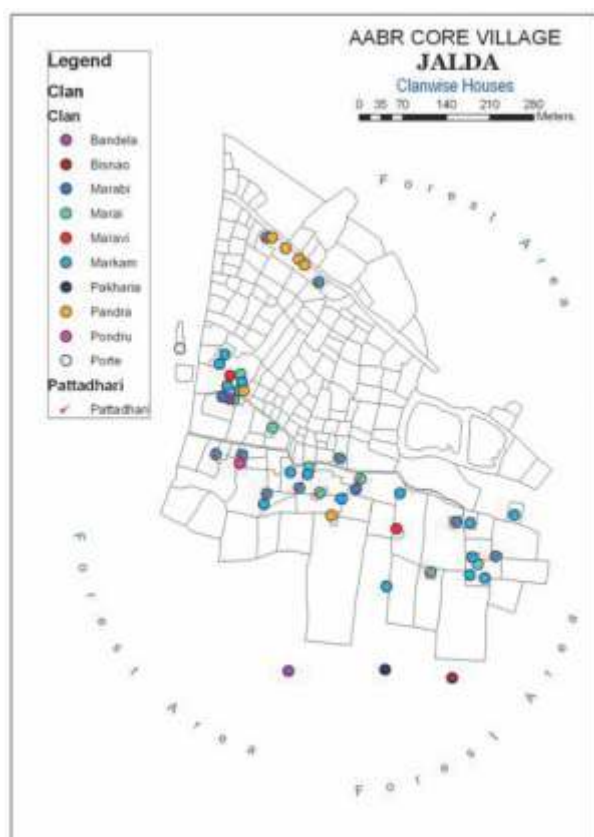


Figure 5: Spatial segregation pattern of Clan wise houses and landowners in a core village in AABR based on ground survey using GPS.

- ii. Structuring and Formatting of the Field Schedules and questionnaires compatible to GIS Platform
- iii. Creation and Structuring of Secondary Data and Information
- iv. RS Image processing and interpretation at pre-field level
- v. Ground testing of classified RS data through field testing at ground control points using GPS
- vi. Geo-referencing and Updating Spatial Database using GCPs (Collected through GPS)
- vii. Building of topology and DEM (Digital Elevation Model) on vector maps.
- viii. Generating Complete Database through input of Field Data
- ix. Attaching /Joining the Attribute Tables and other Audio-Visual files.
- x. Generating complete GIS data base and project report through Spatial Analysis, Statistical Analysis, Analytical Tables, Charts, Maps as per Project Objectives
- xi. Computation and Comparison of LULC changes through final maps and interpretation of those findings in relation to socio-economic and cultural indicators
- xii. Conceptualizing the intricate relation between bio and cultural diversity and the forces of changes inherent in the society.

Software Support

- Geo-referencing, enhancement and classification of RS imageries and SOI maps using Erdas Imagine 2011.
- Preparation of vector maps from raster images and digitizing of SOI and other rasterized LULC maps using ArcGis 10 software.
- Feeding, structuring, managing and analysing both spatial and non-spatial data in various feature classes and attribute tables in Relational Database Management System (RDBMS) on ArcGis platform.

The satellite data have been procured and processed through collaborative research programme with National Remote Sensing Centre (ISRO), Kolkata. Preliminary maps are completed and compared integrating all collected maps from different sources. Field based and other published data are processed, structured and attached as attributes to the geospatial data base at the Surveys Digital Cartography Laboratory. The processing of the high resolution Cartosat-I data is in progress which will be overlayed and spatially analysed in GIS platform towards finalization of the database on individual Biosphere Reserve. A few examples of maps produced are given here [Figure 1 – 5]. ●



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Key enhancements in ArcGIS.com

Adding Local Feature layers, Geo-enabling MIS data by Drag & Drop and Configuring Pop-up windows

ArcGIS.com at a Glance

ArcGIS.com is a website for working with maps and other types of geographic information. Using this site, we can create maps; find and use maps, applications, and tools; and share our maps and applications with others. Within the site, we will find applications for building and sharing maps. We will also find useful basemaps, data, applications, and tools that we can view and use, plus communities you can join.



Adding features from a file

We can Add features on our map that are stored in a delimited text file (.txt or .csv), a GPS Exchange Format file (.gpx), or a shapefile (compressed into a .zip).

The ArcGIS.com map viewer adds the location information, draws features on the map for each item in the file, and stores the information in the web map. Once you've added the features to the map, you can configure pop-up windows, change symbols and set the visibility range.



To add a file to your map, open the ArcGIS.com map viewer, click the Add button, choose Add Layer from File, locate the file on your computer and click Import Layer. The layer is stored with your map. If you use Mozilla Firefox or Google Chrome web browser, you can also import the data directly by dragging and dropping a file onto the map.

Text file

You can add features from a delimited text file (.txt) or comma-separated values text file (.csv) that uses a comma, semi-colon, tab, or pipe (|) to separate the fields of text. The file needs to contain one pair of the following latitude and longitude fields:

The ArcGIS.com map viewer displays the first 1,000 rows of features in your file. If you use Internet Explorer 7 and 8 to import your text file, the first 750 rows of features are displayed.

Latitude field	Longitude field
latitude	longitude
lat	long
y	x
ycenter	xcenter
point-y	point-x

GPX file

You can add data captured with a GPS device by converting the data to a file in GPS Exchange Format (.gpx). Numerous third-party and GPS manufacturer utilities exist to perform this conversion. The following types of data are supported:

- **Waypoints**—These are points that the GPS user recorded manually, often specifying a name, to mark locations on the map.
- **Tracks**—These are points the GPS device recorded automatically at a periodic interval. Tracks are rendered as linear features.
- **Routes**—These are points the GPS device used to navigate to a specified location. Routes are rendered as linear features.

The ArcGIS.com map viewer displays the first 1,000 layers of features in your file.

Shapefile

If you have local geographic data stored in Esri shapefile format, you can make it available to others through a web browser by adding it to a map you create with the ArcGIS.com map viewer. Add your shapefile as a .zip file containing the .shp, .shx, .dbf and .prj files.

Tips for adding shapefiles

- Your zip archive must contain the .shp, .shx, .dbf, and .prj files that comprise the shapefile.
- The files must be stored directly in the root (the central directory) of the zip archive, not in directories within the archive.
- You can add standard compressed archive .zip files; other compression formats are not supported at this time.
- Large features with lots of data may draw slowly in a web browser. For the best viewing experience, you should generalize the vertices of your features and keep the .zip file as small as possible.
- You may have poor performance with zipped shapefiles over 1MB. Larger datasets should be served with ArcGIS for Server for optimal performance.
- The name of the new layer is the same as the name of the zip file you added. You can rename the file before adding to the map, or rename the layer once it is part of the map.

Dragging and dropping a data file

In addition to importing your data file through the ArcGIS.com map viewer Add button, you can drag a file from your computer and drop it onto your web map.

The map viewer will handle the file as if you had used the Add button.

Dragging and dropping .csv, .txt, .gpx. and shapefile (.zip) files is supported on Google Chrome and Mozilla Firefox browsers; it is not supported on Internet Explorer and Apple Safari.

Steps

1. Open Microsoft Excel Worksheet containing MIS data.
2. Save data along with location coordinates (Latitude, Longitude in Decimal Degrees) as .csv format.
3. Open the Default map in ArcGIS.com in the ArcGIS.com map viewer.
4. Click the My Map button.



5. Open Windows File Explorer and navigate to location where .csv file is stored.
6. Drag & drop layer on ArcGIS.com Map display area.
7. Data gets added as a layer to Map contents and is displayed using Default symbol.
8. This Layer can be further classified & rendered using available attribute values.

Configuring pop-up windows

In ArcGIS.com, Descriptive information about features can be displayed using pop-up window.

As the map author, we can configure which information to be displayed in the identify window. In addition to Attributes, we can even configure images and charts reflecting different trends.

Steps

1. Open the map in which you want to configure pop-up windows in the ArcGIS.com map viewer.
2. Click the Details button.
3. Click the Contents button.
4. Navigate to the sublayer that contains the feature data you want to configure.
5. Click the arrow to the right of the layer name and click Configure Pop-up.
6. Enter a title for your pop-up window.
 - a. Use the [+] button to select field values from your data. The field values contain field aliases followed by the field names. By default, the primary field is displayed.
 - b. Optionally, enter static text instead of or in addition to your field values.
7. Select an attribute option from the drop-down menu.
 - a. Your choices are a list of field attributes, a description from one field, a custom attribute display, or no attribute information.
 - b. If you've selected to show a list of field attributes, click the Change Attributes button, select which fields to display, and change your field aliases. By default, all fields display.
 - c. You can reorder the list of fields by selecting a field and

clicking the Up button or Down button.

- d. If selected to show a description from one field, click the arrow underneath Select the field containing the description, and click a field name to display.
 - e. If you've selected a custom attribute display, click the Configure button to define and format the information you want to show.
 - f. Check the box next to Show feature attachments as links if you want to provide hyperlinks to attachments at the bottom of the pop-up window. Attachments are supported as a related table to a feature class in a feature service.
 - g. Click the Format Fields link if you want to change the default display format for numbers and dates.
8. For feature service layers only, click the Configure Attributes button to define which fields can be edited on the map.
 - a. The Configure Attributes window opens.
 - b. Check boxes next to the fields you want to display.
 - c. Check boxes next to the fields you want to be editable.
 - d. If you want, select a field row and change the field alias, field name, text box type, and editing hint.
 - e. Click OK.
 9. Add media.
 - a. You can include images, line charts, bar charts, pie charts, and column charts in your pop-up windows.
 - b. Click the Add button and choose the type of media you want to add, for example, an image or line chart.
 - c. A configuration window opens for the type of media you've added.
 - d. If you added an image, specify a title based on your fields, a caption based on your fields, the URL to the image, and if you want, include a related link with the image. Click OK to save your configuration.
 - e. If you added a chart, specify a title based on your fields, a caption based on your fields, and select which fields to include. Click OK to save your configuration.
 - f. If you added a line or bar chart, you can select a Normalization field to normalize the data. The values in this field will be used to divide the value field to create ratios. Normalization ratios are useful when other factors influence the numerical values you are classifying and displaying. For example, population can be influenced by each county's size, so you can divide population by area to standardize the data. Click OK to save your configuration.
 - g. Select a media item and click the Up button or Down button if you want to reorder how the media items appear in the pop-up window.
 10. Click Save Pop-up when you are finished configuring your pop-up windows.
 11. Click the arrow to the right of the layer name and click Save Layer Properties to save the pop-up configuration with the layer. Applies to ArcGIS Server map service layers only. This automatically enables pop-up windows on the layer for any web map that includes the layer.
 12. Click the arrow to the right of the layer name and click Remove Pop-up if you do not want to display pop-up windows for a map service layer you have previously enabled. There is no option to remove pop-up windows for feature service layers. ●

Code Snippet

Environment : Windows Mobile 6.5 Professional,
Windows XP, VS 2008
Version : ArcGIS Server 10 Mobile SDK
Description : The following code is used to read
the GPS and display in label. Also captures the feature
in feature class and synchronizes with central
database

```
using System;
using System.Collections.Generic;
using System.ComponentModel;
using System.Data;
using System.Drawing;
using System.Text;
using System.Windows.Forms;
namespace AM_CodeSnippet
{
    public partial class frmGPSSample : Form
    {
        private String _Port;
        private
        ESRI.ArcGIS.Mobile.Gps.GpsConnection
        _gpsConnection;
        private
        ESRI.ArcGIS.Mobile.Gps.SerialPortGpsConnection
        SerialGPS;
        public frmGPSSample()
        {
            InitializeComponent();

            //Setting up the GPS Hardware Port
            and initializing the SerialPortGPS Connection
            _Port = "Auto";
            SerialGPS = new

            ESRI.ArcGIS.Mobile.Gps.SerialPortGpsConnection();
        }
        public bool StartGPS()
        {
            //Opening Serial GPS Port
            try
            {
                SerialGPS.PortName = _Port;
                _gpsConnection = SerialGPS;
                _gpsConnection.Open();
                return true;
            }
            catch (Exception ex)
            {
                return false;
            }
        }
        public bool StopGPS()
        {
            //Closing GPS Port
            try
            {
                if (_gpsConnection.IsOpen)
                {
                    _gpsConnection.Close();
                }
                return true;
            }
            catch (Exception ex)
            {
                return false;
            }
        }
        private void cmdStart_Click(object sender, EventArgs e)
        {
            //Starting the GPS by clicking on
            Start Button through StartGPS Function
            cmdStart.Enabled = false;
```

```
Application.DoEvents();
if (StartGPS())
{
    cmdStop.Enabled = true;
    lblStatus.Text = "GPS
    Started...Try to fix...";
    timer1.Interval = 1000; //timer
    interval
    timer1.Enabled = true;
    //Starting the timer for refreshing the location
    lblStatus.Visible = true;
    mnuSavePoint.Enabled = false;
}
else
{
    MessageBox.Show("Unable to start
    GPS.");
    cmdStart.Enabled = true ;
}
private void cmdStop_Click(object sender, EventArgs e)
{
    //Stopping GPS
    if (StopGPS())
    {
        cmdStart.Enabled = true;
        cmdStop.Enabled = false ;
        lblStatus.Text = "GPS Stopped.";
        timer1.Enabled = false;
        lblStatus.Visible = false;
    }
}
private void timer1_Tick(object sender, EventArgs e)
{
    //Timer is implemented to refresh
    the current location. If the GPS not fixed then
    the
    //Status lable blinking with Try to
    fix... message otherwise current location & date
    time
    //will be shown through labels.
    if (_gpsConnection.Latitude > 0)
    {
        lblLat.Text =
        _gpsConnection.Latitude.ToString();
        lblLongt.Text =
        _gpsConnection.Longitude.ToString();
        lblAlt.Text =
        _gpsConnection.Altitude.ToString();
        lblGMT.Text =
        _gpsConnection.DateTime.ToString();
        lblIST.Text =
        _gpsConnection.DateTime.AddMinutes(330).ToString
        ();
        lblSpeed.Text =
        _gpsConnection.Speed.ToString();
        lblPDOP.Text =
        _gpsConnection.PositionDilutionOfPrecision.ToStr
        ing();
        lblStatus.Text = "GPS Fixed !";
        mnuSavePoint.Enabled = true;
    }
    else
    {
        lblStatus.Text = "Try to
        fix...!";
    }
    lblStatus.Visible =
    (!lblStatus.Visible);
}
private void mnuSavePoint_Click(object sender, EventArgs e)
{
    ESRI.ArcGIS.Mobile.MobileServices.MobileCache
    Map_Cache =
        new
        ESRI.ArcGIS.Mobile.MobileServices.MobileCache();
```

```

try
{
    String LayerName = "Incidents";
    //The Point Layer where we want to save the gps
    point
    ESRI.ArcGIS.Mobile.Geometries.Point EventPoint;
    Map_Cache.StoragePath = "";
    //location of map cache folder, here My
    Documents is assumed
    Map_Cache.Open();
    //initializing the feature layer
    ESRI.ArcGIS.Mobile.MobileServices.FeatureLayer
    eventFeatureLayer =
        Map_Cache.Layers[LayerName]
as
ESRI.ArcGIS.Mobile.MobileServices.FeatureLayer;
    Double _Longitude =
    Convert.ToDouble(lblLongt.Text);
    Double _Latitude =
    Convert.ToDouble(lblLat.Text);
    //converting longt/latd to map
    co-ordinate system point. Here it is assumed
    that
    //gps co-ordinates are in WGS84
    datum

    ESRI.ArcGIS.Mobile.Geometries.Coordinate
    event_coordinate
    =
    Map_Cache.SpatialReference.FromWgs84(_Longitude,
    _Latitude);
    EventPoint = new
    ESRI.ArcGIS.Mobile.Geometries.Point(event_coordi
    nate);
    //checking whether the feature
    layer is editable or not
    if (!eventFeatureLayer.AllowNew)
    {
        MessageBox.Show("The layer
        is not editable. Now exiting...");
    }
    else
    {
        //getting datatable from
        feature layer to storing attributes

        ESRI.ArcGIS.Mobile.MobileServices.FeatureDataTab
        le eventFeatureDataTable =
        eventFeatureLayer.GetDataTable();
        int geometryIndex =
        eventFeatureLayer.GeometryColumnIndex;

        ESRI.ArcGIS.Mobile.MobileServices.FeatureDataRow
        featureDataRow = eventFeatureDataTable.NewRow();
        featureDataRow[geometryIndex] = EventPoint;

        featureDataRow["Remark"] =
        "Point Recorded At " + DateTime.Now.ToString();
        //we can put more attributes
        here as above

        // Adding row to the feature
        layer data table
        eventFeatureDataTable.Rows.Add(featureDataRow);
        // Updates the feature layer
        data table

        try
        {
            eventFeatureDataTable.SaveInFeatureLayer();
            MessageBox.Show("Point
            saved in feature layer.");
        }
        catch (Exception ex1)
        {
            MessageBox.Show("Saving
            point failed.");
        }
        //closing mapcache
        Map_Cache.Close();
        Map_Cache.Dispose(); //disposing
    }
}

```

```

catch (Exception ex)
{
    MessageBox.Show(ex.Message);
}
finally
{
}
}

private void mnuQuit_Click(object
sender, EventArgs e)
{
    this.Close();
}

private void mnuUpload_Click(object
sender, EventArgs e)
{
    UploadMaps();
}

public void UploadMaps()
{
    //This procedures uploads spatial
    data (hosted through mobile service)
    try
    {
        String LayerName = "Incidents";

        ESRI.ArcGIS.Mobile.MobileServices.MobileCache
        objMobileCache = new
        ESRI.ArcGIS.Mobile.MobileServices.MobileCache();

        ESRI.ArcGIS.Mobile.MobileServices.MobileServiceC
        onnection objMobileService = new
        ESRI.ArcGIS.Mobile.MobileServices.MobileServiceC
        onnection();
        objMobileCache.StoragePath = "";
        ;
        //Mobile Map Service URL
        objMobileService.Url =
        "http://SERVER_NAME/arcgis/services/MOBILE_MAP_S
        ERVICE_NAME_HERE/MapServer/MobileServer";

        objMobileService.WebClientProtocolType =
        ESRI.ArcGIS.Mobile.MobileServices.WebClientProto
        colType.BinaryWebService;

        ESRI.ArcGIS.Mobile.MobileServices.MobileCacheSyn
        cAgent mobileSync = new
        ESRI.ArcGIS.Mobile.MobileServices.MobileCacheSyn
        cAgent(objMobileCache, objMobileService);

        ESRI.ArcGIS.Mobile.MobileServices.MobileCacheSyn
        cResults synchreslt = new
        ESRI.ArcGIS.Mobile.MobileServices.MobileCacheSyn
        cResults();
        objMobileService.CreateCache(objMobileCache);

        objMobileCache.Open();

        ESRI.ArcGIS.Mobile.MobileServices.FeatureLayerSy
        ncAgent flsync =
        (ESRI.ArcGIS.Mobile.MobileServices.FeatureLayers
        yncAgent)mobileSync.SyncAgents[LayerName];

        ESRI.ArcGIS.Mobile.MobileServices.SyncResults
        rslt =
        default(ESRI.ArcGIS.Mobile.MobileServices.SyncRe
        sults);

        rslt = flsync.Synchronize();
        MessageBox.Show("Total " +
        rslt.DataSizeSent.ToString() + " Bytes
        Uploaded.");
        objMobileCache.Close();
    }
    catch (Exception ex)
    {
        MessageBox.Show(ex.Message);
    }
}
}

```


Esri Receives Jane Goodall Global Leadership Award: GIS Company Acknowledged for Contributions to Conservation

On September 24, 2011, conservationist and primatologist Dr. Jane Goodall, United Nations (UN) Messenger of Peace and founder of the Jane Goodall Institute (JGI), presented Jack Dangermond, president of Esri, the Jane Goodall Global Leadership Award for Excellence in Conservation Science during the Institute's program, A Conversation with Jane Goodall, in Hollywood, California.

The award pays tribute to extraordinary people and organizations. Esri, the world leader in geographic information systems (GIS), works with organizations throughout the world by supporting conservation research, education, policy development and sustainable practices.

Founded in 1977, the Jane Goodall Institute (www.janegoodall.org) continues Dr. Goodall's pioneering research on chimpanzee behavior—research that transformed scientific perceptions of the relationship between humans and animals. Today, the Institute is a global leader in the effort to protect chimpanzees and their habitats. It is also widely recognized for establishing innovative community-centered conservation and development programs in Africa and Jane Goodall's Roots & Shoots, the global environmental and humanitarian youth program, which has groups in more than 120 countries.

"By combining Esri's geospatial technologies with JGI's decades' worth of practical knowledge and experience successfully engaging local communities and decision makers, we were able to design a landscape plan around Gombe National Park in Tanzania that better balances the needs of chimpanzees and people," says Dr. Lilian Pintea, JGI's vice president of conservation science.

"The Jane Goodall Institute has made people aware of their connection with species and habitats," says Dangermond. "It inspires a sense of responsibility that leads us to take positive actions toward preserving the inhabitants of this amazing planet. Esri is honored to be recognized by this outstanding organization."

Esri's conservation activities include donating GIS software to conservation organizations around the world; training hundreds of conservationists to use GIS software; providing a free mapping service for data, as well as maps and applications valuable for environment, habitat, and species analysis; and hosting the Society for Conservation GIS (www.scgis.org) ●



Jack Dangermond, Esri, receives the Jane Goodall Global Leadership Award

Hot-Spot Analysis Identifies Potential WIC Recipients: Helps California Agencies Locate Regions with Unmet Need



California Department of Public Health's Women, Infants, and Children (WIC) and Maternal, Child, and Adolescent Health (MCAH) programs are working together to use GIS technology from Esri to identify geographic locations with people who are eligible for but not receiving WIC services.

"Portrayal of counts and percentages of WIC-eligible women who were not receiving services told us only part of the story," said Thomas Stopka, an epidemiologist from California Department of Public Health. "We were interested in locating regions with higher densities of unmet need and statistically significant clusters of need on the state, county, and local levels."

Results of these efforts are used to guide resource allocation decisions, target outreach efforts, assess program outcomes, and help direct public health policy. The information has been used to inform funding decisions at the state, county, and local levels. The work has also provided information to local WIC directors to help determine whether new or expanded clinic services were needed.

For more information on GIS technology for public health, visit esri.com/health. ●

Hot-Spot Analysis: Density of Families Living in Poverty