17th ESRI Petroleum User Group[1]
Houston, March 2007

'Situational awareness' – GIS meets AI![2]

PUG attendance continues to grow with a reported 1,300 pre-registered for this the 17th annual meeting. Google Earth (GE) was something of an 'uninvited guest' at the PUG. End user pressure is making oil and gas enterprise GIS deployers adapt their systems to integrate with GE. ESRI president and founder Jack Dangermond remarked that "GE has opened the world's eyes to GIS' possibilities". ESRI's answer is twofold. ArcGIS is interoperable with GE, and can leverage GE's data as it becomes available. But the big news is that ESRI is setting up a GE-like data server, ArcGIS Online, and an 'enterprise' alternative to the GE client, ArcGIS Explorer.

The GE phenomenon is also a vindication of the success of the hosted model and a services-oriented architecture (SOA). Dangermond described SOA as the 'icing on the GIS cake.' ESRI has been active in this space too, as ESRI's head of software, Clint Brown stated, 'ArcGIS has been designed for SOA.' Perhaps the most telling example of data hosting and SOA was the Talisman/Valtus presentation on a 'one stop shop' for data discovery and delivery. One Valtus client has 1½ Petabytes online.

Shell's Keith Fraley noted a geospatial 'paradox' in the different functionality available to end users of tools like GE and the relatively slow take up of enterprise GIS. The 'public domain' is likewise at the gates of corporate GIS with innovative wikis and mashups. These consumer-oriented tools need to be blended into Enterprise GIS – and here again, the SOA is the answer. BP presented its ESRI based 'strategic planning and integration tool (SPIT!) that is used to maintain BP's prospect inventory, leveraging Microsoft Access and SharePoint server to deliver dynamic data.

A couple of exhibitors showed some innovative new GIS-related technologies. PureTech Solutions (see above) is using artificial intelligence to identify and track personnel and vehicular traffic around a facility – with the results displayed on a map or aerial image. But our star of the show award goes to Immersive Media's Dodeca 11 lens video camera (right[3]) – used by Universal Geosystems to 'transform' pipeline project management. The Dodeca is slung beneath a helicopter and the resulting recording transformed into a virtual reality survey trip for replay in the office. Checkout the snowboarding demo on www.immersivemedia.com.

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[1] *Presentations from the 2007 ESRI PUG are available online at http://gis2.esri.com/library/userconf/pug07/index.html.*

[2] *AI – artificial intelligence. Image courtesy PureTech Solutions http://www.puretechsystems.com/.*

[3] *Image courtesy Immersive Media www.immersivemedia.com.*

Highlights
[ArcGIS Online/Explorer](#)
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TW0703_1   Introduction – Charles Fried, BP and PUG Chair

PUG Chairman Charles Fried (BP) announced a record registration of 1,300 individuals from 350 organizations and 28 countries – and this follows the inaugural EU PUG in London last November. The PUG is planning more international activity for 2007 and has set up a PUG 'Wiki' on www.pug-steering.com. The first PUG distinguished lecturer talk is to be given on the 10th May by NPR's John Lienhard from the NPR[4] 'Engines of our ingenuity' series. Commenting the PUG agenda, Fried noted how the active working groups – on 3D, metadata, geodetics etc. feed into the PUG 'LIST' which has now expanded to a full day session.

TW0703_2   Keynote address – Jack Dangermond

ESRI founder and President Jack Dangermond spoke of the 'openness' of knowledge sharing through geographical information systems (GIS). GIS impacts every facet of the petroleum business, from E&P to environment, facilities. GIS is emerging as a core enterprise IT system in oil and gas moving from the desktop, to department and the enterprise. For Dangermond, GIS' 'business model' of the world is 'our best shot at integrated knowledge.' GIS provides an 'intuitive and analytical framework that defines interconnections between things leading to 'oh now I understand' moments.

ESRI is taking part in the move towards services-oriented architecture (SOA). SOA fits the GIS data delivery paradigm with a multiplicity of publishers and shared interconnections. Dangermond cited the USGS' 'cyber infrastructure/GeoWeb' as an example of a GIS-based 'integration framework.'

Google and Microsoft opened the world's eyes to possibilities of GIS. Individuals are now authors and consumers, sharing knowledge with a whole new world of users thanks to SOA. In oil and gas, land, upstream, and other departments will all be able to leverage each others' data thanks to the GIS. For this to work we need a 'content sharing model.' With some free data (the USGS is serving more and more free content) and others using an e-commerce model. The IT stack (bandwidth) is 'evolving nicely' and web services XML, SOAP are gaining acceptance. The move to a SOA is the 'icing on the GIS cake.'

SOA means focusing a server around a business process – so that people don't have to change the way they work. Exploration will have databases for specific applications but this content will be shared as services with Land, and other business units and maybe replicated to enterprise data store. Legacy applications can be 'wrapped' with web services or replaced with COTS[5] equivalent and retired. Companies need to select a SOA platform, 'most of you have one already.' Dangermond mentioned WSDL, UDDI, XML and SOAP – all of which 'require a lot of work – it's not magic, it's not iPOD!'

Turning to the PUG, Dangermond noted the groundbreaking status of the community for ESRI and the importance of the user-generated 'LIST' of requested enhancements and bug fixes. Although an item on the List may not receive immediate attention, 'it gets done eventually.' The latest ArcGIS 9.2 release includes standards support and 'lots of LIST stuff' such as improvements in spatial analysis, advanced gridding and 2D/3D animation. This lets you view the extent of the polar icecap with time or track a hurricane's progress. The Geodatabase has been enhanced to allow for high precision coordinates, LIDAR and a new cadastral fabric.

Following a demonstration of some of the new features in ArcGIS9.2, Dangermond concluded by saying that we are entering a 'new GIS world' that is part free and open, but that needs map authors and publishers. ESRI is partnering with Pennwell and others to publish more content as services. ESRI has worked hard on openness and interoperates with Autocad and Google Earth. 'As Google opens their content as I'm sure they will, you'll be able to access more of their content from within ArcGIS.'

TW0703_3   ArcGIS 9.2 New Features[6]

Several speakers enumerated new functionality in ArcGIS 9.2 – to avoid repetition we have grouped them all under this anonymous section heading.

3D Contouring and triangular irregular networks[7] TIN surfaces. Users can now manage terrain surfaces with TINs of elevation data. These allow for zooming to any scale and support 'huge' data volume management. Image and raster capabilities have been improved with the new ArcGIS Image Server. This serves images from a massive

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[4] *National Public Radio.*

[5] *Common off the shelf software packages – like err, Google Earth?*

[6] *An 11MB PDF is available from ESRI describing what's new in ArcGIS at http://webhelp.esri.com/arcgisdesktop/9.2/pdf/Whats_New_In_ArcGIS_92.pdf.*

[7] *http://webhelp.esri.com/arcgisdesktop/9.2/index.cfm?TopicName=About_TIN_surfaces.*

image data store with raster processing on the fly. Typical use is to serve raw satellite imagery etc. in an emergency situation.

Database enhancements

The ArcGIS relational schema offers better integration with data stored in Oracle allowing for direct SQL access (as opposed to SDE). The Geodatabase is easier to deploy and ArcSDE is now a part of ArcGIS. ESRI has added workgroup and file geodatabases accessible with SQL Server Express. ArcGIS Server provides 'out of the box' unmanaged applications.

Google-Earth-like features

Complete globe-like Google Earth (without the data, 'but you have that already'). Maps can be authored on the desktop and dropped onto the server where they become available to all through multiple platforms. APIs for ESRI plus, CAD, competitors etc. The technology platform will do for enterprise what GE has done for consumers. In oil and gas the use of K-creations will grow.

ArcGIS Explorer

The ArcGIS Explorer a.k.a. 'GIS for everyone' is a client offering Google Earth-like functionality. ArcGIS Explorer bests ArcIMS by adding cartographic quality mapping and data caching. You can 'edit stuff in Texas from India.' A toolbox provides support for smart phones and Windows Mobile devices that allows for synch between handheld GPS data and the server. ESRI is partnering with Trimble on more sophisticated applications in this space – in particular for the military where 'every soldier will become a sensor.' ArcGIS Explorer is free.

ArcGIS Explorer (AGE) also has a 'globe' interface for display of satellite, roads etc. with transparency control to compare say old (historical) maps with modern maps. A cute 'swipe' tool offers a comparator function comparable to the way folks would roll back an overlay to view an underlying map layer. A globe showing world oil production by country looked rather like a punk's hairdo. The demo got a few 'oohs and aahs' here and there[8]. Another demo showed how a gas station could be located from a phone number[9] and then plotted on AGE with 3d buildings. Next the business analyst was used to generate a report on demographics, household income and terrain. All obtained from web services and display on the map. A new function, the 2D line, extracts topographic profile information between points on the map got a round of applause! Geoprocessing applied to a weather data feed rolled in wind speed to plot a plume of possible dangerous fumes or fire from an accident. Another demo added USGS Alaskan sedimentary basin data, KML files of soil analyses, Local content, EROS satellite data and shape files of the NPR and wildlife reserve. USGS content was added directly from their website during the demo[10]. Content from USGS CDs added photo pans (viewed in Quicktime). Weather data also ran. Any document can be attached to a point so you can for instance click through to a well document and see core photos. A Gulf of Mexico demo displayed oil fields and lease information from the MMS. Geoprocessing showed leases adjacent to BHP Billiton acreage which would expire in 90 days. Results were output to a 'lease report task' and written to the SDE geodatabase.

ArcGIS Online

ArcGIS online (AGO), ESRI's answer to the server side of Google Earth is to be released this month with US imagery. ESRI is in the process of acquiring other data sets (National Geographic was mentioned[11]) and digital cartography all of which will be desktop and ArcGIS applications. There will be a some usage types but it will be 'unbelievably cheap.' AGO offers political, physical, shaded relief and a world street map, exposing the source metadata. A deal with PenWell adds pipeline data to the mix. Layers can be imported and saved to the desktop from whence 'a couple of mouse clicks' will produce a map (applause).

TW0703_4   Demo session – Clint Brown, Brian Boulmay, ESRI

A long time ago, someone in the oil and gas business told Brown, 'you'll never be able to handle our data volumes.' ESRI has worked hard on this problem and in the last decade has come up with a 'unified ArcGIS product line' that serves data from in-house and online sources. Brown acknowledges that Google Earth (GE) 'has

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[8] *Rather reminiscent of the time ESRI revealed the similar functionality that was to be had from ArcGlobe at the 2003 PUG!*

[9] *The phone number was Googled!*

[10] *ESRI has discovered the GeoMashUp – see Oil IT Journal Vol. 11 N° 12.*

[11] *Shortly after the PUG, ESRI announced that it has signed with the National Geographic for delivery of its digital TOPO! Maps – see http://arcgisonline.esri.com/index.cfm?fa=catalog.physical2D.*

changed expectations.' Management says 'Why don't we just get Google Earth?' But as the PUG community knows, 'it is a bit more complicated than that[12].'

Composite applications as shown in the following demos are built with ArcGIS Engine's drag and drop components. This has both Java and .NET interfaces. The desktop is still primarily .NET but ESRI is 'monitoring the Linux desktop for future possible use.'

ESRI's image server serves satellite and aerial imagers but also georeferenced scans of the corporate map cabinet. ESRI is working to serve panchromatic (and other) satellite data from the Digital Globe server. Databases can be up to 1TB in image size. ArcGIS server exposes an HTML user interface and XML/SOAP for orchestration. Browne acknowledged that 'Google Earth is changing user expectations.' But ArcGIS has been designed to accommodate these and to offer a compelling 2D/3D map paradigm. Users can now publish their own data in a Google Earth-like fashion.

0703_4.1 Demo: Fuel distributed in Houston area – Brian Boulmay, ESRI

GIS used across environmental, logistics and sales departments. Field stations showing annual sales by volume. Includes schools, water, protected areas. Geoprocessing used to weight various factors, proximity and potential risk to population. Results are shown in animation of impact of different weights to different considerations. Traveling salesman computation used to optimize truck delivery routes with respect to environment risk. Sears and Roebuck uses the prototype.

0703_4.2 Demo: ArcGIS schematics

Another demo showed ArcGIS schematics to analyze a Brazilian pipeline network by creating a schematic of the gathering system. A hierarchical smart tree was used to display the same information as a clear schematic. It addressed smart field, refinery, hurricane information added in. Quick way to integrate other information.

0703_4.3 Demo: Video Situational Awareness Security Systems - PureTech Solutions

'Situational Awareness' from PureTech Solutions.

PureTech Solutions (Phoenix – Calgary parent) is a video surveillance system integrated with ArcGIS. PureTech synchs camera direction and field of view on map with video feed as panning – zooming. Also can be driven by

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[12] *Despite the knowing twitter that greeted this remark, it would have been good to have heard some of the killer reasons for preferring ArcGIS over Google Earth from the 'horse's mouth.'*

camera analytics with geo features, vehicle size detection, forensic security, alarms re abnormal behavior of vehicles and or pedestrians. Possibleapplications in petroleum – refinery.

TW0703_5   Technology Panel

0703_5.1   Mike Seeber – Anadarko

The earliest GIS adopter in Anadarko was the land department. The next was E&P where a 'one stop data shop' provides access to well logs, production and seismic data from the corporate data store. GIS also reaches out to vendor data stores without ASCII file transfer; 'a huge win for us.' International new ventures are hooked on GIS too, using it to merge multiple data sets for basin and fairway play mapping. Operations, midstream and marketing now all use GIS which is also used for pipeline corrosion studies, planning for seismic wireless communications in forests. Anadarko is working on a list of 'developing opportunities' especially in pipelines since the KerrMcGee acquisition and sees more opportunities in G&G, disaster planning and security at facilities. Challenges include resources (people) and data management – especially of 'stale' data and bundled GIS data sets. It is hard to get these to work together. Google Earth (GE) has introduced a huge integration challenge for Anadarko. Seeber concluded with a graphic comparing the number of users and the complexity of analysis. Anadarko has many users at the low complexity end (GE) and less as complexity increases through mid range Petroweb, Webmaps to desktop applications like ArcMap which have a few power users.

0703_5.2   Dean Malouta – Shell E&P Americas

Shell is working towards the 'oilfield of the future.' An operator may report a problem from a GPS-enabled cell phone. A GIS user network lets users ask questions online – experts are available remotely. Shell has promoted 'geographic awareness' and sees further opportunities now that a corporate spatial data infrastructure has been delivered. This, inter alia, assures coordinate integrity across all applications, leveraging OpenSpirit and Safe FME – although at the expense of a layer of complexity. Metacarta also ran and Shell's standardized taxonomy. Today, Shell has 2 TB of file data and this is to double in the next couple of years. Keeping up with changing technology is hard and costly – but Shell continues to working towards enterprise GIS.

0703_5.3   Adil Mukhitov – Schlumberger

Schlumberger Information Solutions recognizes ESRI as 'the standard.' SIS is an ESRI business partner. SIS previously advised ESRI on the need for high precision coordinates and geodetics – these have been delivered in ArcGIS 9.2. Schlumberger plans to 'optimize the geographical footprints between SIS and ESRI.' SIS strategy is 'to adapt the industry standard rather than develop our own.'

0703_5.4   Rob Pascoe – BHP Billiton

GIS is now seen as fundamental part of exploration workflow and there is general recognition of the utility of GIS. But GIS is still seen as arcane. As the number of layers increases, GIS gets harder for the average user. We need simple ways for the average user to get what he/she wants. Rapidly changing technology makes it hard to keep up. Pascoe sees a move from mapping to analysis. Metadata is the key, as are intuitive geo-browsers for end users.

0703_5.5   Cindy Reece – ExxonMobil

Like Shell, ExxonMobil has been using GIS for 20 years or so[13]. Exxon's strategy is to work up from hardware, applications, data standards, on to work practices and ultimately business automation. Global standardization efforts are ongoing in business, surface and subsurface areas. GIS is being customized to fit the needs of the business. In conclusion, it's all about 'standards, standards, standards'.

0703_5.6   Q&A

How much GIS awareness and knowledge does senior management have?

Reece – It is very prevalent on the geoscience side. Engineering still needs attention.

Pascoe – I agree, but it is spreading into engineering.

New areas for GIS?

Malouta – pipeline, production, reserves mapping, logistics, supply chain through retail.

How is SIS looking to leverage this technology in Petrel etc.

SDE is already in Seabed and ProSource. Petrel will be ESRI-integrated by 2008.

How integrate GIS and Portals?

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[13] *Probably an underestimate – Intergraph's twin-headed GIS mapping system was in fairly widespread use in the late 1970s.*

Seeber – Our portals are layered on top of SDE. So from a land interface, a lease number brings up Documentum. Our landmen say its best thing since sliced bread and ask why we didn't do it sooner. SAP integration has proved harder to achieve.

Malouta – limiting software function count is important – standardize data models.

How do you advise managing cross discipline technology – especially for a diverse company like BHPB?

Pascoe – We are just starting to address this, working on unstructured data, taxonomy, browser-based access and SDE for archival.

Reece – the ownership model for tools and data is key. XOM hires both engineers and geoscientists for its IT department and is active in the SPE's IT Technical Interest Group.

Is GIS more important than spatial data?

You can't separate them - quality is critical (Shell).

GIS is a tool. Data and information are critical (Devon).

Reese – Tools let you do quality checking, co-rendering reveals data busts.

Seeber – You have to watch out for the politics of airing your dirty laundry and warning against bad decision making!

We hear a lot about services. How do you support users working off of services? How are we to achieve the next quantum leap of data services all working together.

Malouta – user groups like this way of working. The position between oils and data vendors can be a challenge. Maybe we need to invest in consortia to solve these issues.

Chevron IMHO - we have not yet realized the full potential of GIS. If you had two key issues to address what would they be?

Reece – N° 1 is data management. We would love to have all GIS data readily available. Then awareness and training – exposing what's out there – and developing use cases.

Pascoe – Data would be 1 and 2. A large amount of data is not in the public domain[14]. We have a rich data set representing 30 – 100 years of activity. We need to get folks to put metadata back out into public domain – not just throw in the towel after a presentation.

Malouta – For me, N° 1 is the digital oilfield – integrating field activity with GIS via handhelds.

Anadarko – I'd say the challenges with data-centric process that need to be addressed. We also need to get handle on midstream and HSE.

TW0703_6   Defining the value proposition of GIS in business - Keith Everill, BP America

Many have tried to articulate the dollar value of GIS. BP's experience is that the true value proposition is in other, non monetary measures. GIS is the 'standard' for inter-agency and public access to information. GIS is pervasive and its use is growing. You can take a 'virtual vacation' when planning the real one and make sure that you book a room on the sunny side of hotel. In general, access to spatial information is at an all-time high.

Inside BP, GIS protagonists have struggled to promote use beyond specialists and small, unsupported communities. This has proved difficult, as PUG chair Charles Fried says, 'they just don't get it!' BP's deployment has been plagued by multple tools deployed and data management issues. BP started with ArcInfo in 1989. This proved hard to use. BP has remained an ESRI client since then, but take-up has not been not great. Scripting monthly updates has been hard and multiple versions of the software made it hard to get the value from GIS. BP's deployment has been by discrete business units. This did not leverage corporate best practices and led to duplication and little data sharing. BP successfully deployed a single version of Microsoft Office[15] – but there is no similar 'common operating environment' for GIS.

A BP senior manager attended a talk that included an interactive GIS presentation. This was the 'spark that ignited the fire' and initiated BP's 'GIS Appraise' project. In BP-speak, this was described as 'a high level strategic statement to govern and articulate the vision going forward.' GIS Appraise evaluated the business value proposition of an at-scale adoption of GIS tools, working on a supported set of best practices. Prior to the appraisal, BP noted that value was only obtained in 'isolated instances.'

A pilot team steering group was set up in September 2006 and conducted interviews with managers and an on-line survey of 150 people. The key learnings were that BP has been 'slow to realize the value of GIS.' This was

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[14] *I.e. the 'public domain' within the company.*

[15] *See http://www.oilit.com/2journal/4php/4_makemonthly.php?year=1998&month=11.*

because of a 'lack of alignment' of people, process, technology and data. BP had been tied up wrestling with the details. BP had 'world class' GIS solutions but they were 'disconnected.' Such solutions include exploration spatial search, pipeline mapping in Nigeria, subsurface mapping and hurricane response in GOM. Each application was built from scratch along with its own database. People's daily lives filled with feeding the email spreadsheet beasts. Energy is a spatial business – this is a 'hugely powerful assertion.' We are caught in the trap of the digital office of Power Points and spreadsheets. After more discussions BP finally realized that there was 'more to it than the dollar value.' The prize is 'leveraged GIS' applied across the business to improve communication and facilitate decision making. BP's 'fast forward' began to 'crystallize' with the deployment of 'light' GIS for users and expert GIS for experts. The full business lifecycle is where the true GIS value proposition lies in BP. Management is now convinced of the value through our self analysis and discovery. Moral of tale, whatever the size of the company, don't focus on the dollar value, conduct research for yourselves.

Q&A

How do you prevent the system becoming another SAP? How do you force people to use it?

No answer on first part. Second – not about imposing – focus on individual behavior and demonstrate best practices. We don't want to be a police force behind data or specific applications. A big challenge.

I work with landmen who have some curious legal title research to do across many contracts. Will there ever be sufficient confidence in data completeness from this community to trust the system?

Yes we have had this discussion with land – they were struggling. In the end they are willing users of GIS. You need to find one or two (people or niches) that 'get it'.

TW0703_7   Team based responsibility – Blake Blackwell, Chesapeake

Team based responsibility (TBR) ties every activity to a team comprising landmen, geologists, engineers etc. Individuals may be in more than one team. TBR determines a point of contact for AFE approval and other business processes. Previously, Chesapeake managed its TBR in Excel with some 20 roles and geographical descriptions. Data entry was performed by 3 employees, then imported to a database and pushed to GIS and the well master system. The system has been upgraded with Hyperion's master data management (MDM) running on Microsoft SQL Server. Initially, Chesapeake experienced some issues with the 1½ million records in its section land grid. Hyperion MDM is synched with SDE. The IT stack includes .NET 2.0, ArcToolbox 9.2, Latitude's GeoCortex[16] internet mapping system and Hyperion MDM. A typical application manages Chesapeake's override payments involves around 500 geoprocessing commands run overnight.

TW0703_8   Consumer and corporate GIS, a geospatial paradox – Keith Fraley, Shell

Fraley believes that the current situation regarding the consumer and corporate approaches to GIS is both paradoxical and ironic. Google Earth has heralded the dawn of 'geospatial enlightenment' and the recognition that geography is fun. Google Earth (GE) also passes the 'soccer mom test,' if she can use it then you've got a good product[17]. On the heels of GE and its vector brother, Google Maps, comes the 'mashup[18],' ad-hoc combinations of spatial data layered onto a map. A good example is www.wikimapia.org – a 'fast growing ecosystem' which allows anyone to add content to a 'wikimap.' For instance, zooming in on Fraley's alma mater, Texas A&M, shows all buildings are tagged with useful information. Fraley did a quick straw poll that ascertained that a) nobody uses wikimapia, b) nearly everyone has used wikipedia and c) a couple of attendees companies deploy wikis internally.

Wikis (and GE) contrast with the 'complex' windows icons menu pointer (WIMP) paradigm of corporate geospatial solutions. This more specialist approach 'inhibits mass adoption.' Another complicating issue is data – the 'number one issue is finding the right data.' Fraley quoted from Peter Morville's book, 'Ambient Findability[19]' – 'information that is hard to find will remain information that is hardly every found.' Silo-oriented software solutions compound the problem – engineering chooses Autocad, the business goes for Mapinfo and geotechnical deploys ESRI. This leads to a 'redundant asynchronous, heterogeneous geospatial technology landscape'. Naturally, everyone wants to consolidate to their own toolset. This becomes a 'very political and costly trek towards the enterprise geospatial paradigm.' A general lack of understanding between GIS and the IT department compounds the problems.

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[16] *http://www.latitudegeo.com/geocortex/*.

[17] *Now is that politically correct or what !*

[18] *See http://www.oilit.com/corporate/4php/4c_makemonthly.php?year=2006&month=12.*

[19] *http://www.amazon.com/Ambient-Findability-Peter-Morville/dp/0596007655.*

Fraley showed a typical GIS interface with tree view, layer selection and map interface. This is 'great for expert users but bewildering for the non specialist.' How do we bridge the gap? The answer is the services-oriented architecture (SOA) with geospatial web services serving a 'true enterprise geospatial infrastructure.' Using slideware from IBM and ESRI, Frayley showed how ESRI's latest marketing is aligned with IBM's view of SOA 'an awesome slide'. Arc 9.2 serves catalogs, maps etc as XML/SOAP service. Google Earth and Autocad can integrate this framework. In fact you can view the web as a global SOA. Who benefits? GIS professionals, everyone. In fact the consumer approach is a bit ahead of us because no legacy and a highly normalized business model.

Q&A

Geoff Wade (ESRI) – What do you think of ArcExplorer?

I love Explorer it's an awesome tool and is great for viewing GE data.

TW0703_9   Strategic Planning and Integration Tool – Nisha Punchavisuthi, BP
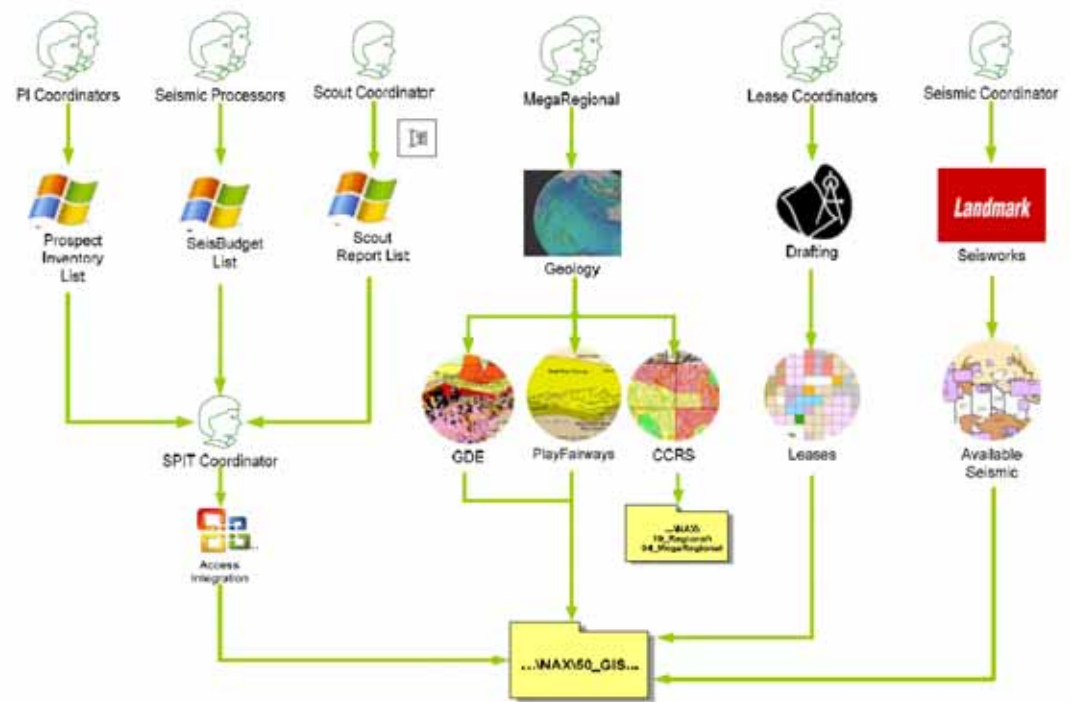
Strategic planning and integration tool (SPIT) data workflows[20].

BP's strategic planning and integration tool (SPIT) 'helps facilitate strategic thought and enhance visualization by providing an integrated platform for exploration data'. Punchavisuthi reiterated Everill's comments about the slow take up of ArcGIS in BP. This has proved complex and has 'turned-off' end users. It is hard to locate data and it is unclear if data is current. BP is addressing the issue of dynamic data using Microsoft SharePoint.

SPIT is BP's prospect inventory which leverages spreadsheets for data input. These are dynamically linked to a Microsoft Access database whose tables are recognized in Arc GIS. End users see a simplified map view in ArcReader. The system supports collaboration between seismic processors, prospect inventory coordinators and scouts. Land, Landmark (interpretation), and mega regional/play fairway data all goes into a public shared folder before consolidation to AcrGIS. The ArcReader interface displays a tree-view of layers allowing drill down to OilOnline, and other data sources. Users can bookmark an area of interest. A right mouse click on 'properties' shows the data's location on the system so users can go create their own maps.

BP is encouraging buy-in to SPIT by a program of demos and a single page tri fold instruction booklet. The self service paradigm offers a 'pre created' map linked to current data. Gulf of Mexico usage of the system is up 40% in 6 months since SPIT 'spat'.

Q&A

Has SPIT been 'productized'?

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[20] *Image courtesy BP.*

No SPIT is published as a map.

Did you do it yourselves?

Yes.

How many users are there?

40-50.

How is SPIT updated?

Through the Microsoft SharePoint server as above.

Does it show well and seismic?

Not from within the Landmark environment. SPIT is a stand alone browser that works with links to dynamic data so long as naming conventions are adhered to.

Do users go to ArcMAP?

Yes – it is a great bridge.

How do you convince users?

'Lunch and learn.'

How do you get ArcReader on desktops?

We launch the ArcReader exe, not the complete install.

Do you feedback to data maintainers?

Yes but we like to keep things simple, working with the existing infrastructure and try to focus on naming conventions for surveys, leases and shape files.

TW0703_10   PPDM Spatial/'Lite' V2.0 – Trudy Curtis, PPDM Association.

PPDM is working on a Version 2.0 of its 'Lite' spatially-enabled data model. This will focus on metadata about data quality, provenance and a descriptive info about layer. Source metadata is crucial when multi GIS sources are deployed. PPDM Lite coverage includes culture and pipelines. Other likely candidates for inclusion include soils and biomass, marine information, transportation, geology (leveraging the USGS North American [geological] Data Model[21]. PPDM Lite Version 1.1 can be downloaded from the ppdm.org website[22]. PPDM Lite needs to be derived/replicated from a PPDM master. There is no local data validation although real-world deployments may adopt a different strategy. Caution needs to be exercised if people are generating wells in both. PPDM Lite 2.0 will be delivered as ANSI SQL92 DDL and can be implemented on Oracle. PPDM also delivered a Geodatabase version for V 1.0. Curtis asked 'anybody use it?' One hand was raised. PPDM is also talking to the Pipeline Open Data Standards (PODS) organization about synchronizing and integrating the two data models.

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[21] *http://pubs.usgs.gov/of/2003/of03-471/boisvert/index.html*

[22] *http://www.ppdm.org/standards/model/lite_v1/downloads.html - may require registration before drill down to this url.*

## TW0703_11 Hosted GIS – Mark Dumka (Talisman) and Kenyon Waugh (Valtus)
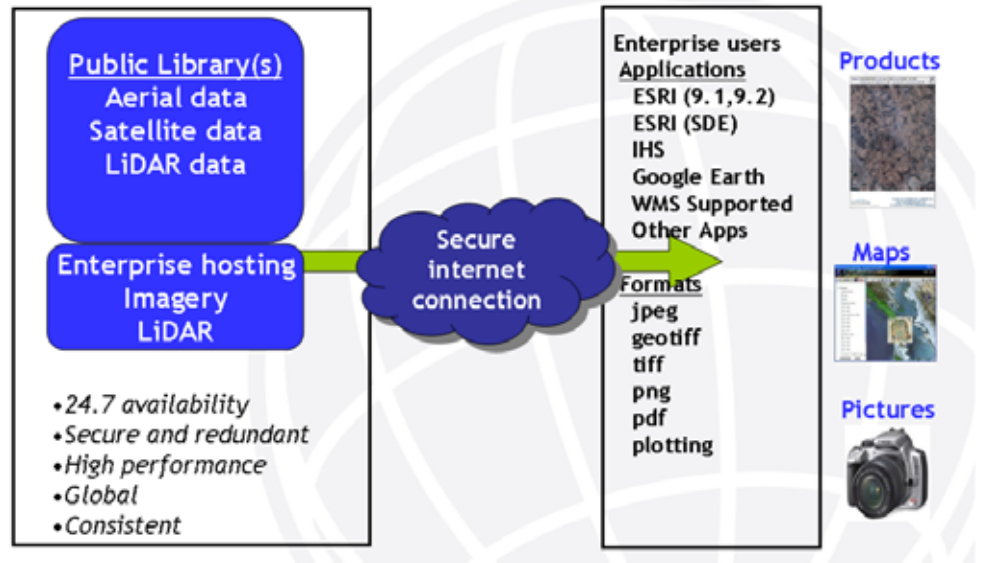
Valtus' hosted data offering[23].

Talisman blends imagery from Valtus' commercial service with other data sources such as the Canadian Government, and Talisman's own data. This is hosted on Valtus' servers. Today's data sets include 1m color, pan-chromatic, infrared, Landsat 7, Canadian NTS scanned topographic maps and USGS DRG[24]. All served as an integrated seamless service for Talisman. In the near future, Valtus will host LIDAR, other DEM and scanned surface/bedrock imagery. Other products are also available. Hardcopy is still 'very important' to Talisman – so Valtus offers pdf output, and 'ground truthing' of vector data against a LIDAR/Satellite backdrop.

Waugh stated that data volumes are expanding rapidly expanding. One Valtus client has 1½ petabytes of data stored with Valtus. The 'one stop shop' for data discovery is working well and notably avoids data repurchase. Valtus has relationships with aerial and satellite data collectors and is focused on outsourced enterprise imagery management. Apps used include ESRI, IHS, Google Earth, WMS etc. By using Valtus Talisman has greatly reduced internal infrastructure requirements and is leveraging Valtus's experience of handling 'troublesome' raster datasets and adopting emerging technologies for storage and delivery.

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[23] *Image courtesy Valtus.*

[24] *Digital Raster Graphics - http://topomaps.usgs.gov/drg/.*

TW0703_12　Play fairway mapping for Pemex – Jay Leonard, Platte River Associates[25].
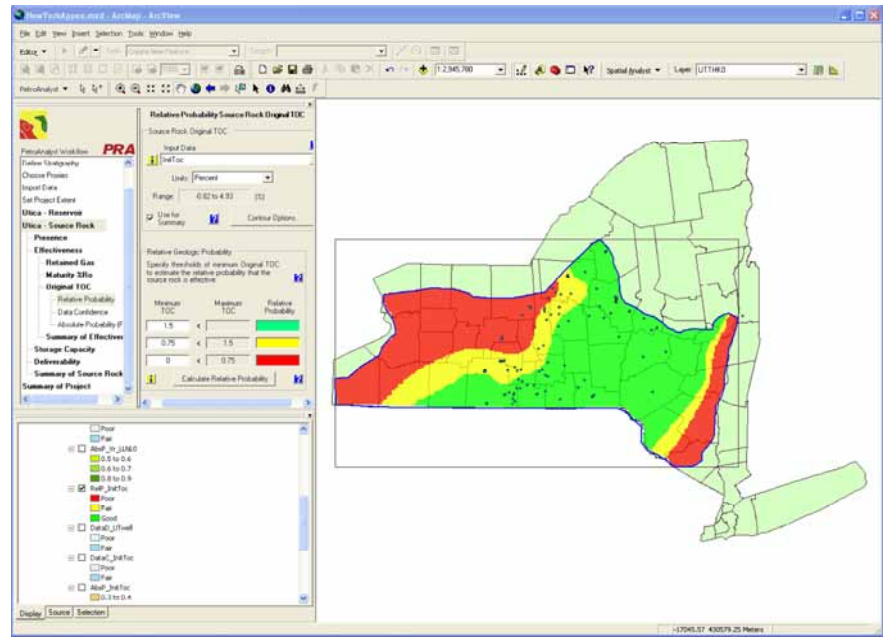
PRA's Common Risk Segment fairway play map.

Pemex is a mirror of the history of risk in the oil business. Following the oil price slump of the mid 1980s, E&P budgets were severely curtailed and the 'risk police' were called in. This resulted in a more systematic approach to prospect analysis – leveraging work done for PDVSA in Venezuela. Pemex' Cantarell is the second largest field in world. Pemex is now looking to the deepwater Gulf of Mexico which has 'huge potential' but at high risk.

Pemex has now developed an integrated process for basin and petroleum system analysis. This tracks ideas from 'hypothetical' plays to 'established prospects'. CEROE and BDOE data bases feed into the SIMAREP mapping system of plays and fairways and component of CERSIS risk evaluation. Established prospects are stored in the 'CERPLAY' register. A 'stop light' maps system offers 'go, no go' 'reality checks' on prospects and petroleum systems. This uses an evaluation process along the lines of that developed by Peter Rose. ESRI ArcGIS and Spatial Analyst display the output from petroleum system tools like Platt River Associates (PRA). SIMAREP embeds workflows to track and communicate probabilities and risk – providing 'consistent results and format across business units.' Other tools support data management and QC with radar plots, maps and rules. PRA provides training in basin modeling, now called petroleum systems analysis. CEROE works from maps of seals, source rocks etc. and calculates and classifies prospect potential, providing a 'reality check' for the whole upstream process. The spatial context supports informed decision making.

Q&A

Done elsewhere?

Have deployed in Williston Basin.

TW0703_13　Metadata for geologists Don Downey, Chevron.

Metadata tells data users who owns the data, where it is located and when it was acquired. Geologists must be involved in metadata creation. There are two approaches to information retrieval, the 'searchers' and the 'taggers.' Searchers say, 'we don't have enough time to add metadata to everything, anyway we can just use our powerful search tools to locate what we want.' Taggers believe in adding complete metadata to ensure accurate search and avoid the 'legal/ethical issues that plague searching.' Downey refers to the AAPG Code of Ethics in this context. The current situation for taggers is that metadata editors are complicated. Generic style sheets should help simplify metadata workflows in the future. For example the standard citation format maintains the spirit of standard bibliographic citation for digital data. Downey suggests some metadata 'tricks' for ESRI meta data entry – use ESRI good XML templates and develop a company policy on metadata. Metadata is created in many workflows – leasing to synchronization issues – here ESRI might be able to do better. Downey would like to be able to extract metadata keywords such as capitalized words, compare these with standard lists for place names, formations etc. This is 'not rocket science.' Geoprocessing workflows for casual user search and data editing or geodatabase

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[25] *Co-authored by Adam Oviedo Perez, Pemex.*

management should all leverage the ArcCatalog Metadata toolbox and the PUG metadata website on http://www.pug-steering.com/wiki/index.php?title=Metadata_Working_Group[26].

Q&A

What we need is a semi-automatic metadata creation process. The payback is in keyword-based search within metadata.

Ellen Hoveland – There have been several metadata initiatives in oil and gas. We are still striving for basic standards for oil and gas. PPDM is relevant in this context.

Charlie Hewlett (Lynx) – We don't need new metadata standards for oil and gas. We just have to get folks to fill in fields that are already there (*applause*)!

TW0703_14   'Joined-up' GIS on the BTC pipeline – Narmina Lovely, BP

The 1 mm bblpd BP-operated Baku Tbilisi Ceyhan pipeline BTP runs from Baku to the Mediterranean. GIS was used as a 'foundation for project efficiencies.' The 'off the shelf' ESRI was customized for BP to handle a 700 GB raster data and 10GB vector data set. GIS underpins land acquisition, legal documentation and compensation of landowners for land and crops. An Environmental Social Impact Analysis (ESIA) report[27] studied population density, archaeological findings, emergency response etc. GIS was used for management and PR presentations, tracking progress of construction. The GIS system was integrated with other pipeline IM systems. Bio restoration leveraged remote sensing satellite and a 'normalized difference vegetation index'. Slope stability analysis, seismic monitoring (with USGS data), river crossing extent and erosion mapping also ran. Inline inspection results, DCVG survey, cathodic tests and pipeline patrols are all combined in the GIS interface.
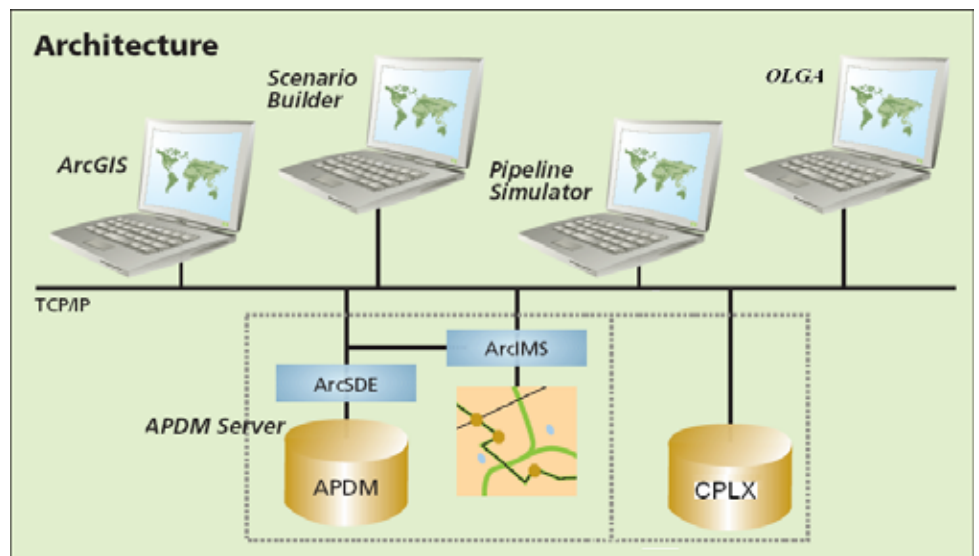
Q&A

Data models?

We just did our own data dictionary. There was no data model as such.

How much data collection effort?

Collection was hard – but we mandated data collection and supply from our contractors.

TW0703_15   Linear programming for gas delivery management – Sidney Santos, Petrobras


Petrobras' OLGA Architecture[28].

Petrobras' OLGA is an in-house application that performs linear programming to manage gas supplies and deliveries under physical and/or contractual constraints. OLGA aligns gas supply with demand. When there is a potential gas shortage, some deliveries need to be curtailed to mitigate penalty payment.

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[26] *Registration and login required.*

[27]

http://www.bp.com/liveassets/bp_internet/bp_caspian/bp_caspian_en/STAGING/local_assets/downloads_pdfs/xyz/BTC_English_ESIAs_Azerbaijan_Content_Statement_BTC_ESIA_Title_Page.pdf.

[28] *Image courtesy Petrobras.*
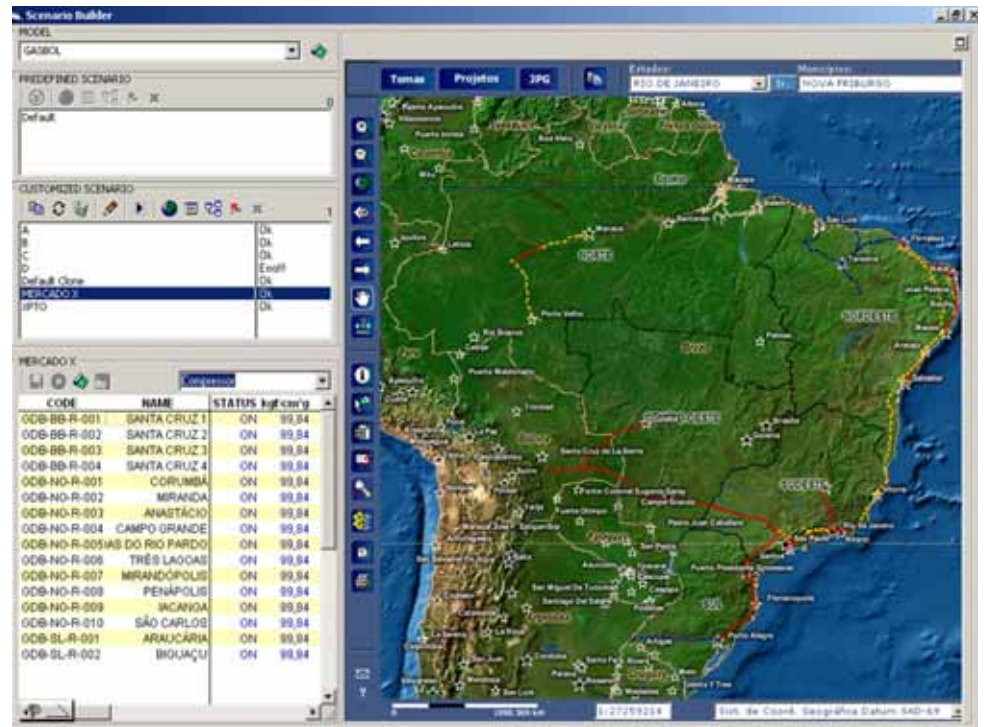
OLGA's ArcGIS user interface[29].

OLGA, which embeds uncertainties, is used to schedule maintenance for scenario forecasting and to analyze contractual liabilities. The Scenario Builder sits atop ArcGIS and the APDM pipeline data model and a gas pipe simulator. All of these tools individually require a lot of specialist expertise. The intersection of the three is the scenario builder for thermo hydraulic simulator, pipeline extension planning etc. The GIS interface to the Scenario Builder helps non specialist users.

TW0703_16   Shell's Spatial Data Manager – Wnjoo Choi, Idea Integration

Shell's global GIS deployment is a 'humungous data management infrastructure' with 30,000 layer files and 25-50 layers per map. The global GIS team supports 200 plus users with 10 staff. Initially web crawlers were used to locate data and to determine usage patterns – but these proved 'not quite up to the task.' Shell then deployed browser-based map search to let users see the 'G:\ drive,' a large data structure. Finally the SEPCo solution framework evolved to ASP .NET and the SEPCo Monitor (the old crawler) along with a data model, metadata support and role based security. Shell now has a documented data model, with metadata including CRS used, bounding boxes, data sources and what layers are involved. Helper applications perform some data validation. Toolset includes ASP .NET, C# .NET, AJAX Callback library, ArcIMS/SDE, Oracle Server, GDAL etc. Users retrieve documents of interest attached to feature set and can add to shopping cart. AJAX Callback tool enhances user experience. Data Service page generates XML source for tree view. Users can save custom queries and search on file name, key words and other tags.

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[29] *Image courtesy Petrobras.*

TW0703_17   Transforming pipeline project management – Brett Vidican, Universal GeoSystems

Immersive Media's Dodeca videocam.

A new device, ImmersiveMedia's Dodeca 2360 11 lens video camera is slung beneath a helicopter and a pipeline route is flown. After processing, a virtual reality metafile (vrml) offers a nifty playback function with zooming and panning around the scene and listening to an audio recording project manager's comments during flight. Can also do handheld, auto mounted.

Pipeline route planning with map and vrml interface.

From *swatson@immersivemedia.com*

TW0703_18   Interoperability extension in 9.2 – Tyson Haverkort, Safe Software

Safe Software's 'extraction transformation and load' (ETL) is embedded in ESRI ArcGIS 9.2 with comparable functionality to Safe's own FME 2006 GB. This is a 'highly integrated' OEM deal. Safe supports formats including SEG P1, Genemap, WhiteStar, GPX, KML, WC3C/OGC, Oracle Spatial and Zycor. Typical tasks of interest include loading the centralized data warehouses, well survey validation, data QA, creating linear geometries for PPDM wells. Safe's tools provide a 'direct read' of 95 formats, data translations, spatial ETL and data 'remodeling.' Data can be re-projected during loading. Safe does not currently do raster data transformation. A demo showed CRS transformation with a large choice of projections in US. Also Safe offers intelligent import of CSV file data (Excel) and databases with flexible data sorting and checks. Also new are kml, python scripts, core support for WFS and GML simple features without licensed product.

Q&A

What's the difference between this and vanilla Safe?

Vanilla gives more – raster, more formats.

We try to read CAD files of facilities but lose details like layers of thread on bolts?

This can be done. But because CAD is such a rich format, allowing almost any geometry in any feature type, you need to create a buffer and an import pipeline to filter your data down to the desired level of detail.

Why don't you have a SAFE Software PUG to share formats and transforms?

A great idea but you should also checkout the fmepedia which has a lot of such information.

TW0703_19   PUG List Raster and 3D session

Faulted surfaces have been implemented in 9.2 using a library developed by Steven Zoraster formerly of Zycor/ZMap. Spline surface fitting with 'barriers' tool is new in 9.2. ArcScene 3D allows 3D viewing of fault blocks. Raster support in the ArcGIS 9.2 geodatabase now offers a 256 TB max file size! Better contouring is promised for 9.3 with 'snap' to faults and closed 3D forms. A 9.3 Beta release is planned for June 07 with support for MultiPoint LIDAR formats.

ArcGIS is now a 'native' 3D system. 3D has been the 'crux' of the PUG list for many years. ArcGIS offers native 3D points, lines with heights at vertex and 'MultiPatch,' a collection of triangles. But MultiPatch forms are not closed topologies (they are 3D polylines, not polygons). Also, support is lacking for both discrete fields (boundary may be tetrahedrons) and continuous fields (voxels). And, 'just as 2D GIS needs both vector and raster structures – so does 3D'. New in 9.2 is the GeneralMultipatchCreator[30] that lets developers write their own converters for VRML, etc.. Longer term, there is a requirement for tools for topology manipulation, to clean and close volumes and for spatial operators (union, intersect, identity ...).

TW0703_20   Geodetics Session

No PUG would be complete without a few warnings regarding geodetics, datums and the potential errors resulting from their mis-application. The Geodetics Session and Workshop introduced the Americas Petroleum Survey Group to newcomers. Presentations covered Geodesy and Projections (Jim Cain, Cain & Barnes), Positioning Issues Related to Seismic Data Loading, (John Conner, EnSoCo) and Enterprise-wide Spatial Data Management, Jon Stigant, Devon Energy. The presentations will be available on www.apsg.info.

Meanwhile, for readers who are not familiar with these issues, we have included the following reference, although it was not a PUG presentation.

0703_20.1 Geodetics, datums and 'friendly fire'

From Office of GEOINT Sciences: Precise Positioning – All You Ever Wanted to Know and Couldn't Find Out About Precise Positioning... William H. Wooden, National Geospatial-Intelligence Agency July 2006.

'When a geodetic datum is changed, coordinates of a point will usually change. In some cases, the differences can be as large as 900 meters. Why is this important? If a soldier calling for close air support has his coordinates with respect to one datum and your coordinates are with respect to a different datum, you could fire at the targeted location and miss the requested location by hundreds of meters- the most severe consequence of your action being friendly fire!'
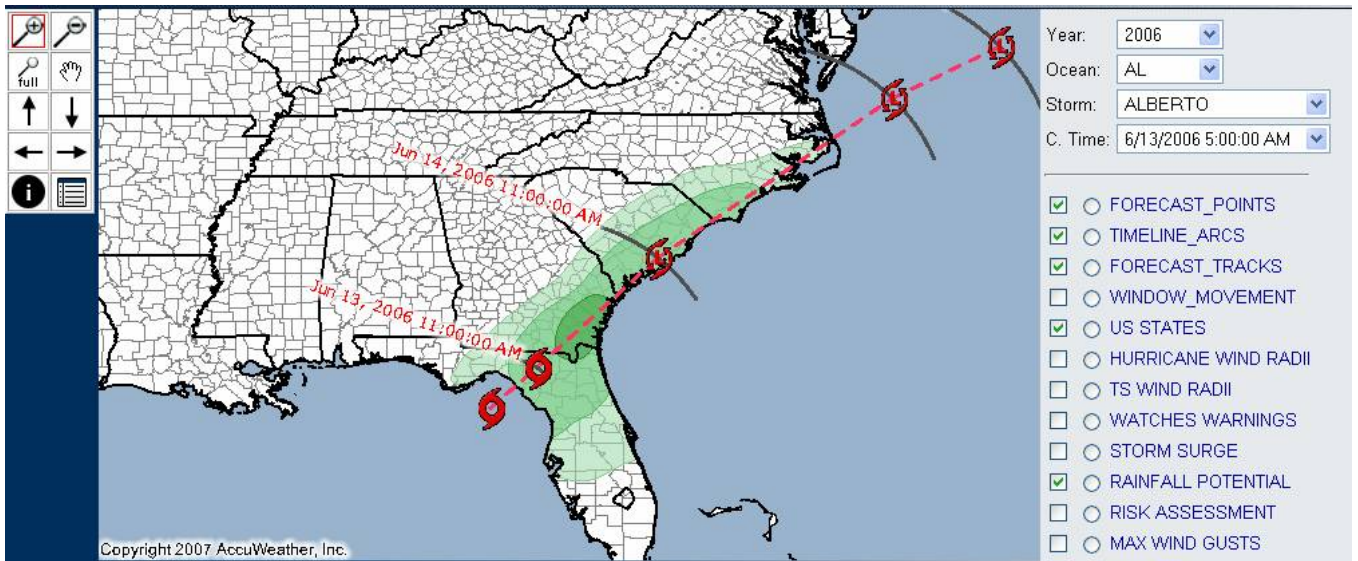
See also http://earth-info.nima.mil/GandG/publications/precpos.html.

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[30] *http://edndoc.esri.com/arcobjects/9.2/ComponentHelp/esri3DAnalyst/GeneralMultipatchCreator.htm*

## TW0703_21   Exhibitors

0703_21.1 AccuWeather – real time GIS-enabled hurricane forecasts

GIS interface for Accuweather's real time hurricane forecast[31].

Accuweather is a private weather forecasting service that provides independent hurricane forecast tracks. The company offers real-time reconnaissance data from the government's hurricane hunter aircraft that fly into potential tropical cyclones. Data is processed in real-time for use in SQL and ESRI systems. More from www.accuweather.com.

0703_21.2 IHS Energy Enerdeq web services SDK
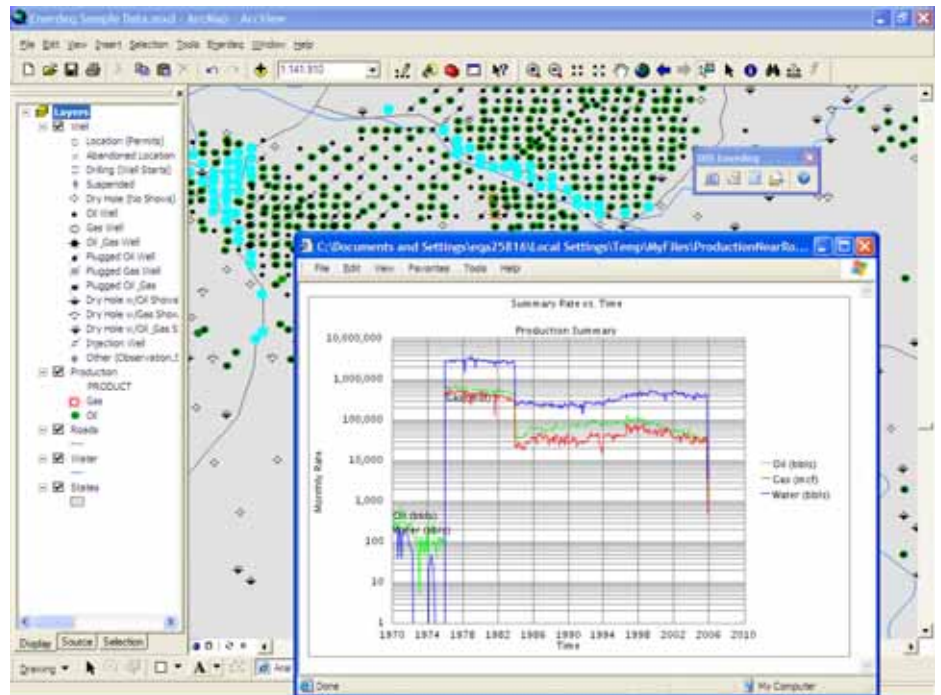
*Web services based access to IHS data from ArcMap[32].*

IHS Enerdeq Web Services 1.2 was released at the PUG and now includes a software development kit (SDK) to enable oil companies, E&P software vendors and middleware providers to build direct links to IHS content such as well and production data. Web Services enhances deliverability and maintenance of data. The Enerdeq product

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[31] *Image courtesy Accuweather.*

[32] *Image courtesy IHS Energy.*

line-up includes a browser, desktop and ArcMap Extension versions. The latter combines ArcMap functionality with direct access to up-to-date IHS data, leveraging enterprise ESRI investments. More from www.ihs.com/energy

0703_21.3 OpenSpirit – ArcGIS Explorer Adaptor
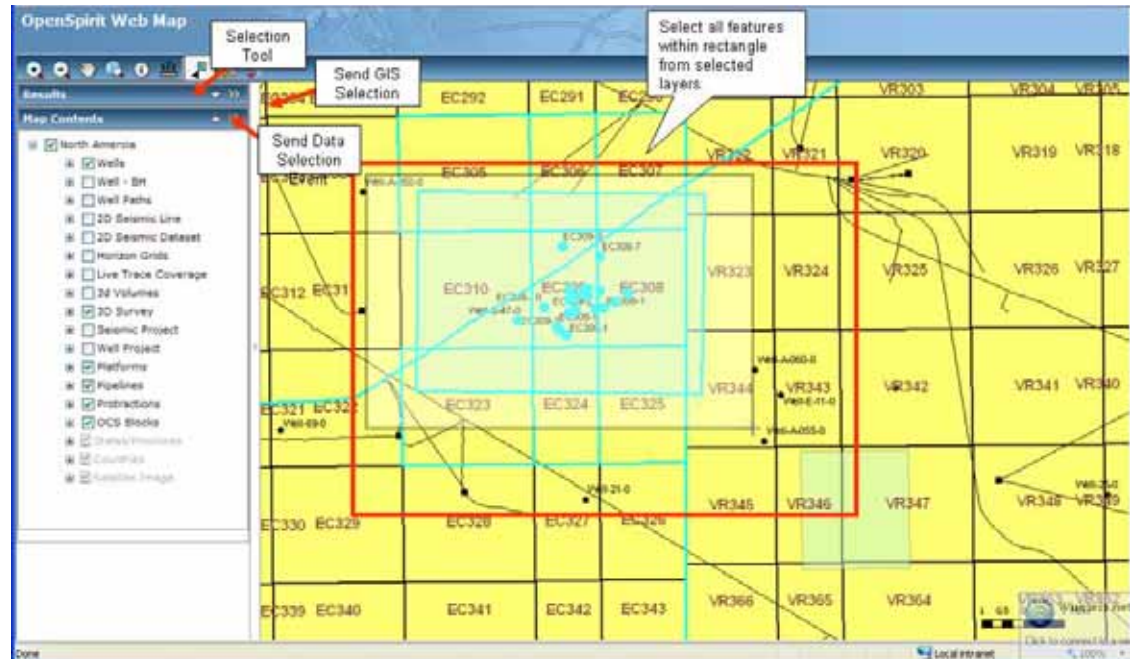
OpenSpirit's web map lets ArcGIS talk to OpenSpirit-enabled applications[33].

OpenSpirit's connection to ArcGIS Server 9.2 enables ESRI's Web Mapping Application to send OpenSpirit data selection events and GIS feature selections to OpenSpirit-enabled applications. Another new release, OpenSpirit's ArcGIS Explorer Adapter (AGEA) is a free[34] application that moves culture and G&G data into ArcGIS Explorer. AGEA understands OpenSpirit data selection events and displays well, seismic, culture and horizons in ArcGIS Explorer. Data selection events from ArcGIS Explorer can be broadcast to other OpenSpirit enabled applications. More from www.openspirit.com.

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[33] *Image courtesy OpenSpirit.*

[34] *But you have to have an OpenSpirit environment to use it.*

0703_21.4 Petrosys' contouring plug-in for ArcMAP
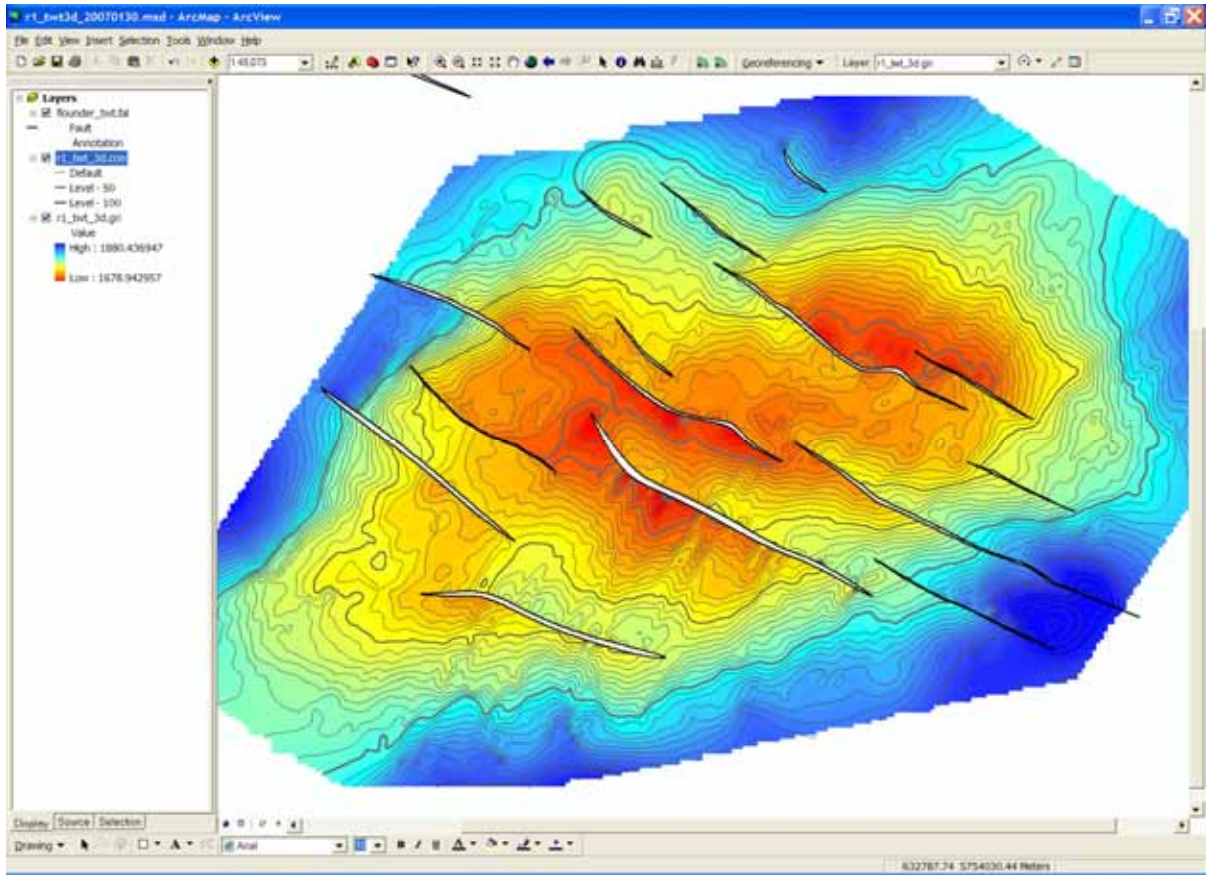
Petrosys adds contouring and volumetrics to ESRI ArcMap.

Petrosys plug-in allows users of ESRI to access the Petrosys surface modeling toolkit from within ArcMap. The plug-in connects directly to the data sources such as: Landmark, SMT, GeoFrame, Finder and PPDM. ESRI users can use Petrosys' gridding, contouring and volumetrics in their environment, ArcMap canvas.

0703_21.5 Surveying and Mapping – subsurface utility locating services

Surveying and Mapping's SUE in action[35].

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[35] *Image courtesy Surveying and Mapping.*

Surveying and Mapping's (SAM) subsurface utility locating service (SUE) uses non-destructive excavating, electrical line tracing, and ground penetrating technologies to locate underground utilities. SUE is claimed to be more effective than 'one-call' as it can perform before the backhoe arrives on the scene. SAM also provides GIS services, converting MicroStation .dgn files to ESRI shapefiles which can be separated into layers showing utilities as located. Layers can be tagged with owner and contact information – all of which is accessible from a road and feature base map. More from www.saminc.biz.

0703_21.6 TriGlobal Technologies UtiliMapper

UtiliMapper services leverage Trible and RadioDetection's hardware[36].

TriGlobal's UtiliMapper is a mapping application for pipeline locating, centerline, depth-of-cover, high consequence analysis (HCA) and corrosion direct assessment (ECDA) surveys. UtiliMapper works with Trimble's GeoXH GPS receivers and RadioDetection's electromagnetic line locators, RD 4000 and Pipeline Current Mapper for accurate spatial locations of pipeline infrastructure. Field measurements are downloaded to ESRI ArcGIS for visual analysis of pipeline location for HCA studies and pipeline condition; including potential external corrosion and shallow pipeline concerns. More from www.triglobal.net.

TW0703_22 Technology Watch subscription information

This report has been produced as part of The Data Room's Technology Watch reporting service. For more on this subscription-based service please visit the Technology Watch home page or email tw@oilit.com.

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[36] *Image courtesy TriGlobal.*