

EDUCATION - PARTNERSHIP EVENT REPORT AND RECOMMENDATIONS

Report Writer's Name:

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Event: **24th Annual ESRI User Conference (UC) and 4th Annual ESRI Education User Conference (EdUC) - San Diego, California – 7-13 August 2004.**

1A. Executive Summary

The largest geographic information systems (GIS) conference in the world, the 24th Annual ESRI Conference, took place from 7 to 13 August 2004. This event brought 13,000 people from almost every conceivable employment sector, from 135 countries, representing tribal, federal, state, and local government, industry, nonprofit, academia, K-12 education, news media, and other sectors. The 4th annual Education User Conference (EdUC) took place during the first 4 days of the UC, and attracted 800 educators.

The conference clearly illustrates the diversity of GIS applications and development, the high degree of enthusiasm from the GIS user community (1,200 user papers, 100 special interest group meetings, dozens of regional user group meetings), and the growth of GIS over the past 24 years. The 1,000 ESRI staffpersons at the conference also reflected the diversity of talent in the GIS industry today.

I encourage everyone that is involved with any sort of work having to do with our planet to attend the ESRI UC at least once in your lifetime.



From enormous banners....



...down to the water bottles, geography and GIS are promoted in everything the conference stands for.

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Where else can one learn about the power of spatial thinking and GIS in literally every major sector of society, at a multitude of scales from local to global, all around the world? Where else can one meet authors of textbooks and journal articles that you have read, or receive training from those who developed the software you are using?

Such is the nature of the ESRI UC – it is at once fascinating and a wealth of information. It gives one a sense that all of us using GIS are not just making a living at it, but we are also contributing to knowledge about our planet and making a positive impact on its resources and people. This knowledge about the Earth is becoming more and more critical each year. The ESRI UC is an incredible learning and networking experience. It is also humbling. I often feel by the end of the UC that my knowledge about GIS after nearly 20 years of work in this field is quite limited. We're all learning!



*Joseph Kerski at the ESRI UC. Not only is the content and networking at the conferences extremely valuable, but in addition, if one wants to see how a conference **should** be conducted, go to the ESRI EdUC and UC. After having attended 20 conferences a year for the past decade, in my opinion, the ESRI sets a standard of excellence in conference logistics.*



The ESRI UC and EdUC are held each summer in the magnificent San Diego Convention Center, itself a geographic location that is hard to top. [Click here for movie.](#)

1B. Related Reports

Directions Magazine wrote a useful summary about the conference on:
<http://directionsmag.com/article.php?article>

[id=646](#)

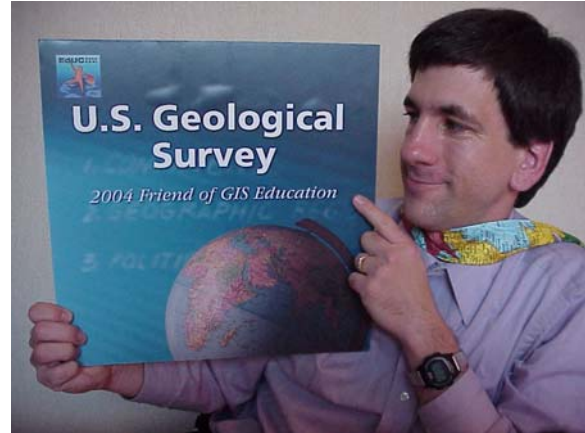
My other ESRI conference reports for previous years can be found on: <http://rockyweb.cr.usgs.gov/public/outreach/success.html>. See <http://rockyweb.cr.usgs.gov/public/outreach/> or <http://www.esri.com/highered> or <http://www.esri.com/k-12> or email me at jjkerski@usgs.gov for additional information about GIS in education.

2. Education User Conference (EdUC)

2A—EdUC Overview

The EdUC ran from Saturday through Tuesday, and offered a forum for people who are teaching, conducting educational research, and supporting education at all levels and in all settings. The EdUC included 30 exhibitors in the main exhibit hall, and in addition, a special designation of “Friends of GIS Education” that pointed EdUC attendees to those exhibitors who offer educational products, programs, and support.

The fact that this conference has been successfully held for 4 years in a row should lay to rest any notion that GIS is confined to a few school districts, universities, or isolated teachers. The EdUC featured 2 and one-half days of workshops, presentations, a map gallery, and an education exhibition.



ESRI created the “Friend of GIS Educator” program for this year’s conference, a special designation to ensure that educators knew about our organization, resources, and exhibit.

I appreciate the effort that the ESRI staff put forth for the EdUC, and our designation as a “Friend of GIS Education.” Our GIS education site is on:

<http://rockyweb.cr.usgs.gov/public/outreach/>

I have attended 3 of the 4 annual Education User Conferences, and before that, the 2000 Education Conference at the California State University-San Bernardino, and the 1998 GIS in Education conference at Eastern Michigan University. TERC’s 1994 Conference on GIS in Education was followed by two in 1996 and 1997.

At each event, increased attendance shows the interest and diversity of those using GIS to teach in informal settings (museums, 4-H programs, etc), K-12 education, community colleges, and universities. This year, the size of the EdUC increased from 500 to 800, with 50 states and 35 countries represented.



I was very pleased to see other USGS staffpersons at the EdUC and their support of education, including our Education Director, Dr. Robert Ridky (above, left).

The number of researchers and practitioners interested in teaching with GIS, in a content area such as environmental science, geography, history, science, or mathematics, is growing, but still forms a relatively close-knit community. Therefore, it is not difficult to understand why many people knew each other at this conference, and why it has such a “family” feel to it. It was excellent to further these relationships as well as form new ones. These people are interested in learning and are passionate about what they do.

Sessions at the conference included presentation, hands-on workshops in data, tools, and software, and other items of interest to the educational community. Approximately eight tracks were run simultaneously over the duration of the conference.

2B—Why GIS in Education?

Many factors encourage educators to use GIS in education, including:

- Technological innovation
- Constructivism

- Integrated, authentic practice
- Authentic assessment
- School-to-career movement and funding
- School-to-community emphasis
- Active, student-centered learning
- National, state, and district content standards [see warning above].
- Public accountability demands for education
- Globalization
- Inquiry emphasis
- Information literacy
- Computer literacy
- Professional societies.
- Universities.
- Private companies, especially GIS companies, particularly ESRI.
- Government agencies’ outreach staffs such as the USGS.
- Research groups (CIPE, TERC, UMAC).
- Advances in data availability and usability.
- Advances in hardware capability.
- Advances in software capability.

From a learning perspective, GIS is highly praised. Lessons around the country illustrate community-based, fieldwork based, interdisciplinary, open-ended projects involving ill-structured problems with real-world data. These projects help students use the same tool as is used in research and business to enhance motivation and learning, explore the world, and provide real employment skills.

From a teaching perspective, challenges remain, such as the traditional dominance of Macintosh computers, while most GIS software is written for Windows operating systems. ArcView, for example, runs on Macs, but only the 1999 version of the software. The new Arc Explorer for Education unveiled at this year’s EdUC looks quite promising for the Mac users as well as PC users. A lack of training in GIS and the perceived and real complexity of

GIS tools is another challenge. The lack of preservice training means that the future implementation rate will continue to be slow.

Other challenges are that:

- GIS is a complex, open-ended tool.
- Teachers must process data as well as develop lessons.
- Increases complexity of teachers' jobs.
- A lack of geographic training and thinking in both teachers and students.
- Inadequate time to learn software.
- Few lesson plans.
- Lack of training, funds, and technical support.
- Insufficient openings in curriculum for GIS.
- Few incentives for teachers.

Teachers ideally need to be paired with at least one other teacher in the school for increased likelihood that these methods will "take root," and they need some start-up lesson plans, and training. In my survey of 1,520 teachers, training was cited as the number one need.

GIS alters communication patterns and traditional roles of students and teachers, for example:

- Coaching
- Small group instruction
- Working more closely with weaker students
- Assessment based on products and progress
- Cooperation

Students with GIS may learn at different rates and not all learned the same content or skills. With GIS, there is a shift from *covering* material to *sampling* material. There is another shift from unilaterally *declaring* what is worth knowing to *discovering* what is important. Students are examining processes over space and time.

In applying Binko's (1989) 4 stages of learning to GIS: awareness, understanding, guided practice, and implementation, GIS is still in the awareness phase for most teachers. In the diffusion literature (championed by Everett Rogers), GIS is in use by the "early adopters"—the ESRI Press books *Mapping Our World* and *Community Geography* have done much to spread the use of GIS in the curriculum.

GIS implementation is not rapid because it still relies on inservice training. Therefore, the USGS and others need to address what future teachers are learning in colleges of education in universities and in community colleges.

The NAS report on GIS in K-12 Education will be published shortly, and we are all anxious to see it. I was invited to advise the NAS during the early phases of the work on the report, my notes are on:

<http://rockyweb.cr.usgs.gov/public/outreach/reports/thinkingspatially01t.pdf>

There is great educational value in requiring students to "dig out" information, rather than handing it to them. GIS involves data management skills and a whole host of other skills besides spatial analysis. It is one of the few tools to take advantage of many computer skills, relational skills, and content skills.

The teacher's role is still critical to learning with GIS, and training teachers needs to be emphasized. Teachers are more likely to adopt GIS if they have previous computer experience, a problem-solving approach, a geographic perspective, a positive attitude toward work change, and active networking and communication skills.

In my opinion, our emphasis should not be

on “How to get GIS into the curriculum,” but “How can GIS enhance teaching and learning in the curriculum?”

2C—Keynote Address



Dr Sandra Henderson of UCAR (University Corporation on Atmospheric Research) was our keynote speaker. She practiced what she preached—hands-on, inquiry-based learning—all through her presentation. In the above example, she works with a member of the audience in a water volume activity. Dr Henderson is involved with educator professional development, with the GLOBE program (www.globe.gov), and with a whole host of other educational programs that are making a difference in teaching and learning.

2D—Highlights of What I Learned at the EdUC

1. The new ArcExplorer Java Edition for Education.
2. A new video featuring Michael Fay on virtualjobshadow.com.
3. A new site www.gis.com/careers.
4. New books, including Cartographica Extraordinaire, Mapping the Future of

America’s National Parks, and Measuring Up—The Business Case for GIS.

5. The new TimeViewer tool on David Rumsey’s map site.

2E—My Workshops and Presentations

I conducted or co-conducted the following presentations and workshops at the EdUC:

1. Research Needs in GIS Education, with Charlie Fitzpatrick, Bob Kolvoord, Marsha Alibrandi, and Tom Baker.
2. GIS in Schools Special Interest Group.
3. Bringing Field Work into the Classroom in combination with GPS and GIS-based projects, with Roger and Anita Palmer.
4. Community Mapping Program, with Connie Knapp.
5. Transforming the Mathematical Landscape with GIS, with Dr Bob Coulter, Missouri Botanical Garden.
6. Elementary School GIS, with Roger and Anita Palmer.
7. International GIS Special Interest Group.
8. How to Download, Format, and Use USGS and other Federal Spatial Data within ESRI GIS products.
9. Meeting with ESRI K-12 Manager Charlie Fitzpatrick on the future of ESRI K-12 educational support and needs.

2F—Other Workshops Attended and Special Features

I attended Shannon White, Marsha Alibrandi, and Barbaree Duke’s presentation

on GIS in education, April Purcell's research presentation, Lyn Malone's presentations on the Geography Network and David Rumsey's map site, a presentation on GIS in education from the University of Arizona, Bob Coulter's Mapping The Environment presentation, and Earthspan's presentation on their impressive Eye of the Falcon workshops and web-based applications.



I attended Phil Pendorf's presentation on how GIS has transformed his Advanced Geography class. Mr. Pendorf and I have been working together since the late 1990s and it is an inspiration to see what he and his students have accomplished.



Wyoming Governor (from 1995 to 2003) Jim Geringer gave the closing presentation at the EdUC. As governor, he was always very supportive of the use of GIS

technology, and now carries that enthusiasm to his new position at ESRI. I last saw Governor Geringer at the 2004 Intermountain GIS conference; my report is on:

<http://rockyweb.cr.usgs.gov/public/outreach/reports/intermountain04t.pdf>

Geringer mentioned that GIS serves to enhance scholarship, citizenship, and artisanship (workforce development) in education.

Geringer stated that \$4.2 billion dollars was spent on technology in education, according to schooldata.com. However, 70% of teachers in one survey said that technology is not well integrated into the curriculum. This is a challenge for all of us working to promote spatial thinking in the curriculum.

One comment Geringer made that I appreciated was "If you carry technology as a separate line item in your budget, you probably don't know how to use it." In other words, technology needs to be integrated in all we do. He also stated that we need better teaching and cited evidence of a John Glenn-sponsored report. Over 28% of students entering college as Freshmen enrolled in a remedial education course!



Maria Jordan, GIS Day Coordinator and wonderful supporter of GIS in education

across the globe.

We are participating in this year's GIS Day, as we have each year since its inception in 1999. I thank Maria for naming me as one of the first 2 GIS Day Heroes in ArcNews magazine, on:

<http://www.esri.com/news/arcnews/summer04/articles/our-gisday-heroes.html>



I was also featured wearing an ESRI T-shirt in the latest ArcNews, buried in the Virginia sands, on:

<http://www.esri.com/news/arcnews/summer04/articles/tshirts.html>



One of my favorite things about this year's EdUC and UC was the active presence of 4H members and their supporters. ESRI and National 4H formed an agreement in 2003 to support geospatial technologies in 4H programs. One of the above students attended our GIS workshop in Fall 2003 at Salt Lake Community College (see report on

<http://rockyweb.cr.usgs.gov/public/outreach/reports/ncqe03t.pdf>) and it was a pleasure to talk with these enthusiastic and intelligent students.



A few more GIS educators that I have great respect for—Barbaree Duke (Virginia educator), Shannon White (North Carolina State University), and Karen Kemp (University of Redlands).



Just a few more of the many special people at the conference—Amanda Gierow, GIS educator, Robb Menzies, who brought GIS to all the public schools in Denver, and Esther Worker, ESRI Denver, 4-H GIS Coordinator and great supporter of GIS in education.



I was pleased at the high attendance at all of my workshops and the other workshops.



Partnerships—that's what it's all about, and forming and maintaining them is one of the key reasons why attending the ESRI UC is so valuable.



After a social gathering of all EdUC attendees, we embarked on a geocaching hunt, sponsored by ESRI and Trimble. Having conducted my own geocaching events for educators (such as at the TIE Conference; report on: <http://rockyweb.cr.usgs.gov/public/outreach/reports/tie04t.pdf>), it was excellent to see how others set up their own events. It is an excellent way to get to know the conference attendees, help educators learn to use GPS, and help them think of additional ideas to use GPS and GIS in their curriculum.



The geocaching course involved virtual caches (no physical box or objects) with a variety of clever clues and a booklet for each team. Prizes were handed out back in the conference center at the conclusion of the event.

3. User Conference (UC)



The ESRI conference theme for this year was "GIS—The Language of Geography."

3A. Plenary Session

3A – 1 Jack Dangermond Address

Jack Dangermond began this year's plenary session by showing maps modeling everything from the brain to the 2003 California fires, and made the case for why GIS is the language of geography.



Each year, Jack Dangermond (above) advocates that we need a unifying consciousness to connect our GIS and geography community with the larger world. It is clear that he doesn't want GIS to be an "insiders-only" club, but rather, he urges the attendees to bring geography and spatial analysis to benefit all peoples and societies.



Opening Day is one of the few times when almost everyone at the conference is together in one room—probably close to 10,000 people. ESRI staff and others

conduct professional presentations, with excellent graphics, lighting, and sound. It is an amazing event, and one gets the sense that even though we work in separate cubicles around the world, we are part of something global, something quite exciting, something that can help make the world a better place. [Click here for movie \(1\)](#) and [movie \(2\)](#).

Mr. Dangermond is humble about what has been his pivotal role in geographic information science since the 1960s. ESRI, now 35 years old, has 4,400 employees, 250,000 users on its virtual campus, over 2,000 business partners, and over 1 million software seats. ESRI is still growing at 10% to 20% per year!

It is getting easier these days to share data, but not procedures and methods. Jack Dangermond urged people to think about how to share complex workflows—package up the workflow and ship it off to other users to hasten project development.

He also described a “GeoPortal Toolkit” that came out of the Geospatial One Stop (<http://www.geo-one-stop.gov>) for the US Office of Management and Budget. This will hasten the spread of web services for agencies looking to publish spatial data. ArcEngine was announced (an ArcObjects for developers) and mentioned some of the performance improvements in ArcGIS 9.

My favorite quote from Jack Dangermond this year was: “As important as it is to describe the World, it is more important to imagine a better world.”

3A – 2 Technical Presentations

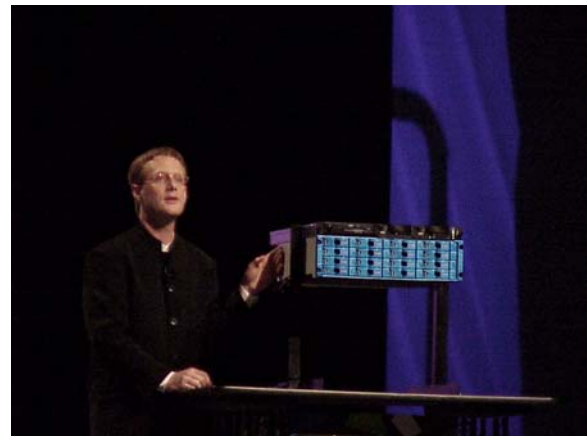
Danny Hillis, the inventor of the "Thinking Machine" and a principal at Applied Minds, Inc., demonstrated his impressive touch table—a table top with a digital map

projected on it, developed with ArcObjects. I have included a photograph of it in the **Exhibits** section of this report.

ArcGIS 9 was then described in detail—including the desktop GIS, the server GIS, the embedded GIS, and the mobile GIS.

Folks from COCIGIS in Indiana discussed how they had implemented GIS in their county and small towns.

I was pleased to hear about the ability of ArcGIS 9 to directly connect and read the data formats non-ESRI software without translation, through a partnership with Safe Software called the Data Interoperability Extension



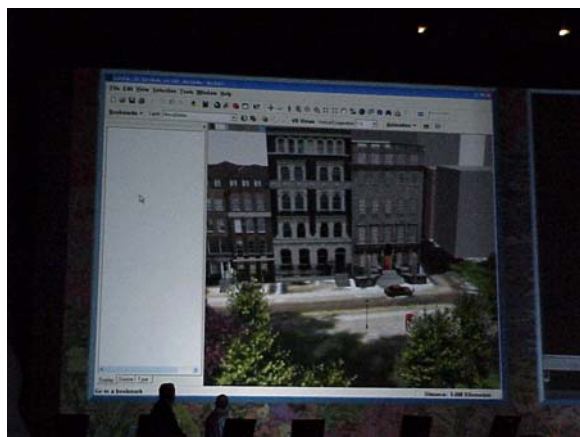
John Calkins, next to a high-speed storage device that holds 5 terabytes of data, which he accessed during a live GIS applications demo on stage.

John Calkins also gave his top 10 enhancements with ArcGIS 9:

- 1) Alphabetizing the toolbar.
- 2) Creating a new feature class within ArcToolbox without having to go to ArcCatalog.
- 3) Clip to shape and enhanced printing layouts and previewing.
- 4) Exporting data and schema to XML.

- 5) Interoperable web services. Add web mapping services to ArcMap.
- 6) Improved functionality for rasters: projections, clipping, color balance, export.
- 7) Improved raster data management.
- 8) Label enhancements: Adjusting them all at once for all themes; turning all on and off at once.
- 9) Masking for labeling and buffering.
- 10) Keyboard shortcuts.
- 11) (John couldn't stop at 10!). Customizing tools enhancements. Pausing the redraw function.

Staff spent time discussing Maplex, for enhanced cartographic label placement. For example, Maplex automates font sizing so that the text is always visible within map features.



ArcGlobe and the ability to paint 3D scenes with photographs makes visualization that much closer to reality.



These folks demonstrated enhancements to ESRI's mobile GIS tools in a humorous and effective way.

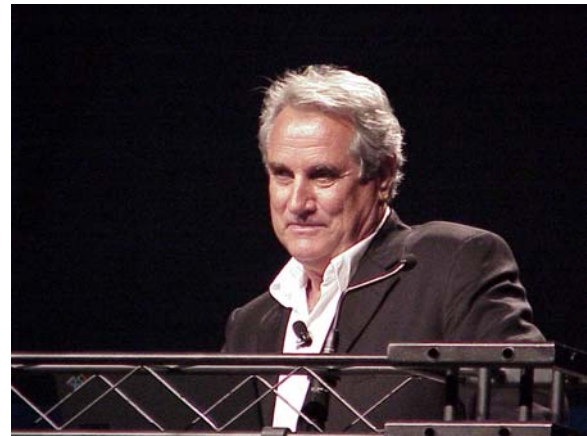
3A – 3 Awards



The mayor of Honolulu and his staff receive a Making A Difference Award.

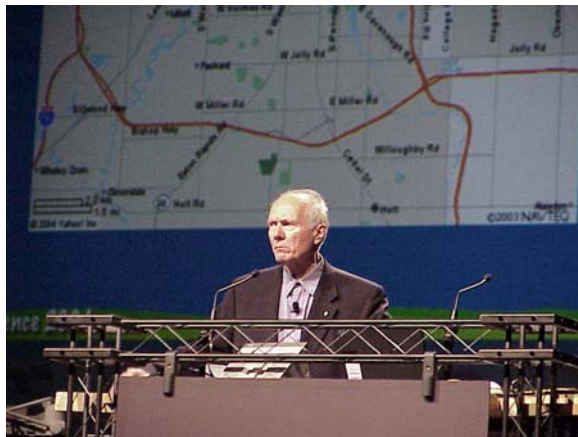


Dr David Rhind from the City University of London and former director of the Ordnance Survey received a Lifetime Achievement Award. I was much pleased by his comment about changing the world through GIS education. His caution was that GIS doesn't influence policies as much as it should. I use his book Geographic Information Systems and Science in all of my university-level GIS courses.



Professor William Von Reit received the President's Award; he is a landscape architect and has worked tirelessly on the Peace Parks Foundation.

3A – 4 – Dr Rita Colwell Address



Alan Schmidt, Director of the Harvard Graphics Lab, received a Lifetime Achievement Award. I and others will recall using SYMAP and other mapping software during the 1970s and 1980s developed by the Harvard lab. Schmidt will be featured in Chrisman's upcoming book How Computer Mapping at Harvard Became GIS. This topic was a key feature of the Map Gallery at the conference.



Dr Rita Colwell served as the 11th director of the National Science Foundation and is a member of the National Academy of Sciences, holds 39 honorary doctorate degrees, and is the recipient of numerous awards.

Dr Colwell called geography the “scientific Esperanto” and began with John Snow’s cholera map of 1850s London. Her address focused on spatial technologies’ impact on infectious disease study, water, and health, but underlying it all was the clear message—Don’t give up on your

convictions. Stand by what you know is right.

Related Reports

Jack Dangermond's replies to the preconference user questions are on:

<http://gis.esri.com/uc2004/qa/>

Other information from the UC is on:

<http://www.esri.com/events/uc/index.html>

An overview of ArcGIS 9 from Directions Magazine is on:

http://directionsmag.com/article.php?article_id=639

3A – 5 Award for Bishop Dunne Catholic School, Dallas, TX USA

Those who know me won't be surprised when they hear that the student presentations are always my favorite part of the plenary session. In the past, winners of the Community Atlas award were featured.

This year I experienced an even greater thrill, because I knew the students, the principal, and teacher who were awarded a GIS in education recognition award. They and their school (Bishop Dunne Catholic School in Dallas, Texas) won this award for their innovative and continuing use of spatial technologies to make a difference in education.

I have been working with the teacher Brad Baker since the mid-1990s. Next, he attended our summer GIS institute that I co-taught with the ESRI Education Team. I had met these and others of his students earlier in 2004 at the GeoTech 16

conference at their school, an event highlighting GIS in education that I have attended for nearly 10 years. See my photo-report from the 2004 GeoTech event on:

<http://rockyweb.cr.usgs.gov/public/outreach/reports/geotechx04t.pdf>

It is excellent to know that some of our education efforts have these type of results. However, we're just planting the seeds. It is these students, their teachers, and their principal who are an inspiration to us all. THEY are the real heroes!



Three of the Bishop Dunne students and principal with Dr Rita Colwell, teacher and educational consultant Christine Voigt, and George Dailey, one of the ESRI K-12 Managers. One of the students is interested in doing medical research at the university level, so it was excellent to be there when she met Dr Colwell, who is also a medical researcher.



Students, principal Kate Dailey, and teacher Brad Baker with Jack Dangermond. Earlier this year, the school was named as one of 20 Schools Of Distinction in the USA. Students at the school have analyzed the local creek habitat, crime in Dallas, created a 3D island, analyzed helicopter landing sites in a state park, have analyzed Habitat for Humanity sites as only a sampling of their many GIS-based projects.



Above, Bishop Dunne students, teacher, and principal after their excellent presentation (with evident relief on the teacher's face!).



Above, Joseph Kerski with two of the students. .

3B – My Paper: Global GIS

I gave a paper entitled “GIS Lessons for the World—The Global GIS Project.” In this presentation, I described the Global GIS project and the curriculum I am building based on the Global GIS data and tools. Global GIS is a series of 1:1M scale data created by Paul Hearn and Trent Hare and a few other stellar USGS scientists.

I was pleased at the attendance in this session, and I met several people from other countries who are interested in continuing a GIS education dialogue with me.

This paper, as all of my other papers, will be on the UC Proceedings:

<http://www.esri.com/library/userconf/archive.html>

My lessons and more information about the data and project is on:

<http://rockyweb.cr.usgs.gov/public/outreach/globalgis/>.

3C – Exhibit Hall

The ESRI UC exhibit hall is really more than a series of booths highlighting the latest

tools, data, projects, hardware, and software. Actually, “booths’ is the wrong word, as many of the exhibits are like miniature cities or islands. The 20 rows of exhibitors represent the best creative GIS minds from around the world. It would take a week to fully walk through and appreciate it all. [Click here for movie.](#)

The exhibit hall is also a demonstration theatre, a “doctor’s office” where users can receive personal technical support, ESRI product islands including education, desktop GIS, mobile GIS, developer, server, natural resources, telecommunications, public safety, government, jobs, and much more.



I do not think that even photographs like these capture the magnitude of the UC exhibit hall. The products, services, and resources on display showing the application of GIS into every sector of society is truly magnificent.



My favorite item in the exhibit hall, and probably a favorite with others as well, was the Northrup Grumman digital map table. This wonderful device was also featured on the stage at the plenary session. It features a touch-screen display with a menu that can be “tossed” digitally from one person to another, and is driven by a LCD projector.

Its purpose is to provide real-time collaborative spatial thinking, in much the same way as that which comes with leaning over a large paper map on a table. The image featured above is a DigitalGlobe image of the Olympic complex in Athens.



Mobile van laden with geotechnologies for collecting data in the field.



Part of the large homeland security display in the exhibit hall.



Another impressive part of the exhibit hall was the enormous historical maps, new maps, and satellite images on each wall.

I also saw Z-corporation's 3D plotter once again; the first time was at the 2004 ASPRS conference. See my photograph of this amazing plotter in my ASPRS report on:

<http://rockyweb.cr.usgs.gov/public/outreach/reports/asprs04t.pdf>

Another useful utility I learned about was Layton Graphics program Map2PDF.



The cleverest marketing idea I saw at the conference was that of Thales, who produced thousands of twin buttons containing the same 4-digit number. The challenge was to locate the person wearing the same number as yourself. If you found your "twin," you would turn it into the Thales exhibit for a very nice prize—a GPS unit. By the end of the conference, some groups were using innovative ways of locating the "twin", such as the above exhibit.

3C – 2 USGS Exhibit

The USGS has exhibited at the UC each year since 1998. Prior to that and continuing to the present day, the USGS has participated with paper presentations and maps in the map gallery since the conference's inception in 1980. I would estimate at least 100 USGS staffpersons attended the ESRI UC.



Our USGS exhibit backdrop was created by USGS employees Liz Colvard and Dave Ramsey, highlighting the history of the USGS and current GIS developments. Our exhibit was 30 feet long and framed by staff from the National Atlas and from EROS Data Center.



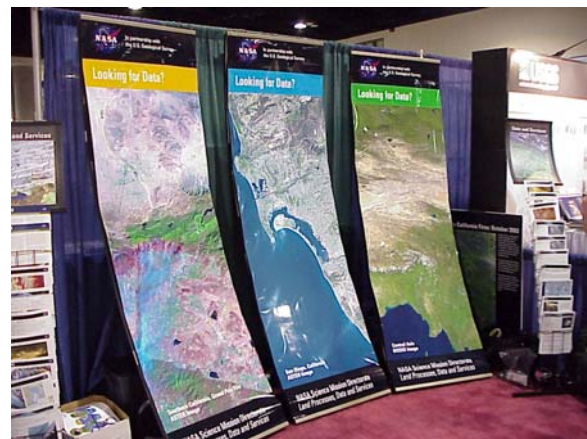
Our exhibit featured information on how to use USGS data within ESRI GIS software, the National Map Corps, how to use the National Map and other USGS resources, new products and services, and free maps, posters, and books, including urban growth, biodiversity, wildfire analysis, lake floor modeling, earthquake studies, and more. We appreciate all that the ESRI staff did to support our exhibit.

Our goal at the ESRI UC is to reflect applications and use of GIS at the USGS,

rather than simply the base data we produce. We also seek cooperative research and development agreements, and production agreements with those we come into contact with. The role of geographic data, partnerships, and research is central to the USGS.

Our exhibit included Internet hookups so we could demonstrate our seamless data portals. The most frequent questions were on how to format our data to use with ESRI software, such as NED, and NHD. The staffpersons were well equipped to handle the technical nature of this audience. They had experience in using and manipulating USGS data, were familiar with data and services from all disciplines, and were those who work well with the public. We have a great many of these individuals at the USGS, and I am proud to work with them. Furthermore, each person's "discipline depth" and experience in GIS to their own projects creates a seamless presence and enhances our overall effectiveness.

This conference's exhibit once again was a joint venture between numerous USGS disciplines and centers. This showed how effective a seamless outreach effort can be.



Triplicate Landsat scene by the NASA scientists adjacent to our USGS exhibit.



John Gorman, The National Map Corps Coordinator, speaks with a visitor to our USGS exhibit.

Data Center in Sioux Falls, SD, speaks with folks stopping by our exhibit on family night.

Family night is one of my favorite times to work at the exhibit as it gives us an opportunity to talk with the general public. Friends and family of attendees can tour the exhibit hall and map gallery. This is a good model that brings GIS into the larger community, and one that I advocate that all GIS-related conferences included.

3D – Map Gallery



I believe that a short walk through the Map Gallery would do more to convince the world of the power of geography and GIS than any lecture or presentation that I or anyone else could give. [Click here for movie.](#)



Joseph Kerski and Liz Colvard at the USGS exhibit.

The map gallery becomes bigger and better each year, with thousands of applications from amazingly creative people worldwide, spilling over from the sail area above to adjacent halls and rooms in the convention center. Each conference attendee received the latest impressive annual Map Book from ESRI, filled with some of the best of these maps.



Ron Beck, scientist from the USGS EROS



One of my favorite displays this year was ancient maps reproduced with ceramic tiles in Puebla, Mexico, www.talaveradelaluz.com. The above image is a close-up of one of these fascinating unions of art and cartography, some were over 10 meters long.



Another of my favorite exhibits was this one from National Geographic, showing how cartography evolved there from manual to GIS-based methods.

Another fascinating display was *Charting The Unknown—How Computer Mapping at Harvard Became GIS*. Those of us who used SYMAP and made choropleth maps with overprinted characters on a line printer could especially relate to this display. This

will be published as a book in 2005 by ESRI Press.

3D – 2 USGS Map Gallery



Once again, the USGS hosted a very large area of the Map Gallery, including 80 maps from USGS scientists and Internet connections to display our online resources. This was made possible through the support of ESRI and the dedication of Barb Ray, Bob Pierce, Jennifer Sieverling, Lisa Rukstales, and others from the USGS who have been working for months to set up this display.



Joseph Kerski next to his poster entitled "Partnerships for GIS Education" featuring a few of the educational partnerships we have been privileged to be a part of—with ESRI,

the Missouri Botanical Garden, with the Community Mapping Program, with the University of Colorado, and more.



Joseph Kerski and Curtis Price at the USGS Map Gallery display. Curtis is one of our Enterprise GIS trainers and researchers, and in my opinion, one of the most gifted USGS GIS staffpersons we have.

3E – Technical Sessions Attended



Many of us take full advantage of the ESRI UC's technical presentations to learn about ESRI software from the experts—the ESRI staff themselves.

I attended the following technical sessions:

1. Introduction to Geoprocessing and

Modeling in ArcGIS

This class concentrated on the expanded ArcToolbox geoprocessing functions, including ModelBuilder.

I noted that the Python scripting language is becoming increasingly popular. One of the best ways to analyze what Python does is to create a model and export it to a Python script.

ArcInfo contains 251 ArcToolbox tools (102 in ArcView).

2. ArcGIS Query and Analysis

ArcToolbox is now a dockable window in ArcMap and ArcCatalog. Geoprocessing can be accessed via tools, command line, model builder, and scripts.

3. Geostatistical Analyst

This session highlighted some of the new features in this extension. Some of the functions that users formerly had to bring data from ArcGIS to an external package such as SPSS can now be accessed via this extension.

4. Geodatabase

This workshop covered the advantages of geodatabases over shapefiles and coverages, and how to work with them.

5. What's New in ArcGIS 9

This was probably the most useful workshop of all to me, and covered labeling, the table of contents tab, copying data between frames, raster hotlinks for the geodatabase, masking features when drawing, selection improvements, better fonts, improved printing capabilities and

interface, paragraph text for layouts, drawing pause, unselecting all, and curved text leader line.

6. Advanced Spatial Analyst

This class emphasized model builder.

All of these workshops were well presented and I appreciate the effort that went into them.

Other Meetings

I also attended part of a meeting with ESRI and Del Mar Community College concerning a grant that the college had received for GIS education. I and others are on the advisory committee for the project.

I also met with Ming Tsou briefly on his new GIS in education project at San Diego State University, and with Dr Xie concerning GIS in education at Eastern Michigan University.

I had another discussion with the education staffpersons at the National Geospatial Intelligence Agency and expressed hope that we might be able to collaborate on educational projects.

3F – Special Events

A special part of the Map Gallery was dedicated to the My Community Our Earth Project (MyCOE). This project was organized by NGS, AAG, the UNEP, and ESRI; I have been an advocate that the USGS becomes involved in MyCOE and have been working with the AAG during 2004 to make certain that this occurs. MyCOE illustrates how geography and spatial thinking can help solve real problems in sustainable development, and brings together the community, researchers, and education.

Native GIS had a large presence at the UC, with presentations throughout each day and a special gathering one evening. It was good to see James Rattling Leaf, Jhon Goes in Center, and Mike Collins from Sinte Gleska University, with whom I have worked on GIS in education initiatives.



Another of my favorite displays—the Youth Community Geography Mapping project was full of maps and projects from many different youth organizations, such as 4-H. It was a pleasure not only to see these projects, but to speak to the young people who were staffing the displays.



Jack Dangermond, ESRI President, Center, standing with some of the excellent 4-H leaders and students in the Youth Community Geography Mapping display.



Digital Globe featured a stunning array of QuickBird images from around the world tied to a contest of naming where each image was located.



I listened to a presentation by GIS pioneer Roger Tomlinson, above. I regularly show his 1967 Canadian Land Inventory movie to my GIS students.



One of my favorite things about the ESRI UC is having the opportunity to meet the smartest people in the industry. Here I am with Tom Poiker, inventor of TINs, and GIS pioneer. I also met Ingrid Bruce, GIS Manager for Rancho Cucamonga, who is featured in a video I have been showing students all through the year on virtualjobshadow.com.



Speakers setting up for their presentations.



The Spatial Outlet featured new books, and also interesting geography-related widgets such as shirts, posters, maps, and more. An added bonus was the preponderance of McCartney and Wings music that they played!



Our USGS Regional Geographic Information Officers—a top-notch bunch.



USGS All-Hands meeting. This was a brief but excellent time of networking with many USGS staffers that we only see once a year—at the ESRI Conference. We discussed the Regional Geographic Information Officers and their role, Enterprise GIS support, licensing, and training, Geospatial One-Stop, and The National Map.



Everyone smiles at the ESRI UC!



There is always something a bit unusual going on at the ESRI UC. This musician, above, played something similar to an electric cello. Three hours later as I emerged from the Map Gallery, he was still going strong!

My only regret at this year's UC was that I was not able to observe any of the GIS Kids Camps, where children of conference attendees explore the world using a GIS.

After the UC ended, attendees were offered tours of ESRI in Redlands, California. I visited the HQ in 2000 and 2001 and it is quite an interesting place.

4—Acknowledgements and Recommendations

4A—Acknowledgements

To make working at a conference the size of the ESRI UC a success requires a team effort working over many months. I commend the USGS exhibit planning staff, particularly Liz Colvard and Leslie Gordon and the others, and all the USGS employees who helped staff the exhibit.

I salute Bob Pierce, Barb Ray, Lisa Rukstales, Jennifer Sieverling, and others for organizing the USGS Map Gallery and all those who took part by producing and displaying their maps and posters. I have not mentioned every name, but know that I am appreciative of all help for this worthwhile event.

4B--Recommendations

I believe that the customer networking, ties to key organizations, and issues raised at this conference are important to the future of the USGS, and it was important to be involved.

I thank those who approved my attendance at this conference. Part of my trip was funded from the GeoTech Colorado course I taught through the University of Denver in June 2004. My report of this workshop is on: <http://rockyweb.cr.usgs.gov/public/outreach/reports/geotechco04t.pdf>. I am also grateful to the Geographic Information Office of the USGS for partial funding support.

By participating in the conference, we sought to demonstrate the leadership that the USGS has in geospatial standards, research, The National Map, and in digital data such as NED and Aster that users can

and have used in their work. We sought to further our partnerships on many levels, particularly in regards to The National Map.

How does GIS in education fit into the goals and mission of the USGS, and how can the USGS contribute to such an agenda? Our “Future Science Directions” and our USGS strategic plan each indicate how GIS in education ties into our mission. Our emphasis is integrated information for societal needs. GIS provides one of the best tools and science for integrating land-based information.

The National Map and our research projects show that we need scientists who can analyze data from a variety of disciplines. Integrated studies are recommended by education scholars in K-12 curricula also, rather than the traditional model of separate subjects that do not overlap. In 2000, a National Research Council study identified 8 critical world environmental themes, and I believe that 6 of them require spatial data and a populace that can interpret such data.

Data from the USGS Customer Satisfaction-Outcome Survey showed that for 18 products, an average of 55% of the customers reported that they use our products for educational use.

I believe we must continue to support GIS in education by participating in and conducting GIS training for educators, creating GIS-based lessons using USGS and other spatial data resources, and by participating in GIS Day and other activities.

By participating in this conference, we demonstrated the leadership that the USGS has in international science and geography literacy. We are the one of the largest producers and one of the largest users of digital spatial geographic data. These are

data sets not only used by geographers, but by anyone interested in solving a project that has to do with space—hydrologists, biologists, demographers, seismologists, geologists, sociologists, psychologists, environmental planners, public works officials, marketers, business analysts, and others. Someone has stated that if physics was the science of the 20th Century, then earth science will be the science of the 21st.

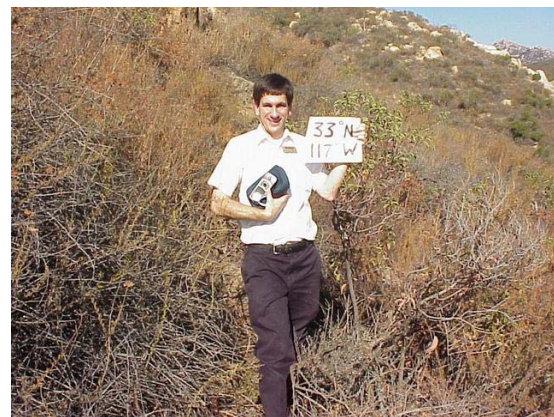
In my opinion, this wealth of data that we create at the USGS (or any organization) will be worthless unless we proactively collaborate to improve geographic and scientifically literacy.

One reason for attending this conference was to illustrate USGS strength in integrating science with education. The growth in geographic technology presents an excellent opportunity for the USGS to get our data and products into the hands of students and educators across the country. Students familiar with our data will form an expanded USGS user base.

We also sought to inform the educational and scientific community that our strength does not end with maps and digital cartographic data, but it includes hazards, water resources, energy, and biological research, for example.



We all look forward to returning to San Diego for the 25th ESRI User Conference, 23-29 July 2005.



No geographic event can be considered complete without a bit of field work—here to Latitude 33 North Longitude 117 West in northern San Diego County.

Report Note

Note that this report contains my own personal observations and opinions that do not necessarily reflect the opinions of the USGS. If any errors exist in these notes, they are the result of my own misinterpretation and do not reflect the high quality of the presentations.

****End of 2004 ESRI EdUC and UC Report****