



RWBC EXPO 2003

May 29 Final Report

Table of Contents

EXPO Organizers, Demo Leaders, and Sponsors	2
Executive Summary, by Keith Pezzoli, Ph.D	4
Opening Key Note by Dr. William A. Suk, SBRP, NIEHS	4
<i>The role of outreach in linking science to policy</i>	4
Comments by Dr. Robert Tukey, SBRP, UCSD	5
<i>Enabling collaboration in science and regional planning</i>	5
Comments by Professor Steve Erie, Director, USP, UCSD	6
<i>USP's role in linking science and technology to policy and planning</i>	6
Comments by W. Erik Bruvold, Vice President and Director, Infrastructure Issues	7
<i>The Benefits of Joining Collaboration in Science and Regional Development</i>	7
DEMO Abstracts and Summaries	8
Demo 1: 3D Regional Canvas of the Californias	8
Part 1: 3D Regional Canvas of the Californias (SIO Visualization Center)	8
Part II: 3D Regional Canvas of the Californias: Web-based Educational Version	9
Statement by Rob Hutzal, Director, San Diego River Park Foundation	10
A Note about the Venue for DEMO 1	11
Demo 2: Online Interactive Mapping of Superfund Toxicants and Quality of Life Indicators	11
Baykeeper and Ja Jan	12
Hiram Sarabia, Binational Water Quality Monitoring Program, Director	12
Role of the TELESIS Corporation (Nonprofit): A founding member of the RWBC	13
Demo 3: Regional Planning Chronologies	15
Role of the UCSD Library (statement by Dan Henderson, GIS Coordinator)	16
Demo 4: Regional Workbench Consortium, Overview	16
RWBC Information Access through the Geological Data Center	17
1. Copies of all Handouts (pdf files)	22
RWBC EXPO 2003 Organizers and Sponsors	22
RWBC EXPO 2003 Agenda and Schedule	22
RWBC EXPO 2003 DEMO Abstracts	22
RWBC Brochure	22
RWBC Partners	22
RWBC Projects	22
DEMO location maps: IOA Complex and SIO Visualization Center	22
2. May 29 Video and Image Archives	22
UCSD-TV Documentary	22
3. Registration Data	22
Categorization of Participant Organizations	22
Participant Goals	22
Participant Areas of Interest	23

EXPO Organizers, Demo Leaders, and Sponsors

EXPO Organizers	
<p>Keith Pezzoli, Ph.D. Urban Studies and Planning Program & Superfund Basic Research Program, Outreach Core University of California, San Diego 9500 Gilman Drive M/C 0517 La Jolla, CA 92093-0517 e-mail: kpezzoli@ucsd.edu Phone: (858) 534-3691</p>	<p>Jason Wiskerchen San Diego Supercomputer Center Regional Workbench Consortium University of California, San Diego 9500 Gilman Drive M/C 0505 La Jolla, CA 92093-0505 e-mail: jwiskerc@sdsc.edu SDSC Phone: (858) 822-5419 RWBC Phone: (858) 822-5254</p>
DEMO Leaders (see the RWBC Web site's projects page for more complete references)	
<p>Demo 1 – Part I <i>3D Regional Canvas for the Californias: SIO Visualizaton Center</i></p> <p><u>Leader:</u> Alejandro Hinojosa, CICESE, and Fellow of the Center for U.S.-Mexican Studies University of California, San Diego e-mail: alhinc@cicese.mx</p> <p><u>Other participants:</u> Dru Clark, Eric Augenstein, Shane DeGross, Debi Kilb, Graham Kent, Dan Henderson</p>	<p>Demo 1 – Part II <i>3D Regional Canvas for the Californias: Web-based Educational Version</i></p> <p><u>Leader:</u> Jeff Sale, SDSU, Education Center on Computational Science and Engineering e-mail: jsale@sunstroke.sdsu.edu</p> <p><u>Other participants:</u> John Ryan, SDSU, Department of Geography</p>
<p>Demo 2 <i>Online Interactive Mapping of Superfund Toxicants and Quality of Life Indicators</i></p> <p><u>Leader:</u> Ilya Zaslavsky SDSC Spatial Information Integration Lab e-mail: zaslavsk@sdsc.edu</p> <p><u>Demo 2 cont. Other participants</u> Scott Shepard, Hiram Sarabia Daniel Machemer, David Lee, David Cleveland</p>	<p>Demo 3 <i>Regional Planning Chronologies</i></p> <p><u>Leader:</u> Richard Marciano, SDSC Sustainable Archives and Library Technologies Lab e-mail: marciano@sdsc.edu</p> <p><u>Demo 3 cont. Other participants</u> Midi Cox, Larry Cruse, James R. Jacobs Ilya Zaslavsky, Keith Pezzoli, Scott Shepard, Eric Augenstein, Kay Dietze, Harry King, Cristin McVey, Dan Henderson, Jane Clough-Riquelme, Andrea Groves.</p>
<p>Demo 4 <i>Regional Workbench Consortium, Overview</i></p> <p><u>Leaders:</u> Keith Pezzoli (contact info above); Jason Wiskerchen (contact info above); Cindy Santini, UCSD, e-mail: csantini@ucsd.edu</p>	

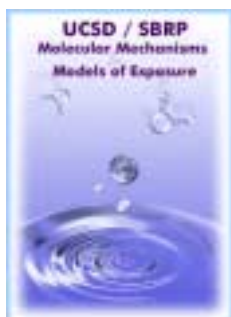
RWBC MAY 29 EXPO 2003 SPONSORS



Superfund Basic Research Program

National Institute of Environmental Health Sciences (NIEHS)
Dr. William Suk, (Director, Superfund Basic Research Program, National Institute of Environmental Health Sciences).

<http://www-apps.niehs.nih.gov/sbrp/index.cfm>



UCSD Superfund Basic Research Program Molecular Mechanisms and Models of Exposure

Dr. Robert Tukey, UC San Diego SBRP Program Director

<http://superfund.ucsd.edu/>



Urban Studies and Planning Program, UC San Diego

Special thanks to: Professor Steve Erie, Director

<http://usp.ucsd.edu/>



international
community
foundation

connecting people and communities to make a difference

International Community Foundation

Special thanks to: Richard Kiy, President and Chief Executive Office,
and the ICF Board Members

<http://www.icfdn.org/index.htm>



SAN DIEGO REGIONAL ECONOMIC DEVELOPMENT CORPORATION

San Diego Regional Economic Development Corporation

Special thanks to: Julie Meier Wright, President & CEO
W. Erik Bruvold, Vice President and Director, Infrastructure Issues
Michael Stepner, Director, Land Use and Housing

<http://www.sandiegobusiness.org/>



Center for U.S. - Mexican Studies

UNIVERSITY OF CALIFORNIA, SAN DIEGO

Center for U.S. – Mexican Studies – University of California, San Diego
Special thanks to: Diana Platero and Jane Clough-Riquelme

Executive Summary, by Keith Pezzoli, Ph.D.

On May 29, 2003, the Regional Workbench Consortium (RWBC) held its first EXPO. The Expo included an opening plenary, four 60-minute information and visualization technology DEMOS, lunch and a closing reception. RWBC leaders conducted the four DEMOS in three separate locations: two in UCSD's Institute of the Americas Complex, one in the San Diego Supercomputer Center, and one in the SIO Visualization Center. UCSD's Superfund Basic Research Program and the National Institute of Environmental Health Sciences (NIEHS) provided the bulk of funding. The International Community Foundation and the San Diego Regional Economic Development Corporation also contributed funds to make the event a success. A broad spectrum of participants including academic (88 people), government (34 people), community-based/non-profit (29 people), and industrial/private sector representatives (37 people) registered for the May 29 roll out of the Regional Workbench Consortium. UCSD participation included seven departments, three programs, several Centers and Institutes, as well as library, community outreach, education and media professionals. Participants also registered from San Diego State University, four Mexican-based universities, and a host of other academic institutions. Likewise there was a wide spectrum of participants from government (city council member, deputy mayor, district directors, water authorities, planners), community-based/non-profit organizations (foundations, environmental NGOs, policy studies, technology and economic development corporations), and industry (consultants, trade associations, legal services, urban and architectural design, resource conservation, environmental management).

The RWBC is a collaborative network of university and community-based partners. Our mission is to *"Create innovative research-learning collaboratives, planning support systems, and integrated educational tools to enable sustainable city-region development.* This report provides an overview of the May 29 Expo. We organized the event to share our tools and projects, stimulate discussion, and learn through knowledge networking. The aims that guide us are noted below:

- Establish a new mode of communication among university, industry, government and community-based organizations seeking sustainable city-region development (i.e., integrated approaches to meeting social equity, economic, and environmental objectives);
- Provide a testbed for developing/applying/evaluating advanced information, visualization, and communications technologies in the context of partnership-driven research projects and knowledge-action collaboratives;
- Create interactive and participatory methods for social learning about sustainable development in the San Diego-Tijuana city-region and beyond (targeting regional planning and policy);
- Promote excellence in undergraduate/graduate research education by creating "knowledge maps" (ontologies) and interactive tools for conceptualizing, designing, conducting, and sharing field studies;
- Inspire/facilitate research requiring the integration of disciplines and spatial scales (drawing from the social, natural, and physical sciences as well as technology, art and the humanities).

Opening Key Note by Dr. William A. Suk, SBRP, NIEHS

The role of outreach in linking science to policy



Dr. William A. Suk, Ph.D., gave the key note speech during the EXPO's opening plenary. Dr. Suk is the Director of the Superfund Basic Research Program (SBRP) of the National Institute of Environmental Health Sciences (NIEHS). As outlined on the SBRP Web site, the program is focused on acquiring new scientific and engineering knowledge that advances both society's understanding of the human and ecological risks from hazardous substances and the development of new environmental technologies for the cleanup of Superfund sites. The knowledge acquired in the SBRP Program not only serves

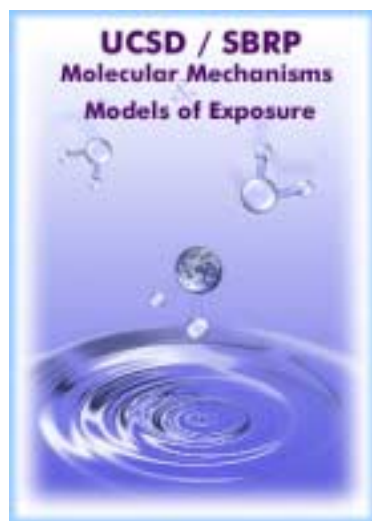
as the basis for subsequent basic or applied research in these areas, but also provides a foundation for practical benefits such as lower cleanup costs on hazardous waste sites and improvements in human and ecological health risk assessment.

Dr. Suk also serves as the Deputy Director of the NIEHS's Division of Extramural Research and Training (DERT). Through cooperative relationships with NIH and with public and private institutions and organizations, DERT maintains an awareness of national research efforts and assesses the need for research and research training in environmental health. Dr. Suk is the Director of DERT's Center for Risk and Integrated Sciences. Serving in these capacities, Dr. Suk is at the frontier of efforts to better link science and technology to policy and planning. His support of the Outreach Core of UCSD's Superfund Basic Research Program has been instrumental in our ability to create the RWBC. The RWBC is largely funded through SBRP funds.

Dr. Suk delivered a PowerPoint presentation for the RWBC's May 29 roll out. His presentation emphasized the importance of "Translational Research." The NIEHS defines this type of praxis as "the conversion of findings from basic, clinical or epidemiological environmental health science research into information, resources, or tools that can be applied by health care providers and community residents to improve public health outcomes in at-risk neighborhoods" <<http://www.niehs.nih.gov/translat/home.htm>>. The RWBC is thus a type of translational research program—that is, a knowledge-action collaborative designed (as Dr. Suk's NIEHS program phrases it) "to establish sustainable mechanisms for educating the public about environmental health issues and for supporting individual and community involvement in the identification and investigation of environmental health concerns" <<http://www.niehs.nih.gov/translat/home.htm>>. Dr. Suk noted that an important part of this challenge lies in the difficult multidisciplinary task of building integrated computational methods to improve our understanding of complex systems. The RWBC aims to innovate along these lines. Moreover, the RWBC aims to enhance sustainability science and science policy. Dr. Suk underscored the significance of science policy by sharing the following quote with the Expo's participants:

Science policy can give direction to future social and economic development, providing extraordinary comparative advantages to the individuals, corporations, and societies that take the "right" decisions earlier than others and thereby define the parameters of future development and reap the social and economic benefits associated with this paradigm shift that may follow. (Source: Konrad Von Moltke, 1996, Linking Science and Technology to Society's Environmental Goals. National Academy Press).

Comments by Dr. Robert Tukey, SBRP, UCSD



Enabling collaboration in science and regional planning

Dr. Robert Tukey is the Director of UCSD's Superfund Basic Research Program (SBRP).

The UCSD Superfund program is an ongoing collaboration of scientists to examine the health effects of toxicants that exist in hazardous waste sites. Hazardous waste sites are sedentary and by the nature of their existence lead to contamination of toxicants into the surrounding soil. The distribution of potentially harmful chemicals through dispersion into soil renders these agents subject to leakage into underground aquifers, contributes to contaminated runoff and poses a human health hazard for communities that are located in proximity to these sites. Superfund and the National Institutes of Environmental Health Sciences is interested in understanding the impact of human exposure to short and long term

health effects. While the need for scientific information relating to human health is foremost in the mission of the UCSD Superfund Program, it is equally important that as a state and federally funded institution that UCSD serve as a leader to integrate its scientific findings into a forum that directly benefits our community. Although the presence of hazardous waste sites present problems on a national level, the UCSD Superfund Program is committed to developing a program that can benefit the San Diego/Tijuana metropolitan area. To meet this need, the UCSD Superfund Outreach program is utilizing the resources at UCSD to bridge its scientific findings to public policy.

The May 29 meeting, which brought together leaders from the NIEHS, UCSD, academia, industry and the local governments to preview the initial efforts that have been in development leading to the design the Regional Work Bench. The development of the RWB and the collaborations that have been ongoing provided an excellent starting point for visualizing the capabilities for monitoring potential "hot spots" within our community. The Outreach Program is taking advantage of the power of the Supercomputer Center and the collaborations with our industrial partners to develop and design web-based gateways that will allow access to databases designed to provide up to date information on the status of environmental health concerns. With the development of biological tools from laboratory based research initiatives that are designed to help in accessing toxicant exposure, the RWB infrastructure will play an important role in disseminating information regarding the regional location and potential environmental hazards in our region. We are hopeful that these initiatives may serve as a platform for the expansion and integration of national scientific databases that will be useful for local communities as well as the integration of policy issues.

Comments by Professor Steve Erie, Director, USP, UCSD

USP's role in linking science and technology to policy and planning



Professor Erie is the Director of UC San Diego's Urban Studies and Planning Program. He gave the key note during the Expo lunch. Professor Erie's comments underscored how the USP Program can provide a supportive institutional setting for the growth and maturation of the RWBC. Specifically, he noted how recent developments at UCSD have encouraged a shift in the Urban Studies and Planning Program's desired path toward a more policy, planning and regionally-oriented focus for its curriculum, recruitment, research, development and outreach efforts. USP is thus in a promising position to move in this new direction, which also will feature greater campus and community collaboration and outreach. Our efforts in building the Regional Workbench--in collaboration with the Supercomputer Center, other research labs and community partners--further facilitates the USP program's pedagogy

and community outreach. USP is creating a Community Advisory Board, a diverse body of 10-15 local leaders and activists, who can help define the research mission of the RWBC. This kind of synergy will enhance USP's outreach, development, internship and job placement efforts. By 2004 USP plans to have institutionalized its new priorities. In terms of community partnerships, USP can play an important role as a catalyst deepening RWBC's research opportunities with SANDAG, the City of San Diego, other government agencies, as well as with our region's business and civic organizations.

As an interdisciplinary program, USP is well positioned to provide the outreach nexus for RWBC funding initiatives. Major funding agencies, such as the NSF and NIEHS, now expect a greater linkage of research to the end-users of research. Hence, the role that planning programs can play as facilitators of collaborative approaches will become more important over time. UCSD is well positioned to launch a planning school, especially now given how the state of California and the UC system is encouraging civic collaboration, outreach, service learning and workforce development. Collaborative university-based

organizations such as the RWBC can jointly spur the development of new knowledge and networking capabilities, sharpen research priorities, and provide new research training opportunities. This can be done by emphasizing what the National Science Board identifies as the twin goals of learning: to gain knowledge, and to acquire skills such as problem solving, consensus building, information management, communication, and critical and innovative thinking/writing capability. The RWBC provides an enabling framework to move us in this direction.

Comments by W. Erik Bruvold, Vice President and Director, Infrastructure Issues



The Benefits of Joining Collaboration in Science and Regional Development

The Regional Workbench Project is critical for it can help regional policymakers and stewards better understand complex relationships and patterns in different ways. In some cases, visual representations will be far better in helping us explore complex problems and discover unique solutions.

While a whole host of challenges and opportunities confront the San Diego Baja area, there are three I think that would be very worthy candidates for attention by the RWBC. In no particular order they involve storm water run-off, border infrastructure, and the reinvigoration of our older neighborhoods.

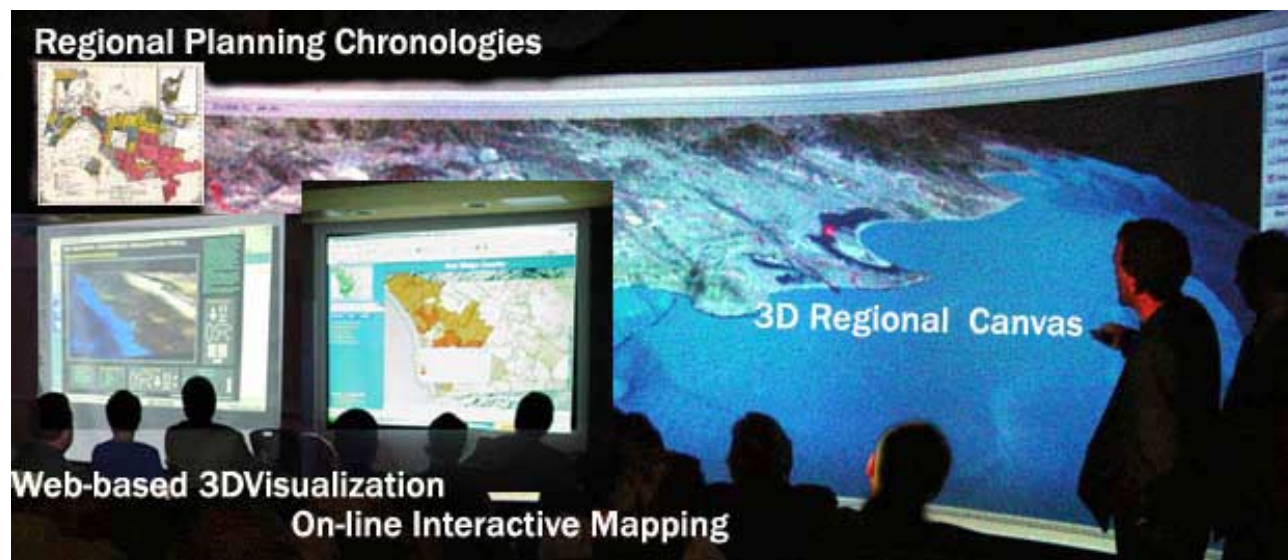
First, San Diego is confronted by the fact of continued growth and population pressure. As we all know, over the next 20 to 30 years, another 1,000,000 people will call San Diego home. Because of both planning policies and consumer choices, the majority of these will live close to the coast and in the watersheds that flow into our bays and next to our beaches. Policy makers desperately need tools to better understand how storm water travels and how to efficiently use scarce resources to protect our coast line while not so overburdening the cost of housing as to create even more pressure to consume land in the far peripheries of our region.

Second, we need to better understand the myriad of relationships that exist that transcend the border. These links are not just commercial but cultural, familial, and communicative. Millions of cross border "transactions" occur each day and we need to understand them as we think about the infrastructure, both physical, cultural, political, and social, that we need at the border to facilitate these transnational flows.

Finally, there is going to be tremendous reinvestment and revitalization in our region's older neighborhoods. This is a good thing. But it clearly is also frightening to people. The RWBC can help provide the visual tools so that people can "envision a village", providing them an idea of how investment and development is not something to fear but rather an opportunity to enhance the livability of their community.

Thank you for the opportunity to speak today and the chance to support such an important project.

DEMO Abstracts and Summaries



Demo 1: 3D Regional Canvas of the Californias

Abstract

3D visualization is key in understanding the complexity of our region's environmental and social problems, from watershed and toxic transport to socio-economic issues around crime and poverty. Here, we showcase state-of-the-art 3D visualization technologies currently being developed and tested in collaborative, partnership-driven research projects. This is part of a long term effort to create a "Transborder City-Region Visualization Theatre" and to make cutting edge 3D-interactive tools directly available to academic, community, industry, and governmental organizations via the Web.

Demo 1 had two parts. The first part involved high-end visualization requiring powerful computing capability and special equipment. The second part was geared to desk top visualization using ordinary PCs.

Part 1: 3D Regional Canvas of the Californias (SIO Visualization Center)

Project Profile on the RWBC Web Site:

http://regionalworkbench.org/databank/project_all.php?pid=14

Message Board Link on the RWBC Web Site:

<http://regionalworkbench.org/comm/forums.php>

Leader: Alejandro Hinojosa, CICESE, and Fellow of the Center for U.S.-Mexican Studies

University of California, San Diego e-mail: alhinc@cicese.mx

Other participants: Dru Clark, Eric Augenstein, Shane DeGross, Debi Kilb, Graham Kent, Dan Henderson, Rob Hutzel

Summary

During Demo 1 (Part 1) of May 29th RWBC rollout, participants were introduced to the 3D Regional Canvas of the Californias, a digital elevation model of Southern California- Northern Baja California region, including land and sea floor terrain features. The 3D Regional Canvas comprises a unique dataset assembled with the best available regional elevation data, shared by active members of the Consortium from institutions of both sides of the border, with a common interest in linking science and policy for a better regional planning. The geographic extent includes the mountain range from North San Diego to south of Ensenada, from the 6,000 feet deep Pacific Ocean basin to the desert of Arizona-California border with the magnificence of the Salton Sea and Colorado River delta.

The participants were first exposed at the registration table to the 4' by 5' solid terrain model of the 3D regional Canvas of the Californias, a physical model cut from a single block of dense foam board by a computer-driven milling machine, and then painted by a unique 3D inkjet plotter with a natural color Landsat image mosaic. The same data used to construct the model would later be explored on the 21' by 8' curved screen of the Scripps Institution of Oceanography Visualization Center, a state-of-the-art visualization tool for presenting, and manipulating very large datasets.

The viewers were immersed on a virtual tour, a fly through the geography of the region from the spectacular Gulf Escarpment, plunging from the pine forest on the mountain top to the desert of Borrego springs and Laguna Salada, the inland valleys of Ojos Negros, Guadalupe, Las Palmas, Ramona, the numerous lakes and reservoirs on the US side contrasting with only 3 such water bodies on the Mexican side. The border line between California and Baja California could clearly be seen on the satellite imagery texturing the 3D canvas, due to the settlements aggregation patterns along the border and the differential agricultural practices on both countries. A virtual coastal tour was a must in every session, from Ensenada to La Jolla, passing by Salsipuedes, Rosarito, Tijuana and San Diego Bay, tilting at the end the canvas for a perspective view of the coastal mesas, where most of the urban development has taken place on the San Diego Tijuana region. To the northwest of Mount Soledad, La Jolla submarine canyon was a feature that catches the eye of the observers. To further enrich the demo, the watersheds boundaries were carved on the canvas, the waste water ocean outfalls for point Loma and South bay treatment plants were outlined so the audience could see the relative position with respect to the coast and the reach into the continental shelf. The seismic character of the region was also depicted with hypocenters below the canvas, collected over the last 27 years by seismic networks on both sides of the border, the Scripps Anza network and CICESE's RESNOR network. The seismic clustering along the major tectonic faults of the region could be perceived. Interaction with the viewers was pursued asking for places to fly through, the Tijuana river estuary was selected in more than one session, also Tecate, La Rumorosa, Ramona, Carlsbad were requested from the audience.

Because of the limited time for the demo, the audience missed the 3D stereo viewing capability of the Visualization Center, a feature enabled with special glasses that greatly enhances the 3D experience. Although the viewers could not go through this ultimate 3D extravaganza, at the end, they got a better perspective of the geography of their region. Following the first Part of Demo 1, the presentation shifted to web based applications around a sub-sampled version of the 3D Regional Canvas.....with links to 360 degrees panoramas, giving the impression of virtually being there.

Part II: 3D Regional Canvas of the Californias: Web-based Educational Version

Leader: **Jeff Sale**, SDSU, Education Center on Computational Science and Engineering

e-mail: jsale@sunstroke.sdsu.edu

Other participants: John Ryan, SDSU, Department of Geography

Project Profile on the RWBC Web Site:

http://regionalworkbench.org/databank/project_all.php?pid=15

Message Board Link on the RWBC Web Site:

<http://regionalworkbench.org/comm/forums.php>

Jeff Sale and John Ryan presented freely available web-based navigational tools enabling users to explore the Southern California and Northern Baja California geo-political region in a meaningful 3-dimensional (3D) spatial contexts.

The Modules

Attendees were shown seven distinct modules designed to demonstrate various capabilities of this new interactive 3D technology. The first module was a fly through of the entire 3D Regional Canvas model. The geographic area covered by this model extends from northern San Diego County to south of Ensenada, Baja, Mexico, and from the Pacific Ocean to the California/Arizona border. A highlight of this

dataset is bathymetry data gathered by researchers at Scripps Institute of Oceanography. It is the same data, but at a lower resolution, as that used to provide attendees with a spectacular immersive 3D experience at the Scripps Visualization Center.

There were higher resolution modules containing the digital elevation models for three major watersheds so far; San Diego River Watershed, Otay Watershed, and the Tijuana River Watershed. Features of these modules include the ability to layer different bitmaps onto the digital elevation terrains, either using built-in layers provided by the modules, or by importing bitmap images over the web. There is also a module for San Diego State University demonstrating the high level of detail possible in the aerial images.

Another highlight of these modules was the Land Use Image Morph of development throughout the San Diego and Tijuana regions as it has grown during the past 27 years. The ability to seamlessly transition between satellite images from 1976 through 1989 and on to 1999 profoundly demonstrated to attendees the radical growth occurring in San Diego county and the greater Tijuana region.

Additional Interactive Features

Attendees were not only shown the ability to simply fly through these worlds, even though that alone might have been enough for some. Additional interactive features were demonstrated that included embedded movies, slide shows, and QuickTime Virtual Reality panoramas of several locations within the Tijuana River Watershed and the San Diego River Watershed regions. The panoramas were another highlight of the modules. They demonstrated an additional degree of context within which attendees gained greater insight into the relevant features of the watersheds and international border. By just clicking on a specific point on the map, the observer is instantly transported to that locale, and is able to unrestrictedly view the full 360 degree point. This 'you are there' view offered locale specific data at a significantly high resolution. Together with the full map extent, the combination allows the researcher to analyze the combination of macro and micro structures within the region.

Other features included clickable objects that launched supplementary web pages and animated objects representing the location of a particular vehicle or person, such as a researcher in the field. This was merely the beginning of what is possible in the long run. Much of the development effort up to now has involved simply building the terrain models and developing the navigational features of the interface.

The final highlight demonstrated the potential for database-driven interactivity. The Santa Margarita Ecological Reserve (SMER) module was the first module to include a database interface to MySQL using open source JDBC drivers from FuseLight (<http://www.sulake.com/fuselight/>). It is our hope that real-time data from the remote weather stations at SMER will soon be available to our interface through the high-speed High-Performance Wireless Research and Education Network (HPWREN, <http://hpwren.ucsd.edu/>) so we may begin to explore new ways to access and represent complex environmental data.

Users are frequently more engaged in a realistic 3D space. It is what we are used to. But the cost involved in delivering a complete and fulfilling 3D fly through experience has been prohibitively high for academia. These modules are neither the first nor even the best 3D fly through experiences available if you have the money, but they are possibly the best freely available web-based interactive educational fly through experiences you'll find anywhere. Still, they are prototypes designed to evoke response and stimulate dialog. We are in need of users and feedback, particularly professionals in regional planning and environmental monitoring.

Applications of this Demo 1 technology will be developed in partnership with the San Diego River Park Foundation, under the leadership of Rob Hutzel.

Statement by Rob Hutzel, Director, San Diego River Park Foundation

<http://www.sandiegoriver.org> 619-297-7380

The San Diego River Park Foundation is an active member of the Regional Workbench Consortium. One of the goals of the Foundation is to establish the San Diego River Watershed as a living laboratory and testing grounds for new, innovative technology that will serve to advance a better understanding of the



natural systems and social dynamics of the region. The May 29th Expo was an opportunity to showcase this emerging collaboration of developing and applying advanced technology to enhance watershed planning, such as the ongoing efforts within the San Diego River Watershed. The San Diego River Park Foundation presented a poster series at the Expo introducing its efforts to attendees. The display presented a vision of what some of the major watershed issues are and the opportunities presented in creating the 52-mile long San Diego River Park in addressing them.

A Note about the Venue for DEMO 1: SIO Visualization Center

The [Scripps Visualization Center \(VizCenter\)](#) hosted Demo 1. The SIO VizCenter opened in March 2002; it has a suite of state-of-the-art [computer hardware](#) and [software tools](#) for presenting and manipulating very large datasets. The center, which can accommodate up to 60 people, is built around a Panoram curved floor-to-ceiling screen (~9' by ~29') featuring 3.2 megapixel resolution (3,276,800 pixels). The Infinite Reality graphics subsystem within the hardware is driven by a single-pipe SGI Onyx 3400 with a system bandwidth capable of 44 GBps. The Onyx is powered by 16 MIPS R12K processors and 16 GB of addressable memory. Disk space is currently 1.5TB, with a sustained access rate of 125 MB/sec. This technology allows us to display multiple data layers (e.g., seismicity, high resolution topography, seismic reflectivity, draped interferometric synthetic aperture radar (InSAR) images etc.) simultaneously, render them in 3D stereo, and take a virtual flight through the data as dictated on the spot by the user. Multiple video streams can be simultaneously displayed including the SGI megadesktop, S-VHS video, DVD video, and video from a laptop computer. Similarly, the five-channel surround sound audio system can be integrated via the SGI megadesktop, laptops, or simple handheld recording devices.

The potential video and audio combinations are numerous. One project in collaboration with Regional Workbench partners involves the display of 3D images of the Southern California-Northern Baja California border region. These images integrate topographical and bathymetry data and are part of our effort to merge [GIS with 3D visualization](#).

Contact information for the Vis Center's Director (Graham Kent), Science Director (Debi Kilb) and Program Coordinator (Kitty Haak) can be found on their web site:

<http://siovizcenter.ucsd.edu/contact.shtml>

Demo 2: Online Interactive Mapping of Superfund Toxicants and Quality of Life Indicators

Leader: Ilya Zaslavsky, Ph.D. Director, Spatial Information Integration Lab, SDSC

e-mail: zaslavsk@sdsc.edu

Other participants: Scott Shepard, Hiram Sarabia, Daniel Machemer, David Lee, David Cleveland

Project Profile on the RWBC Web Site:

http://regionalworkbench.org/databank/project_all.php?pid=16

Message Board Link on the RWBC Web Site:

<http://regionalworkbench.org/comm/forums.php>

Abstract

Geographic Information Systems integrate diverse spatial information to enable cross-discipline and cross-scale geographic analysis and decision-making. We demonstrate our online interactive mapping technology, which allows for easy visual integration of raster and vector data available from multiple Internet information sources, including data servers at UCGS, NOAA, Geography Network, as well as at local San Diego agencies. This technology is a necessary ingredient of a community holistic interactive mapping environment (CHIME) we are developing, where stakeholders can discover, generate, share, integrate, and analyze regional development data across discipline boundaries. In its current state, the technology supports linking watershed-specific Superfund toxicants data from many sources, with San

Diego county Quality of Life indicators and cross-border demographic and health information being developed at Telesis Corporation, with water pollution data collected by the BayKeeper non-profit group.

Summary

Demo2 was presented presented by Hiram Sarabia (Ja-Jan and Baykeeper non-profit community-based groups), Scott Shepard (Telesis Corporation, non-profit), and Ilya Zaslavsky (SDSC). The main focus of the demo was the Community *Holistic Interactive Mapping Environment (CHIME)*, both technology and applications, being developed in conjunction with RWBC. The goal of CHIME is to provide communities with information resources about various aspects of quality of life and pollution, and help integrate this information "on the fly". A detailed description of CHIME is in the PowerPoint presentation available from the demo page at the RWBC web site, as are links to online maps.

The demo presentation reflected different aspects of CHIME, as presented by different RWBC partners. Hiram Sarabia talked about Ja-Jan and Baykeeper activities in measuring and mapping pollution in water bodies on both sides of the border, and how these efforts are aided by RWBC-supported connection with UCSD Superfund Basic Research Program (Julian Schroeder Lab), and Telesis and SDSC mapping technologies. Scott Shepard presented Telesis Quality of Life Data Warehouse and mapping service projects, and demonstrated live maps of quality of life, the San Diego Baykeeper Internet Mapping Service, and the United States - Mexico Border Health Commission Mapping Service. Ilya Zaslavsky showed several interactive maps of San Diego watersheds, and explained how emerging standards-based mapping approaches and cutting-edge technology allow community users to build online interactive maps "on demand" from multiple spatial data sources available on the Internet. He also demonstrated GIS class projects developed by Superfund students, who analyzed available environmental statistics on Superfund toxicants they study in the lab.

The CHIME online interactive mapping applications collectively strive to improve the social and environmental conditions and quality of life on a regional scale within the San Diego - Tijuana binational metropolitan area. CHIME is a great example of how novel partnerships and applications of emerging technologies can have a powerful and immediate positive impact in the region by allowing community-based groups to generate high quality data visualization products that integrate directly into existing decision support systems. The demos were successful, and attracted many questions. As a result, several interesting collaborations are being explored between Ja-Jan and Baykeeper, Telesis and SDSC, on the one side, and local city and regional environmental planning departments, on the other.

Baykeeper and Ja Jan

Hiram Sarabia, Binational Water Quality Monitoring Program, Director



The San Diego Baykeeper's Binational Water Quality Monitoring Program (BWQMP) and the Ja Jan binational water quality monitoring group (Ja Jan) represented by Hiram Sarabia have been participating actively in the Regional Workbench since its inception. Baykeeper and Ja Jan regularly collect water quality data at over 50 coastal and in-land sites from Oceanside to Ensenada, Mexico and represent the largest and most developed community-based program of its kind in the binational region. The goal of the work conducted by these groups is to create high quality environmental information resources for the community, help regional agencies bridge existing data gaps, identify pollution sources and assist in the restoration of impacted waterbodies.

The presentation given by Hiram Sarabia highlighted some unique community oriented data and visualization products being created by the UCSD Regional Workbench and in collaboration with UCSD's Superfund Laboratories (Julian Schroeder Lab), Telesis Corporation and the San Diego Supercomputer Center. These products illustrate how technological resources available through the Regional Workbench can have an immediate positive impact in the region by empowering communities to generate high quality data products and seamlessly integrate into the decision making process. The participation of Baykeeper and Ja Jan in the expo has helped these organizations to better understand their role within then

Regional Workbench as community groups and visualize the potential to build stronger bridges between researchers, decision makers and impacted communities.

Role of the TELESIS Corporation (Nonprofit): A founding member of the RWBC



The TELESIS Corporation (Nonprofit) has served San Diego County as a health and social science research agency for twenty-five years. We are one of the founding members of the Regional Workbench

Consortium (RWBC). In a very short period of time, the consortium has harnessed the best thinking and technology strategies to apply to our trans-border regional planning associated with sustainability and quality of life. To accomplish related goals, our team's (Joint) collective effort is producing collective results that can only be derived through true collaboration. Our social science quality of life research work is blending well with the environmental, and technology research of our partners. Our agency's mission and vision is aligning with the consortium's emerging strategic plan.

The Regional Workbench Consortium is successful because the core members are dedicated professionals from the diverse fields of technology, environmental and social science and political policy. This group has an unmatched commitment to aggressively research complex regional quality of life problems. Regional planning is a difficult task. Bi-national regionally planning has yet to be resolved. Therefore, it will take time, a deep commitment and creative thinking to resolve the present and future challenges of our regional growth.

It is rewarding to be a member of the Regional Workbench Consortium. We gain by sharing common ideas and partnering with members to create advanced geographical mapping and related software applications. The strength of Regional Workbench Consortium is derived from the sure will of its members to succeed. It is an ideal vehicle to engage universities with government, nonprofits agencies and the local communities to construct strong planning alliances with the help of advanced technology.

Our next step will include the refinement of our online mapping services that depict cross-border demographic and health information. This new way of dynamically viewing border issues holds promise for addressing environmental justice and social equity problems. Our vision is to merge social and environmental data into a practical set of applications for university research and community problem solving.

Preuss School UCSD Intern Participants in SBRP labs and Projects:

Andres Alva
Sophomore, The Preuss School
Works in Zaslavzky Lab at UCSD SDSC



Andres has focused on two main issues:

(1) understanding and explaining the distribution of Preuss student population using cartographic techniques. For this, he mastered a GIS software package (ArcView), imported data layers with various spatial and statistical data, developed maps showing a distribution of Preuss students by zip codes, in relation to demographic, social and environmental characteristics of neighborhoods. The next step here is developing a Web-based interactive map with this information, linking it to the Superfund web site, and generating an analytical report.

(2) developing a new method for online mapping, using a combination of XML-encoded spatial data and Flash client-side scripting. This is very much a work in progress. The final outcome should be a generic Flash-based Web mapping system for thematic mapping and layer manipulations.

Josephine Aguilar
Senior, Sweetwater High School
Julian Schroeder's Lab SBRP UCSD



The Superfund Outreach Program recruited a high school student, Josephine Aguilar, into Julian Schroeder's laboratory. Josephine is at Sweetwater High school in the San Diego area which includes many students from underrepresented groups. Josephine received initial lab training. In the past year the Schroeder laboratory at UCSD began a collaboration with the San Diego Baykeeper organization (www.sdbaykeeper.org) to assist this non-profit organization in monitoring water quality at sites throughout San Diego county. The San Diego Baykeeper was established to enforce the provisions of the federal Clean Water Act of 1972. The organization measures levels of bacteria and toxic metal contamination, and when contamination is found reports these to governmental organizations (such as the cities of San Diego and Encinitas and the EPA). To determine whether areas of the San Diego Bay are contaminated, a graduate student, David Lee, together with our high school student researcher, Josephine Aguilar, have joined Baykeeper in collecting water samples from Paleta and Chollas Creeks, both designated toxic hot spots by the State Water Quality Board, and process these samples along with others collected from around the county. The water samples are being measured by ICP-AES analysis, and further analyzed in the Schroeder laboratory to determine the levels of dissolved metals such as arsenic and lead. The data we are generating has been presented by Baykeeper to the City of San Diego. Examples of this data and photographs of the site can be viewed at the Schroeder lab web site (<http://www-biology.ucsd.edu/labs/schroeder/index.html> ; click on "Outreach Activities and Video"). Josephine Aguillar is planning to enter the science fair by reporting on her project.

Demo 3: Regional Planning Chronologies

Leader: **Richard Marciano**, Ph.D., SDSC
Sustainable Archives and Library Technologies Lab
e-mail: marciano@sdsc.edu

Demo 3 cont. Other participants: Midi Cox, Larry Cruse, James R. Jacobs, Ilya Zaslavsky, Keith Pezzoli, Scott Shepard, Eric Augenstein, Kay Dietze, Harry King, Cristin McVey, Dan Henderson, Jane Clough-Riquelme, Andrea Groves.

Project Profile on the RWBC Web Site:
http://regionalworkbench.org/databank/project_all.php?pid=12

Message Board Link on the RWBC Web Site:
<http://regionalworkbench.org/comm/forums.php>

Abstract

Regional Planning Chronologies: Taking the Long Look at Equity through the Official, Invisible, and Visionary Planning Histories of San Diego This demonstration showcases the use of information technology to provide integrated views of regional planning history. We are developing a framework that juxtaposes (and interrelates) official city plans, federal policies, and alternative planning visions (both unofficial & community-based). This is part of a sustained effort to provide online access to primary regional historical planning sources that will inform citizens, academics and community groups, as well as planners and decision-makers. We will show how the analytical use of digital historical content can help us understand current patterns of urban and regional development.

Summary

The "Regional Planning Chronologies" demonstration (demo #3), also called "Taking the Long Look at Equity through the Official, Invisible, and Visionary Planning Histories of San Diego", showcased the use of information technology to provide integrated views of regional planning history. We are ultimately interested in developing a framework that juxtaposes (and interrelates) official city plans, federal policies, and alternative planning visions (both unofficial & community-based). This is part of a sustained effort to provide online access to primary regional historical planning sources that will inform citizens, academics and community groups, as well as planners and decision-makers.

Three different perspectives were presented: (1) a Regional Planning Library perspective, with demonstrations of interactive online use of the 1926 John Nolen City of San Diego Plan and the 1974 "Temporary Paradise?" study by Donald Appleyard and Kevin Lynch, (2) a Sustainable Archives information technology perspective, with a demonstration of the 1936 HOLC Federal Agency redlining map and associated documents for the City of San Diego, and (3) an Analytical Perspective showing how digitized historical resources can be analyzed in conjunction with contemporary data.

(1) offered a chance for the UCSD library to experiment with the presentation of documents from UCSD's preservation program. James R. Jacobs and Larry Cruse are interested in preserving a series of local planning documents, the first of which is "Temporary Paradise? A Look At The Special Landscape Of The San Diego Region, A Report To The City Of San Diego," published privately in 1974 on newsprint by a couple of MIT, Donald Appleyard And Kevin Lynch. comprising just 51 pages of observations and ideas published as a tabloid on newsprint and distributed free, it is one in a chain of seminal planning documents in the region's history. They are also considering creating an archive of several hundred other such sources.

(2) demonstrated the use of advanced interfaces to serve historic documents (both maps and documents), by demonstrating various digitization approaches and online interfaces using large raster images, by also demonstrating online GIS approaches with vector data, where 1930s and Census 1990 and 2000 data can be juxtaposed,

(3) demonstrated a third approach based on geo-linking and analysis of past and present maps.

Demo 3 highlighted three themes - preservation, technology and integration of historical and current data. The following ideas emerged again and again during the course of the day.

How do we make the technology of the mapping more accessible? Are there good methods for relating urban spatial design and land use? What is being done to improve the preservation of historical documents and the schemes to access them?

How can others access the data and make tables (as shown in Demo 3) while tailoring the results to their own issues? These are all question that need to be worked out in a collaborative, learn-by-doing approach.

See Appendix by Midi Cox:

"Evidence of 1930's Redlining in 1990 and 2000: Comparing an "A" Area with a "D" Area"

http://regionalworkbench.org/files/Demo3_MHLH1.pdf

Role of the UCSD Library (statement by Dan Henderson, GIS Coordinator)

The GIS division in the UCSD Libraries has been instrumental in completing a variety of tasks related to the RWBC. These include but are not limited to:

- Training partners to use ArcGIS software
- Providing data and data storage
- Creating 3d fly through movies for web sites
- Georeferencing the redlining maps to modern State Plane Coordinates
- Providing ArcGIS and ArcIMS software via the campus ESRI site license
- Creation and printing of posters and maps for conferences, etc.
- Initiating and creating metadata standards for regional spatial data
- Compiling DEM and satellite data for regional canvas

The Libraries' continuing role will be in the field of metadata and information storage, as well as being the GIS center for the UCSD campus.

Demo 4: Regional Workbench Consortium, Overview



Keith Pezzoli, Ph.D., USP, UCSD kpezzoli@ucsd.edu

Jason Wiskerchen, RWBC Web Developer, jwiskerc@SDSC.EDU

Cindy Santini, RWBC Web Developer, e-mail: csantini@sdsc.edu

Project Profile on the RWBC Web Site:

http://regionalworkbench.org/databank/project_all.php?pid=9

Message Board Link on the RWBC Web Site:

<http://regionalworkbench.org/comm/forums.php>

Abstract

The RWBC is a collaborative network of university and community-based partners dedicated to enabling sustainable city-region development. We are building a trusted Internet-based workbench to facilitate

research, outreach and education that require region wide data integration and information sharing. Our partnership-driven approach integrates issues of equity, environmental stewardship, and economic efficiency. This demo provides an overview of the RWBC's mission, projects, partners and precepts. We will include a tour of the RWBC's Web site, including the tools, data base structure, and multimedia communications components.

Summary

The purpose of Demo 4 was to give an overarching framework of why the Regional Workbench Consortium was created and how it is forming regional partnerships to address the many issues we face in the San Diego / Tijuana Cross-Border City Region.

Demo 4 began with an overview of scholarly literature the lies at the foundation of the RWBC's conceptual architecture. This includes works in Sustainability Science, New Regionalism, Information/Communication/Visualization Technologies (including integrated planning and decision support systems), and Ethics. Using a model of the RWBC logo, Keith Pezzoli described the 3 E's of sustainability and ICT components of the RWBC and which sets of literature apply.

Jason Wiskerchen and Cindy Santini gave three different user case scenarios for how the RWBC site can be used and what information and services are available. They first described what sections of the site are accessible to a general user who has not registered with the site. These sections include:

- About
 - Mission
 - Partners and Participants
 - Contacts
- Project Summaries and Project Pages
- View Event and Calendar pages
- Tools and Applications Pages
- View the Message Board and Video Comm Center
- All Educational Sections (Narratives, Student Research, etc..)

Jason and Cindy also showed participants how to register and create a "my RWBC account" which gives a user the ability to post events to the Calendar and use Message Board systems.

Lastly, Demo 4 demonstrated how a user with proper permissions can upload new projects and information to the RWBC Database for display in the Projects section of the site. This is a three step process of providing project descriptions, data and file uploads, and linkages to references and other online resources.

A period of time was available at the end of each presentation of the demo for questions and comments on the site, it's capabilities, and the overall organizational structure of the RWBC.

RWBC Information Access through the Geological Data Center



The Geological Data Center (GDC; <http://GDC.ucsd.edu>) holds the discoveries of the expeditions of the Scripps Institution of Oceanography, including 822 cruises over the last 50 years. As a work in progress, data, images and documents are currently being made available online through a fully searchable digital library, <http://SIOExplorer.ucsd.edu>, a collection in the NSF-funded National Science Digital Library (www.nsdlib.org).

The GDC collaborates with the Regional Workbench Consortium (RWBC; <http://regionalworkbench.org>) in three basic areas: data, technology and networking. Many GIS projects stop at the shoreline. The

transport of toxic substances does not, and the study of watershed ecology and coastal processes requires a comprehensive integration of terrestrial and marine data.

In terms of data, perhaps the greatest interest for the RWBC is the multibeam seafloor swath mapping data from more than 85 SIO cruise tracks which pass through the San Diego or Tijuana border region. These data are used to create high resolution maps of the sea floor for the research community. Unlike terrestrial mapping where complete spatial coverage is achieved by using optical sensors, ocean seafloor mapping data is mainly collected by sonar systems. Modern multibeam systems map a swath of width up to 3-4 times the water depth, in contrast to the pre-1982 era single-channel echosounders which only yield a single profile under the vessel. An example of a multibeam survey is shown in Figure 1.

Even with the revolution in seafloor mapping brought on by innovations in multibeam sonar systems, coverage is incomplete and modern swath data must be merged with earlier conventional profile data and with prior gridded datasets. Due to navigation and sound velocity correction and other errors, a significant amount of effort must be invested in de-conflicting the various datasets. Figure 2 is an example of a map created from a combination of conventional NOAA ship tracks and surveys, CICESE bathymetric grids, digitized contour maps, and SIO multibeam data. This dataset spans more than two degrees (220 km). The integration of each dataset was screened before it was included in the current model.

As time goes on and new data are acquired, the model needs to evolve. Data from offshore La Jolla are shown in Figure 3, taken during the November 2002 Centennial Expedition Leg 1 with R/V Roger Revelle. Visually we can compare the new data to the existing grid, identify issues such as sound velocity ray-tracing artifacts, make corrections, and merge the new data with the prior grid.

In terms of technology, a system was devised to introduce new data sources in a controlled fashion. As in many fields, with seafloor mapping too many efforts end up as “make once use once” projects. The system is designed to be scalable and new sources are being considered. As new data are integrated into the system the grid resolution may increase overall. The suite of software tools includes a mix of public domain packages (GMT and MB-System) and commercial packages (ESRI for GIS and Fledermaus (www.ivs.unb.ca) for visualization).

In terms of “networking,” the extensive contacts of the GDC with academic, government and industry researchers over the years has proven to be a valuable resource, in terms of access to data, introduction of new sensor systems, and opportunities for collaborative efforts.

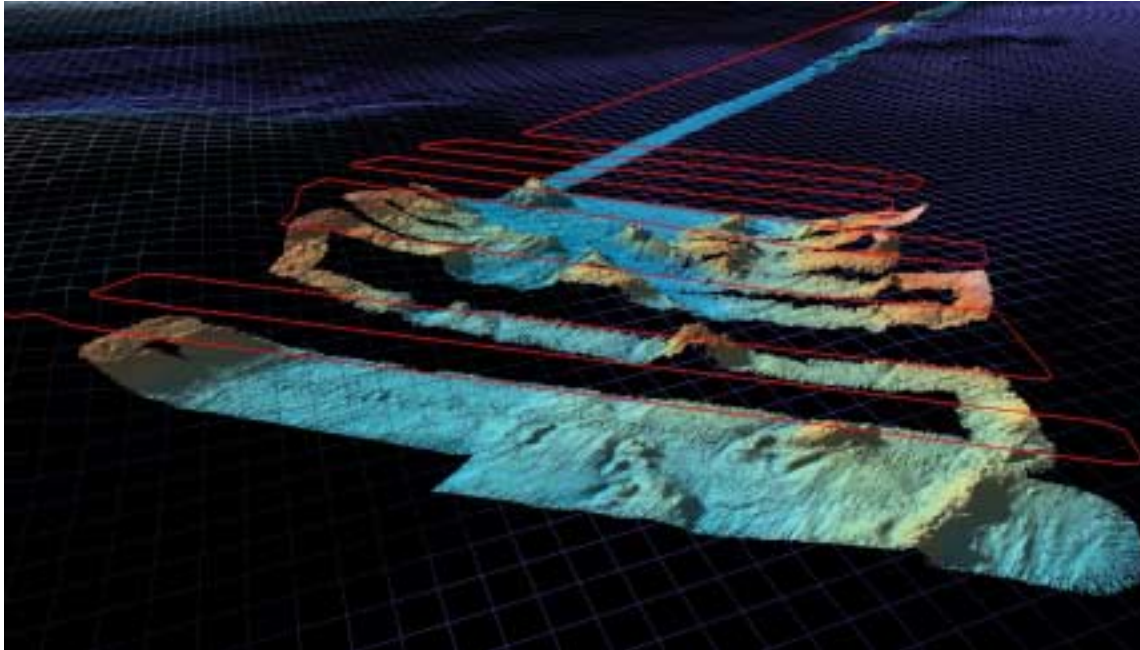


Figure 1. 3D view of a typical multibeam seafloor mapping survey. The ship track on the sea surface is shown in red.

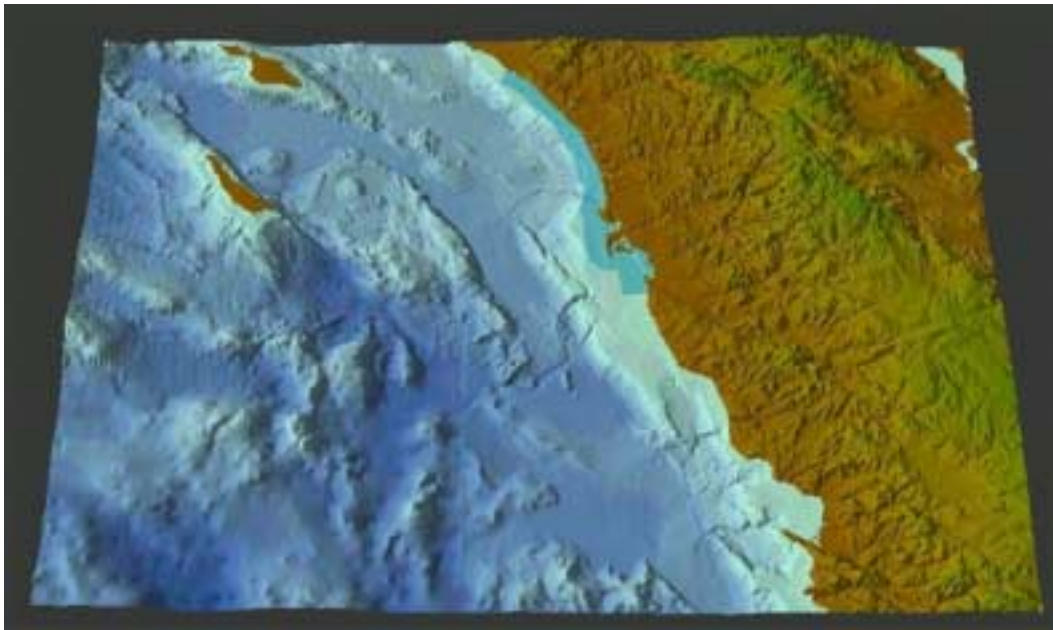


Figure 2. An example of a GDC combined data product, including contributions from multibeam sonar, conventional echosounders, prior grids, and hand-digitized contours, plus terrestrial DEM's. The technology to combine and de-conflict data sets is a work-in-progress.

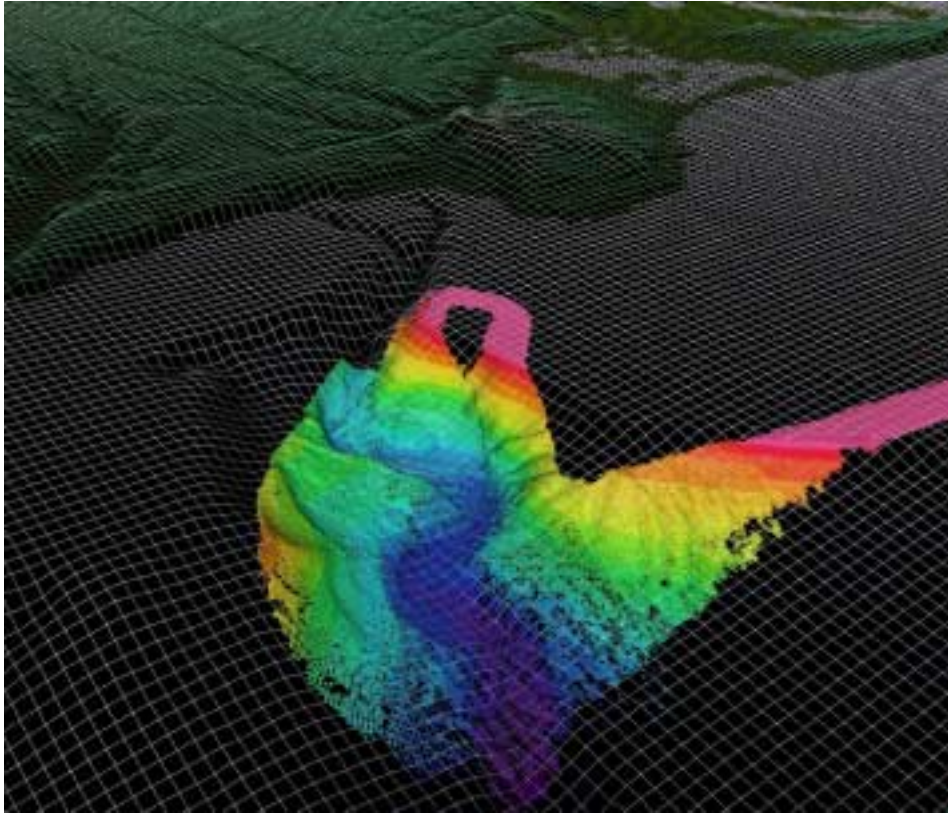


Figure 3. New data from the R/V Roger Revelle, November 2002, are overlain onto the existing grid model. After correction for sound velocity artifacts, the new data will be incorporated into the next version of the RWBC model. This view looks up Scripps Canyon into La Jolla.

The Center for U.S.-Mexican Studies



Since 1998 the Center for U.S.-Mexican Studies has been involved in research and policy analysis related to the border environment in this region. Through its Visiting Research Fellowship program the Center has been able to bring together leading U.S. and Mexican researchers and environmental professionals to advance our understanding of the complex dynamics of population growth, economic development, and environmental management. The Center's unique contribution has been to bring together, on a continual basis, environmental experts representing diverse disciplines in both the natural and social sciences, many of whom have also been actively engaged in environmental policymaking, and focus their energies on sets of issues over time.¹

The Center has been a pioneer in building an interdisciplinary research community representing the partners in NAFTA focused on the border environment. One of the Center's key collaborations within the region is the Regional Workbench Consortium. This year one of our environmental research fellows, Alejandro Hinojosa-Corona, professor at Ensenada's **Centro de Investigación Científica de Educación Superior de Ensenada** (CICESE) represented the Center's environmental program through his involvement in the RWBC. Professor Hinojosa-Corona brought to the project his extensive experience in the application of geographic information systems and remote sensing techniques to environmental research, spatial analysis and natural resources management, as well as access to his environmental network in Mexico. Interdisciplinary collaborative research is a common denominator in his recent work, which includes themes in hydrology, land cover change, and landslide risk assessment for the Tijuana region. The Center was pleased to collaborate in the Regional Workbench Rollout by providing our state-of-the-art facilities at the Copley International Conference Center and supporting Prof. Hinojosa-Corona's involvement in the RWBC mapping project throughout the year. It is the objective of the Center's environmental program to recruit and provide fellowships for Mexican researchers and environmental professionals who are collaborating with larger projects in the university, thereby enriching the binational nature of these endeavors.

¹ From 1997-2002, the Center's environmental project supported 30 research fellows and 10 non-stipend guest scholars. Fifteen of these individuals were younger scholars (Ph.D. candidates); 13 of them were from Mexican academic institutions

1. Copies of all Handouts (pdf files)

[RWBC EXPO 2003 Organizers and Sponsors](#)

<http://regionalworkbench.org/files/organizers.pdf>

[RWBC EXPO 2003 Agenda and Schedule](#)

http://regionalworkbench.org/files/agenda_schedule.pdf

[RWBC EXPO 2003 DEMO Abstracts](#)

http://regionalworkbench.org/files/demo_abstracts.pdf

[RWBC Brochure](#)

http://regionalworkbench.org/files/rwbc_brochure_05_03.pdf

[RWBC Partners](#)

http://regionalworkbench.org/files/rwbc_partners.pdf

[RWBC Projects](#)

http://regionalworkbench.org/files/rwbc_projects.pdf

DEMO location maps:

[IOA Complex and SIO Visualization Center](#)

2. May 29 Video and Image Archives

[UCSD-TV Documentary](#)

<http://www.ucsd.tv/library-test.asp?showID=7244>

Posters and Images

[Links to Demo \(Technology Innovation\) Project Pages](#)

<http://regionalworkbench.org/databank/projects.php?PHPSESSID=471270c2f66456fbel390161cde4cc73>

[Link to Demo Forums \(RWBC Message Board\)](#)

<http://regionalworkbench.org/comm/forums.php>

3. Registration Data

(information submitted by the RWBC EXPO participants when they registered for the roll out over the period: May 5-28, 2003)

[Participant Names and Affiliations](#)

http://regionalworkbench.org/files/participant_registration.pdf

[Categorization of Participant Organizations](#)

<http://regionalworkbench.org/files/affiliations.pdf>

[Participant Goals](#)

<http://regionalworkbench.org/files/goals.pdf>

[Participant Areas of Interest](#)

<http://regionalworkbench.org/files/interests.pdf>

Report compiled by Keith Pezzoli, Ph.D., with the full participation of the RWBC steering group, including all the RWBC EXPO 2003 Demo leaders. Send comments or questions to kpezzoli@ucsd.edu