



INSIDE

- A real-time data fix for the Mexican Navy
- Communicating Environmental Risk in Kazakhstan
- Personnel News
- ASA's 20th Anniversary celebration

ANNOUNCEMENTS

- ASA's internationally recognized OILMAP software will be available on the internet in July at [www.oilmap.com](http://www.oilmap.com)

THE FUTURE OF ENVIRONMENTAL TECHNOLOGY

Is Technology the Key to Environmental Change?

With 20 years behind them, ASA's leadership looks to the future of environmental technology and contemplates the state of the art 20 years from now.

"In 1979, the idea of performing numerical modeling on a personal computer would have seemed preposterous," observes Eoin Howlett, Operations Director of ASA, "but now, environmental data measurements taken by a buoy at sea can be incorporated via satellite into a complex numerical model, and the results can be published on the internet in just a matter of minutes." And this accomplishment, we conclude, is just the beginning. Twenty years from now we anticipate that people will calculate for themselves how the pollen will affect their allergies tomorrow, and whether the heavy rain today caused runoff and sewer overflow sufficient to prevent their kids from swimming.

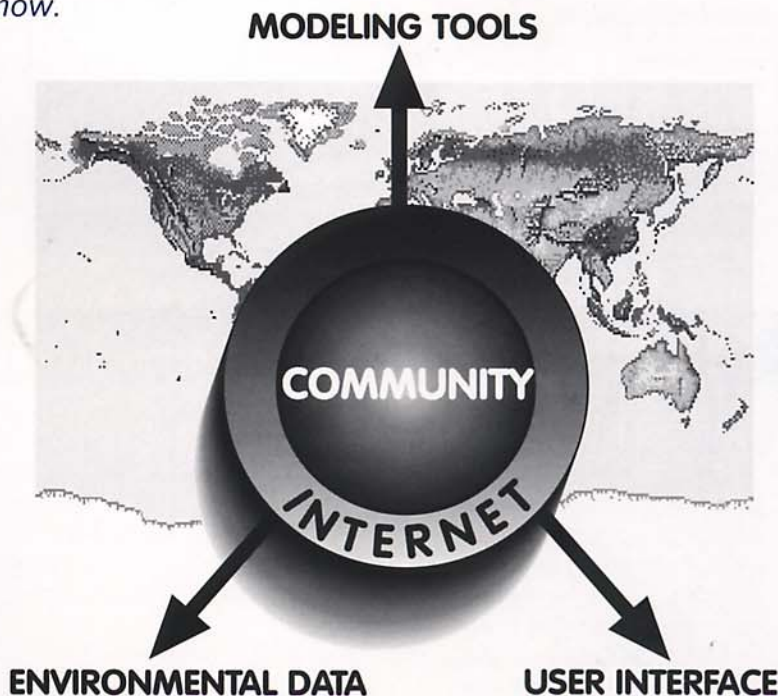
Several factors will contribute to the propulsion of environmental technology beyond traditional scientific boundaries. At the core of this phenomenon is the sprawl of the internet. This infrastructure serves as the nervous system to link together components such as environmental data, modeling tools, and user interface tools.

Environmental data provide the real world information that calibrates numerical models to reality. Like the data we collect through our eyes, ears, and other senses, this data is the input to all our decision making tools. "Recently, a proliferation of environmental information has become available, though it has not really been integrated into any systems that could take it a step further," comments ASA co-founder, Malcolm Spaulding. Real-time data from satellites, current meters, and anemometers is abundant on the web from government and university sites. The mere existence of this data, while delectable to scientists, is only the beginning. "It's when you combine easily accessible data with a toolkit of modeling calculations, that you really have powerful analysis tools on your hands," explains Craig Swanson, ASA co-founder.

As an example, current meter measurements from several buoys will be input into a model which will predict currents for an entire bay. These modeled currents will be input into a water quality model along with results from a land-side model of surface water runoff to predict bacteria concentrations.

Modeling tools allow analysis of the data. They perform the same tasks as neurons transmitting in the brain translating light entering the eye into an understandable idea. Environmental data tells you how much rain fell, a model can tell you the concentrations of bacteria in your local swimming area, based on bacterial load and dilution.

Yet to interpret bacteria concentrations, we need to go one step further. We need to know what a concentration of 10 fecal coliform per 100 mL means for a child swimming in the water. Is it safe for swimming,



or isn't it? User interface tools translate the techno-voodoo of data and models into everyday language and answer real-world questions.

Visual tools include the menus and file folders of a Windows system as well as intuitive three dimensional graphic animations, such as bacteria concentrations moving with the tides and currents. In the future these animations will be replaced with more life-like visualizations and eventually, with virtual reality images. The goal is to get to the point where you can't tell if the projection is real or a simulation. To achieve this higher resolution will require a tremendous amount of data and condensed time period. "This will not be easy to do," Spaulding said. "The projections that are done are just estimates. Since environmental conditions are constantly changing, it's difficult for computers to keep pace. There is still an element of uncertainty, and it will be tough to make the projections life-like, with that uncertainty."

Other interface tools seek to synthesize the expertise of specialists into an accessible format which can guide the layperson through analysis decisions. Some scientists are working on projects which will compile an expert's

# NO TIDES AFTER Y2K!

It's probably a good bet that your credit card will still work, that your plane won't crash in a mass collapse of air traffic control centers, and that your millenium New Year's eve party will be a let down, but will your tide tables work?

The Mexican Navy addressed this problem with a unique approach by developing an interactive electronic tide table system that may be used for any year or century. ASA combined Coastmap, our real-time data integration and

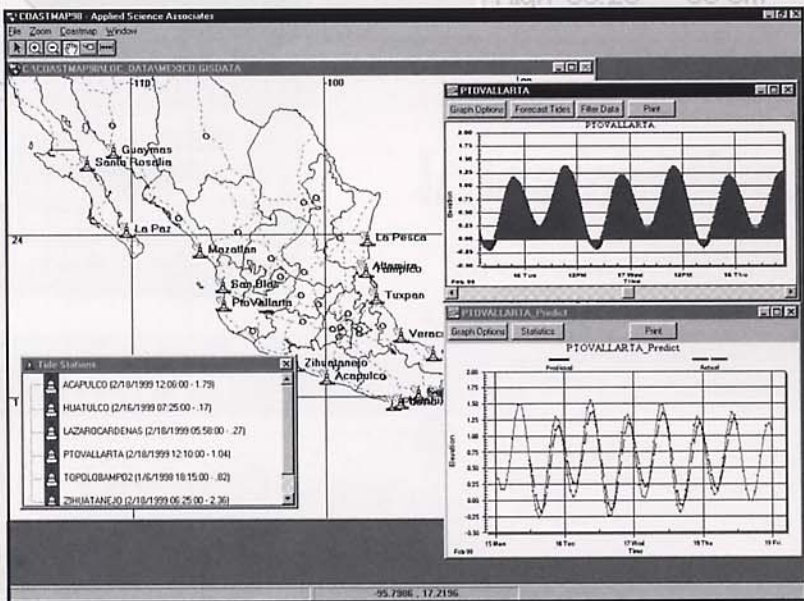
analysis software, with the popular Tides & Currents program from Nautical Software.

Twenty-seven tide gauges were installed along the coast of Mexico that collect tidal elevations and transmit the data in real-time back to Navy Headquarters in Mexico City. Coastmap links to this incoming data and analyzes the data to create tidal constituents (up to 107 of them!) for each tide station. Tides & Currents uses these constituents interactively to make tidal predictions for each station for any year in any century.

Racal and Aanderaa Instruments managed the hardware and communications aspects of the project which was a challenge over so large a geographic area. ASA's Eoin Howlett, who was responsible for the integration of the various software components in Mexico City, was impressed, "Even with advanced communications infrastructure, there are always difficulties obtaining quality real-time data, but I found myself sitting in a small office in Mexico City, nowhere near the ocean, and real-time tidal data was popping up on my PC from satellite and phone links."

As well as using the data for tidal predictions, the Navy will use the tidal data to monitor extreme events and to analyze some of the water quality problems in the region.

*It's probably a safe bet that your millenium New Year's eve party will be a let down, but will your tide tables work?*



## TRAVELER'S NOTES...Communicating Environmental Risk

By Eric Anderson

Early April found me in Atyrau, Kazakhstan, on the Ural River just above the North Caspian Sea. Atyrau is the operational management center for the Offshore Kazakhstan International Oil Consortium (OKIOC). My trip was to install our OILMAP software, train environment and health and safety personnel in its use, and attend a public meeting at which OKIOC was presenting its goals, progress, and environmental policy.

Kazakhstan is a country in the process of great change. For the period between the Russian Revolution (1917) until 1991, Kazakhstan was first under the rule of Russia and then the USSR. With the collapse of the former Soviet Union, Kazakhstan became an independent state, and in 1993 instituted a democratic government with strong control in the hands of its President, Nursultan Nazarbaev.

A proposed set of environmental regulations is in the process of governmental approval. These draft regulations have set the standards for the North Caspian oil development project now under way. The plans are for exploratory drilling to begin in May at a site in the middle of the North Caspian, Kashagan East.

I spent a week working with the OKIOC staff, most of whom are on a 28-day-on and 28-day-off schedule. In Atyrau, all OKIOC personnel live in the same hotel and walk the 200 meters between the hotel and the OKIOC offices morning, noon, and evening. The day starts with breakfast at the OKIOC table, is punctuated with lunch and dinner at the same table, and may end with a beer at the bar. The living and eating arrangements led to a level of intimacy and openness not achieved in more usual corporate environments.

I was impressed by the competence and dedication of the OKIOC staff. It was obvious that they were committed to implementing an exploratory drilling program with up to date technology and excellent environmental controls. The multinational staff worked well together and interacted with a brisk professionalism that conveyed their competence and their regard for their colleagues.

Unfortunately, the public meeting failed to convey this sense to the parties gathered. Historically, industrial development under the USSR was without any consideration for insults to the environment. Given this background, it is easy to see why there would be many concerned citizens and environmental groups. Anecdotal information from several sources indicates that oil development and production continue in areas of the South Caspian (e.g. Baku, Azerbaijan) under lax controls and with disregard to spilled oil. Therefore, the mere promise of environmentally sound development practice



The OKIOC board heading the meeting.



Protestors from a local university in Atyrau.

Applied Science Associates, Inc.  
70 Dean Knauss Drive  
Narragansett, RI 02882-1143

Phone: (401) 789-6224  
Fax: (401) 789-1932  
Email: asa@appsci.com  
URL: <http://www.appsci.com>  
ADDRESS CORRECTION REQUESTED

FIRST CLASS  
U.S. POSTAGE  
PAID

SAUNDERSTOWN, RI 02874  
PERMIT NO. 15

## HAPPY ANNIVERSARY ASA!

At ASA's anniversary celebration the prestigious governor's award, commemorating 20 years of success, was presented to one of ASA's founders, Malcolm Spaulding, by Dr. John Knauss.



## The Future of Environmental Technology...continued

knowledge into a useable form. Experts ideas and experience are translated into rules of logic. In their most advanced form, such programs may include artificial intelligence which "learns" from itself.

The implications of this technology are open to speculation. Will our improved scientific understanding really result in improved environmental decision making? Will people reach consensus on complex issues when the underlying circumstances are more comprehensively understood? Or will a substantial increase in public knowledge still take a back seat to other human factors, such as politics and public relations? The 20th century has provided dramatic changes in how we lead our life; the question is whether computer technology will really improve our lives and our environment, or just add to the complexity of them.

Visit ASA's homepage at <http://www.appsci.com>



The ASA newsletter is printed on recycled stock.

## Traveler's Notes...continued

was not sufficient to assuage the fears of many of the audience participants. The North Caspian is a very shallow water body with active fisheries which have sustained generations of fishermen. A public perception of an oil-or-fishery future appears to be common in Kazakhstan.

The atmosphere in the hall in Atyrau reminded me of post *Exxon Valdez* Alaska. There was a strong feeling of mistrust between the parties involved. During one of the breaks I saw an interpreter talking with a citizen's group representative. As I approached he said "I don't like dollars, dollars are bad!" I asked the translator what it was he thought was good. He responded that morality was good. When I queried what in particular was his interest, what was good, he shied away from me and said "I can't talk about that here." I think he found the atmosphere dangerous for bringing up what is truly valued for him.

My impression of the public meeting is that it was an important first step. There is a long way to go, however, before there will be a feeling of mutual trust between the oil company and the private groups represented at the meeting. From our experiences in the U.S. over the last ten years, the following may be useful ideas for promoting trust:

- Having a level architecture for the meetings: all parties are seated at the same level in a round, not regimented, setting,
- Having a joint oil company and private group sub committee generate the agenda for upcoming meetings,
- Giving time up-front for the major issues to be stated,
- Hiring a disinterested third party to chair the meeting itself.

A major difficulty is to have the two sides work together to find a common vocabulary for the definition and discussion of the perceived environmental risk. One way in which this dialog has developed in the U.S. over the past decade is through the joint implementation of oil spill drills. Having participated in these exercises, I have found that working together on a joint task has created more genuine respect between what had been oppositional groups than any direct discussion has done. It is my hope that such joint spill drills can be developed for the Kazakhstan environment.

Eric Anderson is President of ASA.