

States change with technology

No force is more pervasive in defining how government delivers services to its citizens than technology. From the simplest applications, such as automated mail routing, to advanced applications such as sharing public safety information across jurisdictional boundaries, technology is changing not only the way government operates, but the way in which we think of government's role.

This month, CSG's Trends Research and Response Group looks at the impact technology is making in various areas of public policy.

Agriculture

Probably no industry has seen greater technological innovations in the past two decades than agriculture. Agriculture technology has allowed greater production at lower prices with lower labor requirements. Even though the food and fiber system is 17 percent of the total domestic economy, fewer people are producing more food, so that farmers and ranchers now comprise less than 3 percent of the total American work force. Technology allows them to produce more food than ever.

Today, for example, a cloned cow could produce milk containing insulin or another vital human pharmaceutical, and be milked in a robotic parlor with little human intervention. She could be receiving Bovine Growth Hormone to maximize her production. A computer chip in her ear could provide quick monitoring and access to her milk production, feed consumption and health records. She might be consuming herbicide-tolerant genetically modified (GM) corn that allows maximum soil conservation because no tillage was required for weed control.

The corn might contain additional genes that make it higher in protein or more easily digested and it could have been planted and harvested by driverless tractors, guided by global positioning systems.

The chemicals used on the crop could have been automatically and selectively sprayed by a variable-rate spray rig that changes the amount it sprays every foot based on the presence of weeds. In fact, all equipment used to produce the feed the cow is eating might be capable of modifying the application rates of all inputs such as tillage, seed, fertilizers and even irrigation water.

The carcass of her male calf, produced by artificial insemination using sexed semen, will be processed into consumer-ready beef in a state-of-the-art facility that uses real-time imaging to

detect contaminants that might compromise food safety. Science fiction? No, all of these agriculture technology efforts take place today.

These technological advances are most beneficial to larger farms, a fact that is driving changes in the struc-

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ture of American farms as the number of farmers continues to decline while farm size continues to increase.

The advent of cheaper, more reliable transportation along with improvements in food processing and packaging have resulted in lower shipping costs. When food can be shipped around the globe, international competition controls price and profitability and agricultural global trade comes under intense scrutiny. America exports one-fifth of all of its agricultural products and one-



Agriculture continued

fourth of the food we consume is imported. The distance between production and consumption continues to increase, resulting in consumers with little knowledge about their food.

Rapid advances in technology promise to revolutionize the structure of American agriculture. The adoption of emerging technologies has important policy implications for public officials. It will become increasingly difficult to gauge the unintended consequences of policies, legislation and regulation of an industry that has stakeholders at both ends of the technological spectrum.

Making new technologies and training in the use of them available to smaller farms may help to slow the decline of the moderate-

sized farm. All farm operators may need insurance safety nets to weather price instability. Agricultural policy of the future may even need to be tailored to particular groups or regions.

As agricultural policies related to tax incentives, siting, zoning, odor and runoff control are developed and implemented, policy-makers should consider unintended consequences for both the large farms that can afford technology and small farms that cannot.

— Carolyn L. Orr, chief agriculture and rural policy analyst, corr@csg.org

Education

Hand-held electronic devices and laptop computers are the heirs apparent to the computer lab and the clusters of desktops that can be found in almost any classroom today, says Glenn Cook in a July 2002 *American School Board Journal* article entitled “Laptop Learning.”

Carts with portable computers now move from class to class, where students work at their desks on the Internet rather than waiting their turn to gain access to a desktop computer. In May 2001, the 40,000-student district outside Richmond, Va., agreed to lease 23,000 Apple iBook laptop computers – one for every middle school and high school student and teacher. The laptop project, the first and largest of its kind in the nation, became a major test of the effectiveness of wireless technology, Cook wrote.

Since then, local districts nationwide have begun similar projects. Clovis Unified School District in California implemented the “Anytime, Anywhere, Anyone Learning” laptop initiative for middle and high school learners, with elementary schools adding students to that initiative as well.

The Daviess County Public School system in Kentucky began its e-Learning Project this fall, providing laptops to a pilot group of high school freshmen and their teachers in all three of its high schools, acknowledging that kids are learning differently in today’s digital age and seeking to meet their needs and increase student achievement with access to computers 24 hours a day. “It’s

a decision-making tool to help us decide where to go from here,” said Superintendent Stu Silberman. “We are addressing the questions of how, when and where today’s kids learn.” Chief Financial Officer Tom Shelton is building a financing package that the system hopes will allow the project to continue. If the project is fully implemented, all high school students will have the opportunity to participate as the district begins to phase in the program with all incoming high school freshmen.

In Maine, every seventh grade student receives a laptop computer. The Maine Learning Technology Initiative is the largest educational technology project in the state’s history. Maine was the first state to embark upon a plan to eliminate the digital divide by providing a laptop to each seventh- and eighth-grade student and teacher.

In August, Michigan Gov. Jennifer M. Granholm signed a bill providing \$39 million for the state’s one-to-one wireless computing program that targets middle school students. “Learning without Limits,” a semifinalist in CSG’s 2003 Innovations Awards program, started in 14 school districts. Michigan Virtual University, in conjunction with the Michigan Department of Education, coordinated the pilot phase of the program.

— Charlotte C. Postlewaite, chief education policy analyst, cpostlewaite@csg.org



Environment

Technological innovations can play a significant role in improving the environment; however, new environmental technologies often face resistance from potential customers and regulators who are uncertain about manufacturer claims about their effectiveness. A few states have sought to reduce the uncertainty surrounding these new technologies by developing programs that verify technological performance and provide potential users and regulators with credible independent data.

The state of California operates the California Environmental Technology Certification Program (CalCert) that provides an independent scientific and engineering evaluation of an environmental technology's performance. Manufacturers describe their performance claims and provide supporting data to California's EPA. CalCert assesses the information and, if necessary, will require additional testing to confirm claims. Approved technologies receive certification verifying performance claims. CalCert is voluntary and self-supporting, with participating companies paying for the cost of evaluations. CalCert tests, evaluates and verifies technologies for pollution prevention, treatment, emission control and monitoring.

The Minnesota Office of Environmental Assistance offers an Environmental Assistance Loan Program to small and mid-sized businesses to reduce pollution at the front-end of production rather than treating or disposing of pollutants after the product has been produced. In a recent round of funding, for

example, loans of up to \$100,000 at 0 percent interest were made to businesses and institutions involved in such activities as wood finishing, metal painting and coating, printed circuit, plastic and fiberglass, and manufacturers of products that include lead, mercury and other known toxic chemicals.

Massachusetts has operated the Strategic Envirotechnology Partnership since 1994. STEP is a partnership between the University of Massachusetts and the Massachusetts Executive Office of Environmental Affairs formed to help businesses develop and market innovative, technology-based solutions to environmental problems. STEP advances promising technologies through stages of development. The partnership increases the amount of private investment in environmental technologies, by reducing the risk and uncertainty associated with bringing environmental technologies to market.

On the federal level, U.S. EPA has managed the Environmental Technology Verification (ETV) program, which develops testing protocols and verifies the performance of innovative environmental technologies. The goal of ETV is to accelerate the entry of new environmental technologies into the marketplace. ETV, through public and private testing partnerships, evaluates the performance of environmental technology in all media: air, water, soil, ecosystems, waste, pollution prevention and monitoring.

— *Scott Richards, chief environmental policy analyst, srichards@csg.org*

Fiscal Policy

Any technology that improves state government operations contributes to sustaining or improving the fiscal capacity of the states. This includes technology that enables state employees to be more productive in their workplace and technology that enables states to more efficiently deliver services to the public. It means simple things such as a jig that Illinois transportation department employees invented to reduce the expense of repairing broken augers. It also means complex technology such as computers that states use to process massive amounts of data concerning public benefits such as welfare "smart cards," licenses, vital statistics and taxes.

California and Iowa have developed similar programs recently that are examples of using technology innovatively to help the fiscal bottom-line. Both involve data mining, which Kurt Thearling, director of Advanced Data Mining Capital One, defines as "the automated extraction of hidden predictive information from (large) databases."

California's Integrated Nonfiler Compliance System (INC) electronically matches data from W-2 forms, 1099s, real property sales, K-1 partnership returns and related records against filed returns to identify entities that do not file tax returns. Once non-filers are identified, the system creates and manages their cases, calculates their potential tax liability, chooses the best cases to pursue and places questionable cases in a review status. The system also generates and sends notices of non-compliance and requests-to-file-a-return to entities that it identifies as non-filers.

California's Franchise Tax Board developed and operates the program. INC improves compliance with state tax laws, increases

revenue, improves customer service to taxpayers, organizes the data and activity within the board such as filing, collections and auditing. The system has processed more than 160 million records and is credited with bringing in \$182 million since it began. INC was a semifinalist in the CSG's 2003 Innovations Awards program.

Iowa's Tax Gap Compliance Program, also an Innovations Awards semifinalist, uses customized software to:

- identify entities that fail to file tax returns;
- identify entities that file but don't pay their taxes; and
- streamline the auditing process of the state department of revenue and finance.

The basic component in Iowa's program is an electronic data warehouse containing more than 2,550 elements from 10 major systems. The program uses business logic and query software to compare and match data from the source systems to identify areas of tax non-compliance. Each match generates a list of audit leads. The leads are loaded into a Web-based audit component application for assignment and further investigation. Depending upon the outcome of an investigation, the system can generate tax due notices or issue refunds.

The Iowa Department of Revenue and Finance credits the program with generating \$26 million in tax revenue above and beyond the baseline collections during the program's three-year project development and implementation period.

— *William Voit, senior project director, wvoit@csg.org*

Health

Computerized prescription writing can provide tremendous benefits to both the healthcare provider and the patient. Electronic communications between doctors' offices and pharmacies significantly reduce medical errors associated with handwritten, fax and telephone prescriptions, minimizing misunderstandings based on illegible handwriting and medications with similar sounding names. Other important benefits include preventing fraud and forgeries, providing patient education, and saving time for patients, pharmacists, and physicians.

Electronic prescribing has the potential to improve the quality of health care, decrease costs, manage risk better, and increase efficiency. In addition to eliminating errors stemming from illegible handwriting on paper prescriptions, handheld electronic devices supply the prescribing physician with several key pieces of patient-specific data, including the patient's history and drug interaction warnings, enabling doctors to closely monitor compliance and dosing regimens. Electronic prescribing also points to the greater efficiencies that online information can provide physicians and pharmacists by enabling physicians to send prescriptions directly to the retail pharmacy or the mail order facility.

A number of states have developed statutes or taken positions regarding electronic prescribing. Florida is one of two states in the country to legislate legibility on prescriptions. On July 1, 2003 a law went into effect for Florida physicians requiring that their written prescriptions to be legibly printed or typed; that the prescription's date be written out; that the quantity and strength of the drug be written in text and number; and that the prescription be signed by the prescribing practitioner on the day when issued.

In Florida, the new law's greatest impact could be in motivating doctors to switch to electronic prescribing to eliminate prob-



lems with illegible handwriting.

Another state making great strides in electronic prescribing is Rhode Island, which recently signed legislation that amends the current law referring only to oral or written prescriptions to include the word electronic. This amendment's intent is to protect patients, physicians and pharmacies. Since the beginning of 2003, Rhode Island has been participating in a statewide electronic prescribing program. After pilot testing in early spring, the system was activated statewide in May, and now any prescriber in the state is able to connect with nearly 120, or 70 percent, of the state's pharmacies. The Rhode Island Quality Institute, the group responsible for developing the program, has called the statewide initiative "an opportunity to promote and protect the health of the citizens of Rhode Island" because electronic communications between doctors and pharmacies are expected to increase formulary compliance; simplify pharmacy administration; reduce dispensing and other errors related to illegible handwritten prescriptions; and ultimately improve patient satisfaction.

— *Regan Hunt, health policy intern, rhunt@csg.org*

Public Safety

With more than 4.6 million adults and 670,000 juveniles under some form of community supervision today, probation and parole officials nationwide continue to struggle with providing adequate supervision within current budgetary constraints. States are also confronted with growing inmate populations and crowded prisons and jails. To help meet these challenges and address this supervision dilemma, many states are turning to Global Positioning Systems or GPS technology as well as other electronic supervision methods as effective supervision tools.

According to a 2002 report by the American Probation and Parole Association, the crux of the GPS tracking system is a portable battery-operated tracking device worn by offenders under supervision. The light-weight device is normally worn on the offender's ankle. Multiple satellites track the device through signals and calculate the offender's location accurately within a few feet. These locations are relayed to the offender's supervisor, who has the option of either tracking the offender in real-time or saving the data for later analysis. The ankle devices also include a tamper-resistant feature that alerts the supervisor if the device is being removed or otherwise made inoperable.

One feature of this technology is the capability to enforce

restrictions placed on offenders without having to physically supervise the person 24 hours a day. Supervisors, for example, can place exclusion zones around areas such as schools, playgrounds, and neighborhoods that may be off-limits to an offender. The system immediately alerts authorities by page, fax or e-mail when there are violations.

According to the *Journal of Offender Monitoring*, about 3,500 people are under GPS surveillance in 27 states. And 50 percent of those under GPS watch are under supervision for a sex crime. Washington is undergoing a pilot program to track approximately 30 offenders from the state's Special Commitment Center on McNeil Island. The state currently releases about a dozen sex offenders each month who require special supervision.

Likewise, Wisconsin is negotiating with manufacturers to expand their current GPS capabilities. So far, the system has demonstrated a 90 percent success rate for inmates who qualified for work-release privileges. Probationers and parolees are deemed a "success" if they satisfy all conditions of their release.

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