Radio Bridges the Gaps
For Park Irrigation System

Syringe cycles can be activated by a button on the field station, from the central controller, or with a hand-held remote radio.

For centuries Americans have closely guarded their right to have a portion of this country's geography reserved for public use. Our history is filled with examples of people, such as landscape architect Frederick Law Olmsted, naturalist John Muir and President Theodore Roosevelt, who fought to save part of our natural heritage for future generations to enjoy.

Mountain ranges, estuaries, forests and other natural wonders were placed into a bank of protected land, out of reach of developers, industry and others who might place their personal gain above the public interest.

As communities grew, millions of acres of land were added to this bank—not necessarily for their natural beauty, but for their usefulness in serving many of the recreational activities popular with the public.

Instead of huge blocks of land, parks today often consist of many individual parcels distributed throughout a community. And, instead of being preserved in a completely natural state, they are converted into golf courses, baseball diamonds, football and soccer fields, tennis courts and numerous other sports facilities.

Maintaining these parks has become a strategic endeavor, requiring more than park rangers to guard natural resources. Often the land involved is reclaimed from previous use, or is simply impractical for commercial or residential use.

Landfills are converted to parks; flood plains are utilized for recreation much of the year; and rights-of-way near power lines, highways and pipelines are put to productive recreational use. The topography of such areas can often make installation of park utilities and communication cables difficult.

Decades ago, many of these utilities were not even necessary. The primitive nature of parks was part of their allure. Phones, plumbing, irrigation, and even electricity were only added as park use increased. Paved roads and parking areas, concessions, lights and irrigation enabled parks to carry a bigger load. As communities grew, their park departments had new standards to meet—with limited budgets to meet them.

Growth has not been the only source of pressure on public park systems. Recreation has taken on many new forms since the beginning of the century. Responsive park directors do their best to accommodate each new sport as its popularity grows. This has greatly changed the nature of parks and the resources necessary to maintain them.

Griffith Park in Los Angeles, CA, has been changing for more than 60 years in response to the recreational needs of residents and tourists alike. The park, once more than 4,000 acres of chaparral tucked between the canyons of the Santa Monica Mountains and the Los Angeles River, is today the site of four golf courses, the city zoo, a western art museum, a train museum, horse trails, tennis courts and numerous picnic areas.

To convert the desert canyons into recreational areas, the Los Angeles Department of Parks and Recreation had to come up with one primary ingredient: millions of gallons of water every week. If the Los Angeles River had not been dry most of the year, the problem would have been easy to solve. Instead, the park department was forced to depend upon the city water system to irrigate Griffith Park.

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In 1914, the parks and recreation department chose the park for its first municipal golf course, the Wilson Course. Golf was a new venture for the department. So they contacted golf course architect Tom Bendolow, a Scottish-born pioneer in park and municipal golf course design, to lay out the 18-hole course. Bendolow had designed the first municipal course in the country in the 1890s at Van Cortlandt Park in New York’s Bronx.

Bendolow’s concept of a golf course consisted of the bare essentials. The Scotsman, recalling his youth on the primitive links courses, did not attempt to change the desert landscape. He took what was there and added the necessary elements for the game. For a time, that included oiled sand greens.

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The old manual system often had up to 15 heads grouped into a single zone. There simply was no way to direct extra water to one location without overapplying it to all other areas included in the zone. This wasted water, encouraged disease outbreaks on the greens, and left portions of fairways mushy.

Each new head was essentially its own station. That meant more than 2,500 stations for the 36-hole layout. Only a highly sophisticated control system could handle such a load and provide the park crew with the ability to make necessary adjustments. That meant computerized control.

The golf course section foremen needed to make adjustments from the field, while the department wanted to make changes from a central controller. There were still sections of the park that required irrigation but were so remote that they did not have basic utilities. Finally, the system also had to allow for expansion.

The ultimate solution in the minds of the park department would be a system that was tied together by radio. In that way, all parts of the irrigation system could be managed from a central location without installing communication lines. Unfortunately, no such system existed at the time.

With radio control ultimately in mind, the park selected the Motorola MIR 3500 control system. Even though the system depended upon hard-wire communication between field satellites and a central computer, the company had 60 years of experience in radio. Motorola had agricultural irrigation systems utilizing radio in the field, but had not yet perfected this technology for turf irrigation.

The radio control system was tied together by radio. The department wanted the ability to change irrigation cycles so that plants would have the water they required, but no more.

To do this, they needed an on-site gauge of rainfall, humidity, wind velocity, temperature and solar radiation. If they had this information, they could use a formula to determine how much water was needed each day to replace that used by plants or lost to the environment.

As phase one neared completion, the two remaining pieces of the puzzle were found. Motorola released its MIR 5000 radio-controlled system and Aqua Engineering of Ft. Collins, CO, developed a compatible weather station.

The decision was made to install the MIR 5000 on the 12 holes of phase two and retrofit the MIR 3500 from phase one with a compatible radio. The night waterman continued his rounds as, one by one, sections of the park were converted to automatic control. It became clear to the park staff that one person had to be selected to comprehend all the changes a radio-controlled irrigation system would bring about. They selected six-year park veteran Tom McCall.

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McCall immersed himself in details. The park was going to operate two separate radio-controlled systems. The first would link five controllers scattered across the park by "trunked radio." This is similar to the system used by companies to maintain communication between a home office and its delivery or service trucks.

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The final ingredient for water conservation in the master plan was a weather station. The park staff wanted the ability to change irrigation cycles so that plants would have the water they required, but no more.

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The decision was made to install the MIR 5000 on the 12 holes of phase two and retrofit the MIR 3500 from phase one with the new system. Griffith Park would become the first park or golf course to utilize radio control.

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Each field controller contains a radio. On the other end is an IBM PC connected to a radio base station. Coded radio signals are sent from either end to a mountaintop repeater station, where they are broadcast over the park. In this way, field controllers can communicate with the central.

McCall cites the example of Ferndale Park, located on the opposite side of a mountain, four miles away from the central computer. "I can check the status at Ferndale from the central in seconds," he explains, "without worrying about phone lines or someone cutting into a cable between here and there. The signal reaches anywhere in the park, so we can add new systems just by installing another controller and radio."

The Wilson and Harding golf courses

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operate on an assigned UHF frequency, just like a "walkie talkie." While the range is less, radios on the field controllers can receive instructions from either the central computer or hand-held remotes.

The field controllers are essentially stand-alone units that contain all the information necessary to carry out irrigation. The field units and the central computer communicate at least three times each day to report conditions at each station. If a head or pipe breaks, pressure sensors alert the field controller, which is programmed to shut down that station and go to the next. When McCall arrives at the central in the morning, the computer shows him which station has shut down, so that repairs can be made.

McCall utilizes the weather station data to increase or decrease cycles system-wide each day. By entering one figure at the central, all field controllers receive the change and adjust automatically. "In the short period of time we have used the system, we've saved a tremendous amount of water," remarks McCall. "It's a big change from leaving notes for the night waterman!"

Five optional syringe cycles are programmed into field controllers for greens and tees. By pressing a button on the field controller housing, the golf course section foreman can instruct the unit to activate one, or all five, of the preprogrammed three-minute syringe cycles. The controller reports back to the central that the syringe cycles were activated so McCall can keep track of water use and keep the superintendents informed.

McCall also downloads special "wash-down" instructions when crews are fertilizing. "As soon as the crews apply fertilizers to a fairway, they can hit the button to activate the appropriate heads to wash the fertilizers off the foliage and into the soil!"

Since gravity provides up to 140 psi and Bermad pressure-regulating valves bring the pressure down to designed operating levels, the park no longer requires booster pumps. "We're saving all the way around," McCall points out. "The turf is noticeably improved, and we're saving both water and power. We also expect to be able to reduce our dependency on fungicides and cut back on fertilizer in the coming months."

James Ward, the superintendent of grounds maintenance for the Griffith Park region, is quite pleased to be in charge of the first radio-controlled park irrigation system in the country. Ward is familiar with the Motorola system, since it is primarily a higher-tech version of the MIR 3500 system. He was the first to install the MIR-3500 at a golf course in the park system's Valley region.

"It's important for management to understand how advanced irrigation control systems work," Ward believes. "It's too easy to say the system can't do something when you start using it, especially when you are the first customer. That is why Tom was appointed to work with Motorola's Dave McGath and American Landscape as the system was installed and brought on line. He keeps us all informed about all details. That's important, because we will be converting Rancho Park Golf Course to radio control next. Everything we learn here will be passed on to superintendent Ken Novak at Rancho."

From all reports, George Clifford Thomas would be pleased with the advances made in irrigation since 1924. Both radio and irrigation were new then. It seems only natural that the two would finally be merged, so that Thomas' avocation of golf course landscaping could continue in spite of growing water shortages.

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