UAVs

MWD's Multiple Uses

Since METROPOLITAN WATER DISTRICT of SOUTHERN CALIFORNIA (Metropolitan) launched its drone program two years ago, staff across the agency has used the technology to more effectively and efficiently meet diverse goals, from property inspections to public outreach. The program is based in the IT department, which integrates drone-generated data into the department's existing data management and dissemination platforms and makes it available to other Metropolitan departments.

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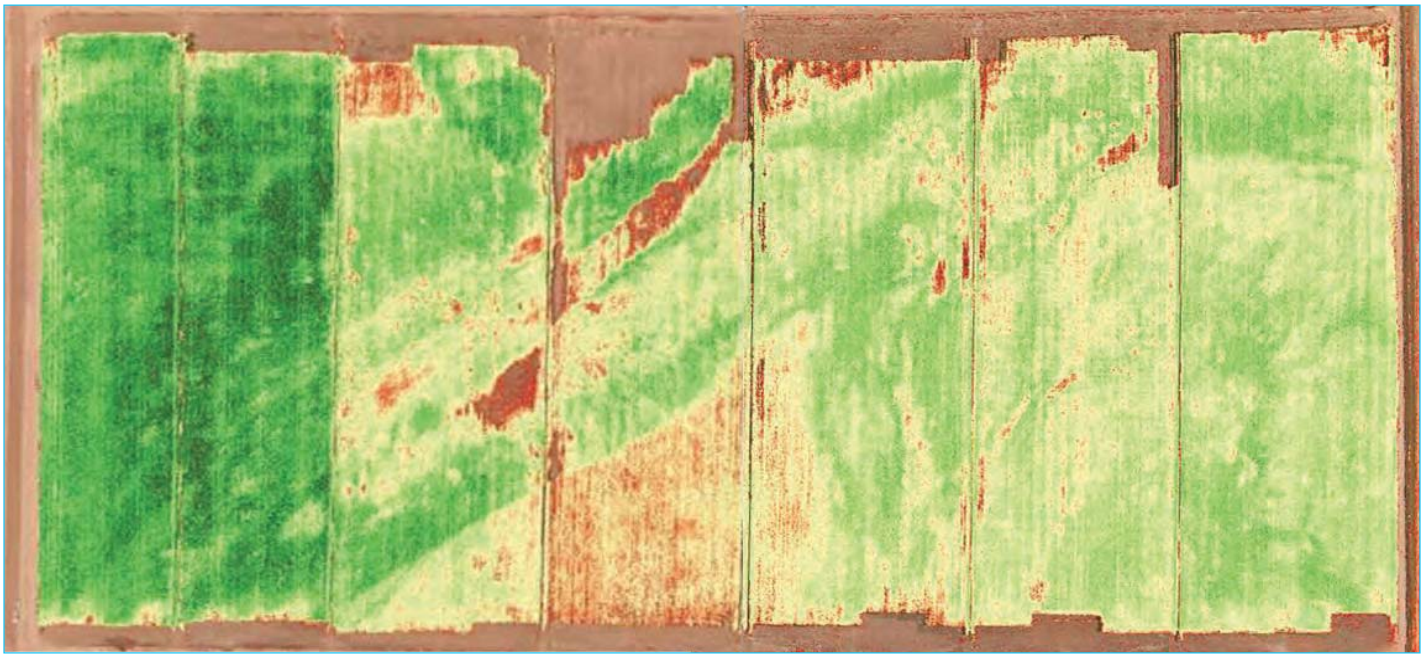

A view of irrigated crop land assembled from drone-shot footage.

CURRENT APPLICATIONS INCLUDE hazardous area inspections, facility and property inspections, crop health surveys, education and public outreach, and environmental monitoring. Drones have facilitated each of these applications in diverse ways.

Hazardous area inspections. Drones have been used to inspect the spillway at Metropolitan's Morris Dam, which is in steep terrain, reducing risk to conventional inspection teams and producing a superior product in less time.

Certification and Restrictions

- Drones are certified by the FAA and must be registered and receive a tail number.
- Pilots must be licensed, with special education and experience requirements.
- Drones can't be flown beyond the pilot's line of sight. Binoculars and telescopes are not allowed as a means of tracking flights. Drones can't be launched from a moving vehicle, can't fly more than 400 feet above the ground and can't fly over people or within five miles of an airport.

We were able to shoot high-resolution video, including footage that couldn't have been captured on foot, in 20 minutes versus two hours.

Facility/property inspection at Lake Matthews. Drones facilitate encroachment monitoring and unauthorized recreational use of undeveloped property adjacent to Metropolitan's Lake Matthews reservoir. This is particularly important because the property includes several abandoned quarries that are a public health and safety risk.

Crop Health Surveys. Multi-spectrum camera monitoring of Metropolitan land at the Palo Verde Irrigation District provides farmers with data for water use planning and crop management. Cameras shoot invisible light wavelengths, producing hundreds of photographs over those crop fields that are then stitched together into one expanded image and analyzed through a variety of different indices to determine crop health and more.

Education and Public Outreach. Drones captured footage of the Colorado River Aqueduct for a video commemorating the 75th anniversary of the aqueduct's initial wholesale water deliveries. We were able to capture images that would have been difficult if not impossible using a helicopter, such as lower Parker Dam, where helicopters are prohibited. Drones were also used this year to capture compelling footage of Metropolitan's Solar Cup at Lake Skinner, the nation's largest solar-powered boat race in which high school students race one-person, solar-powered boats they build themselves.

Environmental Monitoring. Drones document wildlife corridors around Metropolitan's Diamond Valley Lake and for planning and maintenance of recreational trails, as well as to document and monitor raptor activity at various sites.

Metropolitan Drone Program Stats

PROGRAM INITIATED: 2016
NUMBER OF DRONES:
3 with a fourth on order
NUMBER OF PILOTS:
3 (100 + years combined flight experience)
PROGRAM ADMINISTRATION:
IT Department
PROGRAM ACTIVITIES:
Typically 2 flights a week
PROGRAM GOALS:
Safety, high-quality end product goals, low costs
ACCOMPLISHMENTS:
Developing a database of no-fly and environmentally sensitive areas.

Construction Monitoring/Documentation. Drones also monitor construction of a demonstration facility for the Regional Recycled Water Program, a partnership with the Sanitation Districts of Los Angeles County to purify wastewater and produce high-quality water that could be used again. The progressive photos of the facility's construction in Carson, CA provide the project manager with an aerial progress report of the project.

Future Potential Uses

The following are additional potential applications of unmanned aerial vehicles at Metropolitan.

- Topographic and geotechnical mapping support (3D modeling for planning and monitoring construction projects).
- Facility/structure baselines for seismic and other natural disasters (3D models that provide a baseline to be compared with post-event structure scans to locate damage).
- Land use surveys and GIS for building information model support.
- Dam/levee monitoring (using imagery and ground control points to create accurate 3D models for comparison with subsequent flights to determine movement, erosion, etc.)
- Incident investigation surveillance/monitoring.
- Disaster response and damage assessment.