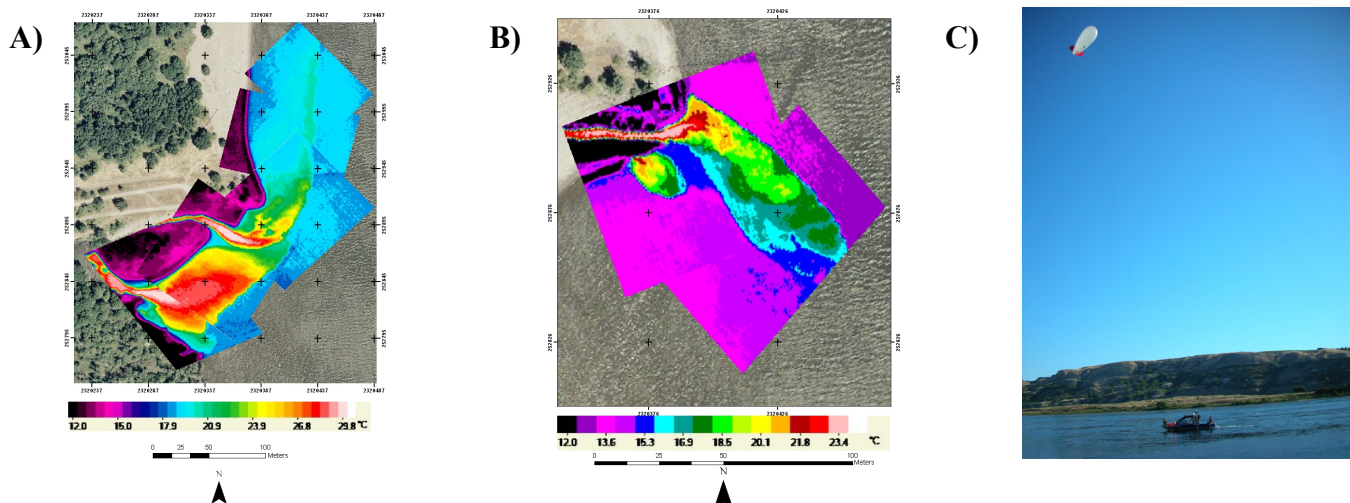


BALLOON REMOTE SENSING OF WATER QUALITY IN MIXING ZONES EPA SBIR Phase II Project EP-D-07-086

With USEPA SBIR support, MixZon has developed a low cost, rapidly deployable, aerial remote sensing system for water quality monitoring in mixing zones at site scales. Mixing zones are limited regions in rivers, lakes and coastal areas where the initial dilution (dispersion) of point-source wastewater discharges occur. We have demonstrated the technical feasibility of our system to obtain ambient water quality data in riverine mixing zones.

Our patent-pending system measures discharge mixing and uses visual and infrared sensors to monitor temperature as a dilution tracer using a FLIR A320 infrared camera. A temperature tracer can also be used as an indicator of other water quality parameters within the mixing zone such as BOD, coliforms, dissolved metals, etc.. Our platform provides real time, geo-referenced mixing zone data for NPDES permits, ESA habitat assessment, and hydrodynamic mixing zone simulation model validation. Our robotic camera mount and application software creates visual & infrared images tagged with temperature, humidity, distance to target, camera x-y-z pitch, tilt, roll position, bearing to true and magnetic north coordinates. Data is transferred from the aerial platform to a ground station in real time via a wireless network.

Used in conjunction with our CORMIX model, MixZon has unique capability to produce high quality mixing zone data for NPDES compliance at 1/3 the cost of alternative airborne remote sensing, in-situ dye study, or temperature probe methods. The images below present example results from our platform in field application.



Images A and B show a mixing zone from an industrial non-contact cooling water discharge ($Q= 1\text{m}^3/\text{s}$; $\Delta T=10^\circ\text{C}$) taken by our remote sensing platform at an elevation of 500 ft. The discharge is configured as a surface channel or canal into the Columbia River. In image A, two plumes are visible during an ebb tide episode. The larger “southern plume” in image A is the result of a leak in the canal wall, with the “northern plume” being the intended discharge location. Image B shows the same site during flood tide after an attempt to repair the leak and extend the discharge location farther out on the point. The “northern plume” in image B is the intended discharge location, with a new canal leak visible as the small “southern plume” in image B. The new leak (southern plume) in image B is at the same location as the intended discharge before canal modifications as shown (northern plume) in image A. Both leaks were not visible through visual inspection at the site. Oregon State plane coordinates appear at the image borders providing geo-referenced images of the regulatory mixing zone. Image C shows our tethered balloon platform deployed from a boat in field application.

COMPANY OVERVIEW:

MixZon develops IT and integrated systems for design, management, and regulatory compliance monitoring of emissions from power plants, industrial facilities, and wastewater treatment plants. We offer proprietary software (licensed to USEPA), hardware, and technical services for simulation modeling and regulatory management of point source emissions for NPDES permit compliance. Our remote sensing platform currently provides geo-referenced field monitoring data for simulation model validation and regulatory compliance monitoring for wastewater discharges. We are developing technology which will extend our platform to monitor other discharges, including fugitive VOC emissions into the atmosphere. Our modeling and monitoring technology has international application to design and management of environmental impacts from point source emissions. We currently have over 5000 clients worldwide who use our CORMIX computer-aided-design (CAD) system for management of point source emissions.