

In situ Fluorometry and SMART Protocol

Brian Parscal, Project Specialist
Kim Beasley, General Manager
Clean Islands Council - Honolulu, HI



Summary

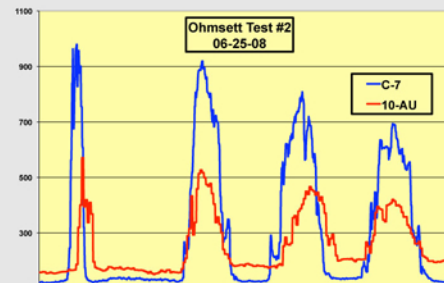
Special Monitoring of Applied Response Technologies (SMART) is a cooperatively designed monitoring program for in-situ burning and dispersant application. Since its inception, the dispersant component of SMART has utilized the Turner Designs 10-AU Fluorometer as the primary instrument to measure oil in sea water. Though this instrument has served the program well, new advances in fluorometry show the potential of a new generation of in situ instruments. Clean Islands Council, in conjunction with Turner Designs has developed and evaluated one such instrument. The Turner Designs C3 Submersible Fluorometer shows promise in enhancing the effectiveness of a fluorometry based SMART program.



Fluorometry and navigational information is displayed in real-time as well as recorded for later analysis.

In 2007, CIC began working with Turner Designs to investigate the potential of a new generation of in situ fluorometers. Being submersible, in situ instruments eliminate the need for the pumps and hoses associated with the 10-AU package, thus making for a more portable operation.

The first instrument CIC evaluated was a Turner Designs C-7 Fluorometer. This unit was specifically tuned to detect crude oil in sea water and is quite compact. The instrument itself is about the size of a cigar. Our preliminary testing of the C-7 in the lab involved using fluorescein dye as a surrogate for crude oil and the results were very encouraging. Armed with this data, CIC took the instrument to Ohmsett, an oil spill response test tank in Leonardo, NJ. where we had the opportunity to test the C-7 alongside a 10-AU Fluorometer in dispersed oil. Again, the results were encouraging and illustrated the potential of in situ fluorometry for the SMART monitoring protocol.



Comparison of the C-7 and 10-AU fluorometers on dispersed oil.

Shortly after testing the C-7 at Ohmsett, Turner Designs introduced its latest in situ fluorometer. The C3 Fluorometer utilizes the same optics as the C-7 but incorporates a more advanced data handling capability and includes a built-in depth sensor. With this enhanced capability we can now log the depth and position of each sample point and create a three-dimensional model of the area as prescribed by tier III SMART protocol.



Turner Designs C3 Submersible Fluorometer

Conclusion

With its compact size, ease of operation, and enhanced data handling capabilities, the Turner Designs C3 Submersible Fluorometer shows potential as a next generation instrument for SMART tier II and tier III monitoring. Clean Islands Council will continue to work with the oil spill response community in evaluating in-situ fluorometry as applied to the SMART protocol.



Clean Islands Council's C3 based SMART Package

History

In early 2000, after developing a comprehensive dispersant application program, CIC in conjunction with our member companies and partners, invested in a SMART monitoring program. CIC obtained a Turner Designs 10-AU Fluorometer and adopted the SMART model as developed by NOAA and and USCG National Strike Force. Over the next several years, CIC made numerous improvements to the original package, which included integrating a laptop computer to give the operator real-time data display, data logging, and live GIS mapping capabilities. Though CIC currently has a fully operational SMART program, the complexity of the core instrument, the 10-AU Fluorometer, demands an inordinate amount of effort to operate and maintain.



Clean Islands Council's 10-AU based SMART Package.