Researchers from the University of Utah on a Team that Developed Water Quality Monitoring Method for NASA Launched: STS-128/Discovery/ISS-17A Test Period on International Space Station (ISS): September 2009 – March 2010

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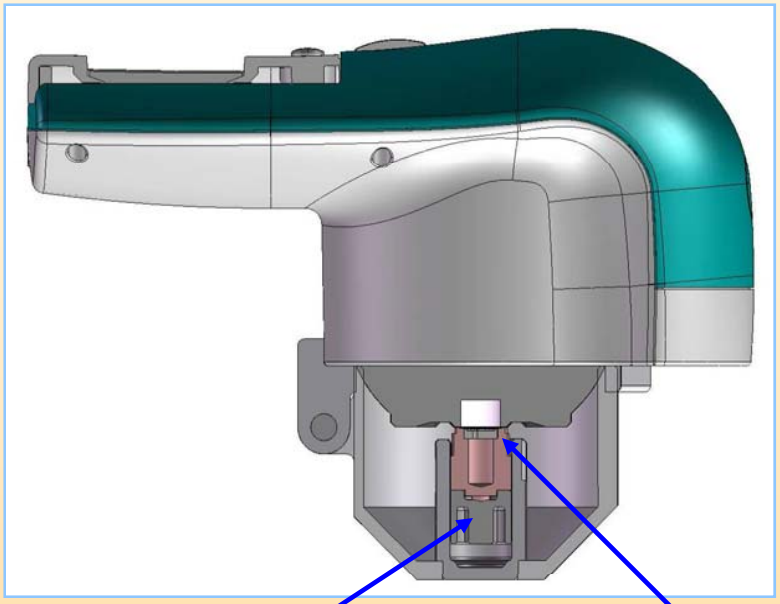
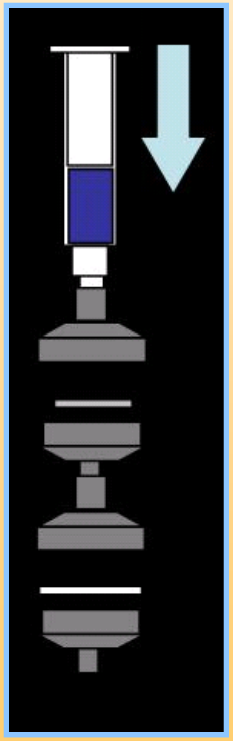
Colorimetric-Solid Phase Extraction (C-SPE) is a water quality monitoring method developed for NASA for use on the International Space Station (ISS) and future Lunar and Mars missions. Principal Investigator, Marc Porter, led the research and development team. This effort was a collaboration between scientists and engineers from the University of Utah, Iowa State University, Wyle Science Laboratories and NASA's Johnson Space Center.

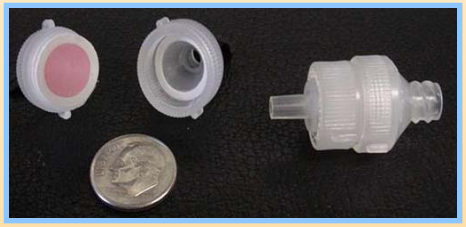
For crew safety NASA mandates a low payload, easy-to-use, zero gravity operable, non-hazardous, reproducible, reliable method to monitor biocides in the drinking water systems on ISS.

U.S. leg of the ISS uses iodine as a bioicide; Russian leg uses silver(I). Two different methods of water quality analysis were developed to accommodate both crews.

A handheld Diffuse Reflectance instrument (BYK Gardner, Germany) was modified specifically for biocide monitoring in space.



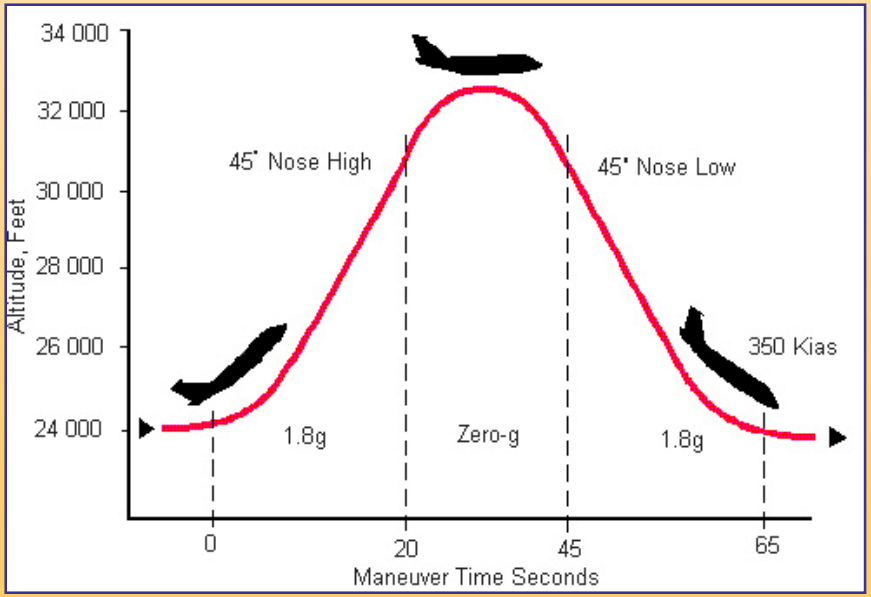




A syringe is used to pass a water sample through a cartridge holding the reaction membrane. Color intensity, which is a measure of biocide concentration, is monitored.

After extensive laboratory studies, successful feasibility testing was performed under weightlessness conditions. C-9B flights originated at Ellington Field near Johnson Space Center in Houston.

The Zero-g maneuver provides ~25 seconds of weightlessness per parabola. There are ten parabolas per set, with four sets total for each flight.



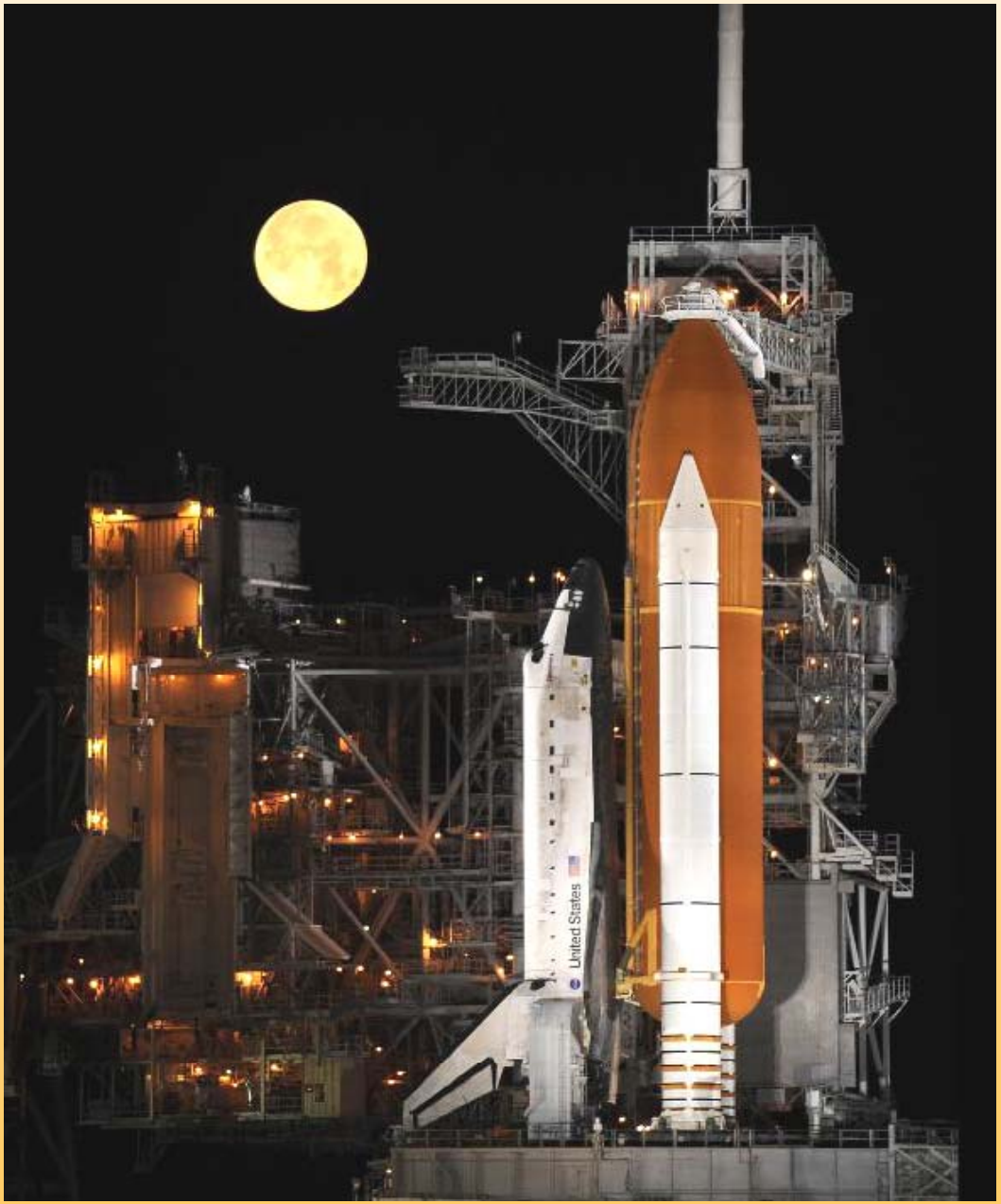
Some of the team members involved in microgravity feasibility testing.

All components needed for the six-month trial experiment are loaded into a soft pack storage kit of size and weight specified by NASA. Astronauts trained in the water monitoring method will analyze two different samples each month over the trial period.

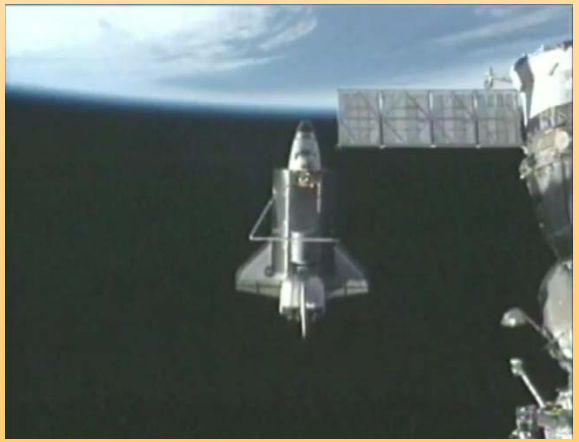
STS-128/Discovery/17A Flight Crew.

STS-128/17A

Discovery sits on Launch Pad 39A at Kennedy Space Center on August 28, 2009.



C-SPE launched at 11:59 p.m. EDT for six-month trial test on ISS.



C-SPE scheduled test dates:

09/22/09 confirmed

10/22/09

11/22/09

12/22/09

01/22/10

02/22/10

03/22/10

Research Team Members involved in development and pre-flight testing of C-SPE water quality monitoring kit:

Marc Porter, Principal Investigator,
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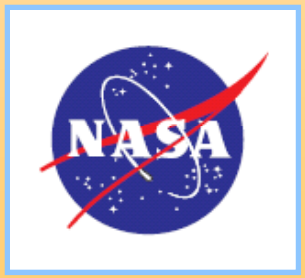
M. Arena, N. Dias, D. Gazda, J. Fritz, A. Hill, J. Nordling, R. Lipert, L. Ponton, C. Shu, D. Weisshauer

J. Alverson, M. Benoit, D. Gazda, D. Nolan, J. Rutz, J. Schultz, J. Straub



G. Bearman, D. Jan, J. Limardo, T. McCoy, P. Mudgett, N. Packham, N. Skinner

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Selected C-SPE references:

Arena, M.P., M.D. Porter, J.S. Fritz. *Anal. Chem.*, 2002, 74, 241-247.

Fritz, J.S. *et al. J. Chromatog. A*, 2003, 997, 41-50.

Gazda, D.B., J.S. Fritz, M.D. Porter. *Anal. Chem.*, 2004, 76, 4881-4887.

Shuttle photographs available at: //www.nasa.gov