Investigation Title: Volatile Organic Analyzer (VOA)

Principal Investigator(s): John T. James, Ph.D., NASA/Johnson Space Center

Additional Investigator(s): Thomas Limero

INVESTIGATION OBJECTIVES

1. Evaluate VOA operation in microgravity: heating and cooling profiles, gas chromatography temperature programming, scrubber capability (halons, freons, moisture), and VOA on-orbit procedures.

PHASE 1 MISSIONS

STS-81, STS-89

OPERATIONAL ACTIVITIES

Not provided by PI.

RESULTS

Heating and Cooling: VOA/RME maintained excellent thermal control. Gas Chromatography Retention Times showed excellent reproducibility in flight and compared to ground-based databases. Excellent reproducibility of Ion Drift Times was observed.

Scrubbing Capacity: Moisture/contaminant scrubbing was excellent. Halon scrubbing was not sufficient.

VOA On-orbit Procedures: Nominal procedures (remote and automatic samples) were satisfactory. IFM procedure was very difficult.

Mechanical/Electrical Design: All mechanical devices (flows, valves, etc.) performed nominally. Electrical devices (heaters, valve drivers, computers, etc.) worked nominally except for code problem fixed by scandisk. Significant carryover was identified as coming from the trap/inlet.

Software/Database: All method files performed nominally. Data analysis programs generally performed well. Algorithm/database issues were identified.

CONCLUSIONS

VOA hardware components and software successfully tested in microgravity. Proper calibration will lead to accurate identification and quantitation of target compounds. Minimum impact to crew for on-orbit nominal procedures.

PUBLICATIONS

None.

Investigation Title: Volatile Removal Assembly (VRA)

Principal Investigator(s): Donald Holder

Additional Investigator(s):

INVESTIGATION OBJECTIVES

1. To assess the operability and performance of the VRA process in microgravity. On-line data will be collected during normal steady-state operation. Water samples collected by the crew will be analyzed on the ground to supplement on-orbit data.

PHASE 1 MISSIONS

STS-89

OPERATIONAL ACTIVITIES

Not available at this time.

RESULTS

Not available at this time.

CONCLUSIONS

Not available at this time.

PUBLICATIONS

Not available at this time.

Investigation Title: Water Quality Monitor (WQM)

Principal Investigator(s): Richard L. Sauer, P.E., NASA/Johnson Space Center

Additional Investigators: Yuri Sinyak, Ph.D.

INVESTIGATION OBJECTIVES

1. To demonstrate the Total Organic Carbon (TOC) Analyzer technology in microgravity and determine whether the design meets the analytical requirements for monitoring the quality of International Space Station (ISS) reclaimed water.
2. To evaluate real-time the quality of the reclaimed potable water on Mir.

PHASE 1 MISSIONS

STS-81

OPERATIONAL ACTIVITIES

The Water Quality Monitor (WQM) experiment was expected to provide a demonstration of the technology for measuring total organic carbon, total inorganic carbon, total carbon, pH and conductivity on orbit. The WQM hardware consisted of a water sampling kit, a stowage kit and a TOC Analyzer. The sampling kit contained the supplies needed to collect water from the Mir water ports, plastic bags, 25 ml water sample syringes (used to insert samples into the TOC Analyzer), pens for labeling the samples and disinfectant wipes. The stowage kit contains items needed to support the analysis of water samples in the TOC Analyzer such as data and power cables, test sample syringes and data cards. The TOC Analyzer was a portable electronic box. The crew inserted either test solution or Mir water via syringe into the TOC Analyzer using an access door on the front panel. The crewmember then pushed a button on the instrument's front panel to begin automatic analysis of the sample. Water samples were also archived for analysis on Earth; results were compared to on-orbit data, which was intended to help evaluate the performance of the TOC Analyzer in microgravity.

RESULTS

Information not currently available.

CONCLUSIONS

Information not currently available.

PUBLICATIONS

Information not currently available.