Operational Use of the Air Quality Monitor on ISS and Potential for Air Quality Monitoring Onboard Submarines

Thomas Limero*, Jared Jones*, William Wallace*, and Paul Mudgett**
*Wyle Science, Technology, and Engineering Group
** NASA/Johnson Space Center

Abstract

The air quality monitor (AQM) began operations on the International Space Station (ISS) in March 2013 and was validated for operational use in January 2014. The AQM is a gas chromatograph-differential mobility spectrometer that currently monitors 22 target compounds in the ISS atmosphere. Data are collected twice per week, although data collection can be more frequent in contingency situations.

In its second year, the AQM has provided data to decision-makers on several ISS contaminant related issues in both air and water. AQM has been used in strictly air incidents, such as a potential ammonia leak, and to investigate air contaminants affecting the water processing (excess ethanol). In the latter case data from water monitors and AQM were compared to understand the issue with the water processor. Additionally, the AQM has been moved to different ISS modules to determine whether air is sufficiently mixed between modules so that a central LAB module location is representative of the entire ISS atmosphere. Historic data on the ISS atmosphere in different modules from archival samples (ground lab analysis) suggest that the atmosphere is usually homogenous.

This presentation will briefly describe the technical aspects of the AQM operations and summarize the validation results. The main focus of the presentation will be to discuss the results from the AQM survey of the ISS modules and to show how the AQM data has contributed to an understanding of environmental issues that have arisen on ISS. Presentation of a potential ammonia leak (indicated by an alarm) in 2015 will illustrate the use and value of the AQM in such situations.