Environmental Monitoring

Technologies are desired to ensure that the chemical content of the air and water environment of the crew habitat falls within acceptable limits and the life support system is functioning properly and efficiently. Required technology characteristics include: 2 year shelf-life; functionality in microgravity and low pressure environments (~8 psi). The technologies require significant improvements in miniaturization, reliability, life-time, self-calibration, and reduction of expendables. Examples of desired analytes are:

- Trace silver (0.05-15 mg/L) and trace organics in water (acetone: 0.05-5 mg/L; aldehydes: 0.4-60 mg/L; alcohols: 1-100 mg/L).

Technologies for quantification and identification of microbial species are requested within an alternative subtopic, ISS Utilization.

Spacecraft Fire Protection

A first response crew mask capable of protecting the crew from ammonia, hydrazine, and combustion products is desired. A suitable first response mask should be quick to don, protect the wearer from environmental contaminants and elevated temperature hazards, and provide breathable air during prolonged emergency response activities. This mask would be one-size fits all and be effective for a minimum of 1 hour. While wearing the mask, the crew should have excellent freedom of motion and positive indication of effectiveness.
A portable, self-contained fire and toxic atmosphere cleanup system is desired that can rapidly remove contaminants from a spacecraft volume

Technology Readiness Levels (TRL) of 3 to 4 or higher are sought.