Books & Reports

Advanced Hybrid Spacesuit Concept Featuring Integrated Open Loop and Closed Loop Ventilation Systems

A document discusses the design and prototype of an advanced spacesuit concept that integrates the capability to function seamlessly with multiple ventilation system approaches. Traditionally, spacesuits are designed to operate both dependently and independently of a host vehicle environment control and life support system (ECLSS). Spacesuits that operate independent of vehicle-provided ECLSS services must do so with equipment self-contained within or on the spacesuit. Suits that are dependent on vehicle-provided consumables must remain physically connected to and integrated with the vehicle to operate properly.

This innovation is the design and prototype of a hybrid spacesuit approach that configures the spacesuit to seamlessly interface and integrate with either type of vehicular systems, while still maintaining the ability to function completely independent of the vehicle. An existing Advanced Crew Escape Suit (ACES) was utilized as the platform from which to develop the innovation. The ACES was retrofitted with selected components and one-off items to achieve the objective.

The ventilation system concept was developed and prototyped/retrofitted to an existing ACES. Components were selected to provide suit connectors, hoses/umbilicals, internal breathing system ducting/conduits, etc. The concept utilizes a low-pressure-drop, high-flow ventilation system that serves as a conduit from the vehicle supply into the suit, up through a neck seal, into the breathing helmet cavity, back down through the neck seal, out of the suit, and returned to the vehicle. The concept also utilizes a modified demand-based breathing system configured to function seamlessly with the low-pressure-drop closed-loop ventilation system.

This work was done by Brian A. Daniel, Garret R. Fitzpatrick, Dustin M. Gohmert, Rick M. Ybarra, and Mark O. Dub of Johnson Space Center. Further information is contained in a TSP (see page 1). MSC-24804-1

Data Quality Screening Service

A report describes the Data Quality Screening Service (DQSS), which is designed to help automate the filtering of remote sensing data on behalf of science users. Whereas this process often involves much research through quality documents followed by laborious coding, the DQSS is a Web Service that provides data users with data pre-filtered to their particular criteria, while at the same time guiding the user with filtering recommendations of the cognizant data experts.

The DQSS design is based on a formal semantic Web ontology that describes data fields and the quality fields for applying quality control within a data product. The accompanying code base handles several remote sensing datasets and quality control schemes for data products stored in Hierarchical Data Format (HDF), a common format for NASA remote sensing data. Together, the ontology and code support a variety of quality control schemes through the implementation of the Boolean expression with simple, reusable conditional expressions as operands.

Additional datasets are added to the DQSS simply by registering instances in the ontology if they follow a quality scheme that is already modeled in the ontology. New quality schemes are added by extending the ontology and adding code for each new scheme.

This work was done by Richard Strub, Christopher Lynnes, Thomas Hearty, and Young-In Won of Goddard Space Flight Center; and Peter Fox and Stephan Zednik of Rensselaer Polytechnic Institute. Further information is contained in a TSP (see page 1). GSC-16227-1