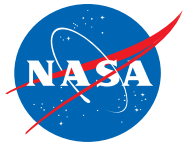
National Aeronautics and Space Administration



Intravenous Fluid Generation (IVGEN) for Exploration Missions

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Overview

- IVGEN Objectives
- Project History
- ISS Demonstration Hardware Overview
- Exploration Mission Hardware Concept
- Post-flight hardware analysis
- Lifetime testing

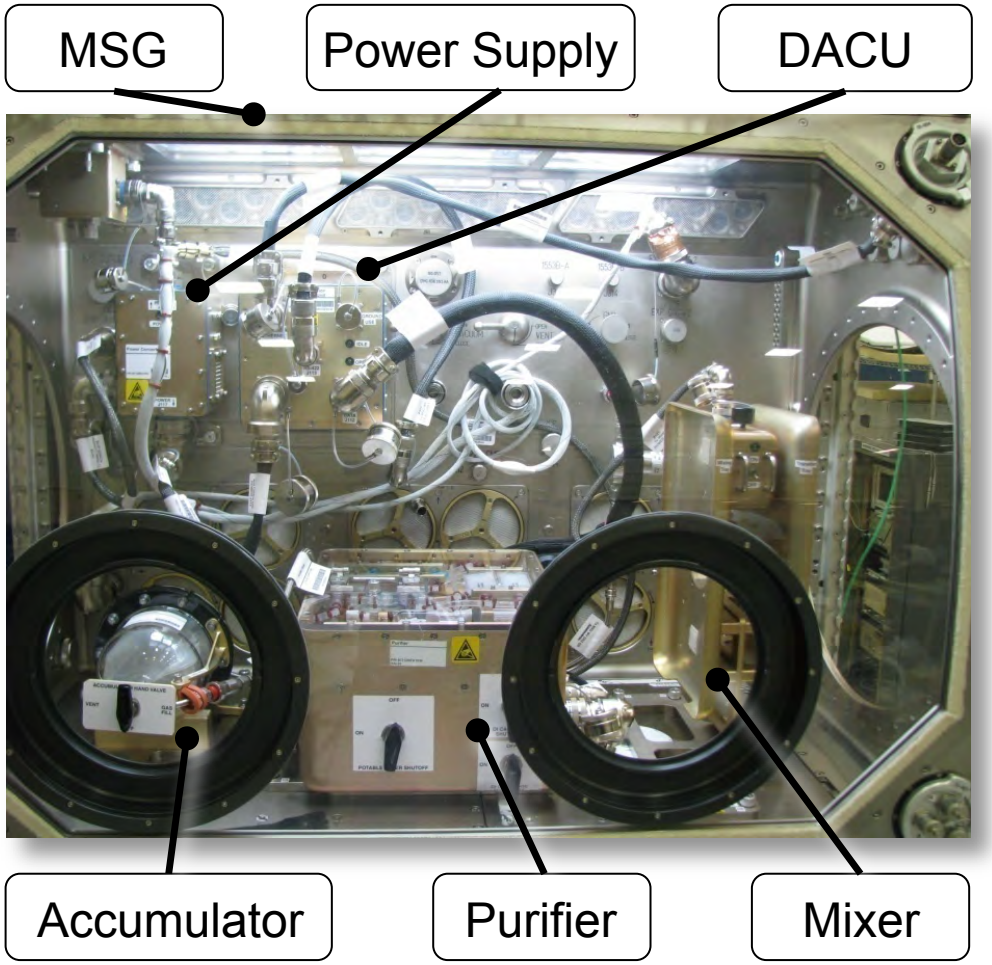
IVGEN Objectives

- Design a system to produce IV fluids including:
  - Compact water purification
  - Integrated reduced gravity pharmaceutical mixing
  - Product meeting USP standards
- Minimize volume and mass for the required production rate
- Filter capacity should be easily re-scalable to meet exploration requirements and constraints
- Submit IVGEN to a Technology Demonstration aboard the ISS

IVGEN Project History

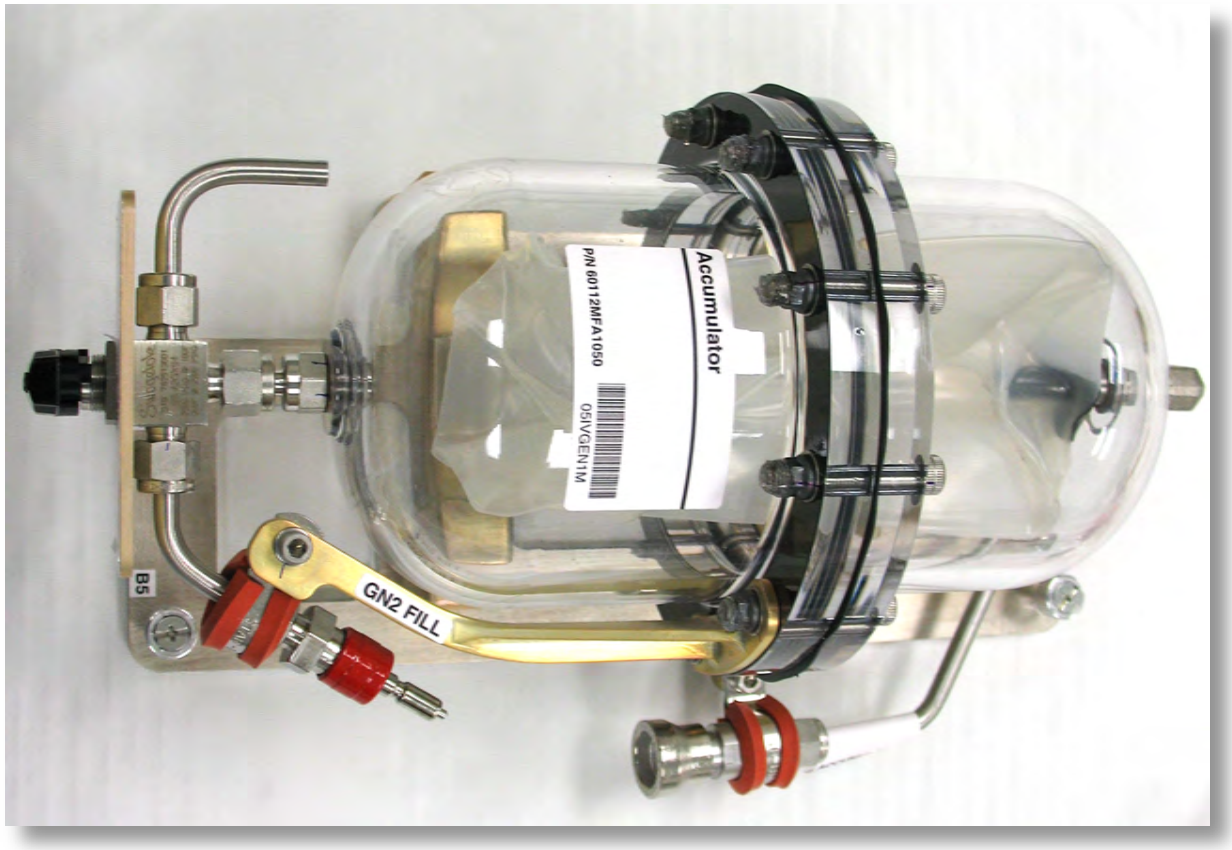
- Laboratory Study for Microgravity Mixing
- Trade Studies for Technologies to Generate Medical Grade Water in Microgravity
- Laboratory Study for Technologies to Generate Medical Grade Water in Microgravity
- Flight Experiment (May 2010) and Flight Data Analysis
- Exploration Mission Design Recommendation

ISS Demonstration Hardware Overview



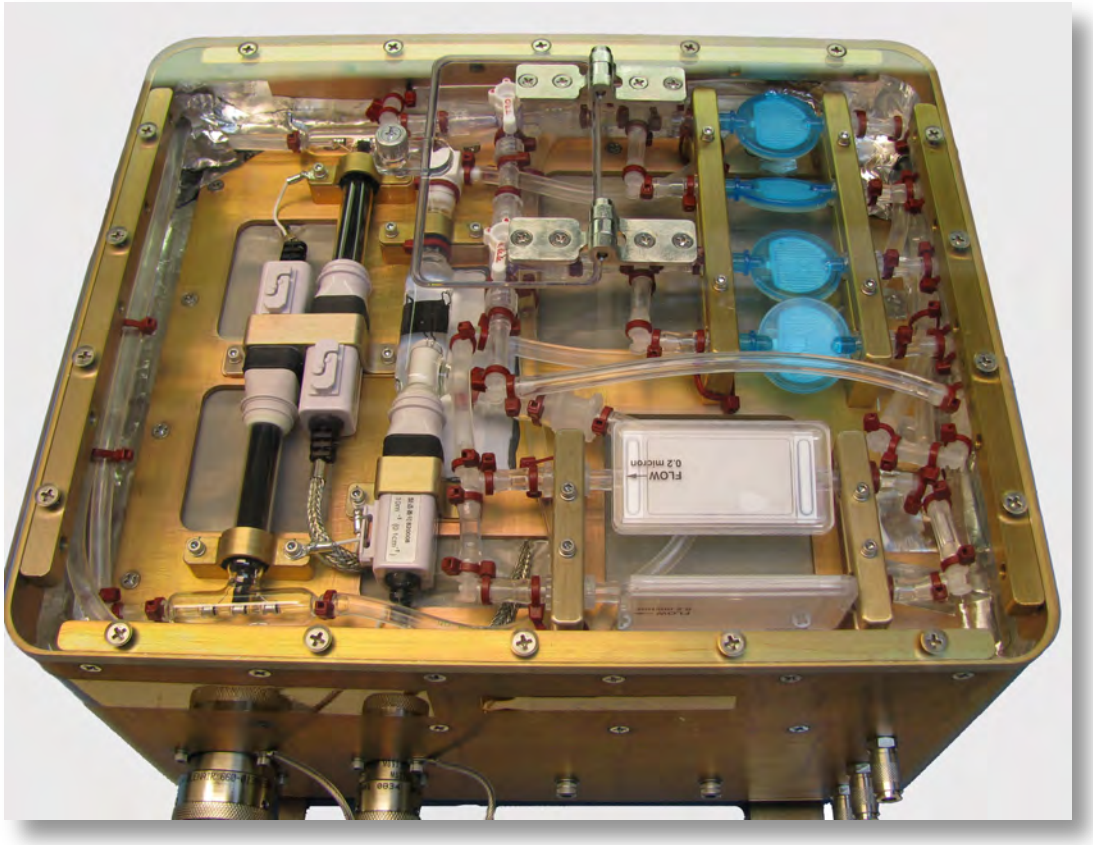
- Operate in the Microgravity Science Glovebox (MSG) on ISS
- Data Acquisition and Control Unit (DACU) handles data flow and storage
- Accumulator drives water flow through the system
- Purifier filters water and contains diagnostic instruments
- Mixer combines purified water with the sodium chloride

ISS Demonstration Hardware Overview



Accumulator

ISS Demonstration Hardware Overview



Purifier

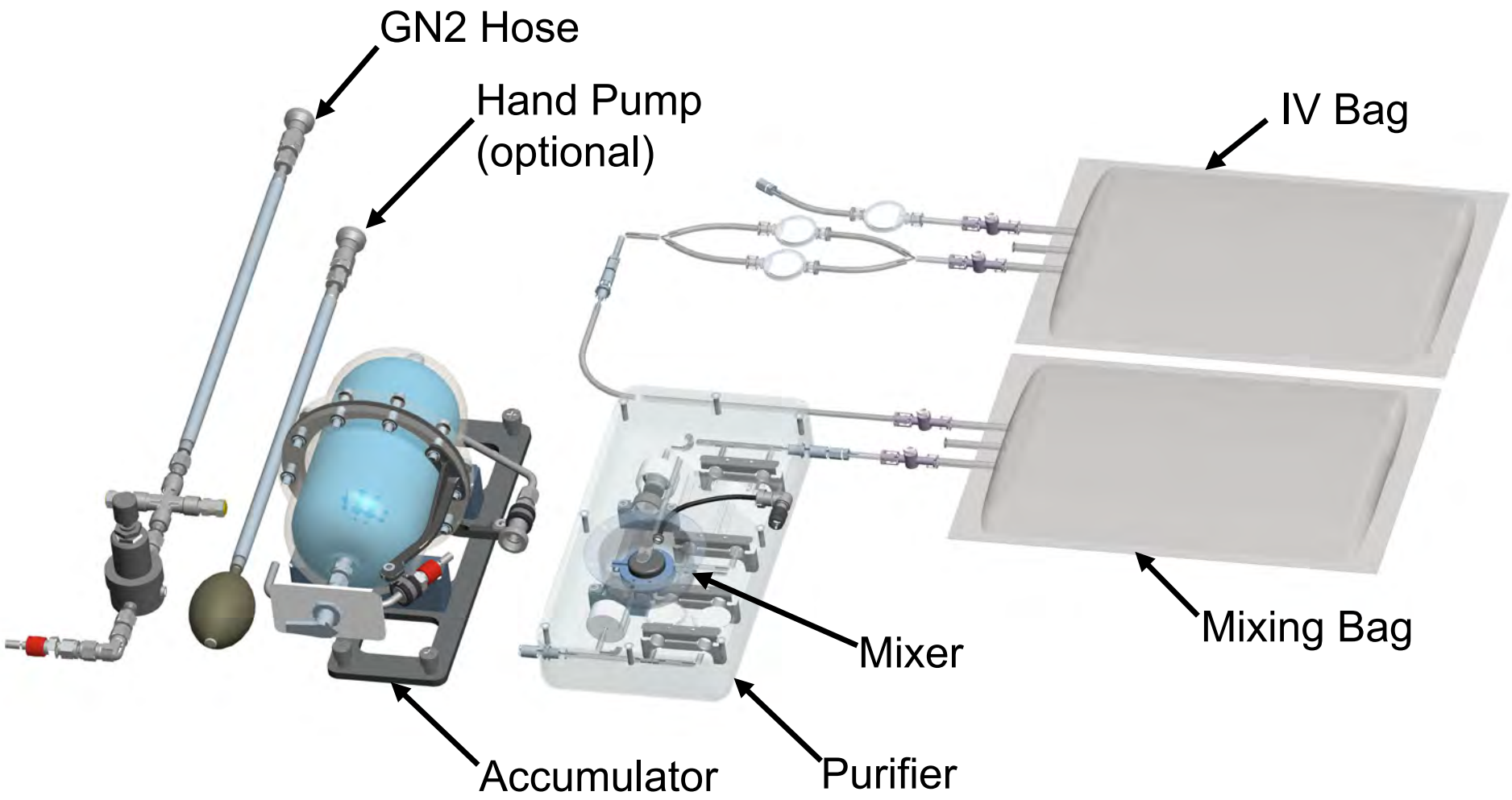
ISS Demonstration Hardware Overview

Mixer

Mixing Bag

Collection Bag

IVGEN Exploration Design

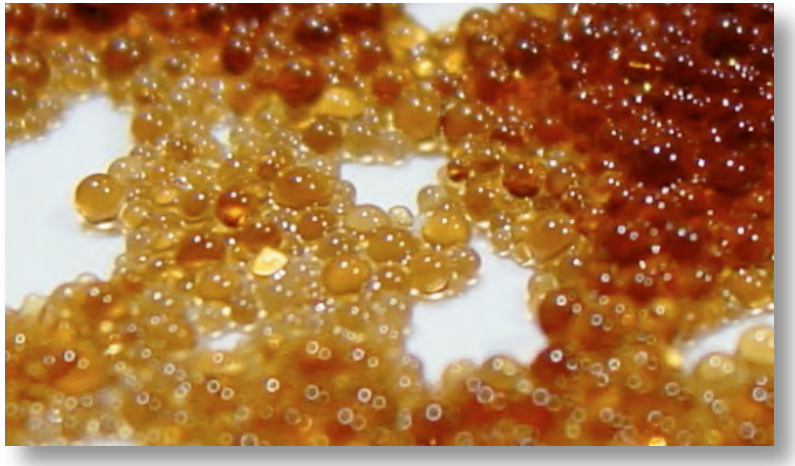


Post Flight Hardware Analysis

- Visual inspection for damage, contamination, and/or deterioration
- Assess system's ability after sitting unused for two years
- Measure hold-up volume of system
- Test remaining Saline Bags

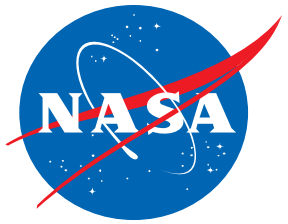
Ongoing Lifetime Testing

- Packaging material
- Packaging technique
- Cartridge material
- Resin volume



DI Resin

DI Resin Cartridge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