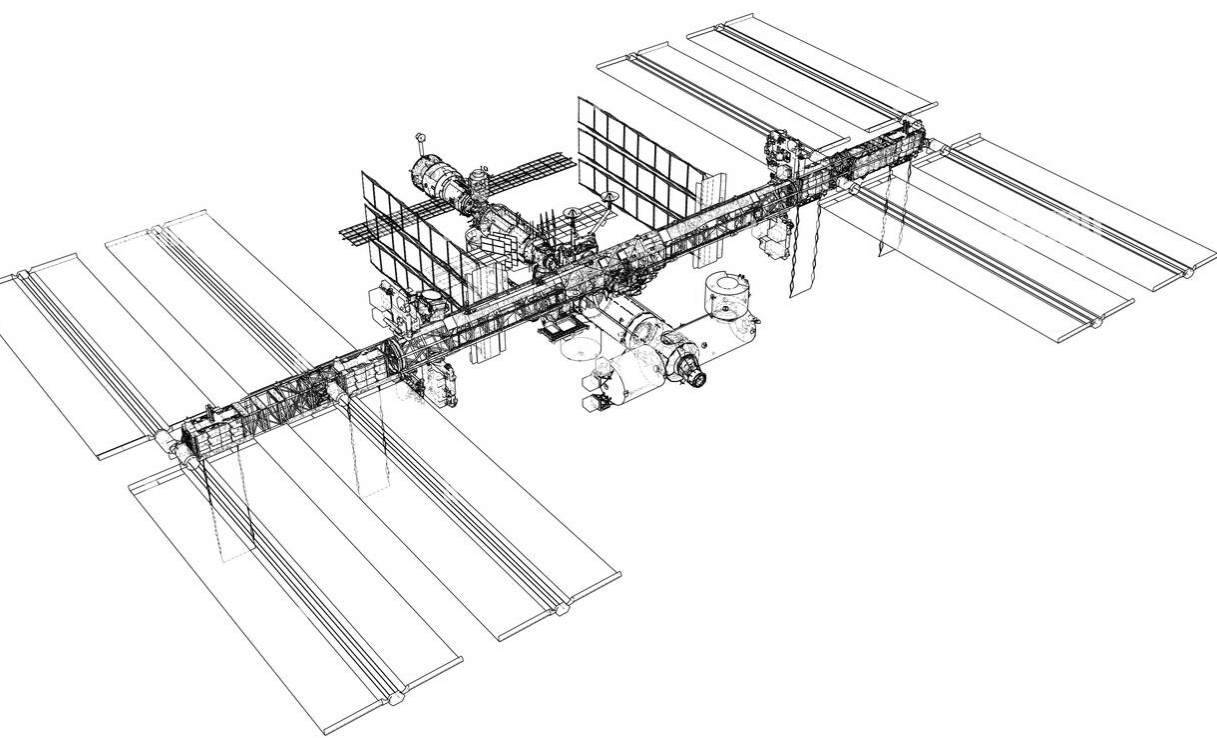


Developing a Compact Fluid Management Module for Aerospace Electrolyzers

Project Goal

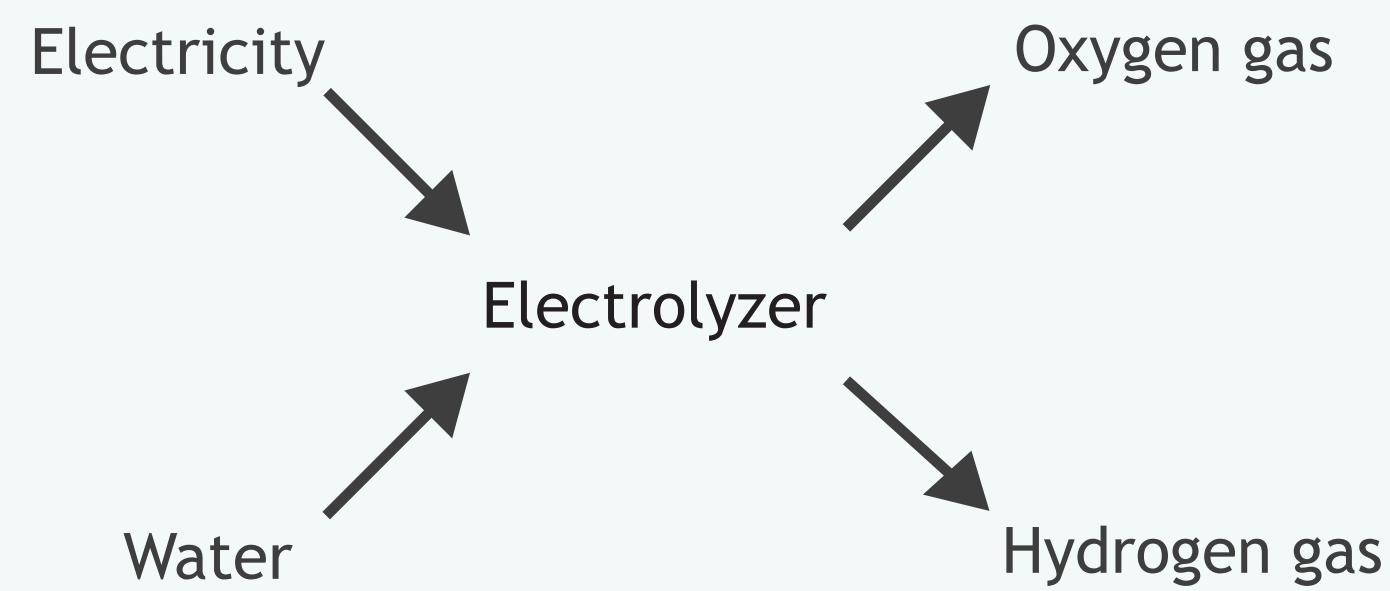
Reduce volume and mass of electrolyzer fluid management module (FMM) to take up less space and weight on the ISS.



Electrolyzers Generate Oxygen for Astronauts

Basic Functionality

An electrolyzer uses electricity to convert water into hydrogen and oxygen, a process called electrolysis. The oxygen is used to maintain a breathable atmosphere on the ISS.



Detailed Functionality

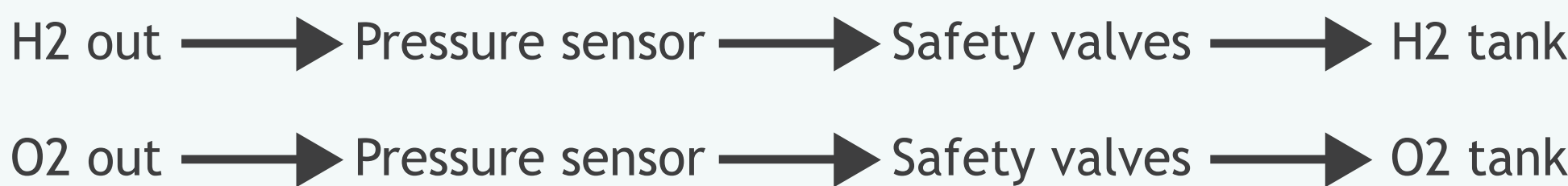


H2O in

Cell stack

Static Vapor Feed Electrolyzers (SVFEs) have a simpler support system compared to traditional liquid feed electrolyzers. The cell stack (left) is where the electrolysis reaction occurs. Our project focused on the fluid management module (FMM), a series of monitoring and safety components for the output gas lines.

What we worked on (FMM)



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Compacting the Fluid Management Module

- We:
- brainstormed novel ideas
 - reverse engineered components
 - prototyped integrating components into an existing part of the cell stack
 - developed a working prototype of an output line with compressed air

Current Lab Setup

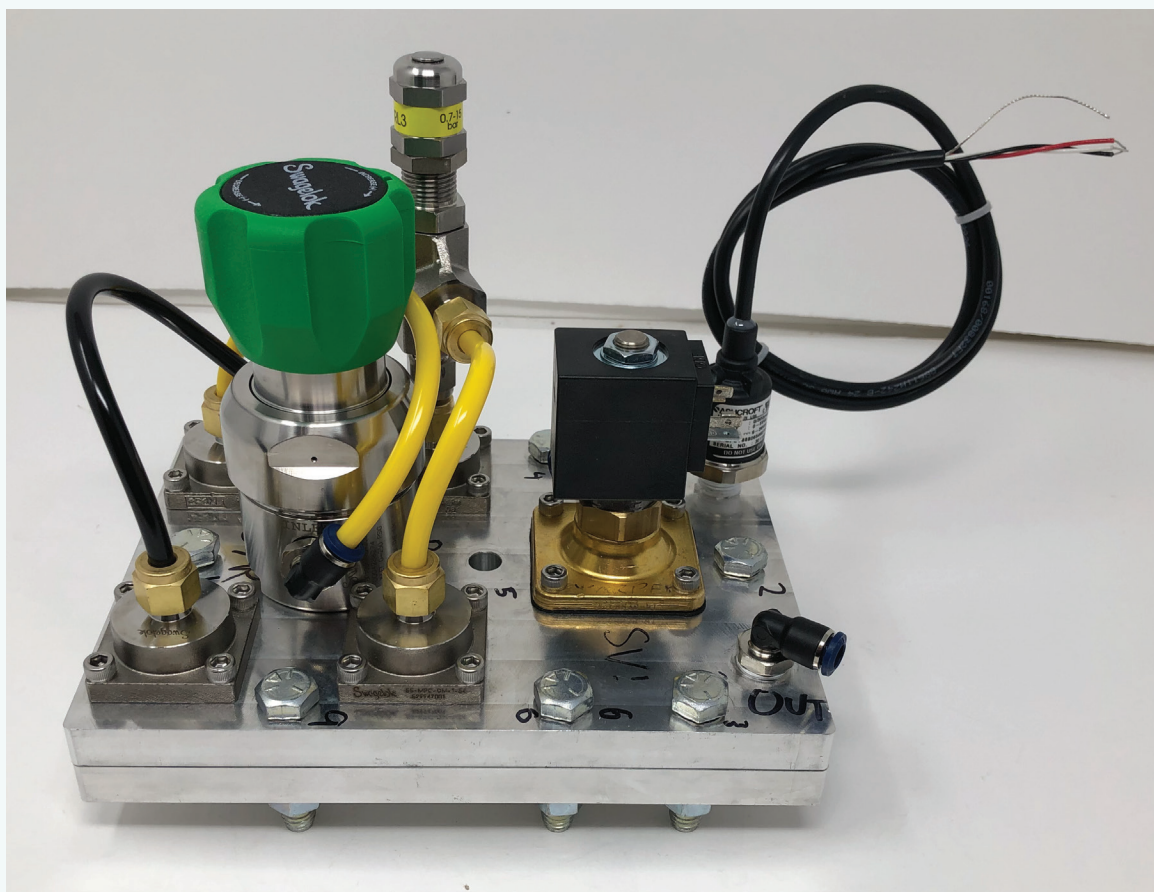


Giner lab-scale demo unit: not optimized for volume or weight

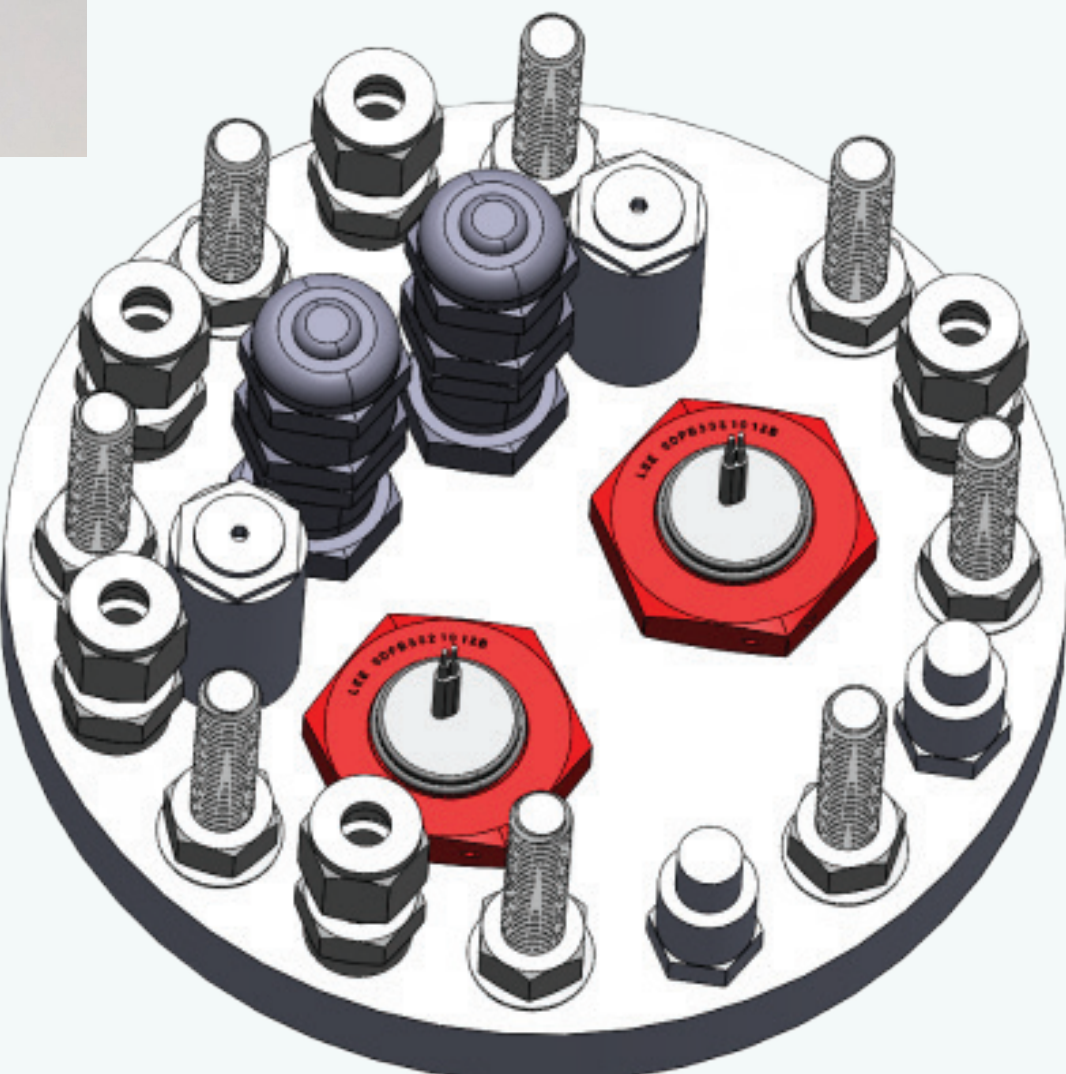
Current FMM components and plumbing



Final Designs

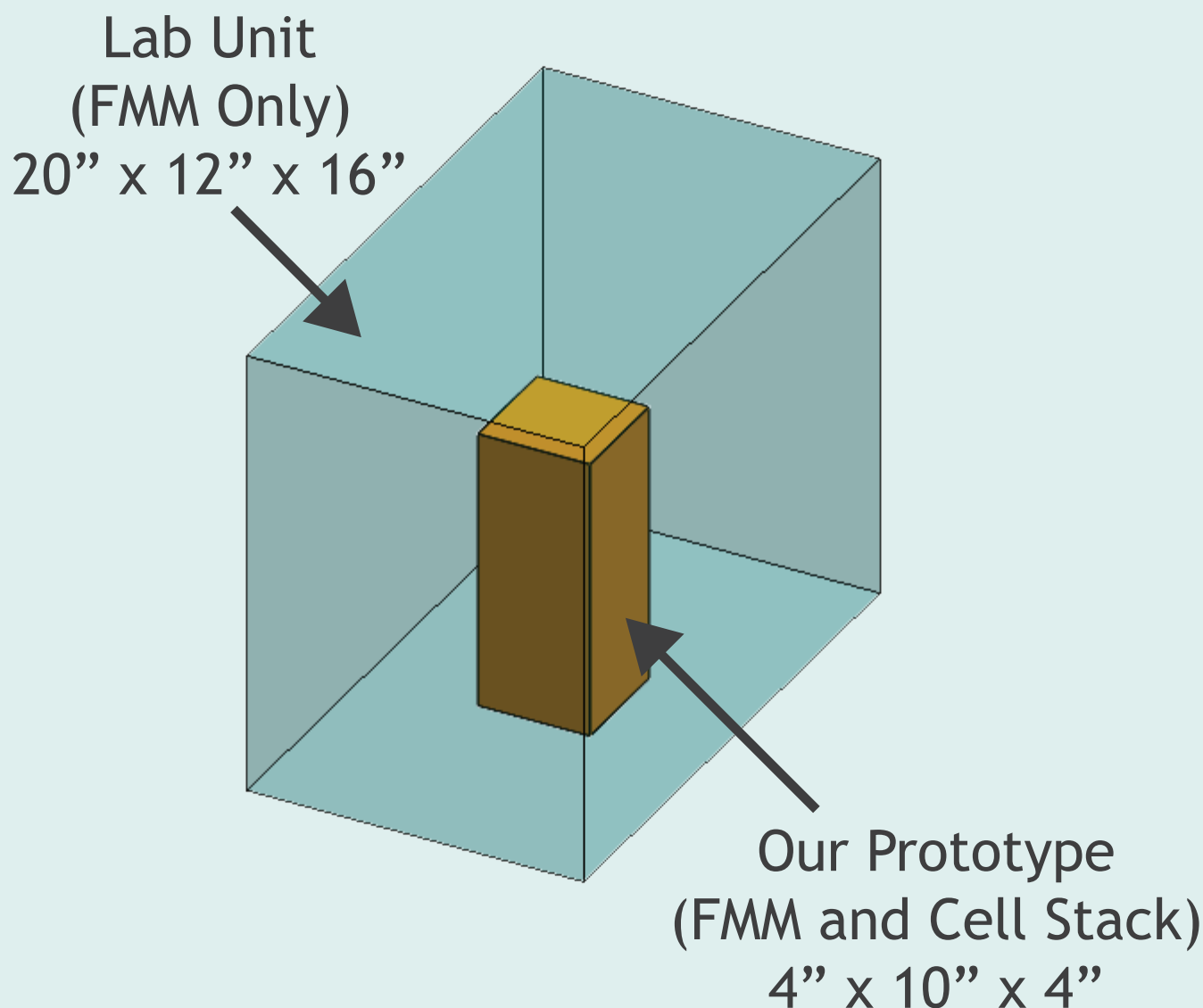


Single gas output line prototype with components condensed onto one plate



Two gas output line concept with components condensed onto existing cell stack surface

FMM Volume Comparison



24x smaller,
10x lighter