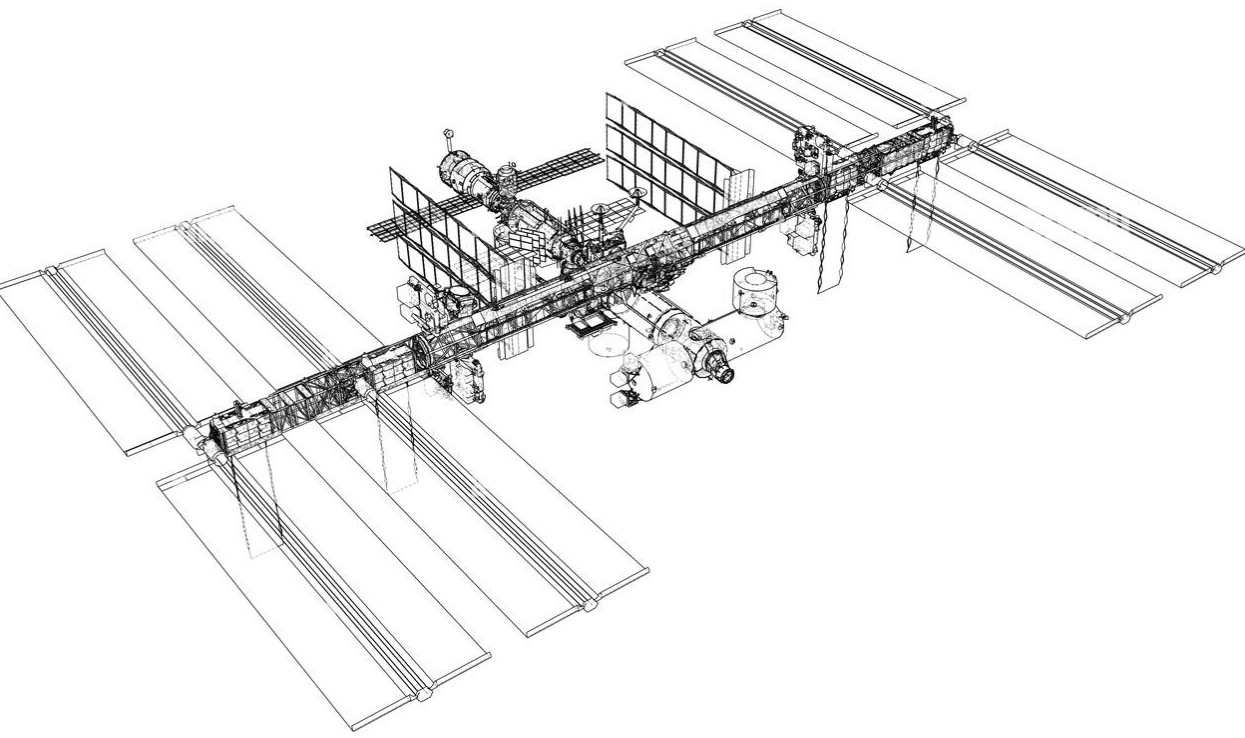


Developing a Compact Fluid Management Module for Aerospace Electrolyzers



Project Goal

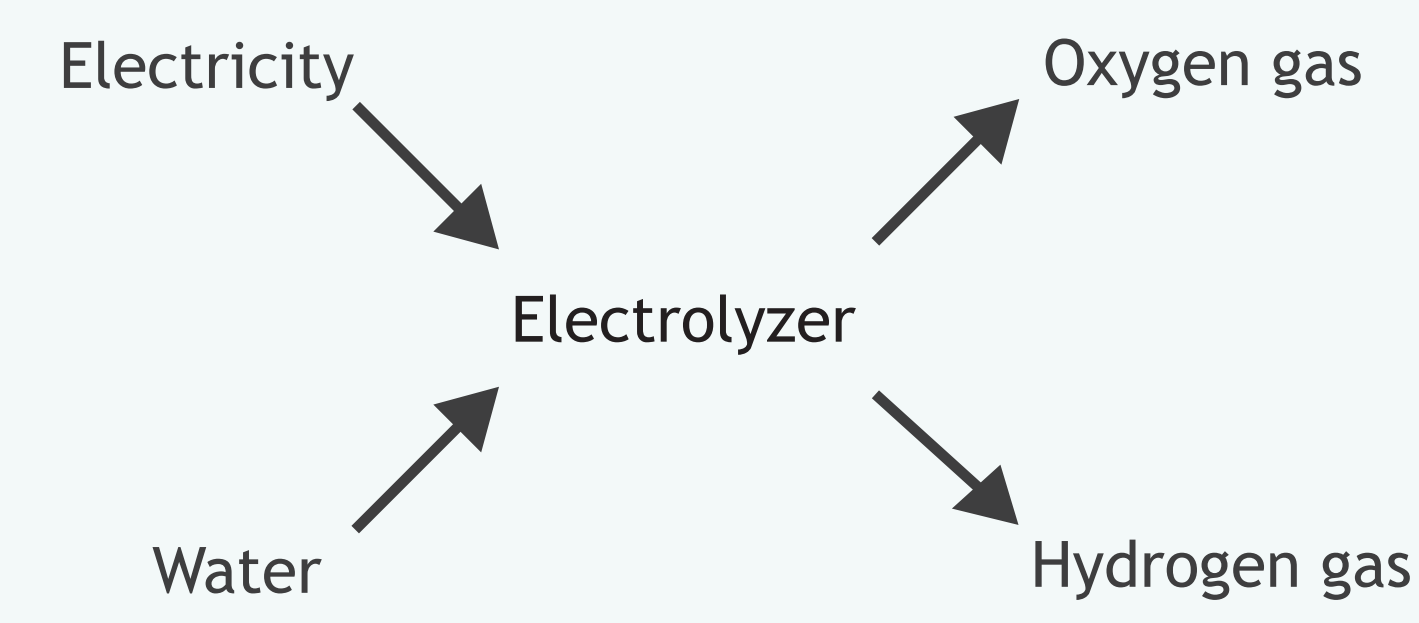
Reduce volume and mass of electrolyzer fluid management module (FMM) to take up less space and weight on the ISS.



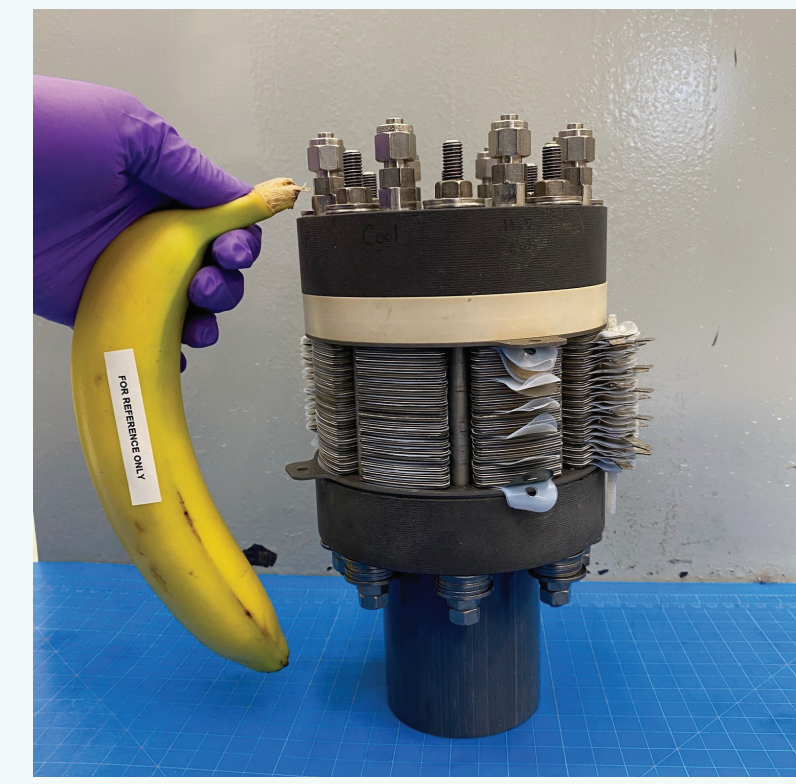
Electrolyzers Generate Oxygen for Astronauts

Basic Functionality

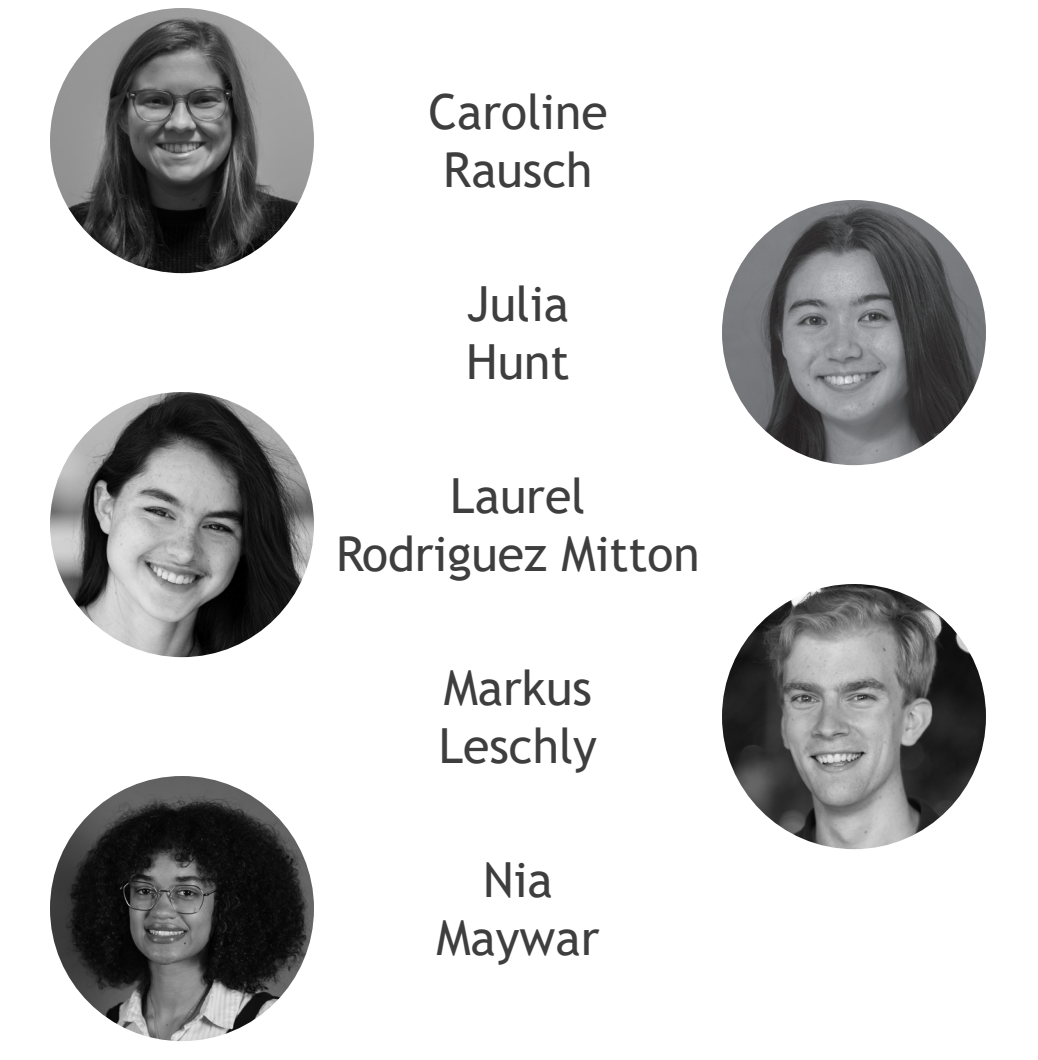
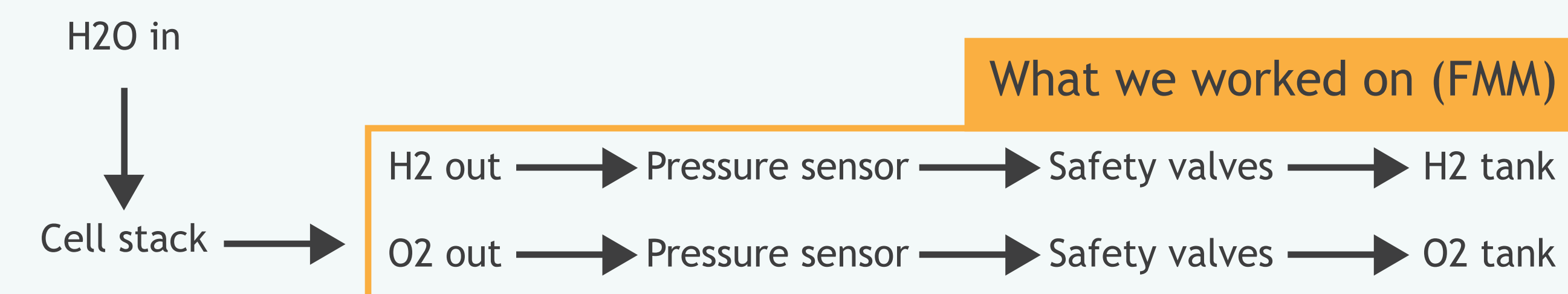
An electrolyzer uses electricity to convert water into hydrogen and oxygen, a process called electrolysis. The oxygen is used to maintain a breathable atmosphere on the ISS.



Detailed Functionality



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.



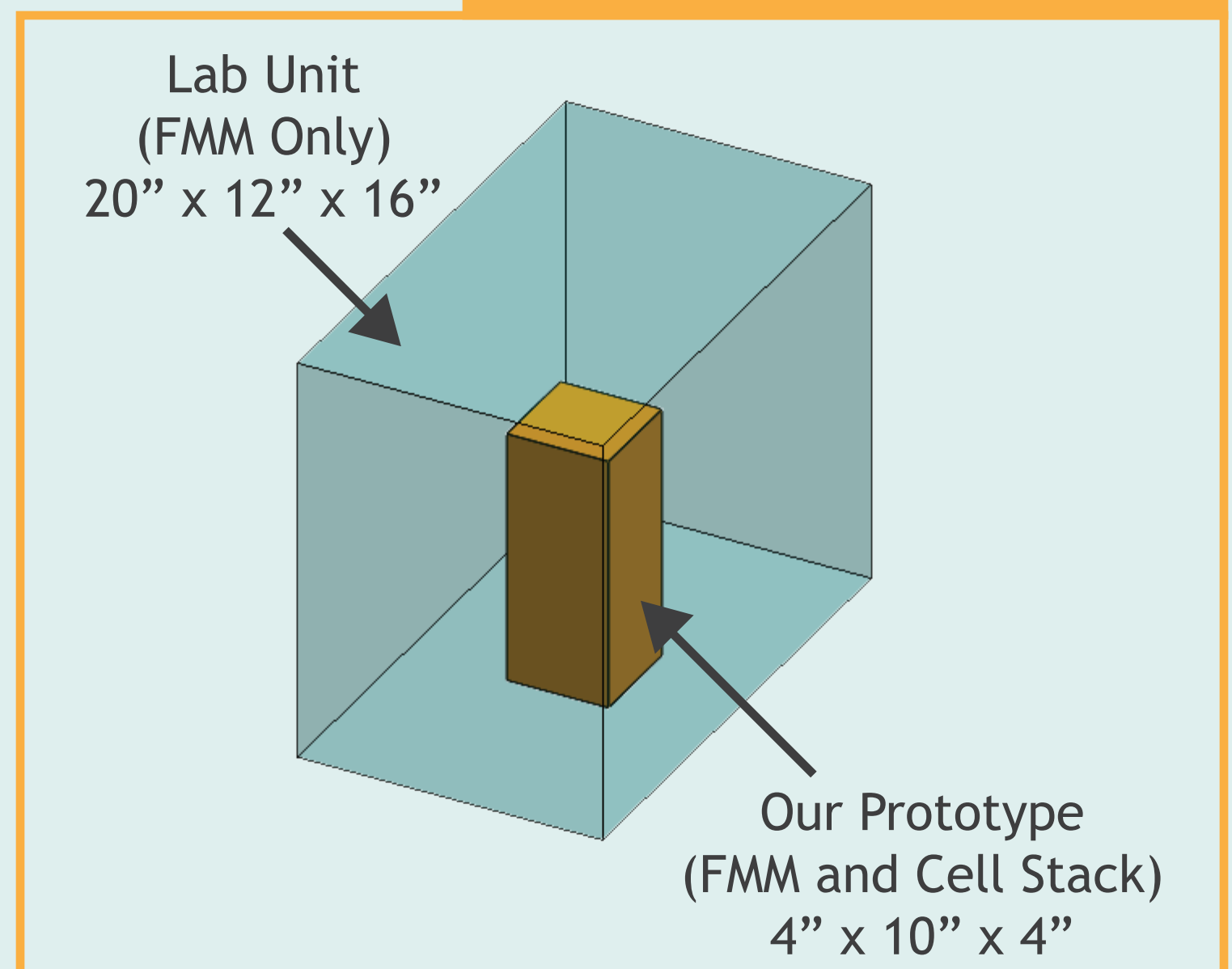
Advisor: Alessandra Ferzoco
 Subject Matter Expert: Chris Lee
 Giner Liaisons: Evan Cusato, Elliott Donlon, Meagan Rich-Emar, Ben Zackin

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

**24x smaller,
10x lighter**

FMM Volume Comparison



Current Lab Setup

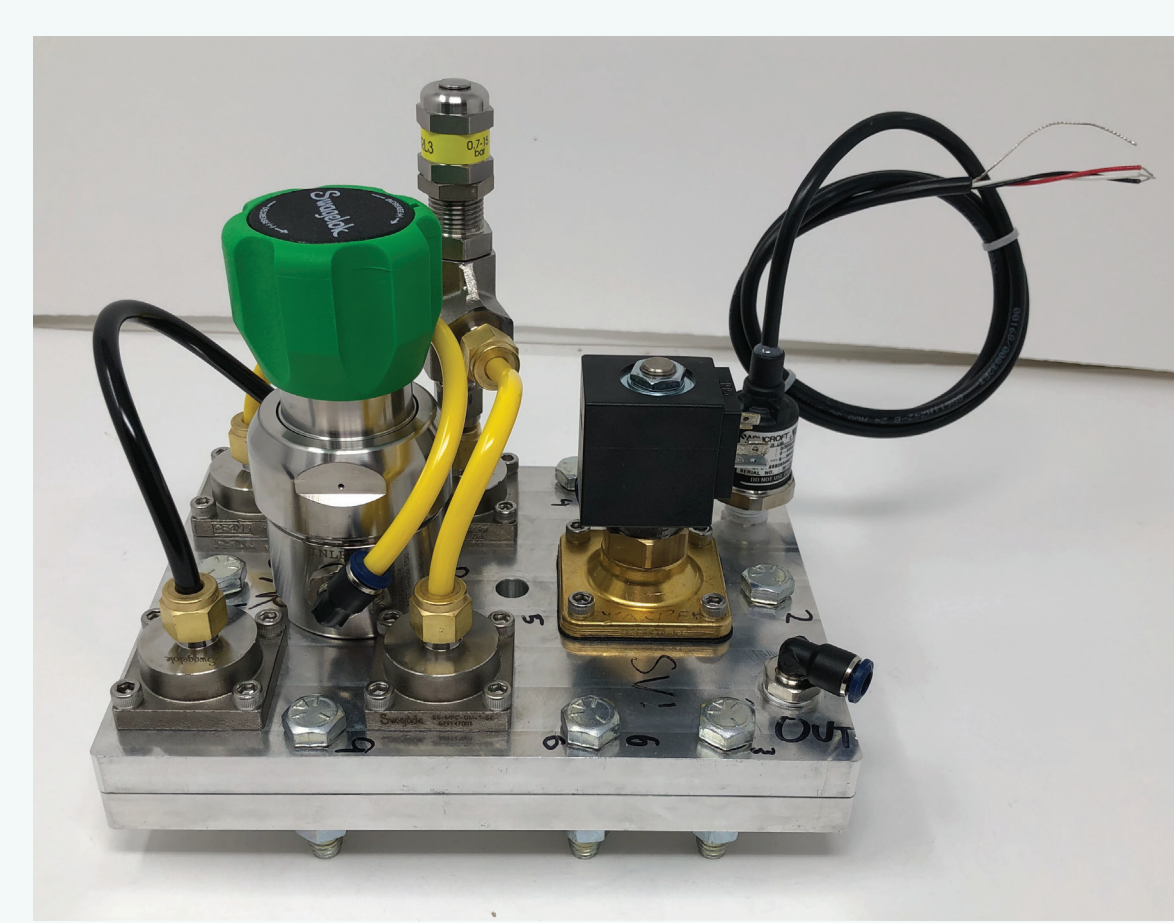


Giner lab-scale demo unit: not optimized for volume or weight

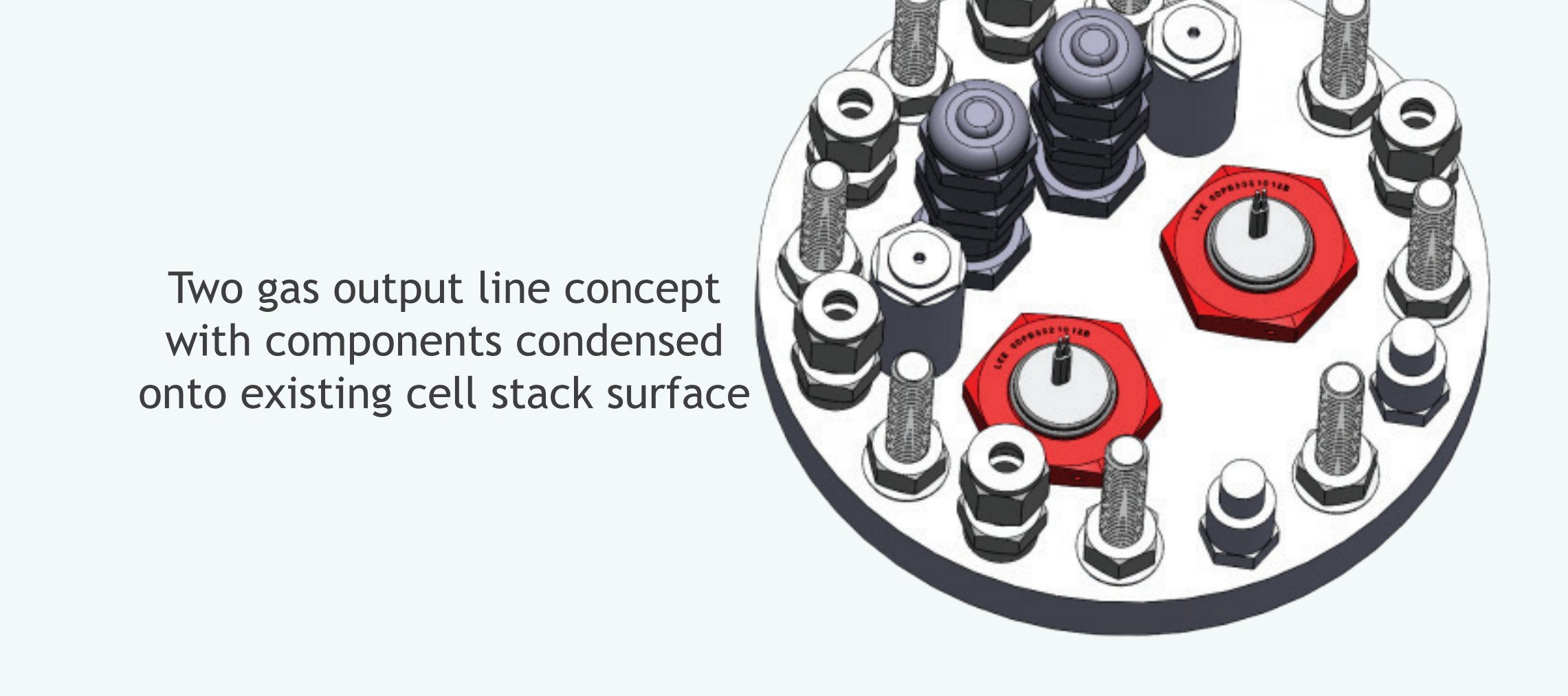


Current FMM components and plumbing

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