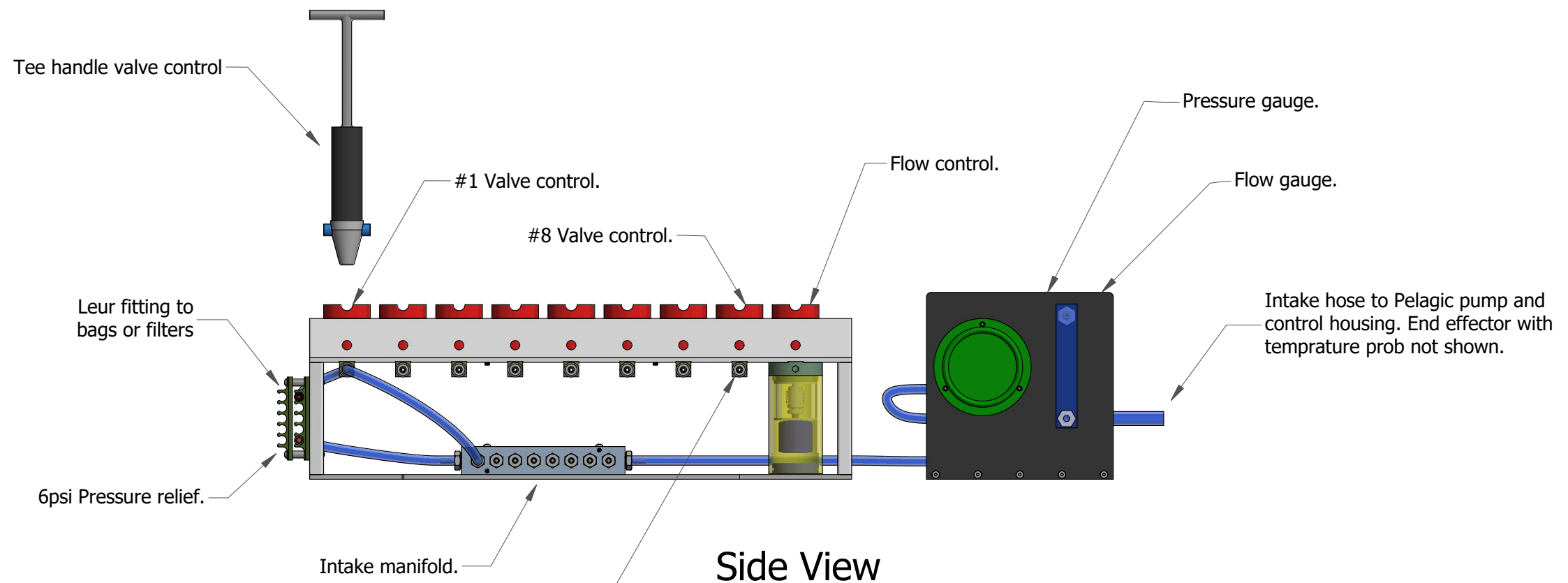


Universal Fluid Obtainer (UFO)

Rika Anderson - Carleton College
Elizabeth Trembath-Reichert - ASU

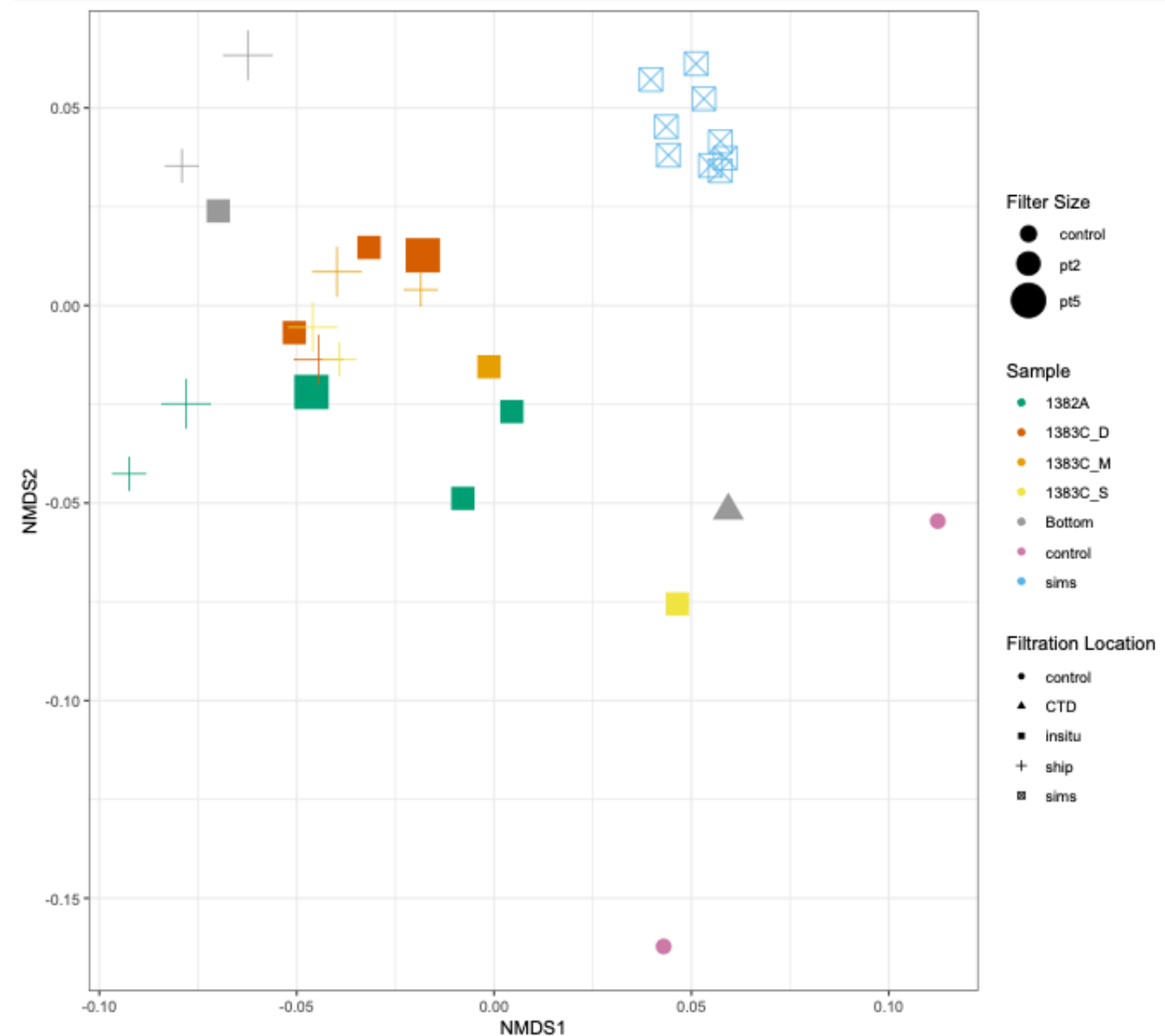


Why do we need a fluid sampler for use with NDSF vehicles?

- Large volumes of fluids are often needed from the deep sea

Source	org/ml	g DNA/org	L needed
Bacteria ocean	1.00E+06	1.00E-15	0.02
High Bacteria vents	1.00E+05	1.00E-15	0.2
Low Bacteria vents	1.00E+04	1.00E-15	2
High Viruses vents	1.00E+06	1.00E-17	2
Low Viruses vents	1.00E+05	1.00E-17	20

- Filtering *in situ* provides a more accurate snapshot of the microbial community

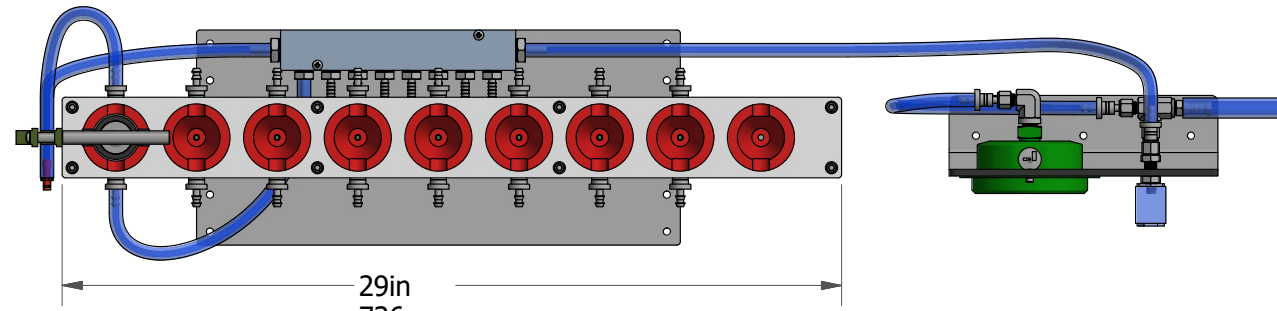


Why do we need a fluid sampler for use with NDSF vehicles?

- Fluid samplers are usually owned and maintained in the labs of **individual PIs**
- **Barrier to entry** for early career scientists, scientists without their own samplers
- Requires **re-testing** each sampler for compliance with NDSF regulations/compatibility with vehicles

Goal: Develop a **community fluid sampler** with WHOI engineers to meet community needs for fluid sampling, while remaining simple and adaptable to prevent a high maintenance burden

Current UFO Design

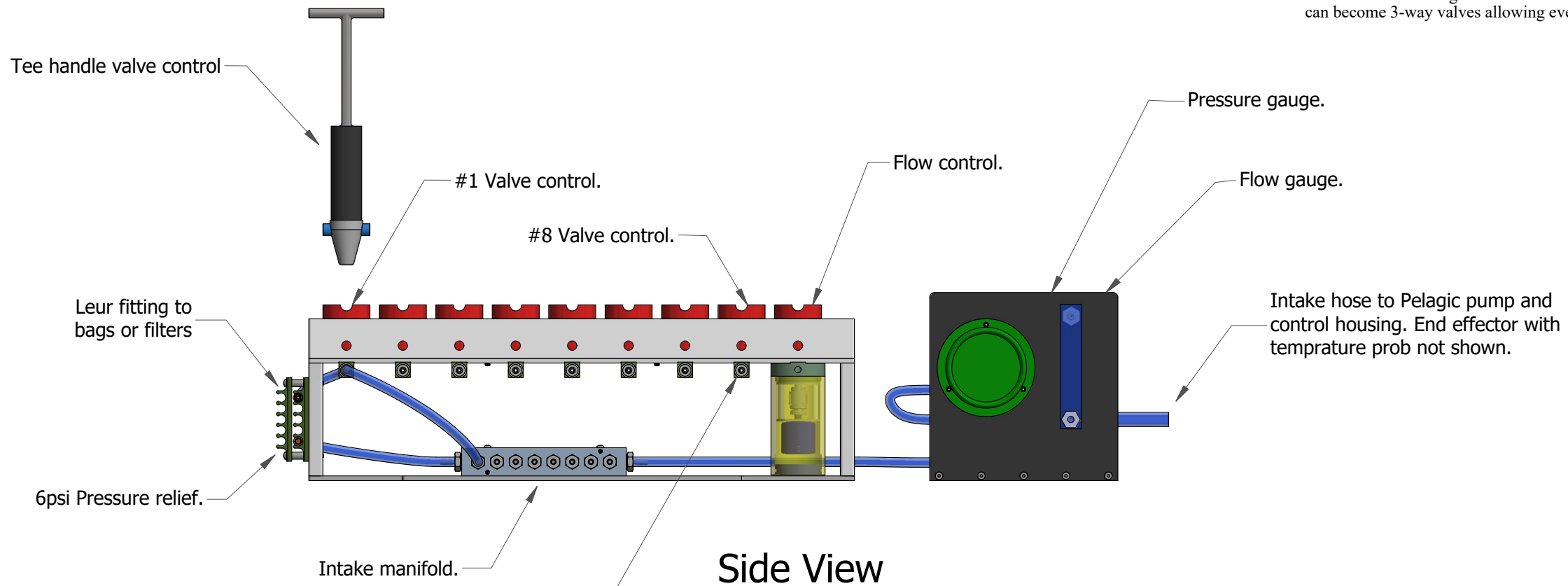


Top View

List of Objectives:

- Easy to maintain
- As much COTs as possible
- 120°C temperature
- Variable speed up to 1 liters per minute or multiple pumps
- 8 to 14 ports
- Connect to filters and bags
- Titanium intake tube
- Flow meter
- Temperature
- Purge cable
- Plug and play Jason and Alvin
- Modular
- Standard Leur fitting interface

I am proposing the water sampler valve array in this document using the above objectives. Relatively speaking this is an inexpensive robust system focused on the use of COT components. The thought is to maximally utilize the existing vehicle infrastructure; manipulator and cameras. This strategy takes advantage of equipment we already own. This 8-valve system could be 16 or 24 valves simply by duplicating the array. The strategy of using independent valves allows for a wide range of unforeseen connections. The 2-way valves can become 3-way valves allowing even more alternatives.



Side View

UNLESS OTHERWISE NOTED: DIMENSIONS ARE IN INCHES REMOVE ALL BURRS & SHARP EDGES BREAK ALL SHARP EDGES R0.02 MIN		CREATION DATE: 9/12/2019	WOODS HOLE OCEANOGRAPHIC INSTITUTION
TOLERANCES Fractions Decimals Angles #/16 .xx ±0.05 ±0.5° x.xx ±0.01 x.xxx ±0.001		MODIFIED DATE:	Water Sampler Valve Array
MATERIAL		DRAFTER: Billings	
Parker or Swagloc instrument valve. (very robust)		ENGINEER: Billings	SIZE: D DRAWING NUMBER: Assembly Valve Array REV:
		SCALE:	SHEET 1 OF 1

Next Steps

- Sampler building in progress
- Continue to canvas the community for feedback
- Testing
- Some community members have already begun to include it in proposals

