

# Precision multi-sampler for use with deep-submergence vehicles

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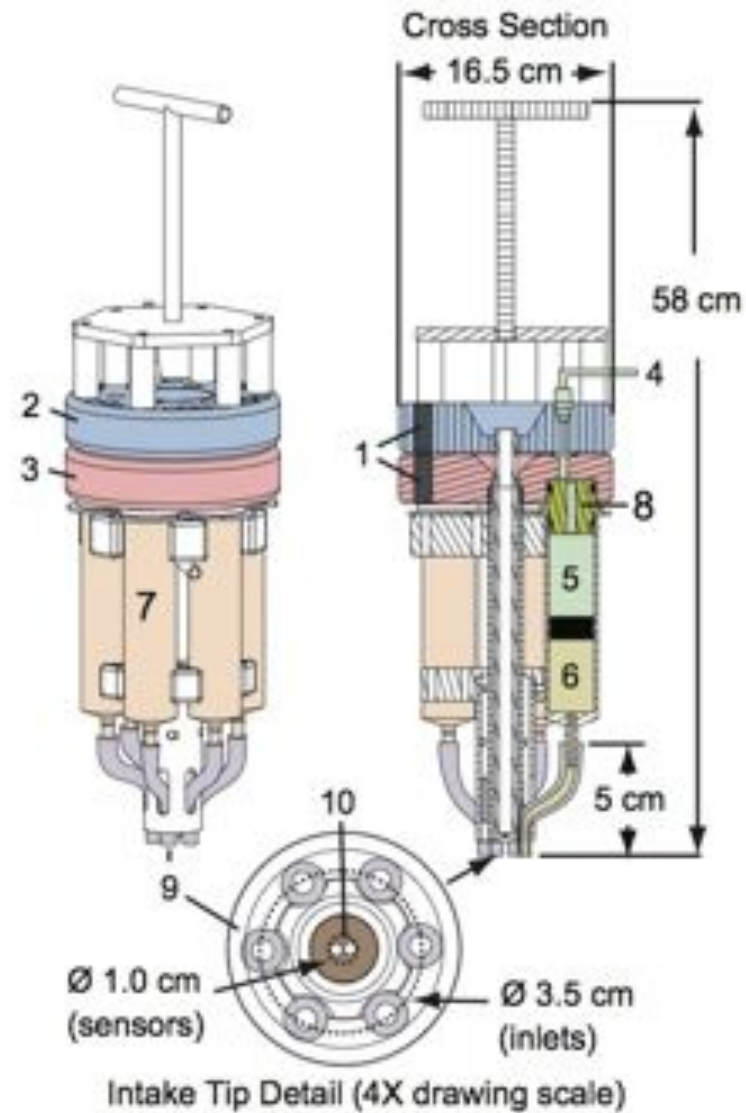
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Basic Premise:

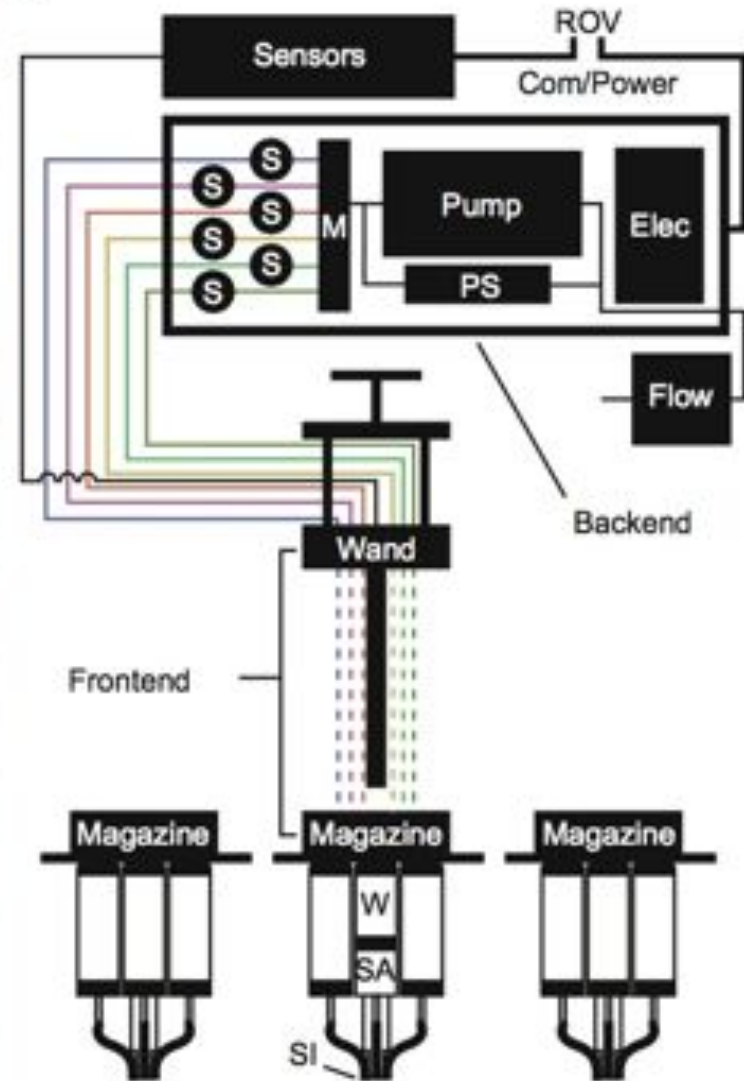
A sampler designed to collect discrete microbial samples with high spatial resolution (X,Y, & Z) with minimal cross contamination between samples, and that would include sensors for T° and O<sub>2</sub> at the sampler interface. Sampler design to be compatible cross-platform between deep-sea vehicles, and capable of efficient sample turnaround using ROV *Jason2*.

Sampler design and implementation supported by a collaborative NSF OTIC grant proposal between Emerson & Breier, funded in 2009.

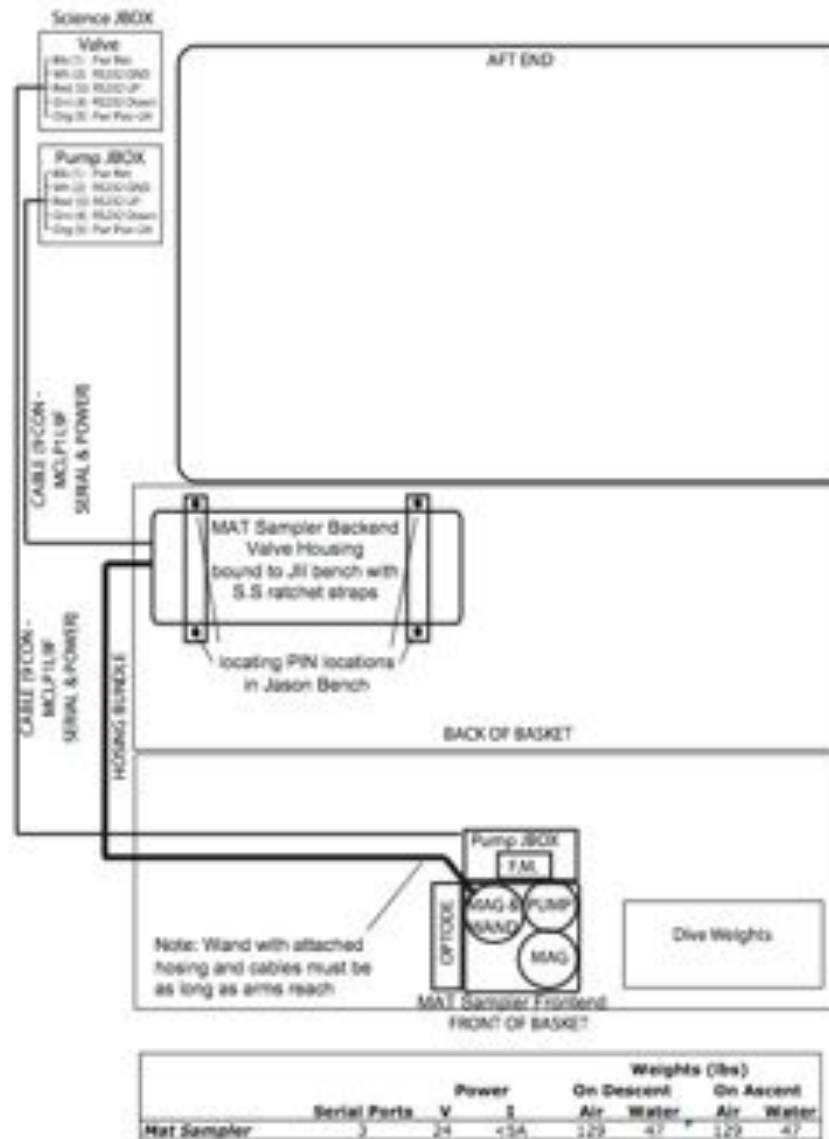
# Diagram of working end of sampler



# Components



# ROV *Jason2* – basket layout w/sampler



# Cassettes ready for deployment







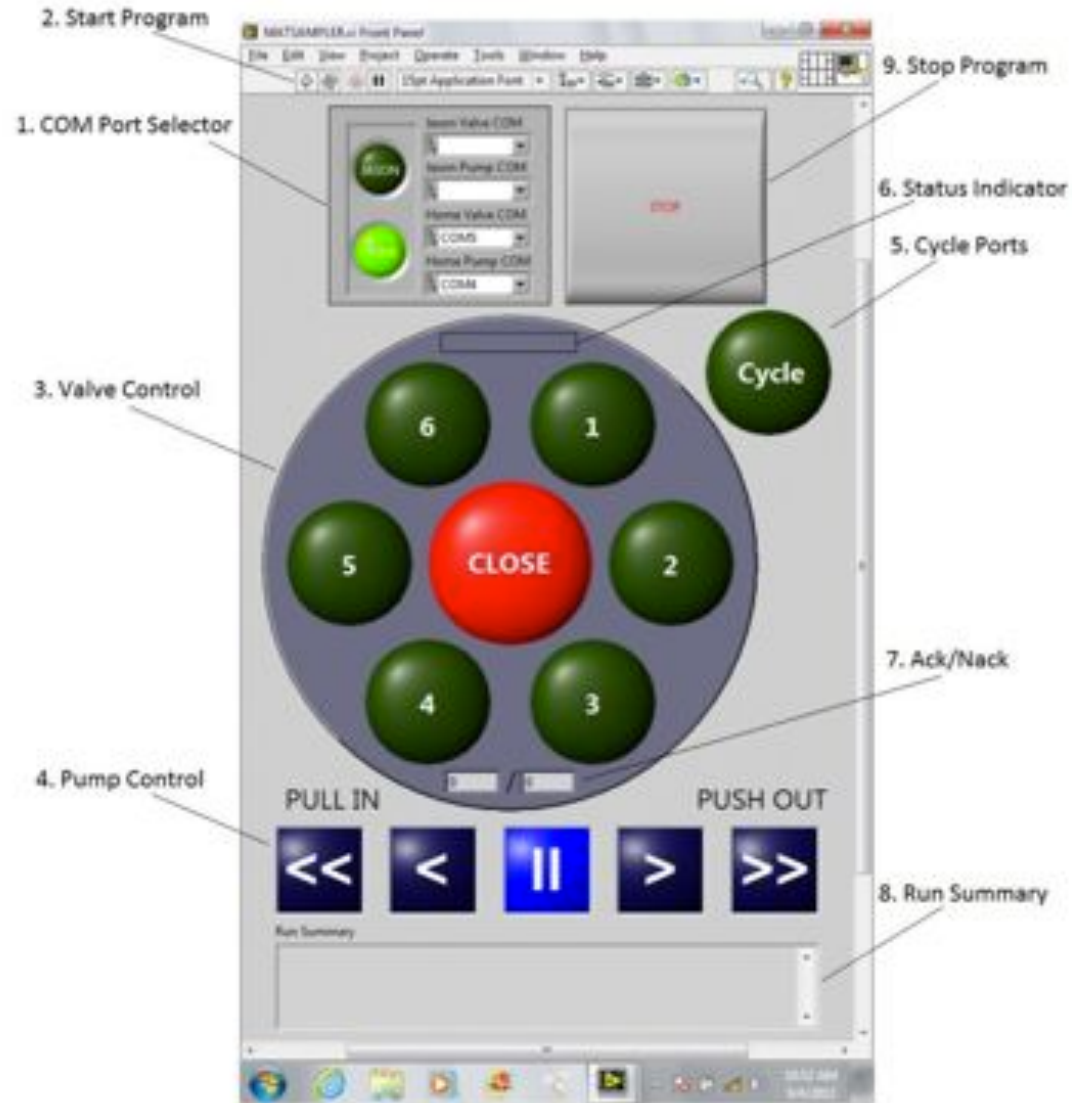
## Elevator crate for additional cassettes



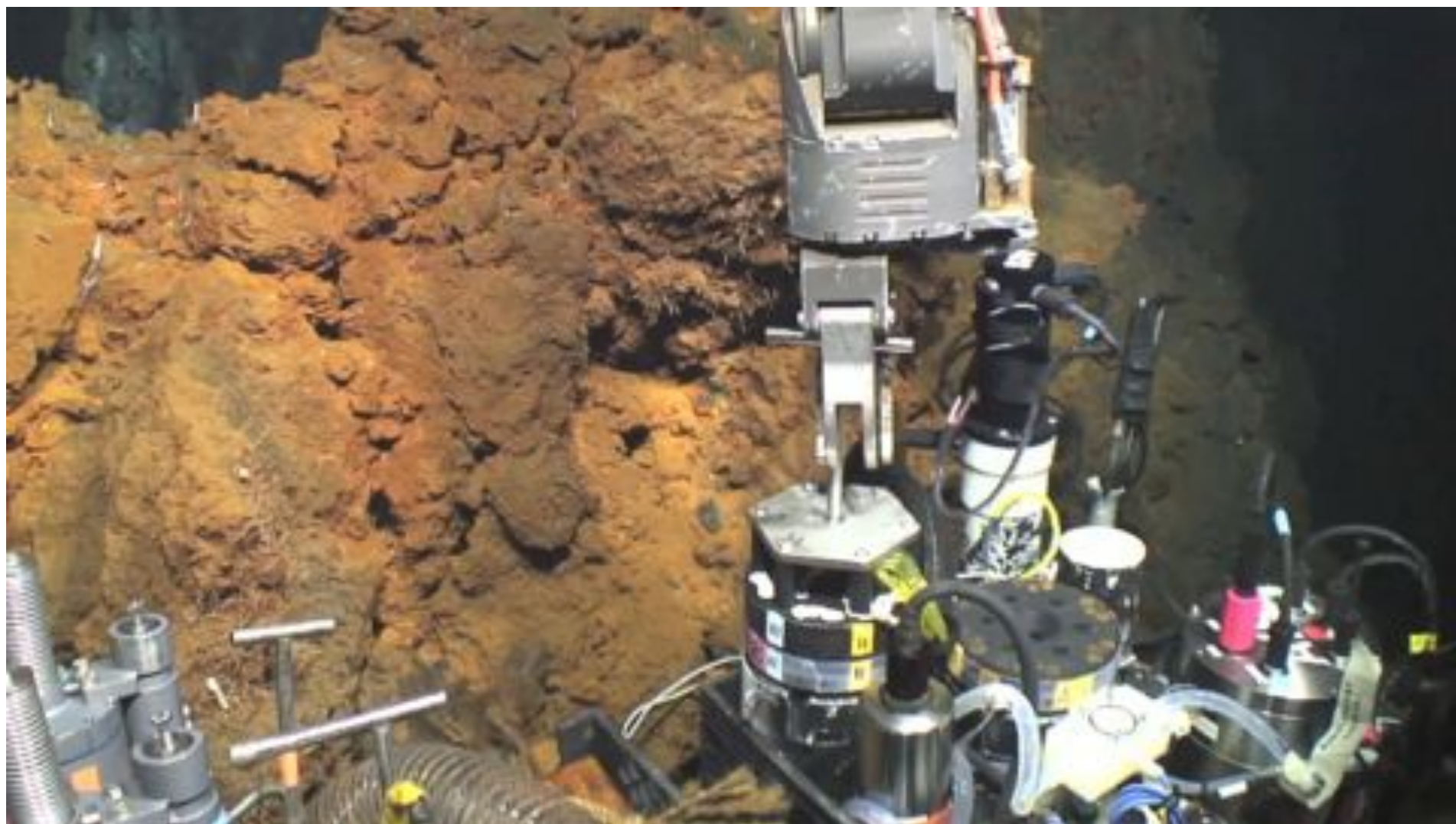


# Control Interface – Tablet Computer

MAT Sampler Labview GUI











# Different sampler configurations





# Porewater Sampler



## **Summary of Deployments.**

January 2012, Mid-Caymen Rise, vent fluids  
& microbial mats (max depth, 4988m)

October, 2012, Mid-Atlantic Ridge, microbial  
mats (max depth, approx. 3600m)

March, 2013, Loihi Seamount, microbial mats  
& porewaters (max depth, 4980m)

### **Summary of Usages.**

- Microbial mat sampler: Microbial iron mats & streamers
- In situ sample preservation, e.g. collection of mat samples into syringes pre-filled with RNALater
- Concentrated vent fluids, collected on a syringe
- Porewater sampler, collecting  $0.2\mu\text{m}$  filtered porewater directly from within mat

### **Proposed usages:**

- Collecting particles from the water column
- Collection of meiofauna
- Tracer addition.

## **User Community.**

- Microbiologists
- Biogeochemists
- Others – biologists, physical oceanographers

What NDSF/ROV Jason2 would provide (as currently configured):

- Sampler Unit:
  - ‘Backend’: Valve unit w/electronics in pressure housing
  - ‘Frontend’: Pump, jbox, wand, cassettes
- Set-up of sampler on basket
  - Integration into Jason comms
- Control interface – laptop computer in Jason van
- Sampling cassettes – 4 total
- Milk crate for holding cassettes on elevator

**Users responsibility:**

- Disposable Syringes or other sampling devices
- Assembly and disassembly of cassettes
- QC of cassettes & delivery to J2 prior to pre-dive or elevator ops.

**Pre-dive checklist:**

- Operation of pump and valve unit coupled to cassette.



**Modifications.**

- Minimization of pump/valve/electronics
- Options:
  - placement of 'backend' on J2 undercarriage
  - consolidation of components into a single operational package
- Add temperature sensor

2012 - 2013

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120	Phạm Văn A	8	OK
121	Phạm Văn B	7	OK
122	Phạm Văn C	6	OK
123	Phạm Văn D	5	OK
124	Phạm Văn E	4	OK
125	Phạm Văn F	3	OK
126	Phạm Văn G	2	OK
127	Phạm Văn H	1	OK
128	Phạm Văn I	0	OK
129	Phạm Văn J	0	OK
130	Phạm Văn K	0	OK
131	Phạm Văn L	0	OK
132	Phạm Văn M	0	OK
133	Phạm Văn N	0	OK
134	Phạm Văn O	0	OK
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144	Phạm Văn Y	0	OK
145	Phạm Văn Z	0	OK
146	Phạm Văn AA	0	OK
147	Phạm Văn AB	0	OK
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200	Phạm Văn CC	0	OK

95% được vào!!!  
Thầy Chíp