

# Experimental Design & End Users

- Participants: Tim Boyd (Chair), Mark Patterson (rapporteur), Dan Jones, Dan Hayes, Maxine von Eye, Alex Forrest, Sara Adams, Lars Boehme, Øyvind Ødegaard
- Nested observations now a reality
- Making AUVs more appealing to science community, making data more useful to end users needs to be the forefront of planning
- Expanding uses of AUVs will require new experimental design where cost per datum gets brought out, needs to be balanced against the scientific/societal value of the data

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- Basic oceanography (T/S data) still needed greatly for most regions of the Antarctic/Arctic
- Nested living AUVs approach, tag fish, have them phone home when a properly equipped seal swims by
- Fear of failure for polar AUV expeditions make most cruise interdisciplinary that will have other sensors, so if AUV fails, other platforms will still be able to work
- Need for new users to have a “how to” & ”what to expect” quick start manual (less than 5 pages)
- Web site that Maxine built should add “an available vehicles” page with instructions for access

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- Statisticians might profitably be involved in the mission planning stages for nested vehicle, different scales of sampling campaigns - they can remind us about Nyquist, aliasing, spectra, statistical power
- Need to move past the “gee whiz” stage and start thinking “operational oceanography” *sensu* Hayes; there are methods to create optimal sampling campaigns that are underutilized, where applied mathematicians and statisticians can help us
- Need to layout the options to the statistician; AUV use will be increasingly hypothesis driven even in extreme unexplored environments.
- The aliasing issue has not been well addressed for many phenomena, and how it pertains to AUV mission planning and use; boundary conditions are one measurement metric where AUVs can really help in data assimilation models
- Of course AUV data sets can be used for model “verification”

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- Lawnmowers and yo-yo sections are still very useful because they are “comfortably intercomparable” with more traditional methods like CTD casts
- The latter sampling paradigms are perhaps the most straightforward for “telling stories” about how the ocean is working
- Some discussion about data standards; some processing companies require the data be in a certain format; new wave may be metadata/data mining software that will be here soon => as long as you put it up on the web, the software finds it and extracts it and plots via a Web GUI (Google to the nth power)
- As multiple platforms on a single field campaign becomes more common, time synchronization is the elephant in the room - can even be a problem within a single vehicle
- To second Karen H.’s idea, dispersion experiments might be best done using two vehicles, one to find, another to map