

Summary Report

Synchro Co-design Session I - Testing & Evaluation Access



The first Synchro Co-design Session was held on April 11, 2023, 10 am - 3:30 pm in the Pacific Forum Room at MBARI, 7700 Sandholdt Rd, Moss Landing, CA 95039. The aim was to bring together scientists, engineers, and Synchro team members and collaborators to discuss and agree on the terms of reference for Synchro's testing and evaluation access, including evaluation criteria for the applicants and processes.

Objectives:

- Provide an overview of Synchro strategy, objectives, timelines, expected outcomes and values.
- Share prospective access concepts planned from each organization providing *Direct Access*
- Discuss prospective terms of reference for testing and evaluation:
 - Call for applicants and applicant prioritization process
 - Quality assurance /quality control
 - Testing, validation, transition and application
 - Responsibilities between applicants, access providers and Synchro Program Office
- Arrive at consensus terms allowing the call for applicants to be launched

Intended Outputs:

1. Draft/Preliminary Terms of Reference Document for Testing and Evaluation Access
2. Governance Structure was introduced but not extensively discussed at this meeting. This topic will be revisited in future meetings.

Meeting Summary

Attendance

The session was attended by 29 people in a mix of both virtual and in-person. 17 people attended in person with the remaining appearing virtually. Below is a list of attendees.

Attendee Name	Attendee Affiliation
Fiorenza Micheli	Stanford University
Tiffany Vance	NOAA/US IOOS Program
Andrew DeVogelaere	Monterey Bay National Marine Sanctuary, NOAA
David Mucciarone	Stanford University
Thomas Connolly	MLML/SJSU
Amy West	Synchro/MBARI
Kevin Gomes	MBARI
Colleen Kellogg	Hakai Institute
Christopher Edwards	University of California, Santa Cruz
Jon Kaye	Moore Foundation
Jason Adelaars	Synchro/MBARI
Kendra Daly	University of South Florida
Yi-Hui Wang	California Ocean Protection Council
Raphael Kudela	UCSC
Kendra Negrey	UC Santa Cruz
Heather Lindsay	Gordon and Betty Moore Foundation
Jay Staton	California Department of Fish and Wildlife
Henry Ruhl	CeNCOOS/MBARI
Matt Lemay	Hakai Institute
Dr Rob Dunbar	Stanford University
Chris Meinig	PNNL
Collin Closek	Stanford Center for Ocean Solutions
Liz Whiteman	California Ocean Science Trust
Erika Montague	Schmidt Marine Technology Partners
Kate Lowry	Science Philanthropy Alliance
Jason Thompson	OceanKind
Tom O'Reilly	MBARI
Gene Massion	MBARI

Morning activity

The morning block featured a series of overview talks to unpack the scope of the Synchro program. We heard from the following speakers:

- Henry Ruhl (Synchro Program Director): provided a general overview of how Synchro got to this point; what Synchro's intended functions will be; who the team players are; and how Synchro will fit into the greater context of ocean observing, industry, and scientific research
- Tiffany Vance (US IOOS): highlighted efforts by the IOOS office to transition ocean technology to the ocean science community
- Raphe Kudela (UCSC): provided background on the Alliance for Coastal Technologies program
- Tom Connolly (MLML) & Colleen Kellogg (Hakai Institute): provided a list of direct access facilities that would be available to the Synchro applicants
- Henry Ruhl: provided a list of facilitated access facilities and platforms that could potentially be available to Synchro applicants
- Chris Edwards (UCSC): provided an overview of US West Coast data assimilation models
- Kevin Gomes (MBARI): provided an overview of the MBARI Ocean Decision Support System (ODSS), a real-time asset management and tracking tool

Breakout Session 1: what does successful technology transition look like?

The attendees were separated into groups of about 4-5 people to discuss the following questions.

1. What are your limitations on starting to use emerging/maturing technology?
2. What would enable you to use new technology?
3. What evidence do you use to understand if a new technology is effective?

Results of discussions

Technology users are often constrained by costs, confidence, and knowledge (both existence or general use of, and also data management) associated with adopting maturing technology. This makes sense because less mature technology is typically more expensive, more complex to operate, and hasn't been extensively tested over longer periods of time. Therefore, it's important to develop better mechanisms (e.g., feedback to manufacturer AND instructions for users) for bridging that "valley of death" so technology can mature.

To enable more user adoption of maturing technology, users desire intuitive sensor functionality, along with confidence in the data, hardware, and manufacturer (in that order).

- Technology data priorities
Data are accurate and within specifications throughout deployment. Data are in some standard format (.csv, .netcdf, .xml, .xls, etc.) or have some kind of user-selected option so they can define data output (this is typical of mature technology).

- Hardware priorities (including firmware and software)
Hardware can perform within its intended environment throughout deployment. Calibration and maintenance are ideally performed annually or longer. Manufacturer recommendations for minimizing biofouling. Industry standardized connectors (ie USB, bluetooth, SubConn). Intuitive and debugged software interface.
- Manufacturer priorities
Be more consumer-focused: create a better user experience and provide support. Be upfront about a technology's limitations, but aware of how those limitations impact consumer needs. Provide more user support to customers. Come up with a more developed marketing strategy for reaching consumers, because users relying largely on word-of-mouth recommendations isn't efficient.

Breakout Session 2: Application and Evaluation Terms of Reference: how do we work effectively?

The breakout groups were reconvened after lunch to discuss the following questions. These questions and feedback will directly support the development of Synchro's application questions and Terms of Reference.

- What are the questions we ask on the application?
- Who reviews the applications?
- How do we score applications?
- How do we evaluate technology?
- What will be the responsibilities of the applicants vs access providers vs Synchro Program office?
- Where might we need to be adaptive with our approach?

Application Questions

We received approximately 30 responses from the group as suggestions for the applicant questions. Currently we are coalescing those responses into a targeted line of questioning for the applicants to complete. Those questions currently fall within four main categories: description of the applicant/team; description of the impact the technology could have; description of the technology itself; elucidating the applicant's expectations/outcomes of the evaluation. We're imposing word/character limits on the responses to each question in an effort to keep the whole application to less than two typed pages.

Evaluating applicants

Breakout groups suggested that a diverse evaluation group is the best approach. We should include end-users, science/tech, and policy experts. They also raised key questions to answer: How many reviewers are needed? How much discussion do we want per applicant? Additionally, we need to decide whether we initially accept everyone who applies, or is there a

simple thumbs up/down in the beginning and then create a grading criteria (like a scoring rubric) as we receive more applicants than we can accommodate?

How do we evaluate technology?

We received a rather broad range of responses encompassing the following metrics:

Hardware Performance

- Did the signal drift?
- Was intervention necessary?
- How well did the hardware perform in the environment (eg., biofouling issues)
- Did the hardware measure the property and was it accurate and realistic?
- Data validation to other sensor or reference sample

Market Performance & Impact

- Risks/rewards and/or costs/benefits
- Expected Users?
- Potential impact
- What did we learn?
- Compare tested hardware to existing hardware

What are the different roles?

Synchro Program Staff:

- Coordinate between deployments to avoid technical conflicts (e.g., too much power required, one piece of equipment affects another's results, etc.)
- Liaison needed between applicant and access provider
- Identify partnerships
- Communicate successes

Access Provider:

- Flexibility needed with IT and licensing
- Care & protection of the hardware
- Data management w/in their system
- Provide accurate representation of platform

Manufacturer/Applicant:

- Provide technical and engineering expertise. Provide working, safe equipment, and training and support
- Provide needed equipment (e.g., cables, accessories)
- Deploy the technology, confirm it's working, provide specific parts/equipment needed to deploy at site, oversee deployment (remotely)
- Provide a testing plan and intellectual lead for the testing plan. Bring support staff.
- Provide hardware documentation
- Communicate expected outcomes and needs

- Adhere to the access provider's requirements for safety

How do we adapt?

According to the group discussions, Synchro should be ready for anything. Its difficult to foresee every possible impasse, but the group listed some valid suggestions we should be aware of:

- Language barriers (use of translators or Google Translate)
- Acts of nature (storms, pandemics, etc.)
- Program expectations not coming to fruition (eg., no applicants at first call)
- Add a section about code of conduct to the Terms of Reference
- Advertising Synchro Program beyond our usual channels
- Reserving the ability to modify the procedure as more of a "stepping stone" approach

As with any new program, we adapt through awareness, effective communication, and taking appropriate actions.

Thank you for attending Synchro's first co-design session. If you have any new content to suggest that wasn't covered in the meeting, please reach out to the Synchro Program Office at info@oceansynchro.io

Sincerely,
Synchro Program Office