

2024 Proposal Process – Internal-Only Projects
Submission Deadlines: Phase I – July 12th at 8:00 a.m., Phase II – August 30th

Project Number: 902208

Project Start: Jan. 1, 2022¹

Project Duration (in years): 3 of 5¹

Please indicate if proposal includes requests for any of the following (mark all that apply).

☐
Ship Time

☐
ROV

☐
AUV

☐
Wave Glider

☒
Mini ROV

Please indicate what type of project is being proposed (mark only one).

☐
Feasibility/Scoping
[<100 days effort]

☒
Development²

☐
Research

☐
Infrastructure²

☐
Education

☐
Time Series

☐
Institute
Initiative

Project Manager³: Alana Sherman

Principal Investigator: [Enter name here]

Lead Scientist: [Enter name here]

Lead Engineer: Frank Flores

Project Title: MiniROV Operations

Please indicate which category best describes the project theme (mark only one).

☐
Ocean
biogeochemistry

☐
Ecosystem
dynamics

☐
Ocean
visualization

☒
Exploration &
discovery

Please indicate percentage of effort on this project anticipated for 2024 toward these three highest institutional goals from the [Strategic Roadmap](#) (percentage total should equal 100%).

Goal	Innovate and Build	Explore and Protect	Inspire and Engage ⁴
Percentage	30	70	0

¹ This date and number should remain the same for the duration of the project. If your project start date for 2024 is not January 1, please indicate the start date in the first cell of the milestone chart. Format for duration example: "Year 2 of 5".

² Development and infrastructure projects must complete the risk matrix (see end of the proposal form).

³ Not all projects will require all four titles to be filled in. Please indicate individuals only for those titles that are appropriate for your project.

⁴ This category includes transfer of hardware, know-how, publications, presentations, etc.

1) ABSTRACT (all projects)

Briefly provide a high-level summary of the project (ideally no more than 1/2 page).

This proposal outlines the labor and expenses needed for the maintenance of the MiniROV. All ship time, labor, and expenses associated with deployment of the MiniROV for specific projects will be captured in those project proposals. The on-going plan for the MiniROV is that operations will be handled by Frank Flores, Alana Sherman and a new hire. We are still in the process of interviewing for this position.

2) PROPOSAL (all projects)

Background

Provide context for the project, being sure to address these questions:

- *What fundamental problem does this project address, and why is it important?*

The MiniROV provides three valuable services to the institute:

1. As a highly capable fly-away ROV that can sail with MBARI scientists on ships-of-opportunity.
2. As a testbed for new algorithms and complex instruments. This platform can seamlessly transition from the test tank to our ships, thus accelerating the development cycle.
3. As an extra vehicle available to sail on local vessels when MBARI ship time is in high demand.

- *What makes this work relevant to MBARI and the Packard Foundation?*

The MiniROV is a tool that helps us develop cutting edge technology and also facilitates scientific discovery near and far, making it relevant to a broad range of efforts important to MBARI and the Packard Foundation. As an asset the MiniROV has been involved ocean exploration across all disciplines, and has helped us push the edge of technical capacity.

- *Is this effort linked to other internal or externally funded projects or collaborative efforts?*

We anticipate that this vehicle will be requested for use by several internal projects including: Bioinspiration lab, Scalable Marine Robotics, and Continental Margins. We have also supported the MBA as part of the AMP proposal.

- *Where does this work fit into the ~5–10 year plan for your group, at MBARI, and in the field?*

The 5-10 year plan for the MiniROV is to continue to develop the platform such that it has the appropriate onboard capabilities to contribute to both developments and expeditionary work. Like many assets at MBARI, the MiniROV is a dynamic system and its strength has always been its flexibility to be modified and improved to meet the next challenge. It is anticipated that on the next 5-10 years the vehicle will be adapted to meet the increasing challenges of on-board

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computing and underwater imaging. In the near term, we will just be focusing on meeting the immediate needs of MBARI PIs and preparing for the 2025 Arctic expedition.

Nature and Scope of the Proposed Project

Please provide a sense of the scale and scope of the proposed work. Is this a large de novo R&D effort, modest platform/sensor integration, targeted science investigation with minimal or no engineering needs, extension of current program, small-scale scoping exercise expected to lead to a larger effort, or other? If the project is intended to be multiple years, how will the anticipated level of effort likely change over time?

The scope of the program is moderate and varies to a small extent year to year with vehicle usage and new developments. The largest variable in determining the level of effort is large expeditions, which often require substantial preparation and time at sea. Usually, one of these expeditions arises every couple of years.

Does this activity relate to one or more 2024 proposals your team is submitting?

If so, provide a list of relevant projects by project/DQ # and provide a brief description of how they are related. Since resources are limited and cuts during Phase 1 are likely, please indicate where this project fits in the hierarchy of your priorities. Does this proposal take precedent over other ongoing or planned activities?

Our team is not submitting other proposals, but other proposals will request use of this asset.

Anticipated Shared Resource Needs

What staffing is required to advance the work in 2024 (e.g., is this a multi-faceted engineering development or a targeted science investigation that does not require significant use of shared personnel)? Is in-house or contract manufacturing needed? What level of ship/ROV/AUV (DMO) support is likely? If this is intended to be a multi-year effort, please provide a rough indication of anticipated shared resource needs over the duration of the project (e.g., will stay flat, will significantly increase in Year X, will significantly decrease by Year Y).

This proposal requests engineering and manufacturing time, in total about 1 FTE. We will not be requesting ship time or other DMO assets.

Anticipated Expenses

What rough order of magnitude direct expense budget is anticipated annually over the course of the project? Is procurement of specialized capital equipment or outside contractors required? Will there be annual travel?

The budget (~\$40k) includes costs of maintenance, insurance for the vehicle, spare FO cables and connectors, computers, and general tools and supplies. There is no travel associated with this project or procurement of specialized capital equipment.

Intellectual Property (IP) Considerations

Do you anticipate a need for a cooperative research and development agreement or licensing arrangement with an external entity? Will the work potentially result in a patentable product or service? Will novel IP and/or

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custom-made equipment be created, and how might it be disseminated (e.g., license agreement and/or collaborations)?

For additional guidance please review MBARI's intellectual property internal web page:
<https://mwww.mbari.org/itd/ip/>.

We do not anticipate any IP considerations for this project at this time.

Data

What data will be generated? How will they be managed/stored? Are any special data visualization needs anticipated?

The ROV dive data is small in size and designed to be ingested into the existing ROV datastreams. The video is integrated into VARS. The project has no special data visualization needs.

Anticipated Impact

Who are the consumers of the instruments, methods, technology, and data that will be generated within and beyond MBARI? Will the project create tangible connections with other organizations (e.g., academic, NGO, MBA, MBNMS, state or federal agency)?

The MiniROV has been used by the following internal PIs: Charlie Paull, Steve Haddock, Kakani Katija, Bruce Robison, and Giancarlo Troni. We have also supported collections for MBA.

Anticipated Outreach Needs

Thinking about the audiences/consumers you highlighted in the question above, do you anticipate needing to create outreach assets to help increase your impact? If so, please specify whether you anticipate needing to work with ITD and also specify what type of asset (story, graphic, animation, video, etc.) you might need.

There are no anticipated outreach needs at this point.

Continuing Projects Only: Status Report

Briefly provide an update of the current project relative to what was proposed for 2023 by responding to the prompts below. If the project includes multiple subproject projects, please list each of these under a subheading as you deem appropriate.

Current status of project and results to date

The 2023 operation requests for MiniROV were: 10 days for the Aquarium, 6 days for the Bioinspirations lab (Katija), 3 days for Scalable Robotics (Troni), and 1 day for Steve Rock. These requests are split into a Spring cruise and a Fall cruise. All ship days are on the R/V Fulmar. During the spring we managed to achieve the goals of all our users despite relentlessly bad weather throughout the

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three weeks. Days were added to fulfill the aquarium's collection needs as the bad weather affected their program the most. The Bioinspiration lab continued to work on their machine learning algorithms for target acquisition and tracking as well as collect samples. The Scalable Robotics lab had their first successful deployments, testing their sensor fusion algorithms.

Prior to the fall dive series in late October, we plan to modify an existing sled such that it can be dedicated to the work of the Scalable Robotics group. This will allow them to continue to add sensors and orient them in a way that is most suited to the group's research, as opposed to trying to shoehorn them in on our existing (and crowded) midwater sled.

The rest of our effort is spent on hiring and looking ahead both for the needs of the internal PIs and with the approach of the next Arctic expedition.

What percentage of labor and budget have been used through the 1st half of year?

We only have 14% of our labor left, and 38% of our budget.

Will you complete the current year's scheduled work?

Yes we will finish the work requested this year, however dependent on when we hire a new pilot, we will probably go over our requested labor hours.

Significant changes from previous project proposal

None.

Over the past two years, what peer-reviewed publications, education and/or outreach activities have resulted directly from this project? Please be brief.

Publications using the MiniROV will be included in each lab's project proposal.

All Projects: Specific Plans for 2024

Research Activities

All research activities involving the MiniROV are listed within the individual project proposals.

Engineering/technology development

The key technology development related to the MiniROV will be contained in the 2024 Continental Margins project. The engineering associated with this project will be maintenance and small upgrades to continue to grow the vehicles capabilities along with the science and engineering applications.

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The labor hours listed below account for maintaining and preparing the vehicle to be deployment-ready. These hours can be refined once we have a clearer picture on what the demand for the MiniROV will be.

Frank Flores – 500 hours
Alana Sherman – 400 hours
James McClure – 160 hours
New hire Pilot/Engineer – 600 hours
Machinist – 100 hours

Field programs (detail ship requirements/deployments/diver requirements)

In addition to describing anticipated field programs, please be sure to include requirements for specific platforms and equipment (Dorado AUVs, LRAUVs, Wave Glider, mini ROV, etc.) for each proposed field program so that expectations are clear. Requests must also be entered in the budget entry system.

No field programs are requested in this proposal

Specific deliverables

A working and capable MiniROV.

Milestones and required personnel (see [personnel classification list](#) for staff classifications)

[Click here to enter text]

2024 Project Start Date: MM/DD/2024	Milestone 1	Milestone 2	Milestone 3	Milestone 4	Milestone 5	Total Resources ⁵ (in hours) for each resource category for all milestones listed here
Milestone Date	1/24	4/24	9/24	10/24		
Milestone Description	Winter Maintenance	Spring cruise prep	Fall cruise prep	Arctic cruise reconfiguration		
Electrical Engineer	100 A.S. 150 New Hire	100 A.S. 150 New Hire	100 A.S. 150 New Hire	100 A.S. 150 New Hire		
Software Eng-Embedded						
Software Eng-Info Eng						
Mechanical Engineer						

⁵ This number should be the same number you entered on the web budget resource requests for this particular resource.

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Mechanical Eng-Division						
Mechanical Eng-Mfg						
Associate Engineer						
Electrical Tech	80	20	60			160 J.M.
Software Tech						
Mechanical Tech	125	125	125	125		500 F. F.
Machinist	100					100
Divers						
Video Lab						
(Add other categories/rows as needed)						

Budget justification

MiniROV budget 2023	
Insurance	\$6,300.00
Maintenance & Repair budget	\$10,000.00
Supplies – Computers hardware/monitors	\$3,000.00
Equipment <\$5k	\$5,000.00
Supplies - General	\$5,000.00
Software licenses	\$3,000.00
Tools	\$2,500.00
Spare fiber cables and connectors	\$3,000.00
Spare video equipment	\$4,000.00
Spare gearbox for winch	\$8,000.00
Spare level wind motor	\$3,000.00
Dave Graves Contractor	\$21,000.00
SUM	\$73,800.00

Project team

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The project team is: Frank Flores, Alana Sherman, James McClure (EE tech), and hopefully a new hire.

External consultants/contractors

If you propose to engage an external consultant/contractor, please attach a sufficiently detailed SOW and budget proposal from the vendor. If approved, a fully executed Independent Contractor Agreement must be in place before work can begin.

We would like to continue using Dale Graves as a contractor to support the software system for the MiniROV. Dale's expertise will be especially useful in training a new hire on the system. Dale is currently out of town but we will submit a SOW next week and an ICA is already been in place for 2 years. In brief the tasks are:

1. Software training – 1 week
2. GUI modifications for new arctic tools – 1.5 week
3. General troubleshooting – 0.5 week

Total is 3 weeks (120 hours at \$175/hr). Dale's continued help has been invaluable as we try to build up our new team. We are scaling back our request from the past two years to focus just on the software and not include offshore support.

Project lab and office space requirements

In addition to any changes to current space usage, please also include anticipated office and lab needs for students, postdocs, collaborators, etc.

The team would like to retain our current space in the ME tech lab.

Risk matrix (development and infrastructure projects only)

	Technical Risk	Organizational Risk	Tech Transfer Risk	Labor Estimate Risk
High				
Medium				X
Low	X	X	X	

Compliance Considerations

All responses must be recorded in the Google form linked below. A form must be submitted for every project.

[Link to Google Compliance Considerations form](https://forms.gle/wVCb9VRRuYBU5yvF8) -OR- <https://forms.gle/wVCb9VRRuYBU5yvF8>

NONE SUBMITTED FOR THIS PROJECT.