

Community Survey  
Requirements for U.S. Antarctic Program Research Vessels

This survey refers to the present USAP ships, Lawrence M. Gould (LMG) and Nathaniel B. Palmer (NBP), and future ships that would carry out USAP science support functions requiring ships.

For reference, please consider the document "A New U.S. Polar Research Vessel (PRV): Science Drivers and Vessel Requirements"  
[https://www.unols.org/sites/default/files/PRV\\_SMR\\_FinalReport\\_Feb2012.pdf](https://www.unols.org/sites/default/files/PRV_SMR_FinalReport_Feb2012.pdf).

As a community member in polar marine sciences, or a person who uses USAP ships to support other science on the Antarctic Peninsula or continent, we would like you to consider a few specific questions. Please respond from the standpoint of your own particular field of research from two perspectives:

- a) Have the **current** USAP ships met the needs of your research objectives? If not, what additional capability or capacity is desirable?
- b) How do you expect the **future** research priorities and infrastructure requirements for your work to change over a 10 to 30-year timeframe *and* are the current general specifications and capabilities of the USAP ships sufficient for these needs? If not, what additional capability or capacity is desirable?

The second perspective is necessarily speculative, but critical for the evaluation of future fleet capacity and capability. Please consider how *evolving research priorities* and how *emerging measurement systems and technology* will contribute to future demand for global-class infrastructure in your field.

The results of this survey will be used by the ad hoc Subcommittee of the NSF Office of Polar Programs (OPP) Advisory Committee on the U.S. Antarctic Program's Research Vessel Procurement (hereafter referred to as the "RV Subcommittee")

This Survey has five sections starting on the next page:

- A) Your Current Antarctic Research**
- B) Your Future Antarctic Research**
- C) Scientific Support, Facilities and Infrastructure**
- D) USAP Fleet Configuration**
- E) Important Scientific Questions Driving Research into the Next 50 Years**

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**A) Your Current Antarctic Research**

The following questions are centered on your current research in Antarctica and will provide the RV Sub-Committee with a broader understanding of your current research needs.

1. Please indicate your current career status  
[Drop-down menu, should be able to choose only one option]:

Choose One:  
Describe Other:

2. Please provide a 2 to 3 sentence description of your field of study. [Open text option]

3. Please indicate whether your current research is [Drop-down menu, should be able to select multiple options]:

- Oceanographic, ship-based
- Oceanographic, station-based
- Geological/Glaciological, station-based
- Geological/Glaciological, remote field camp-based
- Other – Describe Briefly:

4. Please select the broad geographical region/s of Antarctica where your research has been focused. [Drop-down menu, should be able to select multiple options]:

- Antarctic Peninsula
- Amundsen Sea
- Bellingshausen Sea
- Ross Sea
- Weddell Sea
- Scotia Sea
- East Antarctica
- Sub-Antarctic
- Other (Describe)

5. In what season/s has your research primarily focused? [Drop-down menu, should be able to select multiple options]:

- Spring (Oct-Dec)
- Summer (Jan-Mar)
- Autumn (Apr-Jun)
- Winter (Jul-Sep)

6. Briefly describe how you have used USAP ships to support your research. [Open text option - limit word count to 100 words]

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**B) Your Future Antarctic Research**

The following questions are centered on your planned future research and will provide the RV Sub-Committee with a broader understanding of your future research needs.

7. Please indicate whether your future research will be [*Drop-down menu, should be able to select multiple options*]:

<input type="checkbox"/>	Oceanographic, ship-based
<input type="checkbox"/>	Oceanographic, station-based
<input type="checkbox"/>	Geological/Glaciological, station-based
<input type="checkbox"/>	Geological/Glaciological, remote field camp-based
<input type="checkbox"/>	Other (describe):

8. Please select the broad geographical region/s of Antarctica where your future research will be focused. [*Drop-down menu, should be able to select multiple options*]:

<input type="checkbox"/>	Antarctic Peninsula
<input type="checkbox"/>	Bellingshausen Sea
<input type="checkbox"/>	Amundsen Sea
<input type="checkbox"/>	Ross Sea
<input type="checkbox"/>	Weddell Sea
<input type="checkbox"/>	Scotia Sea
<input type="checkbox"/>	East Antarctica
<input type="checkbox"/>	Sub-Antarctic
<input type="checkbox"/>	Other ( <i>describe</i> )

9. In what season/s will your future research primarily focused? [*Drop-down menu, should be able to select multiple options*]:

<input type="checkbox"/>	Spring (Oct-Dec)
<input type="checkbox"/>	Summer (Jan-Mar)
<input type="checkbox"/>	Autumn (Apr-Jun)
<input type="checkbox"/>	Winter (Jul-Sep)

10. Will your future Antarctic research require USAP ships? [*Drop-down menu, only choose one option*]:

Choose: 11. If yes – briefly describe your intended use of USAP ships:
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**C) Scientific Support, Facilities and Infrastructure**

The following questions focus on your scientific support, facilities and infrastructure needs for your current and future research.

12. The current maximum non-crew berthing capacity of the USAP ships is 37 on LMG and 39 on NBP (both include contractor science support staff and helo crews if carried).

a) Is the current maximum science berthing on the LMG sufficient for your work now and in the future? *[Drop-down menu, only choose one option]:*

Choose:

b) Is the current maximum science berthing on the NBP sufficient for your work now and in the future? *[Drop-down menu, only choose one option]:*

Choose:

13. If you said No to either 1.a or 1.b, please indicate what berthing capacity is appropriate by entering a new number for each ship below:

LMG 37 NBP 39
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14. Is the available laboratory space, deck area and science storage space on the USAP ships generally sufficient for your work in the future? *[Drop-down menu, only choose one option]:*

Choose:

Please describe how this could be improved. *(\*Open text option - limit word count to 250 words)*

describe how this could be improved
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15. Is the suite of scientific support instrumentation on the USAP ships sufficient for your current work (e.g. acoustical profiling & mapping systems, meteorological instruments, underway seawater measurements, CTD or other lowered instrument packages, sample collection and storage facilities, etc.)? *[Drop-down menu, only choose one option]:*

Choose:

Please describe how this could be improved. *(\*Open text option - limit word count to 250 words)*

describe how this could be improved
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16. Are

the network and other technical systems on the USAP ships sufficient for your work now and in the future (e.g. intra-net connectivity on the ship, internet connectivity and bandwidth to external sites, satellite communications, mapping and GIS capabilities, desk space and support for personal workstations, navigation systems, time servers, clean power, etc.)?

*[Drop-down menu, only choose one option]:*

Choose:

Please describe how this could be improved. *[Open text option - limit word count to 250 words]*

describe how this could be improved
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17. Are

the winch, A-frame, crane and small-boat operations capabilities of the USAP ships sufficient for your work now and in the future?

*[Drop-down menu, only choose one option]:*

Choose:

Please describe how this could be improved. *[Open text option - limit word count to 250 words]*

describe how this could be improved
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18. Are the general handling characteristics of the USAP ships with respect to dynamic positioning for over-the-side operations and stability in heavy seas and/or sea ice sufficient for your work now and in the future? *[Drop-down menu, only choose one option]*:

Choose:

Please describe how this could be improved. *[Open text option - limit word count to 250 words]*

19.

Are

the in-ice operation capabilities of the USAP ships sufficient for your science now and in the future? *[Drop-down menu, only choose one option]*:

Choose:

Please describe how this could be improved. *(\*Open text option - limit word count to 250 words)*

20. If

your

science requires greater in-ice capability, would it be sufficient to provide an escort icebreaker for a USAP science ship of the present in-ice capability? *[Drop-down menu, only choose one option]*:

Choose:

21. If your research requires helicopter support, do you feel that your needs in this regard are currently met? *[Drop-down menu, only choose one option]*:

Choose:

Please describe how this could be improved. *[Open text option - limit word count to 250 words]*

22.

Please review the UNOLS SMR-identified outfitting objectives for a new polar research vessel, below. Rate the importance of each for your research on a scale of 1-3. 1 = critical; 2 = nice, but not critical; 3 = not necessary.

Rate: Acoustically quiet ship with minimal underwater-radiated noise

Rate: Habitability

Rate: Geotechnical drilling

Rate: Moon pool operations

Rate: Helicopter operations

Rate: Seismic capability

23. What additional capacity or capability do you feel is lacking in the current USAP ships that may be required in the future to meet future scientific objectives in your field? *[Open text option - limit word count to 500 words]*

24. How do you envision projected climate/weather shifts over the next 40-50 years affecting your science support needs from USAP ships? *[Open text option - limit word count to 100 words]*

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**D) USAP Fleet Configuration**

The following questions provide the opportunity for you, as a USAP ship user, to comment on the configuration of the USAP fleet. With ship costs increasing and projected NSF 'flat' budgets, it is possible that the USAP may need to reconfigure its fleet to a one-ship operation. This could, however, open some new opportunities. For example, the savings of going to one ship may open options of increased support from helicopters, fixed wing aircraft, and smaller, but more capable vessels like the RHIBs; more advanced aerial and underwater vehicles; and increased bandwidth on the ships. Greater partnerships with other National Antarctic Programs could transpire. Note: In the case of a single-ship operation, it is anticipated that resupply of Palmer Station could be via commercial charter but may on occasion use the single USAP science vessel.

25. If USAP OPERATED a single ship and had more flexibility for using other assets, how would this impact your future Antarctic research? If you think that two ships are required, please explain. [*Open text option - no limit on word count* ]

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**E) Important Scientific Questions Driving Research into the Next 50 Years**

The February 2012 Final Report by UNOLS on the Science Mission Requirements (SMR) of Polar Research Vessels (PRV) - link provided at the start of this questionnaire - described two major scientific challenges and a series of related questions that led to the development of the SMRs.

26. Two broad challenges were identified by the 2012 SMR report. Please indicate if these challenges and questions are still relevant and if there are others that need to be addressed in the coming years and support by USAP ships:

(I) What are the processes and thresholds that control the loss of the Antarctic ice sheet to the Southern Ocean?

Choose:

(II) What is the role of the Southern Ocean in the global carbon cycle?

Are these two challenges still pertinent? [*Drop-down menu, only choose one option*]:

Choose:

a) Please list any additional challenges you foresee needing to be addressed in the coming years. [*Open text option - limit word count to 100 words*]

27.

Fourteen key research questions falling under the umbrella of the broad challenges were identified by the 2012 SMR report. For each, please check the appropriate box to show whether you think the question is still pertinent or not. [*Alongside each question, we will have three buttons to check, one for yes, one for no, and one for I'm not sure - only one answer per line*]

1. What is the geologic nature and extent of the polar continental shelves and what natural resources do they contain?  
 Yes  No  Not Sure
2. How has life evolved in the Polar Regions in response to dramatic events in Earth history?  
 Yes  No  Not Sure
3. What is the temporal and spatial variability of glacial ice and water transfer to and from the oceans?  
 Yes  No  Not Sure
4. How can polar marine research provide accurate assessments of the Antarctic ice sheet?  
 Yes  No  Not Sure
5. How are polar marine ecosystems and organisms adapted to extreme environmental conditions and how is this reflected in biodiversity and evolutionary novelty?  
 Yes  No  Not Sure
6. How will unique polar marine ecosystems respond to climate change?  
 Yes  No  Not Sure
7. What is the role of polar marine ecosystems in the biogeochemical cycles of carbon and other elements?  
 Yes  No  Not Sure



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8. How do changes in freshwater cycling in Antarctica affect earth system processes and biogeochemical cycles?  
 Yes  No  Not Sure
9. What role do trace metals and similar compounds have on Southern Ocean ecosystems and how can they be used to understand the complex processes taking place here?  
 Yes  No  Not Sure
10. How does the oceanic heat sink work, where does the heat go as climate warms, and what is the impact on the Southern Ocean and Antarctica?  
 Yes  No  Not Sure
11. How do we best predict trajectories of change in the Southern Ocean and the uncertainties in these forecasts?  
 Yes  No  Not Sure
12. How does the ocean interact with ice shelves?  
 Yes  No  Not Sure
13. What are the dynamics and thermodynamics of polynyas and associated convective processes?  
 Yes  No  Not Sure
14. How are ventilation rates of the deep ocean impacted by deep-water formation in the Southern Ocean?  
 Yes  No  Not Sure

Please list any additional research questions you foresee needing to be addressed in the coming years. *[Open text option - limit word count to 250 words]*

Add any additional comments that might be useful to the Advisory Committee. *[Open text option - limit word count to 250 words]*

*Thank you for completing this survey, your input will be extremely valuable in planning the future of Research Vessel support for the U.S. Antarctic Program.*