

Technology Developments to Advance Antarctic Research: a Workshop

Statement of Task

NASEM will organize a (virtual) workshop to solicit broad community ideas and input regarding how technological innovation can:

- advance, facilitate, and transform Antarctic research and facilitate improvements to science support logistics;
- increase the reach of scientific investigations in Antarctica while reducing the logistics and environmental footprint of these operations; and
- facilitate broader, more diverse participation in Antarctic research.

The discussion themes can both focus on particular disciplinary sciences and cut across multiple disciplines. Some possible cross-cutting themes could include, but are not limited to:

- autonomous sensors and platforms,
- communications and connectivity,
- transportation and logistics, and
- energy sources and consumption, including low power and battery developments.

The workshop discussions will:

- consider the relative impacts, costs¹, readiness, barriers, and probability of success for options in each of the key areas discussed;
- identify promising areas and approaches for investment in technological development for Antarctic science (e.g., leveraging existing NSF award mechanisms, successful models for partnership with the commercial sector);
- consider ideas drawn from technology developments occurring in Arctic or high-altitude mountain research, as well as non-polar research (e.g., cold regions, remote regions, general oceanographic, atmospheric, geological sciences); and advances occurring outside of U.S. research communities;
- consider advances in situ, aircraft- and ship-based, and unmanned (UAS/UAV) observational and sensor technologies (satellite remote sensing developments will not be included);
- consider both technologies with immediate/near-term prospects (already in development) and more forward-looking ideas on the horizon;
- focus primarily on technology developments that could be applicable to a wide array of research activities, as opposed to technologies that are highly specific to particular research projects;
- consider cyberinfrastructure-related advances (e.g., data management platforms; advanced computing technologies) that are of direct relevance to Antarctic research; and
- include participation of representatives from the private sector and from other federal agencies who bring perspectives on cutting-edge technology developments not yet being harnessed for polar science research.

¹ This would not involve detailed calculations of the costs of specific technologies, but rather, more general “order of magnitude” cost considerations (e.g. would the needed development cross the threshold for NSF’s “mid-scale research infrastructure” category?).