Solving the Staging Space Problem at McMurdo Station

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Introduction and Background

Science requests for staging space are now beyond the capacity of the appropriate areas of the Crary Lab. The MAUC has been requesting a permanent solution to this ongoing problem for 4 years. Currently, RPSC contractor staff use creativity and 13 different buildings to offer solutions that are workable as stop-gap solutions, but suboptimal. The lack of availability, or of convenient staging space negatively impacts science productivity. Appropriate staging space would contribute to the scientific infrastructure at McMurdo Station.

Partially, the increase in staging space needs are driven by technological advances that allow more remote, untended, science observation activities, requiring large instrument and battery packages. NSF has encouraged such approaches as means of extending the scientific 'presence' in the deep field areas without increasing the logistical support required to monitor geophysical or biological processes. As the technology improves, and as the scope of scientific investigation into a particular process expands, one can anticipate far more of this type of research instrumentation arriving at McMurdo. Another contributing factor is the general increase in science projects based in field camps. Preparation, sorting, and packing of supplies, and equipment for transportation into the field, unpacking, sample unloading, and gear drying upon return from the field require space for organization. Finally, the increased number and scope of science projects based out of McMurdo Station, augmented by the efforts supported for IPY, have overburdened space resources available for science. For the coming 2009/2010 season 57 different science groups in 9 disciplines have requested space that includes some type of staging needs; of these, 44 specifically requested staging space and 20 have requested more than 200 ft^2 each.

Much of this field instrumentation must be assembled and tested on arrival in McMurdo, and then disassembled for shipping from McMurdo to the field location. The need for assembly and testing arises for several reasons: to determine if any damage has occurred; to integrate components from separate PI research groups into a single system for deployment; and to re-pack for easier shipping or deployment in the deep field. Given the huge logistical and scientific investment in some of these devices, it is only prudent that the systems be fully tested before deployment.

Primary Needs

Space is the primary need. In the most basic view, shelter from outdoor conditions, a hard floor, electrical power, and heat are the four critical requirements that the MAUC has requested in the past and that continue to be key. We will go into each of these in detail before moving on to other needs.

Canvassing current projects and the requests submitted to the contractor we can estimate:

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For transient needs the average amount of indoor space required is 260 ft^2 per project during 1-2 weeks at the beginning and end of their field time.
For continuous field season needs for projects that are based out of McMurdo, 50 ft^2 per project for the duration of the field season, 6 weeks on average.
Transient outdoor storage space needs are 380 ft^2 per project.
Continuous outdoor storage space needs are currently met by the Crary Cargo Line. Easy and immediate access to these items is important and is marginally met by current procedures.
For overwinter storage needs of continuing projects, 200 ft^2 of Do Not Freeze space and 500 ft^2 of Can Freeze space are needed. The Can Freeze space need is currently met by the Crary Cargo Line. Do Not Freeze space is currently insufficient to meet science needs.
With the current number of projects being supported and project timing, a minimum of 16 projects will need to be accommodated at the same time during the season. We do not have estimates of projected growth in the number and size of NSF supported science projects, but this projection over a minimum 10 year span should be factored into staging space plans.
Current absolute minimum needs are for a 3740 ft^2 indoor staging space with an adjacent 1520 ft^2 of outdoor staging space.

Shelter is required so that conditions can be controlled. A ceiling height of 10 ft minimum is needed to allow assembly of taller instruments. The sheltered area needs to include direct access to vehicles such as forklifts for moving large/heavy items.
The floor needs to be solid so that heavy items can be moved without undue stresses and clean so that assembly and testing of sensitive electronic, waterproof, etc. equipment is not compromised.
Electrical power is needed to provide good light that allows assembly as well as testing of equipment. Assembly and/or repairs using powered tools will also require access to standard 120 and 240 v power.
Heat to at least 50-60 °F is needed to allow working in the space for long periods of time without gloves, and to dry out equipment that is being returned from the field before packing and shipping home or returning to work stations.

Additional Parameters

Location

Replicating field conditions is important for testing solar panels, GPS, shelters, cables, seismometers, towers, etc. For this reason, the location should be in proximity to a semiflat outdoor space, through a loading dock that can be easily accessed by vehicles. The current “forklift on request” program is important to the utility of the staging space. In addition, close proximity to Crary Lab and cargo handling is important for efficiency and to reduce use of vehicles in town.

Storage space

For parties in the field, some equipment needs to be stored on station for use during packing, calibration, sample processing/transport or other occasional use. Currently some space is available in the cages at the BFC. This space is not secure as each cage is shared between several groups. Including secure indoor storage in the staging space plan will address this issue as well. We recommend increasing the staging space by 1500 ft^2

to accommodate this.
In similar situations some items that are not freeze sensitive can be stored outdoors.

Occasional needs

Some science groups need internet, air handling, water, or spill containment as part of their staging space requirements. Internet especially is likely to be a growing need for future projects that include data download, analytical or troubleshooting components. The MAUC recommends that these parameters be incorporated into staging space plans, at the very least as build-out capabilities.

Other improvements to workability

Telephones and toilets will make the space fully functional.
A substantial amount of space is currently used to charge and overwinter batteries. These functions could be housed in a separate building if necessary, which would alleviate safety concerns (spills, gas releases) as well as meet DNF winter-over storage needs.

Suggested solutions

One option is to reassign an existing space as staging space for science. This can be implemented quickly, satisfies the basic requirements, and modifications can be planned and implemented rapidly to meet other more specific needs. A problem will be identifying the space and reallocating the existing users. Suggested spaces include:
1) Building 183 - the “airdrop assembly barn" - the building on the left as you walk down to Scott's Discovery Hut. Also called the Incinerator/Food Storage.
2) Building 004 - the 2nd floor of the Science Support Center.
3) For some but not all needs, Jamesways at the transition would be sufficient, but the contractor has been unable to support requests for Jamesways in the last 2 years.
4) Temporary (summer use only) building - a prefab placed in the flat area between SSC and the Mammoth Mountain Inn. This could be installed in one year and would be available for use during MainBody.

A better option is to build a new building specifically for science staging space. This is strongly preferred IF it can be implemented quickly. The advantage of this is that the space will be energy efficient, and designed specifically to the staging space needs. The disadvantage is that it may take some time and this issue has already been put off for too long.

Conclusions

The MAUC strongly recommends that the contractor present a proposal to NSF for a staging space building to be completed within 1-3 years. The building will be a minimum of 5250 ft^2, or larger depending on planned increases in science. It will have a hard floor, power, and heat, and be vehicle and forklift accessible. Adjacent outdoor staging space will be 1520 ft^2 or more. It should be located in proximity to Crary Lab and SSC. Plans for out years should include capacity for internet, telephones, plumbing, and air handling. The building will include open space for equipment assembly, work benches for testing, and secure areas for storage. The new building will improve the scientific infrastructure of McMurdo Station, enhancing workability for current and future needs.