A Strawman Model?

Outline

- Vision
- Polar Astrophysics Management Issues
- Need for an organization
- Existing Models
- SPSI exercise
- My current thinking…

Vision

Antarctica holds tremendous potential for Astrophysics that can be best realized if the scientists involved participate in the management, planning and oversight of the shared resources and logistical support. We propose an intellectual partnership comprised of and directed by these scientists to ensure that the highest quality astrophysics is conducted at the South Pole.

Motivation: We are excited about astrophysics at the South Pole. We want to ensure the best science is done. We want the South Pole to be open to the entire community on a level playing ground. We want to build on what has been learned from CARA and AMANDA.

"Science cooperation and scientific management is the most accurate and efficient" (Bob Morse)

Focus: the unique site conditions

- Cold, transparent, stable and dark atmospheric conditions.
- Clear ice

- Common focus is not specific science or common facilty. It is a place
  - wide range of science programs
  - wide range of instruments
  - wide range of people and communities

Management Issues (cont.)

- Limited resources
  - at site
    - personnel, equipment, power
  - accessibility to site
    - difficult travel
    - not physically accessible 9 months/year
    - size & weight shipping constraints
    - Communications, Data trx
- Environment
  - require new techniques
  - failures can cause large delays

Antarctica is a frontier in Astrophysics

- between temperate ground based facilities and space

Need for an organization

- Need an organization to:
  - coordinate logistics, communication
  - manage limited & shared resources
  - manage limited accessibility
  - build on experience in Polar environment
    - avoid reinventing the wheel; provide continuity
    - develop robust solutions
  - provide a common voice with NSF/OPP, Raytheon, and Astronomical Projects
  - interface with other funding agencies, national and international?

How to Optimize Scientific Output

- Well defined long term scientific plan (strategic planning)
- Scientifically driven and motivated management
- Responsive to, inclusion of, the astronomical community
- Support for small-scale CARA-like projects and seeding projects
- Site characterization
    - new wavelength bands and new techniques
    - long term testing, archival of data
- Coordinated outreach and education and human resources

Existing models

- **CARA STC – was evolving in this direction**
  - managed limited resources
  - characterized the site
  - Coordinated education and outreach
  - began accessibility to community
    - T.A.C. for AST/RO & IR/Abu program
  - Spawned new programs..
    - site testing -> AST/RO, DASI, VIPER -> SPT
    - site testing -> Spirex -> Abu -> 2 meter proposal
  - established international collaborations, JACARA
  - shifted to NSF managed peer-reviewed of all projects

- ***But is this too centralized now that South Pole Astrophysics has matured?***

Existing models

- Institute for Astronomy: Mauna Kea (perhaps it was appropriate at first)
- NRAO
  - deployed at different sites, focused on instruments
- University Observatories: BIMA, OVRO, CSO, Keck . . .
  - focused on single instruments
  - do have similar shared risk observing
- Arecibo Observatory
  - cooperative agreement with NSF
- National Labs - Particle Accelerators
- Space Telescope Institute

Scientific Opportunities for the South Pole Astrophysics Long Term Plan

- **Cosmology & Large scale structure**
- **Galaxy Formation**
- **Star Formation**
- **Exosolar Planets**
- **High Energy Astrophysics / Neutrino Astrophysics**

Mainstream themes heavily endorsed by the NAS/NRC 1990 and 2000 Decadal Reviews

Constraints on viable Models

All science projects must stand up to the rigor of peer review

Peer review of:

- new projects √
- existing projects √
- Any formal organization ?

The South Pole Science Institute model (SPSI)

SPSI was a model suggested at the end of CARA.

It did not take off – I think we may have dodged a bullet.
It was looking like another level of bureaucracy
that would cost us a lot of precious science $.

Peer Review

- SPSI:
  - 5 year cooperative agreement with NSF
  - annual reports to NSF
  - site visit / renewal every 3 years

- Existing projects:
  - reviewed as part of SPSI (become "internal" projects)
  - ***face same rigors as all projects! (level playing field)***

Peer Review of New Projects

- Proposals submitted to NSF/OPP
- NSF peer review selects subset of projects based on scientific merit
- SPSI provides to NSF an estimate of scientific support cost and impact on resources and other projects
- NSF panel selects proposals for funding; SPSI director ex officio panel member to provide evaluation of proposals based on long term science plans
- PI of new project becomes member of SPSI projects committee
- For large projects, a ranking member of PI's institution becomes member of SPSI Board of Directors

Directorship

Director and SPSI science staff must have a scientific investment and motivation

- SPSI science staff do research (50/50 model)
- Need strong scientific leadership
- SPSI must maintain careful balance between providing science support and doing science
  - must be an attractive job!

Directorship

(What's in it for the director?)

- Director must have:
  - strong role in resource allocation within SPSI **and within South Pole Station**
  - strong role in the long term planning of science, and site development and infrastructure
  - strong role in review process
  - ability to seed new projects
    - discretionary funds
    - discretionary time

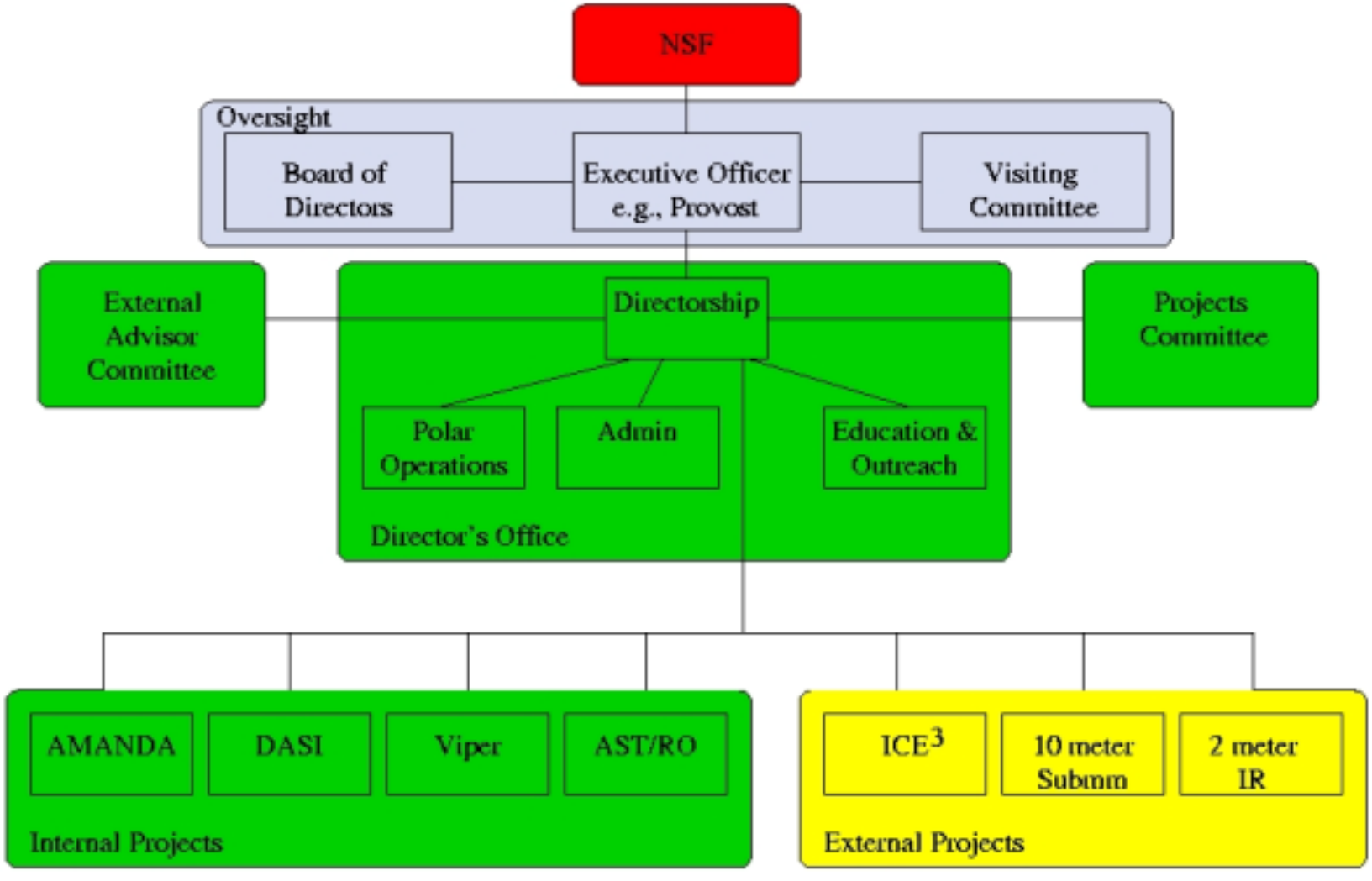
Director needs trust of NSF and community

Directorship

(and what does the director do?)

- Director provides:
  - strong scientific leadership, resource allocation, long term vision and planning
- Director's office oversees:
  - annual reports / renewals
  - fund raising
  - cost / science review
  - business / management office
  - central education and outreach
  - polar operations with control of funds for science support at the Pole
  - liaison(s) with science projects

SPSI Organizational Chart



Polar Operations

- provide science support, advice directly to project groups
- coordinate resources, inventory, shared facilities, population
- evaluation of science support costs and resource needs
- conduct 'readiness' reviews
- provide trained winterovers
- assist project managers
- *tasks Raytheon for science support ?*

Education and Outreach

- Central coordination for SPSI education and outreach
- K-12, undergraduate, and adult education programs using the lure of the Antarctic and Astrophysics to promote science literacy
- Facilitate involvement of researchers
- Conferences, workshops, knowledge transfer
- Developing human resources, especially under-represented groups
- Industry connections?

Org-chart: External Projects

- PI member of Projects committee
- Large projects, a ranking member sits on Board of Directors
- Interface directly with Polar Operations
- NSF provides necessary support funds directly to SPSI

for non-NSF funded projects:

- External funding of SPSI support costs negotiated with NSF and SPSI

What do I think now… ?

Need scientists to be actively involved in logistical support – not just make demands.

- You would not, for example, just order a new telescope. "You get what you inspect, not what you expect."

Like it or not, we are in this together.

- shared and limited resources

It would be wasteful not to pass on lessons-learned and technique and not to help new people and projects.

ICECUBE and SPT are big enough and have enough experience that they really don't need an organization, yet it is critical that they are involved.

What do I think now… ?

We should be the best people to figure out how to manage the limited and shared resources – it should not be decided for us by RPSC or NSF (consider helium supply).

The organization should not be self-propagating. That is, it should not be a stand alone support organization (NSF already has RPSC).

It should be a flexible and dynamic organization composed of the scientists involved.

It should have NSF funding to do its work.

What do I think now… ?

What is its work?

- **Coordinate shared resources, e.g.,**
  - helium usage
  - Data trx
  - Population coordination
  - MAPO and DSL lab space
- **Advise on critical science needs:**
  - Committee on liquid helium (monitor and advise)
  - Committee on IT and bandwidth…
- **Maintain inter-project communications and respond to needs of projects, winterovers, NSF and RPSC**
  - Weekly telecons (with minutes?)
  - March meeting for SIP?, summer planning meeting?
- **Supply Austral summer and winter SP support people**
  - difficult to determine how to split with RPSC
- **Help access readiness before deployment of new projects and instruments – we don't want any failed experiments.**
- **Maintain MAPO and DSL shared equipment, especially the model shop.**
- **Hold workshops (like this one!)**

What do I think now… ?

What is it?

- All of us, with definite assigned responsibilities
- Committee chairs provide reports
  - Each comt chair funded with perhaps one month summer salary?
- 1st Funded by a 3-year supplement (more later)

What do I think now… ?

What does it take?

- 0.25 FTE administration support
- 0.25 – 1.0 FTE coordinator
- Involvement and buy-in by all PIs
- a "director" and core group (all PIs +)
- A few critical committees with chairs to address particularly critical, topical issues
  (provide travel support, 1 mo summer salary for chair?)
- Commitment to Austral summer people (not year by year)
- Commitment for non-specific project winter-over support
  (one or two winter-overs? RPSC funded?)
- EPO coordination support, REU program ?
- Official NSF allocation of its responsibilities (DISCUSS)

Crude cost estimate

Item	Unit/FTE	LOW	HIGH	Compromise
Winterover	$124,992	$124,992	$249,984	$124,992
Austral support	$104,000	$34,632	$104,000	$52,000
Coordinator (polar ops)	$149,792	$37,448	$149,792	$74,896
Administration - Assistant	$86,130	$21,533	$21,533	$21,533
Administration - Financial	$102,982	$12,873	$12,873	$12,873
Coordinator (EPO)	$149,792	$0	$49,881	$37,448
Committee (1mo summer salary)	$20,000	$0	$80,000	$40,000
Travel	$40,000	$20,000	$40,000	$40,000
Telecons	$10,000	$10,000	$10,000	$10,000
TOTAL		$261,477	$718,062	$413,741

Other costs…

- Materials, some discretionary funds..
- SP w/o travel

Funding Mechanism

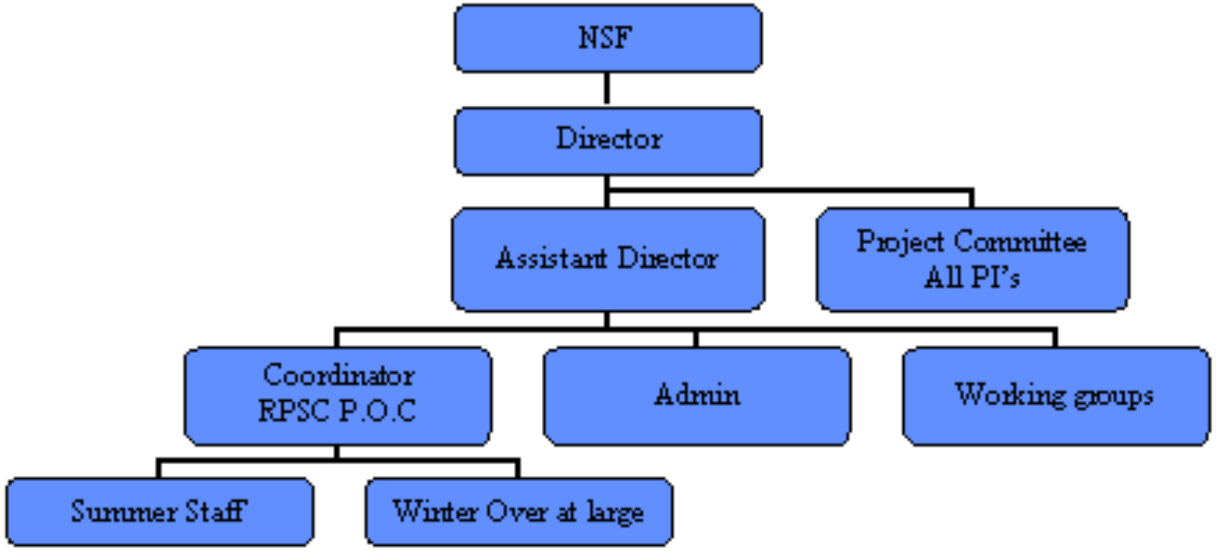
Start with 3 year supplement

- Frankly I think a supplement to U.Chicago (SPT) makes the most sense (Admin, Randy, UCEC, a long-standing project) with responsibility and committee chairs distributed among all institutions and projects.

Issues from yesterday

1. Population optimization (talents and beds)
2. Cargo optimization (leveling)
3. Construction optimization (leveling)
4. Laboratory space and power (shared resources)
5. Standard test equipment, electronics support
6. Coordination of identifying, agreeing on new general purpose test equipment. Iterate with RPSC on the equipment PO. Use T-event authorized (set up) by NSF Operations, i.e., Chiang.
7. IT Committee (lots of issues, history suggests we must be involved)
8. Readiness reviews, implications for projects under term grants Strongly encourage NSF to insist on reviews and be willing to help with them. Authority should be NSF's.
9. Site characteristics of other sites, archiving , the grants program should take care of this by proposal pressure.. We should not take it on as a centrally funded coordinated activity.
10. How are scheduling, resource conflicts adjudicated? NSF is final arbiter – we try to work it out by ourselves first.
11. Who hires winterovers? RSPC's role? RPSC: CRYO, Machinist asst, US: Machinist

SCOARA Organizational Chart



Issues from yesterday, continued

1. Central REU program Yes, but assign students to all institutions – locally students too.
2. EPO – Should not be done for you, but by you. Central EPO should be to assist and get you involved! No – (get REU support).
3. Quick reaction time… Existing grants, try to avoid the situation in the first place
4. Have a "go to" person at the pole, especially for new projects? → bury this in summer coordination at the Pole. We have to help fix RPSC's BIG problem with quick turnaround!

Working Groups / POC

1. **Cryogenics, liquid helium (together)**
2. Power
3. **IT (RFL, CLM, DAS, GAW, GSG, CP)**
    1. Hacking, Irridium, bandwidth, comms (email etc)
4. **T-event SIP (shop supplies) → coordinator**
5. **Telecons (with Minutes?) → SWLH**
6. **Austral Summer Support People Schedule? → coordinator**
7. **Shared test equipment procurement → (SWLH, SEC, AAS, JC, SP, RM)**
8. **Fix Raytheon quick action, SPUC report → JEC to investigate**
9. **Raytheon P.O.C. → coordinator**
10. **NSF P.O.C. → PI**
11. **Search commt for coordinator (all project PIs).**
12. **Coordination between projects of Population & Construction schedules, Space needs & Cargo ROS → coordinator**
13. **Planning Meeting once per year.**
14. **Transparency – increase transparency of all projects, NSF..**
15. **Assisting new people/projects → case by case basis… Have a list of web pages of the projects.**