

Operations Concept



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Starting Points



- ◆ CCAT serves scientific interests of partner faculties
- ◆ Provides both educational and research opportunities
- ◆ Initial programs are surveys with bolometer cameras
- ◆ Flexible design supports future instrument development

- ◆ Operation is a cooperation between
 - academic staff at partners and
 - local (Chile) support staff
- ◆ Only do tasks in Chile when necessary
- ◆ Only do tasks at high altitude when essential
- ◆ Goal of remote operation from San Pedro support facility

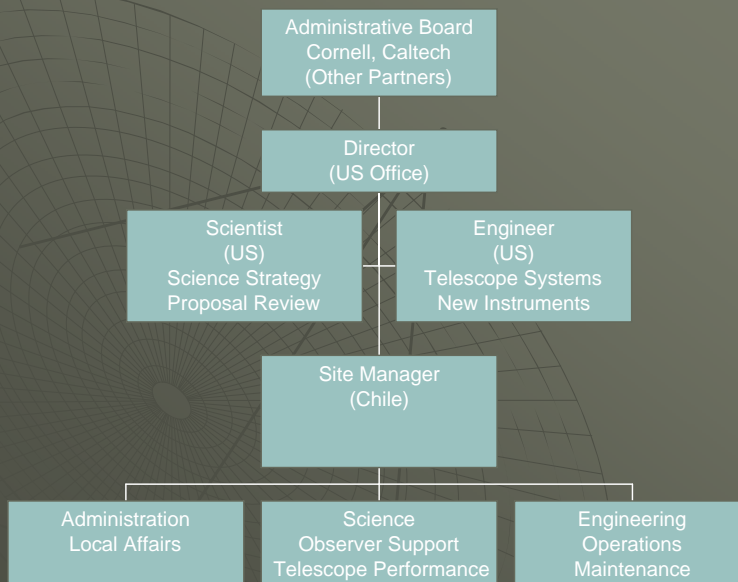
Operations Plan Development



- ◆ Initial model draws on previous experience
- ◆ CSO (Mauna Kea)
 - Offshore operation, user services, instrument development
- ◆ CBI (Chajnantor plateau)
 - Chilean operation and staffing, high altitude issues
- ◆ APEX, ALMA, etc.
 - Observe and learn from experience
- ◆ Continue plan development as project progress

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Initial Operations Organization



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Operations in Chile



- ◆ Similar to CBI, APEX, and other observatories
- ◆ Support facility near San Pedro de Atacama
- ◆ *Turno* work shifts with weekly commute
 - San Pedro is a *very* small town; 8 d x 10 h on, 6 d off
- ◆ ≈ 20 local staff, mostly Chilean recruits
- ◆ Installation & commissioning help from partners
- ◆ No (large) facilities in Santiago
- ◆ Contract services when possible
 - Administration (HR, purchasing, accounting, import/export)
 - Housekeeping, catering, etc.
 - Vehicle and equipment (e. g., generator) maintenance

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Observing Concepts



- ◆ University based facility
 - Range of science interests and objectives
 - Training ground for students and young scholars
- ◆ Initial science objectives are surveys
- ◆ Observing responsibilities
 - Local staff responsible for telescope operation
 - Academic investigators responsible for science, instruments
 - Goal of remote operation from San Pedro support facility
- ◆ Flexible scheduling
 - Necessary to accommodate weather critical programs
 - Short list selected from approved proposals
 - Short list observers on call for remote observing
 - Active program selected by local staff based on weather

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Observing Modes



- ◆ **On site** 20 %
 - Commissioning, etc., of telescope or instruments
 - Instrument team and local staff at telescope
- ◆ **Remote** 40 %
 - Routine observing method in mature operations stage
 - Local staff at support facility control telescope
 - Academic investigator directs observations over internet
- ◆ **Service** 40 %
 - Fully specified programs: Surveys or observer unavailable
 - Local staff at support facility carry out program

- ◆ **Surveys** 60 %
 - Extended periods of uniform observations
 - Remote or service observing

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High Altitude Issues and Mitigation



- ◆ **Altitude Induced Hypoxia (Telescope \geq 5000 m)**
 - Reduced mental and physical capacity
 - Acute disorders: HAPE, AMS, HACE
- ◆ **CBI, other telescopes show successful mitigation**
 - Limit staff at high altitude to essential work
 - Oxygen enrich selected spaces in facility
 - Provide portable supplemental oxygen
 - Remote operation when feasible
 - Engage contractors
- ◆ **Mitigation strategy part of operations plan**
- ◆ **Physiology consultant:**
John West, MD, UCSD



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Personnel



- ◆ **Predominantly Chilean staff**
 - Engineers and technicians available
 - On-job training necessary for specialties
 - Scientists, senior managers may be US expats
 - CCAT will compete with mines, other obs.
- ◆ **Turno system**
 - San Pedro *very* small
 - Weekly commute from residences
 - System common at mines, other observatories

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Initial Operations Staff in Chile



Position	Number	On [d]	Off
Site Manager	1	8	6
Administrator	1	8	6
Astronomer, telescope	2	8	6
Astronomer, survey	2	8	6
Engineer, instrument	2	8	6
Engineer, telescope	2	8	6
Engineer, software	2	8	6
Operator	6	8	6
Technician	2	5	2
Total	20		

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Legal Model



- ◆ Partnership forms legal entity in Chile
- ◆ Establish cooperative agreement
 - Chilean academic institution
 - Univ. de Chile or Univ. Catolica
- ◆ Request privileges
 - Astronomy Law (nr. 15172)
 - Tax and duty exemptions
 - Entry of project personnel

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Operations Budget



Category	(millions)
Telescope Operations	\$ 3.83
US Support	\$ 0.62
Instrument Upgrade	\$ 0.80
Total	\$ 5.25

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Telescope Operations



Category	(thousands)
Staff	\$ 1608
Transportation	\$ 519
Housekeeping	\$ 100
Utilities	\$ 250
Services	\$ 35
Materials	\$ 100
Land use	\$ 125
Subtotal	\$ 2738
Contingency (40%)	\$ 1095
Total	\$ 3833

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US Support



Staff	\$ 315
Observatory Director	0.25
Telescope Scientist	0.25
Telescope Engineer	0.25
Survey Astronomer	2
Assistant	1
Travel	\$ 200
Matls. & Services	\$ 100
Total (thousands)	\$ 615

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