



Project Management

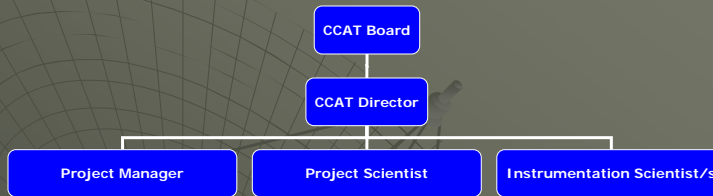
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Phases of Development



- ◆ **Feasibility/Concept Design Study**
 - ~1 Year Culminating in This Review (17-18 Jan 06)
 - Objectives Defined by Cornell/Caltech MOU
- ◆ **Engineering Concept Design**
 - Start June 2006 Duration: 1 Year
 - Provide Full Concept Definition and Enabling Analysis
- ◆ **Development Phase**
 - Start: June 2007 Duration: ~5 Years at 1st Light
 - Major Contracts, Construction, Integration
- ◆ **Commissioning**
 - Duration 1 Year
 - Optimize Telescope Performance, Handover to Ops

Project Organization



- ◆ **CCAT Board**
 - Representatives from Each Partner
 - Scientific, Technical, Financial, Legal Expertise
- ◆ **CCAT Director**
 - Responds to Board, Non-Voting Member of Board
 - Coordinates Activities of Project Manager & Scientists
 - Interface Between Partners and Project Activities

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Project Manager



- ◆ **Define & Implement Program Plan**
- ◆ **Define Tasking & Assign**
- ◆ **Project Team Definition & Development**
- ◆ **Cost Estimation and Control Practices**
- ◆ **Implement Technical Development & Review Process**
- ◆ **Maintain Constant Vision and Foster Team Spirit and Ethics**

The Project Manager is Responsible for Initiating and Maintaining all Required Activities En Route to Success

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Project Scientist



- ◆ Ensure Scientific Quality and Efficacy of Project
- ◆ Interface and Ombudsman to the Partner Scientific Community
- ◆ Leads the Science Committee and Others as Required
- ◆ Leads Efforts in Commissioning Telescope wrt Astronomical Observation & Quality
- ◆ Represents CCAT to the Astronomical Science Community in General

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Instrumentation Scientist/s



- ◆ Lead Development Activities for the Major Science Instruments Developed for CCAT
- ◆ Responsible for Performance of Science Instruments
- ◆ Manages Instrument Development to Meet Constraints of Budget and Schedule
- ◆ Maintains Cognizance of Relevant Technology Development Congruent with Instrumentation

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Project Staffing



Skill	Number	US Office	Chile
Project Manager	1	*	>
Deputy Project Manager	1	*	>
Administrative Assistant	1	*	
Project Engineer	1	*	>
Site Manager	1		*
Administrative Manager	1		*
Optical/RF Engineer	1	*	>
Electrical Engineer	1	*	>
Mechanical Engineer	2	*	>
Control Engineer	1	*	>
Software Engineer	1	*	>
Mechanical Technician	2		*
Electronic Technician	2		*
Software Technician	1	*	>
Scheduler/Planner	1	*	
Administrative Specialist	1	*	
	19	12	13

- ◆ Initial Definition
- ◆ “>” Means Moves to Chile
- ◆ Effort Made to Hire Chileans Who Can Return and Stay
- ◆ Desirable to Hire Some Who Will Transition to Ops
- ◆ Lean/Mean Team
- ◆ Contracts for Other Labor

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Business Model



- ◆ Partners Form Not-For-Profit Corporation
 - Legal Operating Entity in Chile
 - Insulates Partners from Liability
- ◆ Operate Project from Within a Partner Organization
 - Project is Too Small to Provide All Services
 - ◆ Legal, Personnel, Purchasing, Payroll, etc.
 - Provides Infrastructure Necessary During Initial Development (Offices, Meeting Rooms, etc.)
- ◆ Graduate to More Self Sufficient Stage During Operations

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Integrated Product Teams



- ◆ **Formed Within Project Organization to Address Subsystems and/or Tasks**
 - Leaders Chosen from Within Team
 - Constituency Consistent with Technical Content
 - Everyone Gets to Lead Sometimes & Follow Some Times
- ◆ **Project and Deputy Project Managers Mentor Teams**
 - Remain Cognizant of All Activities
 - Participate to Adjust Course and Support Teams
 - Coordinate Tasks, Schedules, Manpower

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Design Development Process



- ◆ **Standard Aerospace Format**
 - Concept, Preliminary, Critical Design Stages
 - Formal Reviews at Each Stage
 - Mandated by Statements of Work for Contracts
- ◆ **Science Involvement with Design**
 - Review of Requirements & Documentation
 - Participation in Source Selection Activities
 - Participation in Design Reviews

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Contracting



- ◆ **Approach**
 - Firm Fixed Price Contracts
 - Competitive Procurements When Possible and Practical
 - Adherence to Federal Acquisition Regulations
 - ◆ Not Required if No Federal Funding
 - ◆ A Good Process for a Level Playing Field
 - Sole Source Justifications Developed for Non-Competitive Awards
- ◆ **Contract Statements of Work**
 - Include Stages at Which Formal Approval by Project is Required
 - Define Process by Which Work Will be Done

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Cost Estimation



- ◆ **Initial Estimate Provided During this Review**
- ◆ **Final and Accurate Estimate at Conclusion of Engineering Concept Design Phase**
- ◆ **Requirements**
 - <90% of Estimated Costs Supported by:
 - ◆ Contractor Letter Quotes or Estimates
 - ◆ Catalogue Prices
 - ◆ Formal Estimating Processes
 - ◆ Extrapolation from Recent Similar Components/Subsystems
 - Final Estimate Must Include 10% Contingency
 - \$20m Preserved for Science Instruments
 - ◆ Includes Contingency for Instruments

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Cost Tracking and Planning System (CTPS)



- ◆ **A Spreadsheet System Previously Developed and Used Successfully**
 - Organized by Month of the Project and WBS Area
 - Provides Format for Initial Allocation of Funds
 - Updated Quarterly to Reflect Actual Expenditures
 - Revised Quarterly to Allow Completion Within Budget
- ◆ **Provides Cost-to-Complete Estimate Within Hours at Any Time in Project**
- ◆ **Reconciled Quarterly with Host Institution's Accounting Department**
- ◆ **Status Reported 2x/Year to Partnership**

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Summary



- ◆ **Management Process Previously Successful**
- ◆ **Staffing is Aggressively Light but Adequate**
- ◆ **Development Process is Straightforward**
- ◆ **Several Questions for Next Phase**
 - More Accurate Cost Estimation
 - Issues of Partnership & Business Approach
 - Development of Project Office & Staffing

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