



ATACAMA LARGE MILLIMETER ARRAY

ALMA COMMON SOFTWARE

ACS-UTFSM Team

┌ **Coordination** ┐

—
**2005-2006 Activities
Project**

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Contents

1 INTRODUCTION	1
1.1 PURPOSE	1
1.2 SCOPE	1
1.3 REFERENCE DOCUMENTS	1
1.4 ABBREVIATIONS AND ACRONYMS	2
1.5 GLOSSARY	2
1.6 STYLISTIC CONVENTIONS	2
2 OVERVIEW	2
2.1 MISSION & VISION	2
2.1.1 MISSION	2
2.1.2 VISION	3
2.2 ACHIEVEMENTS	4
2.3 RESOURCES	5
3 CURRENT PROJECTS	5
3.1 SCARLET	5
3.1.1 Activities	6
3.2 GENERIC TCS	6
3.2.1 Activities	7
4 RESOURCES NEEDED	7
4.1 Logistic Resources	7
4.2 Physical Resources	7

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1 INTRODUCTION

1.1 PURPOSE

This document aims to give a complete description of the ACS-UTFSM Team activities, including the resources needed to fulfill our expectations. The main idea is to inform about our activities and ask for specific resources for the Team.

1.2 SCOPE

The intended audience for this document are any directive, chief or benefactor that wants to help us with our work. Specially this document is prepared for the D.I. UTFSM Director and for the ACS Project Leader.

1.3 REFERENCE DOCUMENTS

- [1] LSO-INS-ESO-00500-0001 – Guide for Document Preparation
<http://www.ls.eso.org>
- [2] USM-STD-0001 – Document Preparation Guidelines
<http://acs.inf.utfsm.cl/download/docs/USM-GUI-0001.pdf>
- [3] USM-MAN-0001 – gTCS Design Manual
<http://acs.inf.utfsm.cl/download/docs/USM-MAN-0001.pdf>
- [4] USM-DIS-0001 – Project 001 Summary
<http://acs.inf.utfsm.cl/download/docs/USM-DIS-0001.pdf>
- [5] USM-DIS-0002 – RPM Generation
<http://acs.inf.utfsm.cl/download/docs/USM-DIS-0002.pdf>
- [6] Twiki-Page – ACS Packaging Project
<http://acs.inf.utfsm.cl/twiki/bin/view/UtfsmProjects/AcsPackaging>
- [7] Paper – ACS Security Paper
www.acs.inf.utfsm.cl/maray/ACSSecurity.pdf
- [8] Twiki-Page – CdbChecker Project
<http://acs.inf.utfsm.cl/twiki/bin/view/UtfsmProjects/CdbChecker>
- [9] Twiki-Page – Internal Presentation
<http://acs.inf.utfsm.cl/twiki/bin/view/UtfsmDiscussion/UtfsmPropaganda>
- [10] Twiki-Page – Scarlet Project
<http://acs.inf.utfsm.cl/twiki/bin/view/UtfsmProjects/ScarLet>
- [11] Twiki-Page – gTCS Project
<http://acs.inf.utfsm.cl/twiki/bin/view/UtfsmProjects/GenericTCS>

1.4 ABBREVIATIONS AND ACRONYMS

A&A	Abbreviations and Acronyms
ACS	ALMA Common Software
ALMA	ATACAMA LARGE MILLIMETER ARRAY
D.I.	Departamento de Informática, UTFSM
ESO	EUROPEAN SOUTHERN OBSERVATORY
gTCS	Generic TCS
TCS	Telescope Control System
LSO	La Silla Observatory
OAN	Observatorio Astronómico Nacional
AIRUB	Astronomisches Institut Ruhr-Universität Bochum
UTFSM	Universidad Técnica Federico Santa Maria
EGO	European Gravitational Observatory
RAO	Rothney Astrophysical Observatory

1.5 GLOSSARY

1.6 STYLISTIC CONVENTIONS

The following styles are used:

bold

in the text, for commands, filenames, pre/suffixes as they have to be typed.

italic

in the text, for parts that have to be substituted with the real content before typing.

teletype

for examples

<name>

in examples, for parts that have to be substituted with the real content before typing.

bold and *italic* are also used to highlight words.

2 OVERVIEW

The ACS-UTFSM Team was founded on 15th of March, 2004, by 4 UTFSM students and Professor Javier Cañas. The main idea of the project is to help the ALMA project, learn how real distributed systems works and how a large (and distributed) software development as ACS is managed and scheduled.

2.1 MISSION & VISION

2.1.1 MISSION

Our mission is to learn and do.

Learn about real complex distributed systems, world class projects and getting the invaluable know-how about bleeding-edge software technologies. Comprehend the theoretical and practical viewpoints, merging academic knowledge with real experiences of engineers and scientists over the globe.

Using this knowledge we aim to explore the world of robotic telescopes, thinking not only in single ones, but in telescope clusters, arrays and farms. All our work will be freely available to the community as a retribution for the support we got from it.

2.1.2 VISION

Our Vision is to work side by side with *top of the line* engineers and scientists, developing using high standards so all our software will be used and maintained long after we release it to the community. Also, be known all over the world as an example of highest quality work and partnership.

2.2 ACHIEVEMENTS

Date	Achievements	Details
15/03/04	Constitution of the Team	By J.Cañas, R.Araya, M.Araya, N.Troncoso and M.Salgado
25/03/04	Training Course at LSO	Learned from <i>how to install</i> to specific ACS Programming and Design details
30/03/04	Work at Ada Lovelace Lab	Using other project equipments and space the Research stage begins.
30/04/04	ACS Research Report	Final Installing and Testing Report[4] published
20/05/04	Video-conference with LSO	The goals and objectives of the team were discussed, the ACS Packaging project begins and LSO lent us two old Workstations (PC).
05/06/04	Training Course at LSO	Installing and Configuration of the Workstations
14/06/04	First ACS office	The D.I. lent us an office and three monitors, including all the maintenance cost
30/07/04	Web Page Released	Our official web page was released, people working in ACS was very excited by our initiative
22/08/04	ACS Packaging Project defined	Requirements, Specification of Activities and Gantt Chart[6].
16/09/04	First ACS Packages Released	This version was called "Zero Approach", and includes a full distribution of ACS divided in 3 RPMs (not including external tools). This product was built completely at UTFSM.
22/10/04	Encuentro Linux 2005 Speech	Presentation about ACS Architecture and Design at the National Linux Meeting (R. Araya).
22/12/04	Security Paper Released	"A Secure Programming Policy for Alma Common Software" [7] paper. (M. Araya)
03/01/05	Two Summer Practices at LSO	Two old members of the team (and a new one) went as Summer Students at LSO
15/01/05	Kick out of the Office	All our things were taken out the office for internal restructuring without any notice for us. We went to Distributed System Lab. for a while.
21/01/05	Last ACS Packages Released	Full documented RPM generation procedure, including scripts for auto-generation, installation and user guidelines [5].
21/01/05	Official ACS developers	For our work, the team became officially ACS developers
09/02/05	CdbChecker Project defined	Configuration Database Checker (XML parser) project begins. [8]
07/03/05	New Members	Nicolas Barriga and Cristofer Reyes became part of ACS-UTFSM Team.
14/03/05	Seek for an office campaign	After a long search, Professor Lautaro Guerra lent us a space at the Projects Office
29/03/05	CdbChecker Pre-Release	The full functional software released to be tested and tuned
13/04/05	Final CdbChecker Version	This version includes TATs (Automatic Tests), Standard ACS Structure and all the asked requirements.
14/04/05	Internal Presentation	We officially present our team to the D.I. and ask for a stable office and support [9]

Date	Achievements	Details
14/04/05	Flavio Gutierrez Visit	IT manager at La Silla Observatory came to our offices to bring a Lego Mindstorm Kit. While he was here he attended meetings with the Team and with the Informatics Department's Director, Raul Monge.
15/04/05	Scarlet Project defined	<i>SCientific Acs Remote LEgo Telescope</i> project defined, using the Lego Mindstorm Kit[10].
10/05/05	CdbChecker became part of ACS	The CdbChecker (our product) is included in all ACS distributions.
14/05/05	Telecon Meeting Participation	Participation in a Telecon Meeting about ACS collaboration. Participants: OAN, AIRUB, ESO, UTFSM, Cosylab, EGO, RAO and LSO.
14/06/05	Newspaper Interview	Appearance at "El Mercurio de Stgo." and "El Mercurio de Valpso.". Also on-line media as http://noticias.usm.cl include the interview.
24/06/05	LSO Technical Courses at UTFSM	We had the first of a series of technical courses done by LSO engineers. Ruben Soto talked about basic astronomical jargon, TSC architecture and the Axis Subsystem.
25/07/05	Two new Members at the Team	Rodrigo Tobar and Matias Mora became part of the team.
25/07/05	gTCS Project Starts	Generic Telescope Control System Project [11]
26/07/05	Jorge Ibsen visit	We had a formal meeting with him and our head chief; professor Javier Cañas.
12/08/05	LSO Technical Courses at UTFSM	Done by Ruben Soto from LSO. He addressed some basic subsystems that a TCS should have and how they should interact.

2.3 RESOURCES

The ACS-UTFSM team only owns resources that its members can afford, meaning office items and documentation. The following list of resources were lent to the team.

Item	Lent by
2 Pentium III Workstations	LSO (J. Ibsen)
Lego Mindstorm Kit	LSO (F. Gutierrez)
1 Mini ITX Workstation	D.I. (J. Cañas)
3 refurbished 14" Monitors	D.I. (M. Varas)
Office Space	D.I. (L. Guerra)
Keyboards, Mice and Network Equipment	D.I. (LabIT)

3 CURRENT PROJECTS

3.1 SCARLET

SCientific Acs-based Remote LEgo Telescope. The goal is to use the Lego Mindstorm Kit to build a Telescope Toy Model and control it remotely using ACS. Also a full GUI must be implemented,

including a scheduler for observation times.

3.1.1 Activities

- Lego Building
 1. Make a stable structure as a model of a real telescope using the RCX, 2 motors, 2 touch sensors, and 1 light sensor
 2. Document the building with a CAD utility like MLCAD.
 3. Calculate theoretical details, like torque and RPMs.
- DevIO Implementation
 1. Implement (using CosyLab demo) the interface between the RCX and the ACS Modules.
 2. Upload all the improvements to the official ACS CVS as a contribution.
 3. Try to use those things in a kernel 2.4 (now working only in version 2.6)
- ACS Components, Containers and Manager
 1. Study and design an ACS implementation for controlling the Lego
 2. Implement the components, the CDB schemas, the IDLs and integrate them into a standard ACS Module
 3. Document all the development process, using a twiki page or any other method.
- GUI and Sched
 1. Study the capabilities of the integrated GUI APIs of ACS (like abeans)
 2. Start from the work done by CosyLab
 3. Implement a simple Java interface and a simple Web-based interface.

3.2 GENERIC TCS

The main goal of this project is to present a basic but complete TCS on October 31Th, starting on July 17Th (2005). At those 13 weeks, all the investigation, modeling, development and deployment must be complete. At the end, Flavio Gutierrez and Jorge Ibsen will be the judges of our work. Also, this TCS must be implemented using only ACS and the supported libs, no other libraries or languages should be used at this project. The design and implementation should be generic, that means that almost any mount (with few hardware layer adjusts) could use this TCS.

The objectives of this project are:

- Develop the TCS with a well defined but simple interface abstraction, that could be used at almost any mount.
- The TCS should include at least a Presetting, Tracking, Auto-guiding, Pointing and Maintenance interfaces, fulfilling the basic behaviour of a modern telescope.
- Test the TCS with the Scarlet Project.
- Develop a control GUI for promotional reasons.

3.2.1 Activities

The first design cycle of this project includes:

1. Requirements Specification
2. Use Cases Description
3. Subsystems Sequence Diagram
4. Subsystems Interfaces Specification
5. Component Interfaces and Description

The first development cycle of this project includes:

1. Installing, Module Creation, Makefile and SVN
2. Horizontal Coordinate Mount C++ Module
3. Scarlet Library Development
4. Abeans GUI first approach
5. OpenGL Telescope Model
6. Horizontal Coordinate Mount full integration

4 RESOURCES NEEDED

Currently the team has seven members, but we are willing to grow, to be able to work on several different projects simultaneously. To fulfill our expectations we need several resources.

4.1 Logistic Resources

This section is focused directly to the D.I. Director, recalling the commitment of the department with our team. All the logistical expenses are paid by the members of the team, including printings, photocopies, spare parts, trips and office items. This cost is not minor, ascending each month between 10.000 to 30.000 pesos. We have managed this problem so far, but we cannot continue our work only by spending members wealth. Our proposal is to set up a bank account for our project for logistic expenses. The department should contribute with 25.000 pesos each month, justifying all the expenses with bills and reports as needed. This 25.000 pesos will be distributed as follows:

12.000	Printings and photocopies
10.000	Spare PC parts
3.000	Office Supplies

4.2 Physical Resources

For our future and current projects we need the following physical items, ordered by relevance.

- 2 Pentium IV Class Workstations.
At least 2000 MHZ CPU, 512 Mb RAM, with Monitor, Keyboard and Mouse.

- Network Switch.
8-port 10/100 Mbps, and new patch cords.
- Webcam.
Logitech Orbit (Sphere).
- Amateur Telescope.
Over 4 in Telescope.
- 3 Motors.
DC motor, 24 Volts with encoder and reduction gear head.