Atacama
Large
Millimeter
Array

Management Plan
ALMA-J System Engineering and Integration

SYSE-80.01.01.00-001-A-GEN

Version: A

Status: Draft A

2005-10-25

Prepared By:	**Organization**	**Date**
Ryusuke OGASAWARA Satoru IGUCHI Koh-Ichiro MORITA	NAOJ	2005-10-25
Approved by:	**Organization**	**Date**
Satoru IGUCHI	NAOJ	yyyy-mm-dd
Released By:	**Organization**	**Date**
Tetsuo HASEGAWA	NAOJ	yyyy-mm-dd

Change Record

Version	Date	Affected Section(s)	Change Request #	Reason/Initiation/Remarks
A	2005-10-25	all	Draft A	First Draft

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1 DESCRIPTION

1.1 Purpose

This document describes the management plan of the ALMA-J System Engineering and Integration that is carried on by the ALMA-J SE&I team.

This document includes:

- Overview of the ALMA-J SE&I team with the organizational structure;
- Summaries of the work plans.
- An overview of the documentation and configuration control needed to perform this work
- Milestones of ALMA-J System Engineering and Integration.

1.2 Scope

This management plan is applicable to:

- Development of the design of the ACA system;
- Reviewing of the designs of the ALMA-J deliverables; and
- Assembly, Integration, and Verification of the ACA system at OSF.

2 RELATED DOCUMENTS AND DRAWINGS

2.1 Applicable Documents

No	Document Title	Reference
AD 01	ALMA-J Project Plan	
AD 02		

2.2 Reference Documents

No	Document Title	Reference
RD 01	ALMA Product Tree	ALMA-80.03.00.00-001-N-LIS
RD 02	ACA AIV Concepts and Work Plan	ALMA-85.00.00.00.003-A-PLA
RD 03		
RD 04		

2.3 Abbreviations and Acronyms

AD	Applicable Document
ACA	Atacama Compact Array
ALMA	Atacama Large Millimeter Array
ALMA-B	ALMA Bilateral
ALMA-J	ALMA Japan
AT	Antenna Test
CSV	Commissioning and Science Verification
BE	Back-End
IPT	Integrated Product Team
JAO	Joint ALMA Office
NAOJ	National Astronomical Observatory of Japan
PA	Product Assurance
RD	Reference Document
SE&I	System Engineering and Integration
SE	System Engineering
SI	System Integration

3 ALMA-J SYSTEM ENGINEERING AND INTEGRATION

3.1 ORGANIZATION

The organizational structure of the ALMA-J System Engineering and Integration Team is presented in Figure 3-1. The team is represented by NAOJ [AD 01]. The bulk of the SE team members are working in Mitaka campus of NAOJ, and the bulk of the SI team members are working in Santiago or OSF. The current members are employed by NAOJ.

Dr. Satoru IGUCHI, the ALMA-J Project Engineer, has a design authority for the ALMA-J deliverables, and has a responsibility for the requirements of all the matters related to them.

Dr. Koh-Ichiro Morita, the ALMA-J System Engineering Team Leader, has a management responsibility for the review, development and manufacturing of the ALMA-J deliverables, and the point of contact for all the matters related to the ALMA-J SE.

Dr. Ryusuke Ogasawara, the ALMA-J System Integration Team Leader has a management responsibility for the assembly, integration and verification (AIV) of the ACA deliverables, and the point of contact for all the matters related to the ACA AIV.

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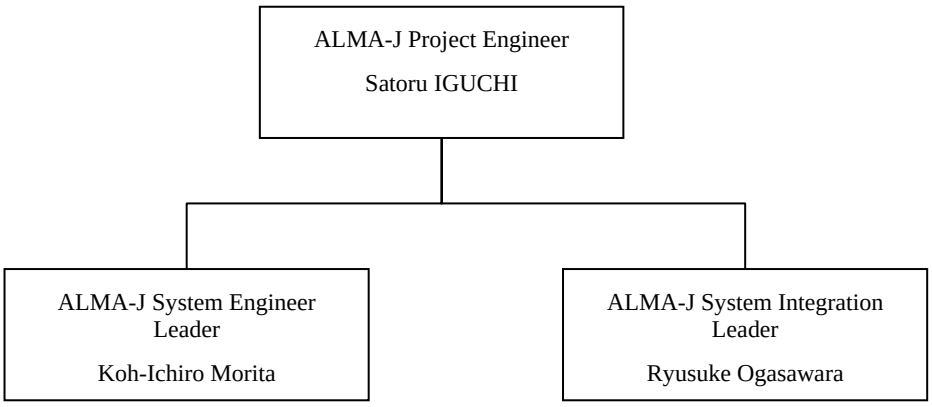

Figure 3-1: Organization structure of the ALMA-J System Engineering and Integration team of ALMA. ALMA-J SE is responsible for ALMA-J system engineering management, and ALMA-J SI is responsible for the ACA system integration.

3.2 INTERFACE WITH ALMA-B

The ALMA-J SE&I team works in the scheme of closely coupled collaboration with ALMA-B SE&I IPT and the relation between those two groups are summarized in Figure 3-2. The work of the ALMA-J SE&I Team is carried on with close relation with the ALMA-B SE&I IPT. Especially, the ALMA-J SI team will be merged into an extended ALMA AIV. The unified ALMA AIV team will do the AIV work for whole ALMA instrumentation including the ACA system.

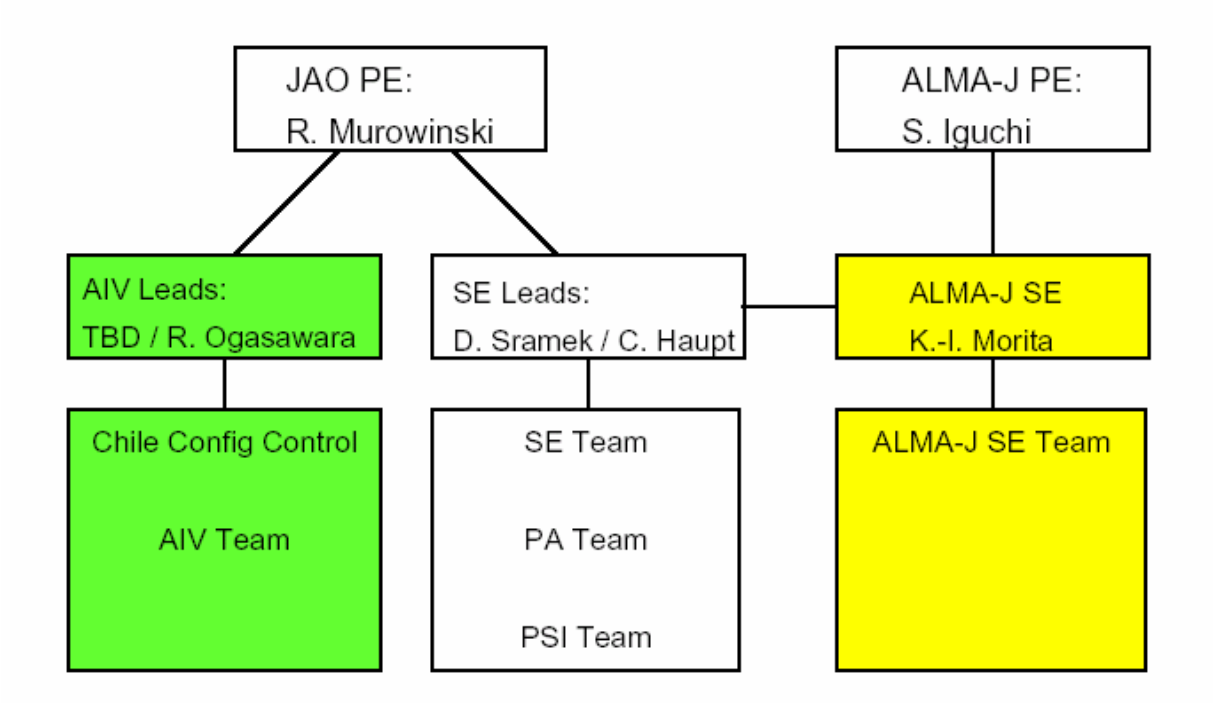

Figure 3-2: Organization structure of the System Engineering and Integration team of ALMA. ALMA-J SE is responsible for management related to the ACA, and ALMA-J SI and ALMA-B SI merges into one unified AIV team.

4 ALMA-J SYSTEM ENGINEERING

4.1 ALMA-J SE PRINCIPLE CONTACT

Dr. Koh-Ichiro Morita
Team Leader of ALMA-J System Engineering and Integration Team
ALMA-Japan Project Office
National Astronomical Observatory of Japan, National Institutes of Natural Sciences
E-mail: morita@nro.nao.ac.jp
Postal address: 2-21-1 Osawa, Mitaka, Tokyo 181-8588, Japan
Phone: +81 (0)422-34-43
Fax: +81 (0)422-34-3764

4.2 ALMA-J SE TEAM MEMBERS

SE task requires a significant allocation of resources. As seen in

Figure **4-1**, a number of tasks fall under the SE summary task, including:

- maintaining external contacts (including those with NAOJ and the ALMA-B project);
- general SE management tasks (including tracking the schedule and budget, plus personnel-related issues);
- top-level system design (esp. issues related to the specifications and external ICDs); and
- organizing the reviews related to the ALMA-J deliverables.

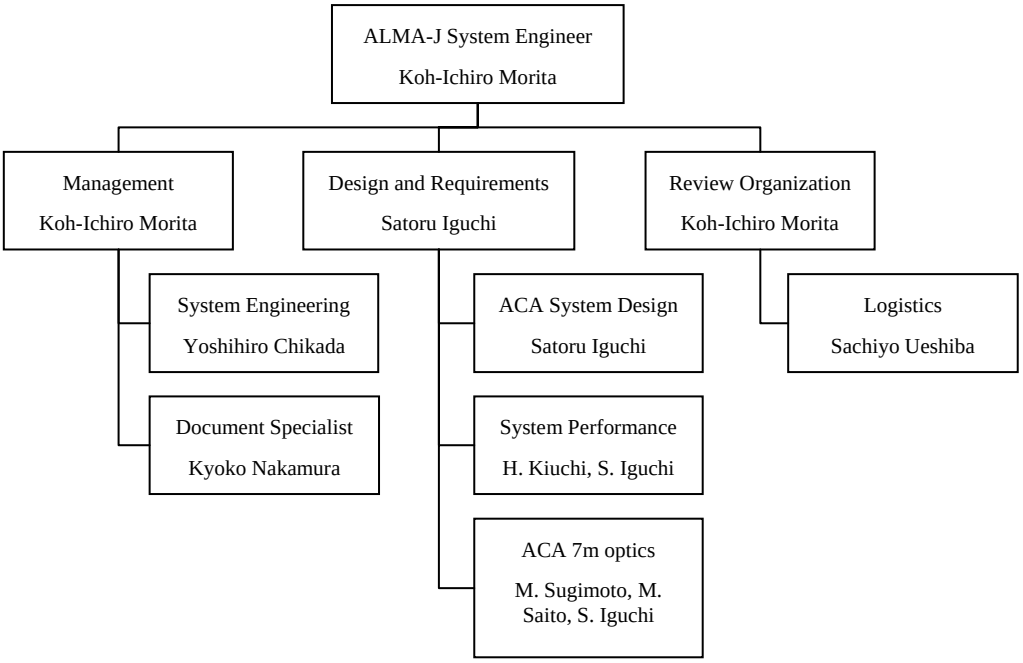

Figure 4-1: The organizational structure of the ALMA-J SE Team.

Current members of the ALMA-J SE&I Team and their primary responsibilities are shown in the Table 4-1.

Table 4-1: Responsibilities within the ALMA-J SE Team

Name	Position	Main Responsibilities
Koh-Ichiro Morita	Team Leader	● Management and external point-of-contat for the ALMA-J System Engineering ● Oversight for the design, development and manufacturing for ALMA-J deliverables ● Review organization for the ALMA-J deliverables
Yoshihiro Chikada	System Engineer	● Support the design and management of all materials for ACA
Kyoko Nakamura	Document specialist	● Management of the ALMA-J internal document system.
Satoru Iguchi	System architect	● ACA system Design ● Requirements and ICDs for ACA System ● ACA system performance ● ACA 7-m optics design
Hitoshi Kiuchi	System Engineer	● ACA system performance
Masao Saito	System architect	● ACA 7-m optics design
Masafumi Sugimoto	System architect	● ACA 7-m optics design
Sachiko Ueshiba	Logistics	● Contact person of Logistics for the reviews related the ALMA-J deliverables

5 ALMA-J SYSTEM INTEGRATION

5.1 ALMA-J SI PRINCIPLE CONTACT

Dr. Ryusuke Ogasawara
Team Leader of ALMA-J System Integration Team
ALMA-Japan Project Office
National Astronomical Observatory of Japan, National Institutes of Natural Sciences
E-mail: ryu.ogasawara@nao.ac.jp
Postal address: 2-21-1 Osawa, Mitaka, Tokyo 181-8588, Japan
Phone: +81 (0)422-34-3970
Fax: +81 (0)422-34-3764
Or
El Golf 40, Piso 18, Las Condes, Santiago, Chile
Phone: +56 (2)467-6132 / +56 (8)550-2493(Cel)

5.2 ALMA-J SI TEAM MEMBERS

SI task requires a significant allocation of resources. As seen in Figure 5-1, a number of tasks fall under the SI summary task, including:

- maintaining external contacts (including those with NAOJ and the ALMA-B project);
- general SI management tasks (including tracking the schedule and budget, plus personnel-related issues); and
- Assembly, Integration, and Verification of the ACA system at OSF.

Current members of the ALMA-J SI Team and their primary responsibilities are shown in Table 5-1.

Table 5-1: Responsibilities within the ALMA-J SI Team

Name	Position	Main Responsibilities
Ryusuke Ogasawara	Team Leader	● Management of the ACA System Integration ● Oversight of Oversight for the design, development and manufacturing for ALMA-J deliverables ● Education of Chilean engineer

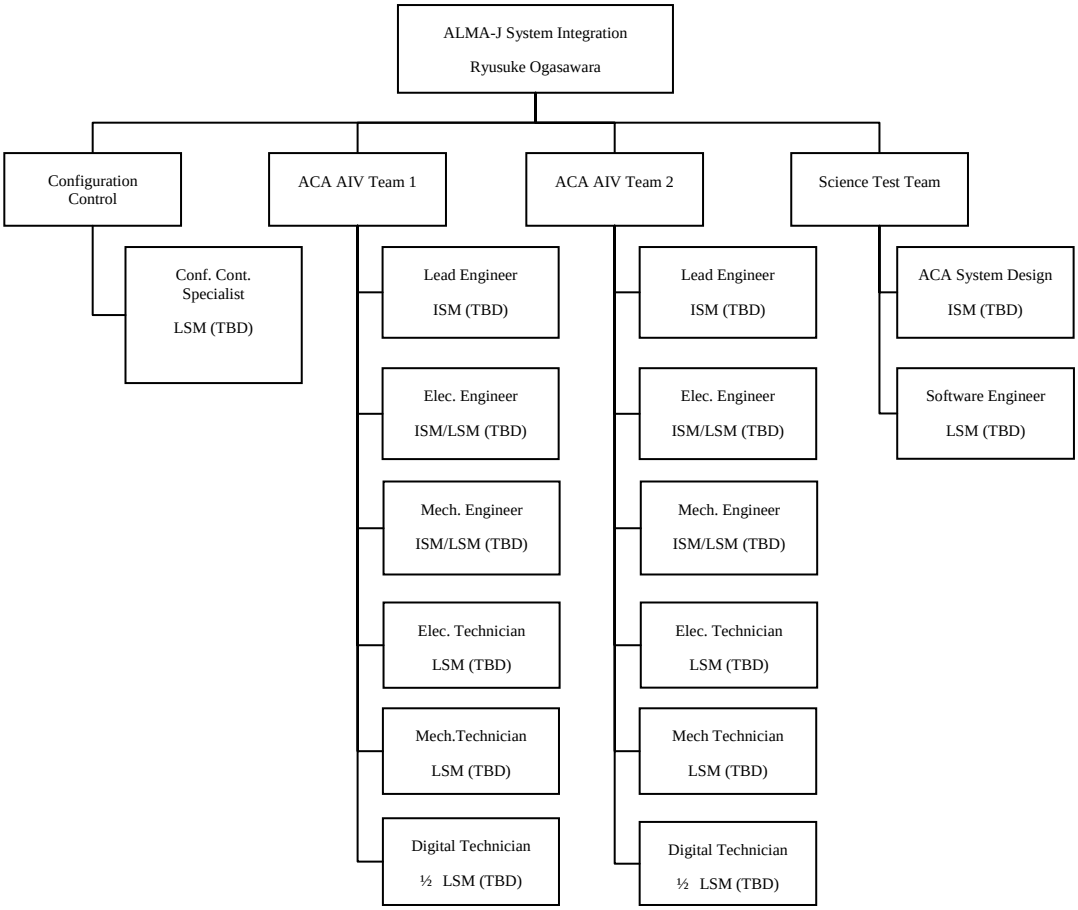

Figure 5-1: The organizational structure of the ALMA-J SI Team.

6 WORK PLAN OF THE ALMA-J SE&I TEAM

6.1 TASK STRUCTURE

The ALMA-J SE&I team has responsibility to proceed tasks related to construction and integration of the ACA in ALMA SE&I whole tasks. These tasks from document product tree are shown in Figure 6-1 (see RD 01).

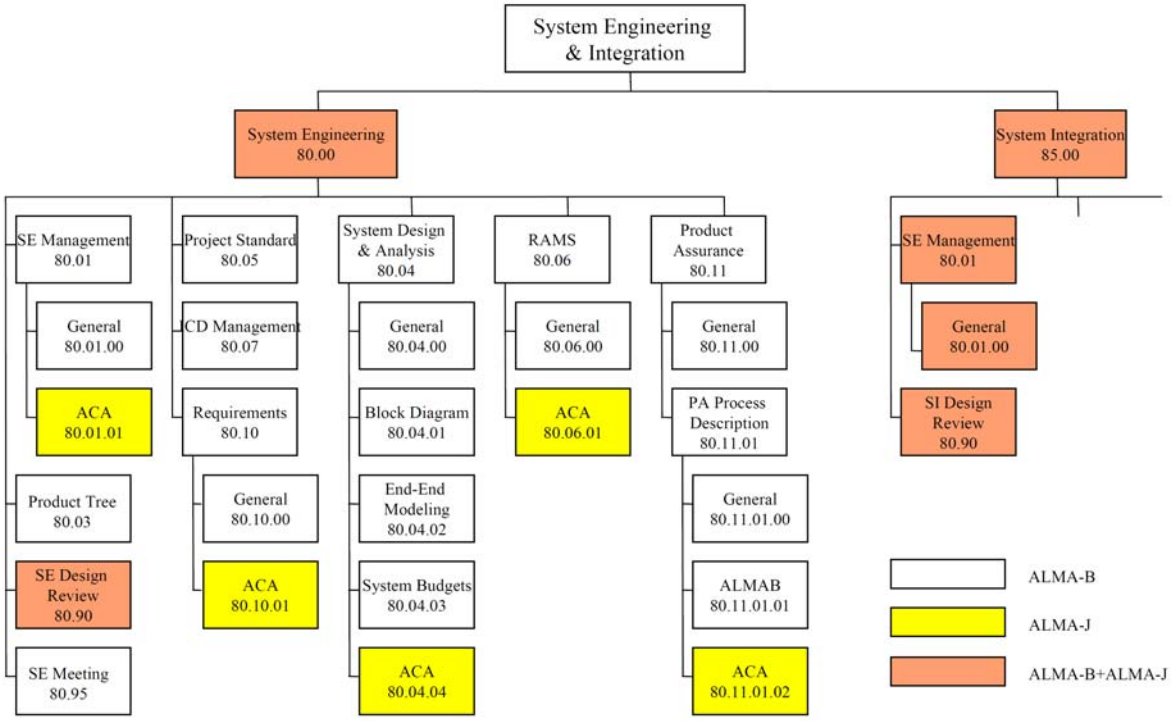

Figure 6-1: The Product Tree related to the ALMA SE&I. Tasks of yellow box shall be done by the ALMA-J SE&I Team.

6.2 ACA SYSTEM DESIGN AND REQUIREMENTS

ACA system design is based on requirements documents, which can be divided into two classes.

a) ACA system requirements based on the science requirements
b) general engineering requirements and standards

Among class a) requirements, there are some requirements which are exactly same as those of ALMA-B. For the system requirements there is a hierarchy of documents as shown in Figure 6-2.

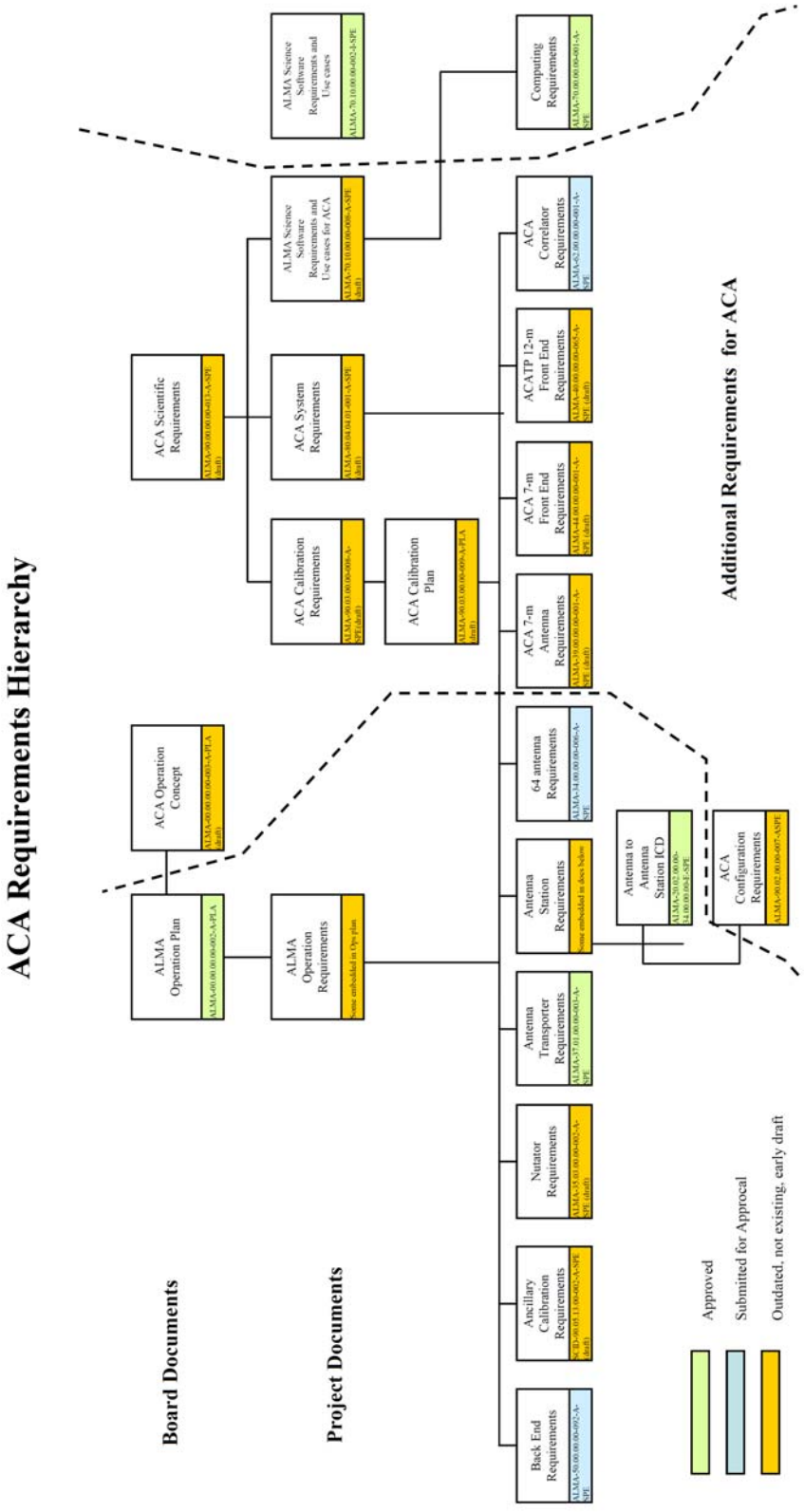

Figure 6-2: Hierarchy of Requirement Documents

6.3 ALMA-J REVIEWS

ALMA-J SE&I team is responsible for reviews of ACA System, sub-systems and ALMA-J deliverables. The plan of reviews is following.

- *2005 May 30-31:* *ACA Correlator PDR* *done*
- *2005 June 21-22:* *Band 4 Cartridge PDR* *done*
- *2005 June 23-24:* *Band 8 Cartridge PDR* *done*
- 2005 November 8-9: ACA 12-m Antenna CDR/MRR part 1 active
- 2005 November 10-11: ACA System PDR* active
- 2005 January-February: ACA 12-m Array Antenna CDR/MRR part 2
- 2006 April: ACA Correlator CDR
- 2006 June: ACA Correlator MRR
- 2006 June: ACA 7m optics CDR
- 2006 July-December: Band 4 Cartridge CDR
- 2006 July-December: Band 8 Cartridge CDR
- 2006 October: ACA System CDR
- 2007 April-June: ACA 7-m Antenna CDR/MRR
- 2007 June: Band 10 cartridge PDR
- 2007 June-September: Band 4 Cartridge PRR
- 2007 June-September: Band 8 Cartridge PRR

* review scope includes the review of ACA 7-m Antenna Specifcations&Requirements and ACA TP/7-m Front End Specifcations&Requirements.

Coordination with ALMA-B will become more important in the year of 2006.

6.4 ACA SYSTEM INTEGRATION

SI team of ALMA-J SE&I is responsible for the ACA System integration, that is ACA AIV work. ACA system is defined to be operated as a sub array in the extended ALMA project and shall be involved in a unified operation. A standalone operation of ACA system is also involved in the concept of the unified operation of the extended ALMA. Thus, the ACA system needs to be integrated and tested totally for its full function. Details are described in RD02.

SI team for ACA System (ACA AIV team) will be established in Chile partly by 1Q2007 and number of the team members will be around 16, to that two teams can be available for AIV work in total [RD02].