

## **The Organizational Structure of ALMA in Chile**

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### ***1.0 Abstract***

The Atacama Large Millimeter Array, ALMA, is an international project organized between two partners, Europe and North America, with the strong possibility of a third partner, Japan. The three parties to this partnership have different legal structures, ranging from that of a private corporation, to an agency of a governmental Ministry, to an international treaty organization. All three partners have, or potentially could acquire, permission and privileges from the Republic of Chile to build and operate ALMA in Chile on behalf of the ALMA partnership. However, recent progress made by the U.S.-European *ALMA Coordinating Committee* (ACC) in establishing the fundamental principles for the ALMA partnership—the relation of the responsibilities of one partner to those of the other—have identified four issues that individually and together lead to the conclusion that a *single-entity* representation of ALMA in Chile may be neither in the best interest of the partners nor of the project. These four issues are the following:

- The draft ALMA Agreement is based on equal efforts from, and equal benefits to, the partners; decision-making is a shared responsibility;
- The draft ALMA Management plan for implementation of the ALMA Agreement in the construction phase of the project is based on a management concept that fully involves both partners in all aspects of the project;

- The immunities negotiated from the Republic of Chile by one ALMA partner cannot be extended to the other partner;
- Each partner finds it necessary to retain clear and recognized title in Chile to the capital equipment exported to Chile by that partner for ALMA.

Therefore, it is argued in this position paper that a new model is needed for the legal organization of ALMA in Chile. That model is based on the same principles that inform the ALMA Agreement for the ALMA partnership. Namely, ALMA is a joint venture of the U.S. and Europe that embodies equality of effort, equality of realized benefits, and fully shared responsibility, in all aspects of the project. The model has the derived benefit of providing a way to involve Chilean institutions and officials in the Observatory operation so as to facilitate stable and amicable relations with the Republic of Chile over the operational life of the observatory.

## ***2.0 Background***

The issues related to the operation of ALMA in Chile have been discussed in the groups appointed by the ACC. Ian Corbett, Arno Freytag, Robert Dickman, and Robert Brown presented their initial conclusions and recommendations to the ACC in a teleconference on June 15, 2000. On this basis it was decided that an ESO-led option should be explored first although other options should also be studied. At the ACC meeting in Paris (13 October 2000), the issue was raised by the North American side of the requirement to do a due diligence investigation of the legal implications for the U.S. and potential other participants of an ESO-led approach and its feasibility. Exchanges of legal questions and answers occurred between Norbert König of ESO

and Patrick Donahoe of AUI representing the views developed by legal counsel in Europe, the U.S., and Chile.

The ACC-appointed Negotiating Team for relations with Chile (which includes Catherine Cezarsky, Ian Corbett, Arno Freytag, Paul Vanden Bout, Wayne van Citters, and Riccardo Giacconi) reviewed these exchanges as well as information provided by ESO and AUI representatives in Chile.

It was concluded, from the information available, that in an approach in which a single institution were to solely represent the ALMA Project in Chile (be it ESO or AUI), there would be no greater protection or immunity provided to the partners than that already provided to each by their individual bilateral agreements with the Government of Chile. Such a single entity-led approach also appeared undesirable to the Chilean representatives because it lacked *transparency*. That is, ALMA as a partnership is hidden from view in Chile if the project is represented by a single entity speaking and acting for partners in the project that are not legally present in Chile. Finally, the necessity for the ownership of capital equipment exported to Chile by the partners to remain clearly and legally with those partners was highlighted as a serious concern for single-entity representation of ALMA in Chile.

During the same six months as the events described above, i.e. the period June-December 2000, significant progress was made by the ACC team assigned the task of drafting the ALMA Agreement. Four iterations of the draft Agreement were produced and evaluated. Although there are still issues pending, the draft Agreement embodies the following principles:

- ALMA is a joint venture between the U.S. and Europe;

- The U.S. and Europe are equal partners, each responsible for half the effort and each entitled to half the benefit of the project;
- No new legal institutions are needed or will be created for ALMA outside of Chile;
- Each partner will be represented by an Executive Agency that will be assigned the responsibility to carry out the respective partner's assigned ALMA tasks. In Europe the Executive is ESO. For North America, the Executive is AUI/NRAO; the exchange of funds between the Executives is to be minimized. Tasks assigned to the Executives will be supported by funding provided to that Executive;
- The tasks and deliverables of the Executives are coordinated by a Joint ALMA Office that consists of the ALMA Director and a small technical, administrative and science management staff.

At the ACC meeting 13 October 2000 the ALMA Executive Committee (AEC) presented to the ACC a management concept for the construction phase of the project that implemented the tenets of the draft ALMA Agreement. Specifically, the proposed Management Plan is based on the concept of Integrated Product Teams that *integrate* the efforts of the involved staff from both partners in each level-1 WBS task. The management and decision-making for each task is a shared responsibility. Thus the management proposed for ALMA is not management of a *new* observatory, but rather it is a plan for the joint management of a joint observatory.

For these reasons it was agreed in the 4 December 2000 teleconference of the Negotiating Team that alternatives to the single-entity representation for the organizational structure of ALMA in Chile should be explored based on the same concepts of joint representation and shared responsibility that are being developed for all other aspects of the project. These ideas

should be developed and exchanged between the U.S. and Europe in preparation for a meeting with a Chilean group being organized under the auspices of the Ministry of Foreign Affairs of Chile. The present position paper is addressed to this goal in response to the specific action item assigned to me at the 4 December 2000 teleconference of the ALMA negotiating team.

### ***3.0 Requirements of the ALMA Partnership from Chile***

In order to secure and maintain support of the ALMA Project from the institutions providing financial support for ALMA, the partnership will need to demonstrate that it has created an organizational structure capable of obtaining from the Republic of Chile provision for the following:

- A stable legal framework for people coming to Chile to work on ALMA and for the security of equipment imported for ALMA;
- Amicable and cooperative relations between the ALMA partnership and Chilean institutions and officials;
- Access to the site and the right to the unhindered development of the site for ALMA;
- Immunities;
- No compromise as a result of the ALMA project to the applicable prerogatives presently enjoyed by other U.S. or ESO observatories operating in Chile.

These requirements, and the issues they raise, are outlined below.

#### **3.1 A stable legal framework for people coming to Chile to work on ALMA and for the security of equipment imported for ALMA.**

The history of construction and operation of astronomical facilities by foreign entities in Chile offers two models which have heretofore been

the focus of the discussion for the ALMA legal regime. The first model recognizes the successful experience ESO has had in building and operating observatories in Chile and suggests that the ALMA legal regime could be brought under the ESO umbrella. ESO is an international treaty organization and as such enjoys privileges and immunities that are potentially attractive for ALMA. The second model recognizes the successful experience AURA and the Carnegie Institution of Washington have had in building and operating observatories in Chile and suggests that the ALMA legal regime could be brought under the AUI umbrella using the same legal structure that is used for CTIO and CARSO. AURA and Carnegie are private corporations recognized in Chile under Public Law 15172. AUI has a status in Chile for ALMA identical to that enjoyed by AURA and Carnegie for CTIO/Gemini and the Las Campanas observatory respectively. I believe that neither of these models is appropriate for ALMA. Both fail to account for the different legal nature of the two participating ALMA partners, and both have been shown to suffer from practical limitations to their apparent prerogatives.

An ESO-led approach for ALMA was at first attractive because it appeared to offer, at least in principle, the most comprehensive solution to the problem in that ESO would, on behalf of the ALMA Project, negotiate a Treaty-level agreement with the Government of Chile that could not be revoked unilaterally. In contrast, any agreement that would be based on passing an ALMA law in the Chilean Parliament, or one based on a Presidential Decree, could be changed by Chile at any time by the same process.

3.1.1 ALMA as an ESO Observatory. There are several other aspects of an ESO-led approach that upon examination appear less than satisfactory as a basis for the ALMA Project.

First is the problem of turning ALMA into an ESO observatory. This is in effect what an ESO-led approach would result in doing. ESO would negotiate a new agreement with the

Government of Chile in which, in addition to La Silla and Paranal, ESO would receive permission to operate ALMA in Chanjantor.

The North American and (possibly) Japanese partners would then have access to the site only through this agreement. Negotiation of the agreement for ALMA could become embroiled in the negotiations by ESO regarding its existing, or future, facilities.

It is not clear that it would be acceptable to the astronomical communities in North America or Japan or to their funding agencies to become subsumed under an ESO umbrella.

Moreover, it is obvious that the immunities and privileges that the North American and Japanese partners would enjoy would be no different from those they currently are granted by virtue of their agreements with the University of Chile. In particular, the immunity of jurisdiction that ESO enjoys could not be used to provide protection to the other partners from legal suits in Chilean Courts. Finally, this approach is viewed by many Chileans as a ruse to avoid open and clear negotiation and therefore unacceptable.

3.1.2 ALMA as an AUI Observatory. There are several aspects of an AUI-led approach that upon examination appear less than satisfactory as a basis for the ALMA Project.

In this case, the legal regime for ALMA would be based on the provisions of Public Law 15172 which has two fundamental limitations. First, it grants rights and privileges by reference to the ESO treaty; second as an act of Parliament, Law 15172 can be amended or changed also by an act of Parliament. Confidence regarding the stability of the legal regime in this case is based solely on the fact that no amendments or changes to Law 15172 have occurred in the 35 years that this law has been in effect.

It is not at all clear that ESO, as an international treaty organization, could be subsumed for the purposes of ALMA under the AUI umbrella. Neither is it clear that such an arrangement would be acceptable to the astronomical community and funding agencies in Europe.

Finally, as in the case of the ESO-led approach, the AUI-led approach would be viewed by many Chileans as a ruse to avoid open and clear negotiation; it would be opposed for this reason.

3.1.3 Implications for the ALMA Legal Framework resulting from the need to provide for the secure ownership of ALMA equipment. The NSF has indicated that under current rules and regulations, the U.S. must retain ownership of the ALMA hardware it delivers to Chile for ALMA. The North American Partners find it difficult if not impossible to find a formula that both maintains the ownership of the U.S. equipment in Chile but somehow hides that ownership from Chile under the ESO umbrella for the purposes of customs declarations and import duties.

The potential Japanese partner is likely to have the same difficulty. In effect then, AUI/NRAO must import the equipment under the provisions and immunities granted under Law 15172 and confirmed by the Foreign Ministry. Japan will be faced with the same requirement.

The converse situation is likely to apply to ESO in the case of an AUI representation of ALMA in Chile for exactly the same reason. Namely, ESO will not be able to maintain the ownership of ESO equipment in Chile but somehow hide that ownership from Chile under the AUI umbrella for the purposes of customs declarations and import duties.

The implication of the arguments outlined in 3.1.1, 3.1.2 and 3.1.3 for the legal structure of ALMA in Chile is this: ***The legal organization of ALMA in Chile must recognize the different legal character of the permissions by which ESO, AUI (and NAOJ) are authorized to build and operate an observatory in Chile.***



### **3.2 Amicable and Cooperative Relations between the ALMA Partnership and**

**Chilean Institutions and Officials.** As the host state for observatories established by European and U.S. institutions, Chile has generously supported their construction and operation through legislation and executive action. The desire of the Republic of Chile to welcome ALMA has been clearly stated by the Foreign Minister, Maria Soledad Alvear Valenzuela, and by the declaration of the President of the Republic, Ricardo Lagos. In return for their support, Chile expects a degree of participation in the project commensurate with the evolving development of science and technology in the country. I strongly believe that ALMA should support the desires of the Chileans in this regard: the best way to protect the interests of the project is for the project to protect the interests of the Chileans in it. My strong view is based in some measure on the experience of the Paranal controversy. This showed quite clearly that the operation of an observatory in Chile depends on more than the existence of an international treaty. Delays of months in clearing customs, for instance, can and did damage the VLT project. It is clear to me that ALMA absolutely needs the good will of the host country to operate effectively.

Evidence of good will from ALMA will take many forms; several of these, noted in the subsections below, have implications for the legal organization of ALMA in Chile.

3.2.1 Observing Time. A 10% fraction of observing time for use by Chilean astronomers was set aside by AURA since the beginning of Cerro Tololo. Since the legal basis for being in Chile was the cooperative agreement with the University of Chile which, under law No. 15172, provided AURA with the same privileges and immunities as were provided to ESO, it is natural that this 10% would be made available to the University of Chile for its use. With the growth of

astronomy interests in other universities in Chile, this generated some questions about equal access by all Chilean astronomers to this reserved time.

Over the years ESO had adopted a policy of assigning time to Chilean astronomers on the basis of Director Discretionary time. It was only in 1996 with the signing of the new ESO-Chile Agreement that Chilean astronomers gained the right to 10% of the observing time on all ESO facilities on the basis of ESO's Observing Time Committee ranking. All meritorious Chilean proposals were accepted without regard for time competition up to 10% of the available time. Some further restrictions applied in the case of VLT time. The approach used for the VLT is considered unsatisfactory by most Chilean astronomers who regard the time theirs by right.

It is my opinion that for ALMA no other approach is viable than the granting of 10% of the observing time for Chilean astronomy with no strings attached. How this time is used is an internal problem of the Chilean scientific community. The issues dealing with possible scientific and/or operational conflicts should be resolved by an ALMA scientific review group that would include Chilean participation.

3.2.2 The Development of Chilean Astronomy. Development of Chilean Astronomy has proceeded over the years until there are now several internationally recognized Chilean astronomers at the senior professional level. Growth in recent years has occurred both at the University of Chile and at the Catolica University in Santiago as well as by other groups in Concepcion and Antofagasta. As part of the 1996 ESO-Chile Agreement, a fund was set up (approximately \$300,000 dollars per year) under the control of a Chilean-ESO committee. The chair of this committee was the Science Advisor to President Frei, Dr. Claudio Teitelboim. Distinguished foreign scientists were asked to recommend the best way to foster development of astronomy in Chile and to judge competitive proposals by the Chilean community to carry out

specific programs. While the system apparently worked and dispersed funds to several projects, there has been criticism within the Chilean astronomical community of the tendency of the Committee to foster new initiatives rather than strengthen existing institutions. Other foreign observatories in Chile have contributed only modestly. For example, AURA's contributions have been (I believe) limited to student and fellowship programs. The U.S. approach, perhaps due to financial exigencies, has been to ask for financial contributions from Chile rather than granting development funds to Chile. (The Chilean participation in the Gemini Project being a prime example.)

I believe that Chile will insist on establishing some type of financial compensation for the use of the land, the potential beneficiaries being the II Region of Chile, where the facility will be erected, and CONICYT. The astronomers are of course most interested in seeing the funds go to CONICYT to be used for the development of astronomy. The II Region is interested in receiving such funds (in lieu of taxes?) for a number of projects of interest to them. I believe that the Chileans would not be agreeable to direct control by the ALMA Consortium in the use and distribution of funds. Much of the preparation for the anticipated ALMA discussions that is going on in Santiago in the Chilean negotiating group has to do with the ways to secure such funds from the ALMA Consortium and for the local repartition and use of these funds.

Some form of lease agreement between the ALMA Consortium and the Chile entity that ultimately will be the beneficiary of the land might provide an appropriate vehicle. If it were possible to buy the land outright (rather than leasing it), this might be beneficial to ALMA; however, the requirement for development funds both for the II Region and for astronomy will still have to be satisfied.

3.2.3 Technical Participation by Chile in the Project. Chile has made very substantial progress to encourage technical development in the country. For instance, software control requirements in the mining industry have created a competent young staff of computer programmers and IT specialists. The fiber optic link communications going the full extent of the country represents a high level of connectivity. Within the observatories more and more of the technical positions in the staff are occupied by Chilean Nationals. Is there more that needs to be done to meet Chilean expectations?

ESO tried to initiate a collaborative work-learn program with the schools of engineering of the University of Chile and the Catolica University of Santiago without finding much interest. Some of the Chilean scientists have suggested that more subcontracts be given to Chilean firms not only in the construction of buildings and roads, in which they have traditionally done well, but also in areas with greater technology content. It is not obvious to me whether such opportunities do in fact exist and whether the Chilean industry would be interested.

3.2.4 Participation by Chile in Governance of the ALMA Observatory. There have been expressions of interest by CONICYT in a greater degree of participation by Chile in the governance of the ALMA Project. It seems quite clear that participation by Chile in the ACC, the Scientific Advisory Committee, and all other appropriate technical/scientific working groups is taken for granted. Chile would like to be perceived as a full partner in the initiative (at about the 10% level) in return for being the host country and for the granting of the many privileges that the observatories enjoy in Chile. What form this partnership might take has not been spelled out in any detail.

The implication of the arguments outlined in 3.2.1 – 3.2.4 for the legal structure of ALMA in Chile is this: ***The legal organization of ALMA in Chile must make provision for***

*Chilean scientific, technical, and administrative participation in ALMA. Furthermore, a mechanism needs to be established for ALMA to contribute to the development of astronomy in Chile.*

### **3.3 Access to the Site and the Right to the Unhindered Development of the Site for**

**ALMA.** Clearly the partners in the ALMA enterprise must be assured of continued and guaranteed access to the site on which they intend to place an investment of 550 million U.S. dollars. The issues to be resolved include the following:

- Is the land to be purchased or acquired under some sort of a lease agreement?  
Irrespective of whether we purchase the land or not, we can expect no grant of extra-territoriality for ALMA. There is none now, nor has there ever been, for Paranal or La Silla, and certainly not for Cerro Tololo or Las Campanas. There may be more apparent stability for ALMA with purchased land and perhaps more freedom of action. But purchase, as opposed to rent, removes the most straightforward way to involve Chileans in the administration of ALMA and for ALMA to fund, in a respectful way, the development of astronomy in Chile. Is there a way to lease the land use concession and assure stability for the project?
- If the land is not purchased, how will the development of the land by ALMA be administered by Chile? In particular, it is very undesirable if local permissions must be obtained in advance for building permits and code compliance. Again, an acceptable way of mitigating such concerns and local actions is to involve the Chileans in the management structure of ALMA. These Chileans can then be given

the responsibility to provide assurance to local officials and inform those officials, post facto, of the development activities.

- By what mechanism will the interests of ALMA on the site be protected from the harmful actions (or consequences) of other projects on the site? Here the issue is exclusivity. Will ALMA have exclusive use of a defined part of the site and a voice in decisions regarding other projects wishing to share the site? If so, how? If not, how will ALMA be protected?

The implication of the issues outlined above for the legal structure of ALMA in Chile is this: *The legal organization of ALMA in Chile must make provision for stable, long-term, access to the site and for protection from unreasonable delay in obtaining local use permissions.*

**3.4 Immunities.** The legal organization of ALMA in Chile must take account of the desires of the partners to obtain from Chile immunities for ALMA and its personnel.

*3.4.1 Personal immunities.* The immunities granted to staff and even contractors of astronomical observatories for importing personal goods, etc. have been quite generous in the past. There is a general tendency in Chile to reduce such immunities to prevent some abuses that may have occurred or in general as a reaction against perceived Colonialistic attitudes.

Such reductions are bound to occur over time and, in my view, they will have to be accepted wherever they do not interfere with effectiveness of the operations or our ability to recruit technical and scientific personnel for Chilean assignments. I do not regard it as necessary,

or even realistic, to seek personal immunities for all ALMA personnel; in any case each of the partners' staff already has immunities either under the provisions of Law 15172 or by treaty.

3.4.2 Labor issues. The labor issues in Chile regard the relations between observatories and local staff. ESO has its own internal regulations for the Chilean staff. These regulations were modified in the 1996 ESO-Chile Agreement to incorporate the fundamental principles of Chilean labor legislation: freedom of association (unions) and collective bargaining. Still ESO is not subject to Chilean labor legislation and an arbitration tribunal of three eminent jurists has been established to resolve disputes. AURA and (to my knowledge) Carnegie have adopted Chilean laws for the local staff. They are not or may not be protected by immunity of jurisdiction since they are not ruled by Treaty-level agreements, thus at least in principle they must resolve disputes in Chilean Courts. It is interesting to note that ESO's salary and benefits for Chilean workers are at the level of the 15 best employers in Chile. I have no direct information but I think that AURA and Carnegie salaries are also competitive in the market.

Most of the labor issues at ESO have not been of an economic nature but rather sociological and political, and of principle. Highly placed Chilean employees in the technical staff at ESO have been active in the trade unions movement in Chile and represent an expression of Chilean concerns. In their view, Chilean workers in Chile must be subject to Chilean law and benefit from all constitutional protections due to Chilean citizens. The compromise that ESO worked out in 1996 does not appear satisfactory to them and thus the continued and prolonged negotiations over minor issues.

Why then not adopt Chilean labor legislation for Chilean workers? Chilean labor legislation is currently quite favorable to industry, although this condition could change in the future. Neither AURA nor Carnegie seem to have suffered ill effects by adopting Chilean labor

laws although I do not believe that either institution has had to withstand legal labor challenges in Chilean Courts. The difficulties that ESO may encounter in adopting this approach because of their Convention could perhaps be bypassed by creating an appropriate joint ALMA entity in Chile that would hire the Chilean personnel on behalf of all the partners. In my opinion it would be very difficult for the Chileans to yield on this point given the current orientation of the Government and the views of the Parliament. (See, for instance, the text of the new law for observatories which was debated but never passed.)

The implication of the issues outlined above for the legal structure of ALMA in Chile is this: *The legal organization of ALMA in Chile should provide for Chilean labor laws to apply to Chilean workers.*

### **3.5 No Compromise as a Result of the ALMA Project to the Applicable Prerogatives Presently Enjoyed by Other U.S. or ESO Observatories Operating in Chile.**

The ESO treaty with Chile for the construction and operation of the La Silla observatory was signed in 1963. It specifies particular rights, privileges and immunities for ESO, and the relation of ESO to the state. The legal regime specified in that treaty has remained in force for nearly forty years. When AURA sought to establish CTIO in 1967, the Republic of Chile welcomed AURA under Public Law 15172 which, by the unilateral action of the state, awarded to AURA a legal status identical to the legal regime in force for ESO. Several years later the Carnegie Institution entered Chile to build and operate the Las Campanas Observatory under the same regime as AURA's. Finally, in 1995 ESO negotiated an amendment to its treaty in order to establish the new observatory on Paranal. This amendment, by mutual consent, modified some



of the provisions of the original 1963 ESO treaty. From this experience we learn that the construction of a new observatory may raise legal issues that directly affect permissions enjoyed by existing observatories. A similar lesson may be drawn from the AURA experience with Gemini. It should be a requirement of the ALMA project that the project be legally organized in Chile under a regime that does not alter the legal status of existing U.S. or ESO observatories presently operating in Chile.

The implication of this issue for the legal structure of ALMA in Chile is this: **The legal organization of ALMA in Chile should be established specifically for the requirements of ALMA.**

**4.0 Summary of the Implications for the Legal Organization of ALMA in Chile Drawn from the Requirements of the ALMA Partnership from Chile.** The five bullets below restate the implications drawn above from the six requirements for the ALMA partnership stated in section 3.0.

- The legal organization of ALMA in Chile must recognize the different legal character of the permissions by which ESO, AUI (and NAOJ) are authorized to build and operate an observatory in Chile;
- The legal organization of ALMA in Chile must make provision for Chilean scientific, technical and administrative participation in ALMA. Furthermore, a mechanism needs to be established for ALMA to contribute to the development of astronomy in Chile;
- The legal organization of ALMA in Chile must make provision for stable, long-term, access to the site and for protection from unreasonable delay in obtaining local use permissions;
- The legal organization of ALMA in Chile should provide for Chilean labor laws to apply to Chilean workers;
- The legal organization of ALMA in Chile should be established specifically for the requirements of ALMA.

Our task is to use these conclusions to help us define acceptable models for the ALMA organization in Chile. Doing things in this way, viz. working from requirements to conclusions,

we can be assured that the ALMA organizational model we create will in fact meet our requirements.

## **5.0 A Possible Model for the Organizational Structure of ALMA in Chile.**

Having summarized some of the issues that I believe will arise in the ALMA-Chile negotiations, let me express a certain degree of optimism regarding their outcome. I see no real fundamental difference between what we need to carry out a successful project and what support the Chilean Government has been willing to give in the past and is apparently willing to give now.

I also hope that the partners will find it possible to respond to the aspirations of the Chilean side. A win-win situation could be created that would assure long-term fruitful collaboration on ALMA between Chile and the European, North American, and Japanese partners. I would like to sketch a possible approach that has been discussed in a preliminary way by AUI and ESO representatives and which, in my opinion, may be a way forward.

### **5.1 Use of Existing Agreements**

ESO, AUI, and NAOJ are legal entities that are recognized and can operate in Chile. ESO does so by virtue of the 1962 Treaty with Chile as further elaborated in 1996. AUI and NAOJ do so by virtue of their agreements with the University of Chile which gives them the same immunities and privileges as ESO.

AUI and NAOJ need to modify their current agreements with the University of Chile to be able to construct and operate a joint ALMA observatory in Chanjantor in addition to carrying out the initial exploration and site testing activities. ESO needs to receive permission by the Chilean Government to extend its activities in Chile to participation in a joint ALMA

observatory. Once these steps occur and after a concession for the use of the land is obtained, the three partners can develop the site, import equipment using the immunities and privileges they have, and develop and operate ALMA. All of this can occur under the existing provisions.

The partners would not need to create an additional legal entity called the ALMA Observatory although a joint management office of the ALMA operations would need to be created under a site Director. In order to cope with the hiring of Chilean staff, and administering the funds destined to the development of the II Region and of astronomy in Chile, etc., it may be beneficial for the ALMA partnership to create a Chilean corporation or an International corporation. Many legal issues surrounding such an action would have to be carefully considered, such as the degree of insulation from local litigation that such a corporation would provide to the partners, the degree to which doing business through such an entity might erode the immunities of the partners, etc. However, there could be significant advantages to the partners if this approach could be adopted. Those advantages include the following:

- 1) The initial negotiation by three established legal entities -- ESO, AUI, NAOJ -- with the Government of Chile might become easier;
- 2) Each of the partners could retain its identity in a joint ALMA Observatory;
- 3) The creation of a local corporation might facilitate negotiations on the use of the land;
- 4) The governance of such a local corporation could include Chilean participation on the Board.
- 5) The corporation in Chile would solve the problem of labor relations with local staff.

While I do not suggest that this is a fully worked out solution, I believe it represents a worthwhile model to study in detail since it satisfies so many of the requirements summarized above in sections 3 and 4. A sketch of the model I have in mind appears on the following page.

# ATACAMA LARGE MILLIMETER ARRAY

## Organization Structure

