

**LLAMA Board Meeting – Argentina-Brazil**  
**September, 25<sup>th</sup> to 27<sup>th</sup>, 2012**  
**Salta, San Antonio de los Cobres (SAC), LLAMA site**

**People presented at the Meeting:**

Brazilian side:

Zulema Abraham (Board)  
Elisabete de Gouveia Dal Pino (Board)  
Guillermo Gimenez (Board)  
Jacques Lépine (Board)

Argentinean side:

Marcelo Arnal (Board)  
Juan José Larrarte (Engineer) (Board)  
Ricardo Morras (Board)  
Jose G. Viramonte (Geologist) (Board)

Additional Participants:

Marcelo Daniel Arzelan (Engineer)  
Carlos Peralta (Geologist)  
Peter Fasel (Engineer) - VERTEX Representative

**1st Day meeting (September 25):**

**Four-Month plan for strategic site studies (presented by Marcelo Daniel Arzelan):**

It has been presented a plan for a four-month study regarding: Antenna transportation (from a Chilean or Argentinean port); local road improvements; hiring of technicians and workers; LLAMA office construction in SAC; Antenna site construction technical details; etc. (LINK to Marcelo Arzelan's presentation).

**Site discussion – seismological issues (presented by Juan Viramonte and Carlos Peralta):**

- The geological position of LLAMA seems safe enough (see schematic drawing by José Viramonte and the Figure including 3D map of all seismic data of the region by Carlos Peralta)
- More studies are still required (to be made in the next 4 months)
- Thermal and geological studies also to be performed in the next 4 months.

**Suggestion of LLAMA overall Administration structure (presented by Marcelo Arnal):**

**Receivers discussion:**

It has been proposed to install in the “Front-End” of the Antenna: 2 sets with 3 frequency receivers each, and one bolometer.

The frequencies have not been chosen yet (Brazilian site has suggested a potential list, but Argentinean Scientific Committee still has to discuss this proposal)

Suggested list of receivers is:

ALMA bands 1, 3, 7, 5, 6, 8, in order of priority.

**2<sup>nd</sup> day meeting (September 26):**

**Whole day visit to the site (Vertex Engineer was also present)**

The visit allowed us to draw the attention on some technical issues such as:

- High tension power tower 2 km away from LLAMA site: studies are required to verify the level of potential noise (to be performed by Juan Larrarte)

- Definition of the site local road access (suggested by Juan Viramonte and Marcelo Arzelan)
- Determination of the specific coordinates of the Antenna installation on the site
- Further requirements for the meteorological station

### **3<sup>rd</sup> day Meeting (September 28):**

#### **Technical issues related to the Antenna (presented by Peter Fasal – Vertex Engineer):**

- Requirements for Antenna installation were discussed (LINK to Peter Fasal presentation LIST)
- Front-end receivers position was discussed. The central chamber of receivers of ALMA antennas have a total diameter of 1.80 m, but a smaller (hole) diameter for the assembling the receivers and the bolometer. A new design may be required to install the 3 sets (Jacques Lepine will contact the receiver producers)

#### **Interview with Salta Governor Secretaries and Argentinean Minister of Science and technology (Marcelo Arnal, Jacques Lepine, Ricardo Morras)**

- Discussion of several political and logistic issues (energy power, etc.)

#### **Discussion of a two-year plan of tasks for LLAMA (presented by Juan José Larrarte)**

(LINK to Juan's list)

- Memorandum issues and a general plan of tasks was discussed.
- Site questions were also discussed again. It has been argued that the transportation of the Antenna should be performed through Chile. However, the custom issue through Chile may be difficult and this will require a study of the best way to transport the Antenna (which will be performed within the next 4 months).
- Education and public outreach of LLAMA in the local community to be organized in near future.
- Budget issues were also discussed: Brazil will provide the Antenna and on-site activities costs (6.760.000 Euros). Argentina has raised so far 138.000 US dollars for site studies.
- Zone of Protection and Silence around the LLAMA site will have to be requested in near future.
- It has been agreed that in case the contribution of both countries to the construction phase were unbalanced, the country having the lower one will increase its contribution to LLAMA's running costs. This increased contribution will be such that at the end of a 5 year lapse both countries will watch their initial investment.

#### **Communication issues (presented by an invited Engineer Marengo):**

- There is a national plan to install optical fiber over all the Argentinean territory, part of which has been done already. Installation in SAC is for seen to occur within 6 to 8 months);
- Microwave antenna installation in Salta Province: installation of an antenna (for connection issues) nearby SAC as soon as possible (7-23 GHz), but as far as possible from LLAMA site in order to prevent potential noise interference;
- In LLAMA site: optical fiber will be installed in the future for connection with microwave antenna (to be connected at least 1 km away from LLAMA).