



*Herzberg Institute of Astrophysics,
National Research Council of Canada, and
Observatorio Astronómico Nacional, Departamento de
Astronomía, Facultad de Ciencias Físicas y Matemáticas,
Universidad de Chile*

Cooperative Research Project 2011-1

Base agreement

WHEREAS: The Herzberg Institute of Astrophysics of the National Research Council of Canada (NRC-HIA), entered into a Memorandum of Understanding (MOU) with the Observatorio Astronómico Nacional (OAN), Departamento de Astronomía, Facultad de Ciencias Físicas y Matemáticas, Universidad de Chile, on Jan 15th, 2011

And WHEREAS: The purpose of the MOU was to facilitate cooperation and collaboration for the ALMA Band 1 project between the two participants

Therefore: The two parties have agreed to proceed with the cooperative research project described below:

Project Name: Development of an ALMA Band 1 receiver prototype

NRC-HIA Project Manager: Dr. Charles Cunningham

OAN-UCHILE Project Manager: Eng'r. Nicolás Reyes

Duration: March 1, 2011 – Feb 28th, 2013

1. Project Description/synopsis/goal:

Design of the prototype ALMA Band 1 receiver. The parties agree that HIA will be assigned one or more of the following key design elements of the prototype Band 1 receiver:

1. Low noise cryogenic amplifiers
2. Orthomode transformers
3. Mixers
4. Optical design

2. **Objectives:** The overarching project goal is to develop Band 1 receivers for the ALMA project. This sub-project will prototype and test the technology.



3. Statement of Work

- a. SOW-1.
 - i. HIA will supply performance details, prototypes for evaluation and design documentation for use in a Band 1 receiver on a best effort basis to OAN.
 - ii. OAN is under no obligation to adopt the designs or documentation supplied by HIA if
 - 1. building such a design is deemed to be not practical or not possible by OAN or
 - 2. a technically superior solution is demonstrated.If OAN chooses the HIA design, HIA would assist in the technology transfer for the production phase.
 - iii. Further amendments to this SOW will follow as they are developed.

4. Schedule and Key Milestones, including reporting frequency:

At this point the schedule is not known but this initial base project is set up for two years. The project schedule can be extended by amendments to this agreement. Amendments to this agreement will incorporate deadlines as they are established.

Reporting will take place every six months.

5. IP Management

Both parties acknowledge that they own the IP of their employees. IP developed by each party remains the property of each party. However, each grants the other a license for use of their IP for the purpose of this agreement.

At this time it is anticipated that this sub-project will not generate IP. However, if it appears that development of IP is imminent, an amendment to this document will be developed that details the treatment of IP.

Note that HIA retains the right to publish the results of Band 1 development work undertaken at the HIA, and OAN retains the right to publish the results of Band 1 development work undertaken at the OAN.

6. Conflict resolution

In the event of disagreement or the need for clarification related to any aspect of the work to be carried out under this Cooperative Research Project, the first level of negotiation will involve the relevant work package managers. If resolution is not achieved at this level, negotiations will be escalated as appropriate to the HIA and OAN project directors, and then to senior management of each organization.



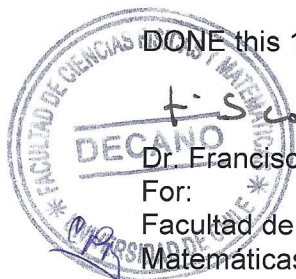
7. Budget and Funding

No funds will exchange hands during this project; each side is expected to pay their own staff and travel expenses for project purposes.

8. Counterpart and Facsimile Execution

This Agreement may be executed in one or more counterparts and by the different parties hereto in separate counterparts, each of which when executed shall be deemed to be an original but all of which taken together shall constitute one valid and binding Agreement. A facsimile copy or portable document format (PDF) copy of an executed counterpart signature page will be as valid as an originally executed counterpart for purposes of signing this Agreement.

DONE this 15th day of January, 2011, in duplicate in the English and Spanish languages.



f. S. Brieva
Dr. Francisco Brieva, Dean
For:
Facultad de Ciencias Físicas y
Matemáticas, Universidad de Chile

Dr. Greg Fahlman
For:
The Herzberg Institute of Astrophysics of the
National Research Council of Canada

APR 04 2011

Date 15 march 2011

City, Country Santiago, Chile

Date

4 April 2011

City, Country: Victoria BC