

# Proposal towards the establishment of an Andean Regional Office of Astronomy for Development

November 1, 2014

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# 1 Rationale

The countries in the Andean Region (Bolivia, Colombia, Chile, Ecuador, Peru and Venezuela) represent a common language block in South America. They share similar social conditions and goals for scientific and cultural development.

The astronomical development in each of these countries can be efficiently achieved through regional cooperation. With the leadership of Chile and Venezuela in aspects of professional astronomy and Colombia for public outreach, it is possible to develop strategies to strengthen the professional research, education and popularization of astronomy in the Andean region. This development effort requires the commitment and shared effort from different institutions.

An Andean Regional Office of Astronomy for Development (ROAD) can serve this goal. It will strengthen ongoing collaboration efforts, create channels of communication and develop new strategies to exchange knowledge and human resources in the region.

The participating institutions have been involved in different projects in each one of the ROAD core areas: research, schools and children and public <sup>1</sup>. However, the participation and degree of commitment has not been homogeneous across the region, or even inside the same country.

Therefore our **main goal is to guarantee and strengthen effective methods of communication between the representatives and coordinators of global, regional and local projects** implemented in the Andean countries, specially looking to orient and advise new working groups in other cities and regions. This lead us to define the following objectives.

## 2 Objectives

- Foster the goals of the International Astronomical Union (IAU) Strategic Plan in the Andean region

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<sup>1</sup>For instance, in the outreach and children activities the following programs have been active during the last years: Astronomy Olympiads, Galileo Teacher Training Program (GTTP), the Network for Astronomy School Education (NASE) and Universe Awareness (UNAWA), Galileo Mobile, CERE S'COOL, Rocks Around the World, Eratosthenes, Galileoscope, Dark Sky Awareness, Astronomers without borders, From Earth to the Universe, International Space Week, Galileo Nights and Asteroid Search Campaigns.

- Serve as partner to the Office of Astronomy for Development (OAD), the IAU and other international organizations to plan and implement relevant projects in the Andean region.
- Create public forums where the project management of all development activities can be communicated and evaluated.
- Initiate and coordinate fund-raising activities for regional development activities.
- Create new institutional alliances among countries in the region to exchange knowledge and human resources.

### **3 Core Values**

- Balance. The ROAD projects must have a balance among different areas (research, education, outreach) and target countries.
- Without borders. Priority will be given to projects that involve two or more ROAD countries.
- Transparency. All Andean ROAD projects will be transparent to the public in their conception, execution and evaluation.

### **4 Institutions Supporting this Proposal**

- Universidad Mayor de San Simón (Bolivia).
- Sociedad Chilena de Astronomía, SOCHIAS (Chile).
- Escuela Colombiana de Carreras Industriales (Colombia).
- Observatorio Astronómico Nacional (Colombia).
- Planetario de Bogotá (Colombia).
- Parque Explora - Planetario de Medellín (Colombia).
- Universidad Industrial de Santander (Colombia).
- Universidad Sergio Arboleda (Colombia).

- Universidad de Antioquia (Colombia).
- Universidad del Valle (Colombia).
- Universidad Distrital Francisco Jose de Caldas (Colombia).
- Universidad de los Andes (Colombia).
- Escuela Politécnica Nacional (Ecuador).
- Universidad San Francisco de Quito (Ecuador).
- Instituto Geofísico del Perú (Peru).
- Universidad Nacional de Ingeniería (Peru).
- Centro de Investigaciones de Astronomía, CIDA (Venezuela).
- Instituto Venezolano de Investigaciones Científicas, IVIC (Venezuela)

## 5 Outline of the main Andean ROAD projects

### 5.1 Task Force 1 (Universities and Research)

#### 5.1.1 Andean School on Astronomy and Astrophysics

- **Objective:** Organize a school for advanced undergraduate students and graduate students.
- **Leading ROAD Institution:** Changes every year.
- **Contact:** Changes every year.
- **Implementation:** Every year we will hold a school aimed at advanced undergraduate students and graduate students. The main subjects of the school have to be broad enough allowing a large student participation. This venue will also serve as a upstanding scenario to invite tutors from abroad and strengthen new institutional collaborations with the Andean ROAD. The first school will take place in 2014 hosted in Ecuador close to the dates for the Colombian Congress of Astronomy and Astrophysics.
- **Budget:** 10KEuro/year

### 5.1.2 Andean Graduate Program

- **Objective:** Determine the feasibility of creating and funding an Andean graduate program.
- **Leading ROAD Institutions:** Observatorio Astronómico Nacional (Colombia); SOCHIAS ROAD office (Chile, Oficina Nacional de Coordinación, ONC); Universidad San Francisco de Quito (Ecuador).
- **Contacts:** Giovanni Pinzón, PhD; Eduardo Unda-Sanzana, PhD; Dennis Cazar Ramírez, PhD.
- **Implementation:** Explore the possibility to coordinate the use of educational resources of different institutions in the region. The model for this project is the AstroMundus program in the European Union where a consortium of 5 Universities in 4 Countries offer a Master Program. This research will be done mainly through virtual meetings.
- **Budget:** 0 KEuro/year.

### 5.1.3 Exploration Working Group in Astroparticle Physics

- **Objective:** Establish a cooperation network of institutions interested in Astroparticle Physics.
- **Leading ROAD Institution:** Universidad Industrial de Santander (Colombia); Universidad San Francisco de Quito (Ecuador).
- **Contact:** Luis Nuñez, PhD; Dennis Cazar Ramírez, PhD.
- **Implementation:** The leading institutions will organize periodic meetings to gather all the groups in the Andean Region interested in developing its research capabilities in astroparticle physics. This will be done through workshops and the installations of small research stations for the Latin American Giant Observatory (LAGO) project, which has already been kick-started in Venezuela, Colombia, Ecuador, Peru and Bolivia.
- **Budget:** 10KEuro/year.

#### 5.1.4 Exploration Working Group in Radioastronomy

- **Objective:** Establish a cooperation network of institutions interested in the development of Radioastronomy.
- **Leading ROAD Institution:** Escuela Colombiana de Carreas Industriales (Colombia).
- **Contact:** Germán Chaparro Molano, PhD.
- **Implementation:** The Leading Institution will organize periodic meetings to gather all the groups in the Andean Region interested in the development of Radioastronomy capabilities. The first meeting is planned for 2015 The Leading Institution will also organize a Training School to build up new capabilities and strengthen the ties between different groups and countries. The first school is planned for 2016.
- **Budget:** 10KEuro/year.

#### 5.1.5 Massive Open Online Courses

- **Objective:** Create a Massive Open Online Course at the introductory undergraduate level with sections for the general public.
- **Leading ROAD Institution:** Universidad Industrial de Santander (Colombia).
- **Contact:** Luis Nuñez, PhD
- **Implementation:** We will create a Massive Online Open Course in Astronomy and Astrophysics, that could be used either as a general course for a wide audience or as an introductory course for undergraduate students of Physics programs. Planned for 14 weeks, the course will contain four major blocks: Astronomy and celestial bodies, Instrumentation in Astronomy, Current Trends in Astronomy and Astrophysics, and Data Bases and Data analysis in Astronomy. The first three blocks will be divided in two modules corresponding to two different levels: A and B. General audience could follow the level A for the three modules and physics students should follow whole content of the course. Each module, will have a 15m video, recommended reading and several assignments.

- **Budget:** 10KEuro/Year.

#### 5.1.6 Communication Network

- **Objective:** Gather contact information of all TF1 colleagues in the ROAD.
- **Leading ROAD Institution:** Universidad de los Andes (Colombia)
- **Contact:** Jaime E. Forero-Romero, PhD
- **Implementation:** Open a mailing list associated to TF1 activities. This network will serve as a platform to exchange information concerning joint projects, fellowships, scholarships and open positions. There will also be a central web-page for the Andean ROAD showing the current ongoing projects and advances.
- **Budget:** 0KEuro/year.

### 5.2 Task Force 2 (Astronomy for Children and Schools)

#### 5.2.1 Periodic coordination sessions

- **Objective:** Strengthen communication strategies between teachers and coordinators from each country
- **Leading ROAD Institution:** Parque EXPLORA (Colombia), IVIC (Venezuela).
- **Contact:** Luz Angela Cubides, Angela Patricia Pérez, Enrique Torres.
- **Implementation:** Hold bi-weekly coordination sessions. They have been held during 2014.
- **Budget:** 0Euro/year.

#### 5.2.2 Virtual training sessions

- **Objective:** Create virtual training and activities open to teachers and students.
- **Leading ROAD Institution:** IVIC (Venezuela).



- **Contact:** Enrique Torres, Juan Carlos Arias.
- **Implementation.** Develop a virtual platform to hold virtual workshops on information technologies applied to astronomy and space sciences.
- **Budget:** 1 KEuro/year.

### 5.2.3 Teaching material for visually impaired students

- **Objective:** Design teaching material to work with visually impaired students.
- **Leading ROAD Institution:** Planetario de Bogotá (Colombia).
- **Contact:** Angela Patricia Perez, Dilia Gonzalez.
- **Implementation:** We start by doing research on the kind of material to develop. Later on we will define the production and distribution processes.
- **Budget:** 1 KEuro/Year

### 5.2.4 Annual TF2 meeting

- **Objective:** Organize and annual meeting to gather all the collaborators in the Task Force.
- **Leading ROAD Institution:** Changes every year.
- **Contact:** Maritza Arias Manriquez, Jonathan Moncada, Manuel de la Torre.
- **Implementation:** Every year we will hold a meeting aimed at collaborators in the node. The venue will change every year. The first meeting will take place in 2015 with the theme Archeoastronomy.
- **Budget:** 10 KEuro/year.

## 5.3 Task Force 3 (Astronomy for the Public)

### 5.3.1 Development for planetariums

- **Objective:** Develop special shows for planetariums in the region.
- **Leading ROAD Institution:** Parque EXPLORA (Colombia).
- **Contact:** Carlos Molina.
- **Implementation:** We want to develop special shows to be projected at planetariums and science museums from the region, highlighting ancestral traditions from indigenous tribes and founding communities from South America. These shows would be shared between the Local and Regional Networks of Planetariums, such as “Asociación de Planetarios del Cono Sur”, and the growing “Red de Planetarios de Colombia”.
- **Budget:** 10 KEuro/year.

### 5.3.2 Communicating astronomy with the public.

- **Objective:** Organize periodic meetings to gather all the collaborators in the Task Force, “Communicating Astronomy with the Public”.
- **Leading ROAD Institution:** SOCHIAS ROAD office (Chile, Oficina Nacional de Coordinación, ONC).
- **Contact:** Farid Char.
- **Implementation:** We want to hold regular meetings that can serve as an exchange platform for people involved in communicating astronomy to the public; this includes science museums, planetariums, mass media and associated industries. We also want to use this opportunity to showcase efforts in the other two task forces. This meeting will be held parallel to large professional meetings. We envision this event as a “Communicating Astronomy with the Public” <sup>2</sup> meeting for the region. We expect to hold the first one during the next Latin-American Regional IAU Meeting in 2016.
- **Budget:** 10 KEuro/year.

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<sup>2</sup><http://www.communicatingastronomy.org/>. The next global meeting for this event will be held in 2016 in Colombia.

## 6 Budget

We foresee the following costs per year in each task force.

- Task Force 1: 40 KEuro/year
- Task Force 2: 12 KEuro/year
- Task Force 2: 20 KEuro/year

The costs are covered by in-kind contributions and proposals submitted for each different project according to its needs.

The seed-funding (5 KEuro) provided by the ROAD central office will be used as follows.

Description	Amount (Euro)
TF1. Small grants (200 Euro each) for students that wish to attend the Andean School for Astronomy and Astrophysics.	1000
TF2. Teaching material for visually impaired students	1000
TF3. Small grants (250 Euro each) for outreach professionals that wish to attend the meeting "Communicating Astronomy with the Public".	1000
Printing and distribution of posters publicizing the Andean ROAD	400
Overhead costs at Universidad de los Andes over the 5000 Euro of seed funding.	1600
Total	5000

## 7 Governance

### Responsible Institution

Universidad de Los Andes (Bogotá, Colombia)

### ROAD Coordinator

Mr. Jaime E. Forero-Romero, PhD  
Assistant Professor

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## **Oversight Committee**

The oversight committee will evaluate the Andean ROAD accomplishments. It will be composed by 4 people as follows.

1. OAD Representative: Kevin Govender (South Africa)
2. International TF1 Evaluator: Gustavo Bruzual (Mexico)
3. International TF1 Evaluator: Jan Tauber (Netherlands)
4. International TF2/TF3 Evaluator: Cecilia Scorza (Germany)

## **Executive Board**

The executive board will be composed by 3 people as follows.

1. ROAD Coordinator/ Coordinator Task Force 1. 1 position 20% full time. Jaime E. Forero-Romero (Colombia)
2. Coordinator Task Force 2. 1 position 30% full time. Luz Angela Cubides (Colombia)
3. Coordinator Task Force 3. 1 position 50% full time. Farid Char (Chile).

The institutional letters of support on behalf of Jaime E. Forero-Romero (Universidad de los Andes), Luz Angela Cubides (Parque Explora-Planetario de Medellín) and Farid Char (SOCHIAS) are attached to this proposal.

## **Core functions of the Executive Board**

1. Decide on the acceptance of new collaborators to the Andean ROAD.
2. Create an annual action plan for the Andean ROAD.

## **Organizing committees**

There will be three organizing committees, one for each Task Force. We aim to have one person from each country in the Andean ROAD. Members in that committee must belong to one of the Collaborating Institutions. The ROAD coordinator and the specific Task Force coordinator will also take part in the decision making process of each committee. The committee members will be renewed every year. The coordinators should stay in their role at most for one year and a half.

## **Core functions of the organizing committees**

1. Collect the basic information required to create annual action plan in line with the IAU Strategic Plan and the needs expressed by the Institutions composing the Andean ROAD.
2. Decide on the priority of projects to be implemented in the annual action plan.
3. Track the progress with the leaders of each project in the annual action plan and the IAU Strategic plan.
4. Pursue new collaborations or organize activities with existing or emerging institutions both domestically (at the level of each ROAD's country) and internationally.

## **Andean ROAD Collaborators**

Only institutions (Universities, Research Institutes, Research Divisions, Planetariums, Museums) or professional associations are considered as collaborators of the Andean ROAD.

Individuals can join the Andean ROAD as volunteers. In this group we in mind four major groups. (1) undergraduate/graduate students in the ROAD countries, (2) graduate students and postdoctoral researchers nationals of

the Andean region working abroad, (3) school teachers working in the ROAD countries and (4) any volunteer willing to support the goals of the Andean ROAD regardless of their country of origin.

## **Process to join the Andean ROAD**

Institutions must direct a one page Letter of Intent (LoI) to the members of the Executive Board stating their intention to join the Andean ROAD and naming one (1) person of contact. Once this petition is approved unanimously by the Executive Board, a Memorandum of Understanding (MoU) will be signed between the new collaborating Institution and the Responsible Institution. In order to accept the application every TF1 institution must have TF2/TF3 partner institution, and viceversa each TF2/TF3 must have a TF1 partner in the same country.

There are three reasons to have these conditions. First, we want to foster lasting processes over the ROAD lifetime; this motivates us to have institutions, not individuals, as ROAD collaborators. Second, we want to avoid previous experiences whereby an individual or an institution act on a covert way on the name of whole national communities; this motivates the two stage (Loi+MoU) process. Third, we want to motivate direct collaboration between institutions with different backgrounds (TF1 and TF2-TF3) to ensure a balance across task forces; this motivates the partnering mechanism.

Volunteers only have to express their interest to become collaborators. They are not limited to live in the Andean ROAD countries. The Executive Board will enable a tool to reach volunteers as they are needed to implement different programs.

## **The role of Chile in the Andean ROAD**

Due to the large size of the Chilean professional astronomical community and its special role in global astronomy its important to spell out in detail the role of Chile in the collaboration

The most important aspect is that all the interaction to coordinate activities with Chile will be done through the Sociedad Chilena de Astronomia (SOCHIAS) — the society that gathers all the professional astronomers in the country.

SOCHIAS has designated Eduardo Unda-Sanzana as the main contact person for TF1 tasks, Cristian Cortés for TF2 tasks and Patricio Rojo for

TF3 tasks inside Chile. Farid Char is a staff member at the Unidad de Astronomía of the Universidad de Antofagasta who will be responsible to interface with the rest of the ROAD countries.

Furthermore, we have been in touch with Ms. Valentina Rodriguez (currently employed at ESO in Chile) who is leading an effort to create an office dedicated to stablish relationships with **the government and industry in Chile**. This could be considered as a Fourth Task Force based entirely in Chile. They are willing to back the efforts of the Andean ROAD as they write in the attached support letter signed by Valentina Rodriguez, Dr. Guillermo Blanc, Dr. Eduardo Bendek. Other people that know about this initiative (although they did not have time to sign the letter) are Prof. Massimo Tarenghi (ESO), Dr. Jorge Ibsen (ALMA) and Paulina Bocaz (NRAO).

# Appendices

## A Brief description of the coordinating institution

Universidad de los Andes (Uniandes) is located in Bogotá, Colombia. It is a private University founded in 1946. Currently it is the top University in Colombia as reported by the QS2014 and Times Higher Education 2013-2014 University Rankings. It also ranks among the top 5 in Latin America and the top 300 on a global scale.

Uniandes hosts a Faculty of Sciences with 5 departments: Biology, Chemistry, Geosciences, Mathematics and Physics. The Physics Department has an active graduate school and also hosts postdoctoral researchers. One of the research groups in the Physics is focused on Astronomy and Astrophysics, composed by 4 Faculty (3 PhD, 1 MSc) with research interests in instrumentation, observational astronomy and computational astrophysics. The Astrophysics Group also manages a small observatory dedicated mostly to outreach and motivating undergraduate students into astronomy.

In July 2013 Universidad de los Andes hosted and gave financial support to the Workshop Astronomía en los Andes <sup>3</sup>. This Workshop received researchers from all the countries participating in this ROAD proposal and also

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<sup>3</sup><http://workshopastronomia.uniandes.edu.co/>

included the participation of the TF2 and TF3 coordinators in the current proposal. This meeting helped us to survey the status of Astronomy in the region and design a blueprint for its development in the region. Submitting the current proposal was one of the main goals of the workshop.



## **B Names and affiliations of the committee members for the year 2015**

### **TF1 Committee**

- Nicolas Vásquez (EPN, Ecuador)
- Giovanni Pinzón (OAN, Colombia)
- Eduardo Unda-Sanzana (SOCHIAS, Chile)
- Kathy Vieira (CIDA, Venezuela)

### **TF2 Committee**

- Enrique Torres (IVIC, Venezuela)
- Cristian Cortés (SOCHIAS, Chile)

### **TF3 Committee**

- Carlos Molina (Parque Explora, Colombia)
- Johnny Cova (CIDA, Venezuela)
- Patricio Rojo (SOCHIAS, Chile)

## C Support letters for the coordinators

## **D Letters from the institutions supporting the Andean ROAD**