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1. Project title:

West Central African Astronomy & Space Science Workshop in Gabon  
by the 2013 Total Solar Eclipse

2. Project summary (maximum 400 words):

On *November 3<sup>rd</sup> 2013*, Gabon and other countries in the central African region will experience a **total solar eclipse**. This is a unique opportunity. This proposal is to support a **regional workshop for astronomy and space science in Libreville** (Gabon). The workshop will be held before the total solar eclipse, and will become a biennial school for astronomy and space science for west central Africa. The driving purpose of the workshop is the development of a regional astronomy & space science research, teaching and outreach hub in west central Africa with an initial focal point in Gabon. The workshop will consist of compact lecture series covering basics of astronomy & space science to help participants teach and develop high school and/or undergraduate astronomy & space science courses; to start/continue with further astrophysics/space science studies themselves and/or to use these subjects in their professional duties. The workshop will address the astronomy/space science research aspect by introducing modern observational techniques, data reduction and analysis skills, as well as key tools in these fields. The hands on activities of the workshop are aimed at setting the foundations for future more advanced workshops aiming at modern astronomical & space sciences techniques. Dramatically improving the local/regional outreach capacity will be a decisive outcome against which to measure the long lasting impact of this workshop. Finally, the time will be used for networking and developing future plans for astronomy & space science in Central Africa; in collaboration with other initiatives in Africa and beyond. Since the workshop will precede the November 2013 total solar eclipse, two streams of parallel activities, aimed at the large public with an emphasis on learners/students will be also offered, namely:

- a. an **exhibition** on eclipses, astronomy & sciences coupled to relevant public talks/hands on activities and multimedia sessions in one major cultural centre in Libreville (Gabon);
- b. **mobile star gazing units** consisting of a telescopes, galileoscopes, Binoculars and solarscopes.

More details on the workshop and these two related streams of initiatives are given in the appendix at the end.

Interestingly, as we are intending to start implementing our plan early in October, there is the additional possibility to couple it to the World Space Week (4-10 October) which is a global annual event “*to celebrate each year at the international level the contributions of space science and technology to the betterment of the human condition*”, as declared by the United National General Assembly.

3. Starting date (when do you expect to start implementing the project?)

October 1<sup>st</sup>, 2013

4. Project duration (how long will the project take to complete?):

Five (07) days for the workshop from October 28<sup>th</sup> – November 04<sup>th</sup> ;  
Five (05) weeks for the exhibition. The star gazing units will continue to be used at any time

afterwards.

5. Project location (where will the project take place?)

Libreville

6. Total grant applied for in Euro (please see later for full breakdown of budget):

€ 33, 000

7. Describe project context and objectives (tell us about the project and what do you hope to achieve with it)

There is very little astronomy & space science taught in Gabon, in Central Africa and more generally in sub-Saharan Africa (outside South Africa). However, there is clearly a growing interest in developing astronomy & space science in the region. This is evident from a growing network of physical sciences students and lecturers in universities and other educational institutions throughout the region wanting to see astronomy & space science growing as a science, career choice, as well as a public outreach vehicle. The interest can also be seen in the rapid increase in the number of students from around the continent applying to the Cape Town-based National Astrophysics and Space Sciences program (NASSP). However, there is not enough capacity in the NASSP program to serve the continental growing needs. It is therefore crucial to start developing teaching and research elsewhere on the continent, with the long term goal of establishing similar programs of astronomy & space science in other regions of Africa such as Central Africa. The continental capacity to use observational facilities in Africa such as SALT, MeerKAT, HESS and the forthcoming SKA requires a focused and collaborative effort. The motivation in the case of Gabon is very clear: the government recently set up a National Agency for Space Observations (AGEOS), whose mandate will be to manage a regional centre for satellite images acquisition and analysis for the purpose - among others - of monitoring the “Congo Basin”, the second “lung” of the Planet, after the Amazonia. Building capacity is therefore increasingly crucial. The workshop will provide an additional platform to address the future inclusion/development of astronomy/space science curriculum for the country and the region as well as key capacity in outreach.

For the Central African region, this workshop will address the *long term goal of regional astronomy & space science development*. Both the workshop and its correlated activities will feed into a regional plan for the development of astronomy in Central Africa in line with the prescriptions in the IAU strategic plan. After the workshop, the participating neighbouring countries could move towards the establishment of a *working Group or a regional node for astronomy & space science in Central Africa* (see below/appendix). It is important that workshops such as these do not remain once-off isolated events, but feed into a long term plan. This workshop should develop into a format that can be easily reused, while retaining a crucial balance between past experiences and new inroads. A synergy should be maintained with more advanced schools planned for the future, for which this proposed workshop could provide an initial momentum. For example, it would be worth exploring how Central African institutions (or a central African hub) could collaborate with such successful initiatives as the “*Observatoire d’Astrophysique de l’Université de Ouagadougou*” in Burkina Faso and others in Africa.

To summarize, what we envisage beyond this workshop and its correlated activities is:

running a biennial Central African School of Astrophysics and Space Science (CASASS) with lecturers from Africa, Europe and the USA and mainly African students from the Central African region and beyond

to foster and promote academic/professional exchange programs for research/training visits/stays

between Central Africa and other regions of the Africa and beyond, with an emphasis on convincing participating neighbouring countries to move towards the establishment of a *committee or a regional node for astronomy & space science in Central Africa*

to facilitate the integration of research/professional teams based in Central Africa within growing continental science & engineering initiatives such as the African VLBI and the SKA AFRICA, and other of large-scale science/engineering projects

8. Target Audience (who will benefit from this project?)

- The workshop is aimed at two (partially overlapping) audiences: 1) physical/mathematical science students; 2) lecturers and educators in these fields.
- The large public will benefit from the exhibition, the star gazing and the outreach activities

9. Overall project implementation plan (how will you carry out the project?)

**NOMMO ASTRONOMIA** (<http://ama09gabon.weebly.com/>), the society for astronomy & space science in Gabon will partner with the AGEOS and relevant local institutions to set up a Local Organisation Committee (LOC) which will have an overall supervision of the project implementation. The LOC (see appendix for preliminary composition) will act a local coordinator. A Scientific Organisation Committee (SOC) will be drawn in partnership between the LOC and international partners for the event.

The (static) exhibition which are to be held at a major cultural centre in Libreville will be overseen by the LOC which will include resources from the centre. The same apply for the mobile activities consisting in star gazing and “road shows”. We anticipate collaboration with teams coming from outside of Gabon.

We aim for 40 participants, all from “French-speaking” Africa. We aim to provide all participants with full travel bursaries and in case of limited funds will give priority to students residing in Central Africa and/or Gabon.

**Details of Workshop:**

**Venue** : ESSASSA in Libreville

**Date** : October 28<sup>th</sup> – November 04<sup>th</sup> 2013

**Number of delegates**: About 40 + 4 facilitators

**Type of participants**: Educators/Lecturers/Students

10. Project timeline (please provide specific dates and activities throughout the project)

Date	Activity
October 1 <sup>st</sup> , 2013	Start of the exhibition titled “ <i>Eclipses, Astronomy &amp; Sciences</i> ”, with special sessions on the November total solar eclipse. Star gazing throughout the whole month.
October 4-10, 2013	World Space Week
October 28 <sup>th</sup> – November 04 <sup>th</sup> 2013	Astronomy & Space Science Workshop in Libreville
November 3 <sup>rd</sup> , 2013	Total solar eclipse over Gabon  (more about the project in the appendix)

11. Project deliverables (at the end of the project what will you be able to measure to see whether the project has been successful?):

<p>a. Establishment of a Working Group for Astronomy and Space Science in Central Africa (WGASSCA) including most of the regional stakeholders with a clear mandate to work towards a Central African Society for Astronomy &amp; Space Science (CASASS). WGASSCA coordinating unit will be located in Libreville and initially hosted by the AGEOS<sup>1</sup>. Each participating neighbouring country commit to set up a local branch and relevant seeds for astronomy &amp; space science;</p> <p>b. A formal/written commitment between all the stakeholders towards a biennial Central African School of Astrophysics and Space Science (CASASS School) with lecturers from Africa, Europe, the USA and mainly African students from the Central African region</p> <p>c. A Gabonese branch of the WGASSCA including all the national stakeholders with a clear mandate and timeline to work towards the development of a national astronomy &amp; space science research, teaching and outreach strategy</p> <p>d. A commitment by Gabonese authorities to fine tune the astronomy module currently offered at the only teacher training institute into a potential test bed for its implementation at University level</p> <p>e. 40 delegates = 40 “champions” for astronomy &amp; space science in Central Africa</p>
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12. Contact details of the project leader:

Title	Dr.
Surname	OKOUMA
Full Name	Patrice Martin
Nationality	Gabonese
Mobile phone number	+27 73417 3614
Email address	<a href="mailto:okouma@gmail.com">okouma@gmail.com</a>
Organization	<b>NOMMO ASTRONOMIA</b>
Position in organization	Head
Street address of organization	N/A

<sup>1</sup> Gabonese Agency for Earth Observations

Organization website	<a href="http://ama09gabon.weebly.com/">http://ama09gabon.weebly.com/</a>
Postal address of organization	B.P. 3360, Libreville - GABON
Organization telephone number	+27 73 417 3614
Organization fax number	+241 72 10 51
Any other preferred means of communication e.g. Skype	Skype: okouma

### 13. Background details of project leader:

Summary of academic qualifications	<ul style="list-style-type: none"> <li>• BSc Mathematics;</li> <li>• MSc Astrophysics &amp; Space Science;</li> <li>• PhD Applied Mathematics (major in cosmology) – PhD thesis accepted by the University of Cape Town (South Africa). Graduation in December 2012.</li> </ul>
Summary of relevant experience	<ul style="list-style-type: none"> <li>• Participant to the OAD stakeholder workshop in Cape Town on December 12-14, 2011;</li> <li>• Single Point of Contact for IYA09 in Gabon;</li> <li>• Member of the Working Group on Space Sciences in Africa;</li> <li>• Associate Editor for <i>African Skies/Cieux Africains</i>.</li> </ul>
Brief career history	<ul style="list-style-type: none"> <li>• Mathematics Teacher at J.B. Obiang Etoughe Public High School in Libreville (Gabon) from 1999 to 2004;</li> <li>• Head of the Maths. Dpt. at the same school in 2003 and 2004</li> </ul>
Alternative contact person if project leader is unable to complete obligations	Mr. Fernand LEPOKO, Secretary General, <b>NOMMO ASTRONOMIA</b> +241 06 03 98 83 / +241 07 599 441
Proposed team members (name, position, email, organization) and their responsibilities	<p>Mr/Dr. .... (contact initiated) Gabonese Agency for Earth Observations (AGEOS) Member of the LOC, will oversee the proper involvement of the space science infrastructure in Gabon</p> <p>Mr/Dr. ... (contact initiated) CEO, National Parks Agency Member of the LOC, will oversee the proper involvement of the Tourism and branding infrastructure in Gabon</p> <p>Mr. Fernand LEPOKO Member of the LOC, will oversee the implementation of the static exhibition as well as logistical aspects of the workshop;</p> <p>Dr. Medard MOUELE Member of the LOC, will oversee the implementation of the star gazing and “road shows”, as well as logistical aspects of the workshop.</p> <p>Mr. Patrice OKOUMA Member of the LOC, will coordinate the actions of all the stakeholders.</p>

14. Project budget (Incomes and expenditures for the workshop. All amounts are in € unless otherwise specified. The bursaries include accommodation and catering):

<b>Item</b>	<b>Cost</b>
<b><u>Income</u></b>	
Sponsorship: OAD/IAU (?) + ...	33,000
Other Sponsorships: Gabonese entities (?) + ...	10,000
Support for Delegates from Gabon from Gabonese sponsors/donors, etc	4,000
<b>Total Income</b>	<b>€ 47,000</b>
<b><u>Preparation Costs</u></b>	
Meetings of the Committees (airtime, phone calls)	100
Communication (Poster, Web development)	500
<i>Subtotal</i>	600
<b><u>Cost of Bursaries</u></b>	
Delegates bursaries (40 students × 7 days × € 25)	8,000
Facilitator bursaries (4 lecturers × 7 days × € 31)	1,225
<i>Subtotal</i>	9,225
<b><u>Travel Costs</u></b>	
Travel - Non-Gabonese delegates (15 × € 1000 on average)	15,000
Travel - Facilitators & Organiser(s) (5 × € 1000 on average)	5,000
Local Transportation	1,150
<i>Subtotal</i>	21,150
<b><u>School Organisation, Events, and Overheads</u></b>	
10 x Text books to remain in Gabon (10 × € 50) .....	500
Opening Function (50 × € 5) .....	500
Workshop banquet (50 × € 10) .....	500
Paper materials & stationery, postage, resource CDs .....	200
Bags and name badges (50 × € 5) .....	250
Social events (3 × € 250 - transport, visits, refreshments) .....	750
Insurance for non-Gabonese delegates .....	700
Other expenditures and overheads .....	500
<i>Subtotal</i>	3900
Contingencies	3000
<b>Total Expenditure</b>	<b>€ 47,000</b>
<b>Other funding (amount/source/purpose)</b>	<b>€ 14,000</b>
<b>Amount requested from the IAU</b>	<b>€ 33,000</b>

# APPENDIX

# Astronomy & Space Science Workshop in Libreville

**LOC:** AGEOS, **NOMMO ASTRONOMIA**, National Parks Agency, Gabonese Universities and other institutions, etc:

Mr/Dr ... (ENS, USTM) - Chairman  
Mr/Dr. .... (**AGEOS**) – Deputy Chairman  
Dr. Patrice M. OKOUMA (**NOMMO ASTRONOMIA**, AIMS/UCT)  
Mr. Abdoul SECK (LPIBJ)  
Mr. Fernand LEPOKO (**NOMMO ASTRONOMIA**)  
Dr. Medard MOUELE (**NOMMO ASTRONOMIA**, UOB)  
Mr. Aliou BADIANE (LPBJ)  
Mr. Armel DJAGBA (LPBJ)  
Mr. Leonce BIGNOUMBA (LNNM)  
...

**SOC:** Gabonese Universities and other institutions, AGEOS, **NOMMO ASTRONOMIA**, National Parks Agency, etc:

Prof. / Dr ... (...) – chair  
Mr./Dr. ... (AGEOS)  
Dr Samuel IKOGOU (ENS; USTM)  
Dr Patrice OKOUMA (UCT, **NOMMO ASTRONOMIA**)  
Dr. Pheneas NKUNDABAKURA (Kigali Institute of Education)  
Dr Abiy Tekola (SAAO, UCT)  
Mr. Solohery MAMPIONONA-RANDRIAMAMPANDRY (SAAO, UCT)  
Prof. C.... C.....  
Dr. P... D....  
Dr. P... V...

**Venue :** TBD by **NOMMO ASTRONOMIA** and partners in Libreville (Gabon).

**Date :** October 28<sup>th</sup> – November 04<sup>th</sup> 2013

**Number of delegates :** about 40 + about 4 facilitators

**Local organization:** ESSASSA, a Centre of excellence in the outskirts of Libreville could take full responsibility of hosting the workshop. This includes providing the venue, other facilities and materials needed for lectures and computer-based exercises, accommodation, transport. The costs of all (10-20) participants from Gabon will be covered by the institutions partnering to form the LOC.

## **Planned facilitators:**

Introductory and observational astronomy & space science teaching: Mrs/Mr/Dr. ... and Mrs/Mr/Dr. ... (). Lectures will also be given by Mrs/Mr/Dr ... on basic astronomy/space

science and outreach, and possibly also by e.g. Mrs/Mr/Dr. ..., Mrs/Mr/Dr. ..., Mrs/Mr/Dr. ... on more specialized astrophysics & space science topics, etc.

We also envision getting a few advanced Gabonese science students to help with lectures, tutorials and telescope training. The instructors' expertise will be in basic aspects of astronomy & space science, astronomy outreach. While the general content of the workshop is defined by the purpose, the topics of individual lectures, the amount of time spent on different aspects will be decided together with the main facilitators drawn from a network of local and international professional in the domain.

***Foreseen participants:***

The workshop is aimed at two (partially overlapping) audiences: 1) physics/mathematics science students; 2) lecturers and educators (professionals) in these fields. The lectures could be followed by advanced interested undergraduates as well. The participants will be from Gabonese institutions of education (around 10-20), from other Central-African institutions of education (around 10-20) and/or other French-speaking African countries, plus the workshop lecturers mainly from Gabon, South Africa, Africa, France and potentially the US/Canada.

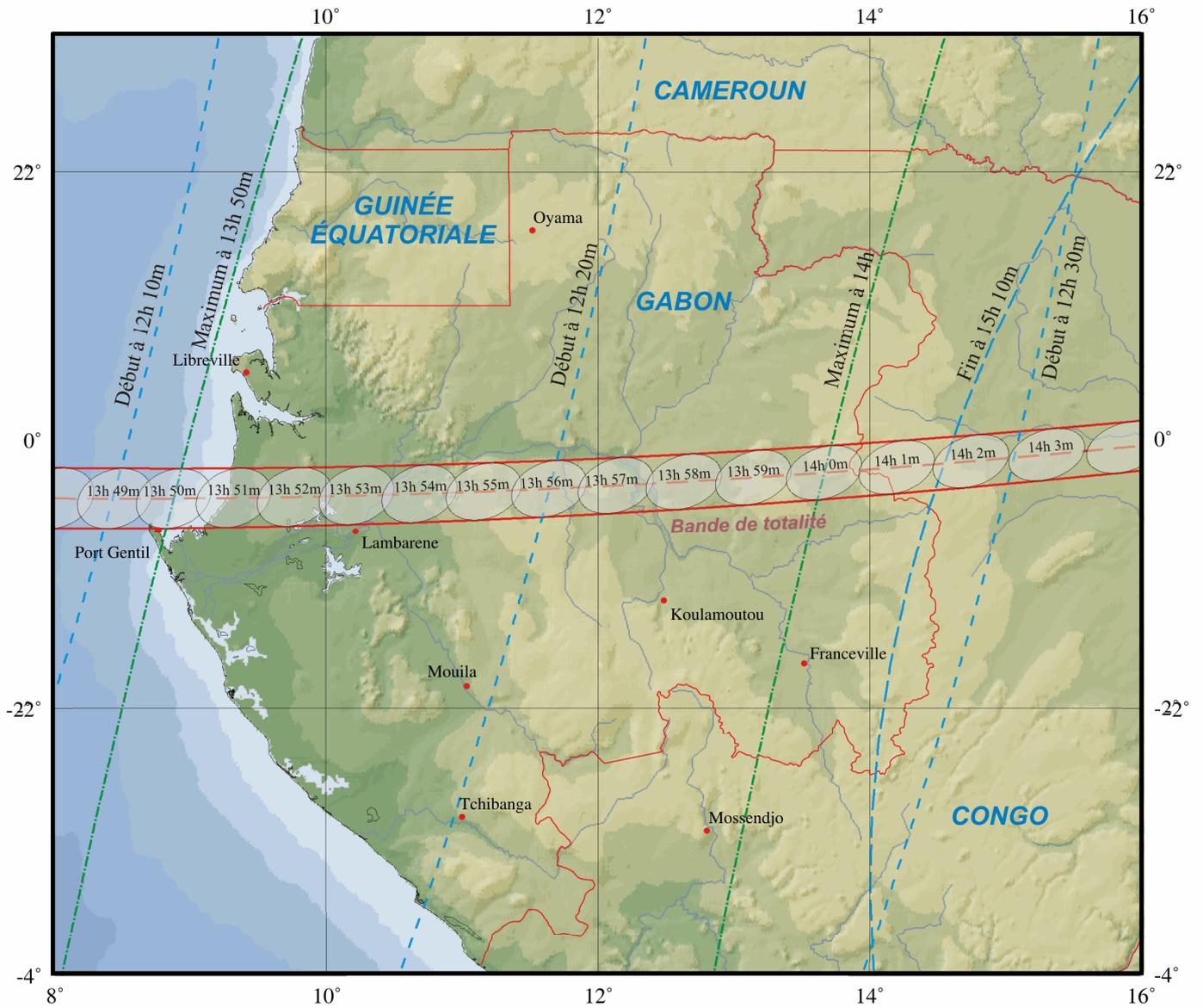
***Format of the workshop:***

The workshop will be 7-10 days long, mainly consisting of introductory astronomy & space science courses/talks, which could be a compact version of the NASSP summer school taught in 20-hours every year at the SAAO (Cape Town, South Africa) and of the (European) Galileo Teacher Training Programme. The lectures will be punctuated by computer lab and telescope and outreach related training as well as star-gazing events in the evenings. For the duration of the week we plan to cover general astronomy & space science concepts as well as basic outreach approaches locally relevant. This could include introductions to imaging and spectroscopy and common data analysis techniques, using for example CEA educational tools. In addition, possibilities to propose for and use both small and large (e.g. SALT, MeerKAT) research telescopes in Africa and elsewhere will be discussed. The need for a computer laboratory is evident. The LPIBJ has a lab of more than 20 Windows internet-enable computers, which could be used, and the organizers will take all necessary software (e.g. CEA, iraf, starlink, ds9) with them and install prior to the start of the workshop.

***Hardware and other resources:***

A computer lab with at least twenty (20) internet-connected Windows computers. Copies of CLEA will be set up prior to the workshop. There are two small telescopes, 250 Galileoscopes, 5 Celestron Firstscopes, already in Libreville, several posters. These will be used for sky viewing. The possibility of data handling training will depend on the additional hardware acquired and set up by the time of the workshop. We are expecting to be able to bring in a mobile planetarium with the relevant human resources as well as additional telescopes. Lecture rooms with laptop computer and data projector will be provided by LPIBJ in ESSASSA. Educational and outreach material would be provided by **NOMMO ASTRONOMIA** and key partners.

## Éclipse totale de Soleil du 3 novembre 2013



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Projection azimutale de Lambert

Tracé de la ligne de totalité et des positions de l'ombre de la Lune toutes les minutes.  
Les instants sont donnés en Temps Universel Coordonné (UTC).