

CONCEPT NOTE FOR AFRICA MEETING ON ASTRONOMY

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1.0 Background and motivation:

Africa has a long and rich relationship with astronomy, dating back millennia. Egypt was a leader in astronomy for many centuries in ancient time, especially with the Alexandria School, and again during the Islamic era with the Ibn Yunus Observatory in Cairo in the 10th century. The world recognized the unique geographical importance of Africa in global astronomy almost two centuries ago with the establishment of the Royal Observatory, Cape of Good Hope in 1820. During the second half of that century, the world class Bouzareah Observatory was also established at Algiers in Algeria which was a main contributor to the "Carte du Ciel" project, the first worldwide astronomical project in history. Since then, Africa's contributions to global human knowledge have both independently and collaboratively grown from strength to strength. The beginning of the 21st century has seen a renewal of Africa's strong heritage of astronomical excellence. Today Africa is home to the largest optical telescope in the southern hemisphere (SALT), the largest and most powerful radio telescope in the southern hemisphere (MeerKAT) and will play host to a large part of the international Square Kilometre Array (SKA) Project.

Nine countries on the African continent will host radio telescopes contributing to the SKA network, providing scientists with the world's most advanced radio astronomy array. These countries are Botswana, Ghana, Kenya, Madagascar, Mauritius, Mozambique, Namibia, South Africa and Zambia.

Africa is also host to the world-renowned HESS observatory in Namibia. The continent is developing the very exciting African Very Long Baseline Interferometry Network (AVN),

and a number of countries are rapidly developing their own astronomy programmes and instruments, such as the Entoto Observatory and Research Centre in Ethiopia, the refurbished Kottamia Astronomical Observatory in Egypt, the 32m radio telescope observatory in Ghana, Oukaimeden Observatory in Morocco, and a 1m optical telescope in Burkina Faso. In terms of training, there have been several developments such as a Master's programme in Astronomy in Uganda and in Astrophysics in Algeria, several radio astronomy initiatives in Nigeria, the establishment of the East African Astronomical Research Network (EAARN), which is supporting the training of astrophysicists in the region mainly through the local expertise, and much more.

Also, several of these projects, and other independent ones, include the development of data processing infrastructure and skills as part of their astronomical activities. These data infrastructures (such as good connectivity and computational clusters) can also be used to serve a broader audience outside astronomy, and are thus an excellent developmental outcome of the growth of Astronomy in Africa.

All these activities come through the efforts of numerous individuals and organizations over many years to build astronomy on the continent. In more recent times, there have been significant developments which have highlighted the need for a conference that will bring this emerging astronomical community together in order to establish a strong cohesive plan for the future. Some of these are listed here.

- a) Astronomy in Africa session at the American Astronomical Society meeting in 2014 in the US.
- b) The Middle East and Africa Regional IAU meeting in Ethiopia in 2017, which resolved to revitalize the African Astronomical Society.

- c) The establishment of three IAU Regional Offices of Astronomy for Development in Ethiopia, Nigeria and Zambia for their respective regions of Eastern, Western and Southern Africa.
- d) A Special Session on Africa-Europe Collaborations in 2018 at the European Week of Astronomy and Space Science in the UK, which was followed by a special issue in Nature Astronomy Focusing on Astronomy in Africa (see editorial with links to several related articles on the Nature website: <https://www.nature.com/articles/s41550-018-0535-8>)
- e) In August 2018, a decision was taken by the International Astronomical Union (IAU) to host the 2024 General Assembly on the African continent for the first time. This followed a bid made to the IAU, on behalf of astronomy stakeholders across Africa, to hold the 2024 General Assembly in Cape Town. This presents a significant opportunity for Astronomy in Africa.

Out of these many conversations emerged the need for a pan-African conference on the development of Astronomy in Africa; a conference which would also be used as an opportunity to re-launch the African Astronomical Society (AfAS) with renewed energy and commitment. There is also a clear need for an AfAS Secretariat in order to ensure the effective implementation of AfAS mandates/plans, as well as to ensure regular communication with the African Astronomical Community.

Given the diversity of stakeholders, two meetings are recommended: one that would focus more on the business of organising the African astronomy community, and a later meeting would focus on scientific research and collaborations.

2.0 Understanding the current state of Astronomy in Africa

In order to fully understand the current state of Astronomy in Africa there is a need for desktop studies which will determine both who the active Astronomy researchers are on the continent, and who the key players are in terms of growing the field of Astronomy. Since the latter would not necessarily be researchers, the following dual approach is proposed:

- 2.1 A scientometric study is conducted to determine all active researchers on the continent, based on their publications.
- 2.2 A survey is conducted via all associated networks in order to determine who is involved in the development of Astronomy in Africa, as well as the number of active MSc and PhD students. The survey should incorporate diversity statistics.

Reports from these two desktop studies would help to inform which individuals are specifically invited to attend which of the two proposed meetings. Such studies should be conducted as soon as possible. Initial investigations into this have begun via an OAD volunteer.

3.0 Objectives of the first meeting (Business focus):

- 3.1 Bring together the key players, in order for them to get better organized around the development of Astronomy in Africa, and to enable the coordination of available skills and resources.
- 3.2 Discuss strategic, policy, and governance issues related to Astronomy in Africa.
- 3.3 Interact with people outside Africa in order to showcase the potential of Astronomy in Africa.

- 3.4 Re-launch the African Astronomical Society (AfAS).
- 3.5 Establish AfAS Secretariat with clear responsibilities.

4.0 Objectives of the second meeting (Science focus):

- 4.1 Share the scientific research being conducted across Africa and stimulate research collaborations within the continent.
- 4.2 Interact with researchers outside Africa, in order to promote new academic collaborations and to enhance existing ones.

5.0 Format of meetings:

- 5.1 The Business meeting will consist of invited talks, panel discussions, and working sessions. Deliberations will centre around the establishment of AfAS, including work on the constitution and activity roadmap.
- 5.2 The Science meeting will comprise a series of invited and contributed talks, as well as posters. Interactive networking sessions will aim to stimulate conversations and scientific collaborations through unconferences, flash talks and working/hack sessions. Topics will include issues relates to open science and free shared data resources in astronomy.

6.0 Venues:

- 6.1 The first (Business) meeting is proposed to be held in South Africa, given the strength of that country's commitments to Astronomy in Africa, as well as the

strong support at government level, with the potential availability of funds for the meeting.

- 6.2 The second (Science) meeting is proposed to be held in Ethiopia, given the strength of that country's commitments to Astronomy in Africa, the strong support at government level, and the fact that Ethiopia will be hosting an IAU Symposium (356) in October 2019, which will be a good event to coincide with.

7.0 Suggested Dates:

- 7.1 Business meeting: 25-26 March 2019
- 7.2 Science meeting: October 2019, immediately after the IAU Symposium 356

8.0 Organizing Committees

- 8.1 For the Business Meeting there will be a Programme Committee, comprising key stakeholders for the establishment of AfAS. This committee will establish both the programme and the invitation list.
- 8.2 For the Science Meeting a Scientific Organizing Committee will put the programme together and select contributions;
- 8.3 For both meetings there will be Local Organizing Committees who will handle the logistics.

These committees will be established once this plan is agreed to and buy-in is obtained from key stakeholders for Astronomy in Africa. All committees will be established with due consideration for diversity and gender equity.

9.0 Participants and registration:

The Business Meeting will be open to participants from all over Africa and the diaspora. Specific invitations will be based on the surveys conducted on the state of Astronomy in Africa. A maximum of 100 participants is envisaged.

For the Science Meeting there will be an open call for papers and contributions will be selected by the Scientific Organising Committee.

Ideally, there will be no registration fee for these meetings, and a limited number of travel support grants will be offered for well-motivated applications, but participants will generally be expected to make their own travel arrangements.

We envisage participants for these meetings from the following groups:

- 9.1 Astronomers based in Africa
- 9.2 Astronomers from the African diaspora
- 9.3 Astronomers from around the world willing to collaborate with African astronomers
- 9.4 Astronomy instrumentation scientists and engineers
- 9.5 Astronomy educators and communicators
- 9.6 Data scientists and ICT professionals related to all the above groups
- 9.7 Students related to all the above groups
- 9.8 Amateur Astronomers related to all the above groups
- 9.9 Relevant government officials
- 9.10 Funding agencies
- 9.11 Relevant industry partners
- 9.12 Individuals who have been involved in AfAS before

10.0 Expected outcomes from the meetings:

10.1 For the Business Meeting:

- a) Clear vision/mandates/plans for AfAS, and the finalization of a renewed constitution.
- b) Re-launch of AfAS with a new executive committee in place.
- c) Plan for the establishment of an AfAS Secretariat to carry out AfAS mandates/plans.
- d) Awareness among high level government officials and policy makers regarding Astronomy in Africa

10.2 For the Science Meeting:

- a) Awareness of research activities in Africa both by Africans and potential international collaborators
- b) New collaborations established both within Africa and internationally in the fields of Astronomy and related big data research.