

HartRAO

Strengthening Astronomy in the North - Meeting Summary

The following is a summary of the “**Strengthening Astronomy in the North**” meeting held on 28 & 29 January 2013 at the Hartebeesthoek Radio Astronomy Observatory.

1. Participants

Meeting Chair:	Dr. Michael Gaylard, HartRAO
The following Universities / Institutions were present:	DST Astronomy Desk, DUT, HartRAO, NWU, NRF, SAAO/SALT, SKA SA, TUT, UCT, UFS, UJ, UKZN, UNISA, UP, Wits University.
The following Universities / Institutions were invited but unable to participate:	University of Limpopo, University of Venda, University of Zululand.
Summary Recorder:	Dr. Aletha de Witt, HartRAO

2. Reason for Meeting

Following the Astronomy Town Meeting in 2012, Prof Nithaya Chetty, NRF/ UP asked Dr. Michael Gaylard, HartRAO, to organise and host a follow-up meeting of astronomers in the North outside of the Western Cape, as recommended by Dr. Lerothodi Leeuw, UNISA.

The meeting was held in order to:

- Stimulate constructive thinking and new ideas for strengthening astronomy in the Northern parts of South Africa, to ensure that astronomy grows in all parts of South Africa.
- Discuss possible opportunities and recommendations for strengthening astronomy in the North.
- Provide an update on the status of astronomy research groups in South Africa, the research, collaborations and training opportunities they currently support and their thoughts on strengthening Astronomy in the North.

3. Agenda

Monday 28 January 2013:

Welcome

Prof Nithaya Chetty opened the meeting at 09:45 am, and stated that we should build a community of astronomers in the North. He also added that astronomers should strengthen collaborations within South Africa, making optimal use of the resources and opportunities that they already have.

University/ Institution Overview

A representative from each university and Institution that attended the meeting gave a short presentation on the instrumentation status of the facility, an overview of the research group / department, training opportunities, future plans and thoughts on strengthening astronomy in the North.

NASSP North Overview and Implementation Discussion
This was chaired by Dr. Chris Engelbrecht, UJ.

Tuesday 29 January 2013:

NASSP North Implementation Discussion Continued
Outcomes to be provided by Dr. Chris Engelbrecht

Astronomy Desk Update

Dr. Bonita de Swardt from the DST presented an update on the activities of the Astronomy Desk. The presentation slides are available for download at http://www.hartrao.ac.za/news/130128_astronomy_north/

Workshop “Strengthening Astronomy in the North”

The focus of the workshop was to discuss possible opportunities and recommendations for strengthening astronomy in the North. How to expand astronomy where it already exists and how to create it where it does not exist.

4. Topics of Discussion and Conclusions

Topic # 1: Overview of Universities/Institutions and Collaborations

The Universities and Institutions present at the meeting all presented their areas of expertise and research capabilities, and gave an update on their growth in terms of staff members post-graduate students, research output, training of students and collaborations within and outside South Africa. From the presentations and discussion of this topic the following conclusions were made:

- All of the Universities and Institutions present at the meeting, that already have an astronomy / astrophysics programme, showed a positive growth in staff members, students and research output and are very keen and optimistic to further strengthen astronomy in South Africa through current and future collaboration and outreach initiatives.
- The University of Pretoria (UP) does not currently have an astronomy research programme, but it intends to start one. It does present a first year introductory course on astronomy.
- Representatives of the University of Limpopo, University of Venda, and the University of Zululand were unable to attend the meeting. These universities do not currently have any astronomy programmes but did show an interest in astronomy. Representatives from these universities had participated in an Astronomy Teaching and Research Orientation Workshop (AsTROW) at SAAO from 15 to 19 October 2012, organised by Kevin Govender, Office of Astronomy for Development.
- UNISA currently offers astronomy courses for undergraduate degree purposes through distance learning. A process to stop many of these courses have started mainly due to the lack of staff members.
- Facilities in the North should focus on the strengths they have including e.g. high-energy astrophysics, space physics and numerical expertise and should strengthen their involvement and collaborations with other facilities for the purpose of multi-wavelength astronomy.

Topic # 2: The Astronomy Desk (AD)

After the presentation by Dr. Bonita de Swardt, in discussion the following points were made:

- A Human Capital Development (HCD) plan for astronomy has been submitted by the AD to the DST which consists of short term plans / initiatives. The HCD plan is a closed document and there are some concerns that the content of this plan is not available to the astronomy community.
- The focus of the Astronomy Desk is on a multi-wavelength approach as a way to unite universities. There was concern amongst the astronomers on the possible misunderstandings and abuse of the term “multi-wavelength”. Many projects are multi-wavelength but non-experts reading the proposals may not understand that, unless it is spelled out explicitly. It was also pointed out that theorists can do multi-wavelength research, but with South Africa in a building mode, observers should focus on the individual instruments they are building, which operate in wavelength bands defined by the technology being used.
- A concept document has been submitted by the Astronomy Desk to DST for an independent astronomy agency. This proposal is currently under revision. The astronomy desk is temporary and as soon as the astronomy agency is established the astronomy desk will fall away.
- The astronomy desk is currently looking at the DST’s return on investment in astronomy but it is very difficult to see where the money has gone. For this purpose the astronomy desk has send out a survey to all facilities to determine how departments have grown and asks the support of the astronomy community to complete the surveys.
- It was made clear that the Astronomy Desk cannot represent all astronomers if a point of contact is not established. The members of the panels of the Astronomy Desk are representatives of the astronomy community. These panels are not yet closed and they are still open to anyone who wishes to volunteer.

Topic # 3: Attracting Students: Outreach

In discussion of this topic the following points were made:

- Astronomy attracts students and thus outreach is very important.
- Astronomy outreach should not only be targeted at getting more students but increasing awareness of science and making the general public excited about science and astronomy is also important.
- Outreach methods already employed by the facilities present at the meeting, include: observing evenings with optical telescopes, demonstrations e.g using a DSTV dish as a radio telescope to detect the Sun, interactive science centres, astronomy clubs, online material, sidewalk astronomy.
- An astronomy column in a newspaper, television documentary or radio programme by local astronomers should be investigated although previous attempts showed that the media are in general not interested in everyday science.
- Mobile technology can be used for astronomy outreach as ~ 90% of young people own a mobile phone. Mxit is already being used for maths in rural areas in Limpopo.
- Information on public outreach initiatives and hands-on activities should be readily available and integration is important. Online material should be expanded and there should be a central repository.

Topic # 4: Bringing Astronomy to Undergraduates

In discussion of this topic the following points were made:

- Universities that do not have astronomy or undergraduate astronomy can offer astronomy courses from another university as part of their curriculum. It should be investigated whether distance learning e.g. UNISA is viable or old style and also whether UNISA astronomy courses are disappearing. Wits University has also offered to provide undergraduate lecture courses and many facilities have the capability to offer practical training, e.g. Boyden observatory, HartRAO and SAAO. Online lecture material is also available through e.g. itunes and video lecturing is also possible. This could also provide a wonderful opportunity for collaboration and partnerships between universities.

- It should be communicated to young people that astronomy is a branch of physics, and we should combine astronomy with undergraduate physics, even in practicals. Practical work is important as it keeps students excited and we need to keep students in the system. We should introduce astronomy-related practicals in physics departments.
- To get non-astronomer physicists into astronomy e.g. through involvement in outreach and research projects. An astronomy club for students and the involvement of amateur astronomers are possibilities.
- Astronomy web pages that are updated regularly with new pictures, references and course work material is essential.
- A key issue that needs to be answered is how many years of mathematics is required for undergraduates to be able to do astronomy. For people interested in astronomy but without the skills in math there is also the option of amateur astronomy.

Topic # 5: Graduate students: Access to Course Material and Practical Training

- Lecture material and video lectures should be distributed on-line.
- Astronomy for students should be hands on. A kit or a range of kits for astronomy practicals for schools and universities can be put together as well as exercises using real astronomical data and practicals at national facilities.
- NASSP is likely to start a second node outside of the Western Cape beginning in 2014 or 2015. Facilities are encouraged to get involved with NASSP through lecturing courses or by providing practical training or by offering student projects and supervision of such projects.

Topic # 6: Building Research Capability/ How can a university with no astronomy do this:

- Universities with no astronomy would first need some grounding in astronomy and they will have to equip themselves. Computational experience could also be a problem and this needs to be addressed as well.
- Most astronomers feel that they would be reluctant to collaborate with someone with no academic background, but we should present some projects in which students and lecturers of non-astronomy departments can participate.
- NASSP students spend weeks doing astronomy practicals and the same can be done for professionals at universities with no astronomy background.
- The employment of Astronomers in the physics department and the use of astronomy courses from another university as part of their curriculum can be a good starting point. Video lectures is also an option and many lecture courses are available online e.g. through itunes.
- The Universities that really need the targeting for astronomy like Limpopo, Venda and Zululand were not at the meeting. It was mentioned that these universities on previous occasions said that they do not have appropriate facilities, e.g. computer labs and cannot embark on astronomy research. They are very eager to do astronomy but with the lack of facilities and background they would need a lot of support.
- Transformations from say biology to astrobiology by integration with an existing group.
- If a student at a university with no astronomy wants to do an astronomy project and the university does not want to loose the student, joint supervision with astronomy professionals can be an option. Joint supervision of students is proposed, but whether this can work needs to be investigated.

5. Important Comments and Questions

- Questions regarding the AVN concerning Topic #1

- “Is training offered for the AVN countries and do they have any other telescopes apart from radio ?
How is the AVN group/ collaboration been set up and where does the funding come from?”
Dr. Michael Gaylard responded by saying that the AVN team in the SKA-SA project and HartRAO are planning a six month training course to develop the specific knowledge and skills required to operate a VLBI radio telescope. Various local universities have taken up students from African countries to help building Astronomers, and overseas astronomers are also planning to take on African students. There is no separate organization for the AVN in SA, it is currently managed by SKA-SA Project, HartRAO and DST (where it originated). Funding for the AVN has so far come from the African Renaissance Fund in DIRCO (R120m) and DST (R21m).
Prof. Nithaya Chetty added that AERAP has also been set up for assisting projects such as the AVN.
- Question regarding HartRAO concerning Topic #1
“Can HartRAO take students for practicals from universities other than NASSP and how ?”
Dr. Michael Gaylard responded by saying this is possible and has been done with several universities, and that the practicals are tailored to the universities' needs.
Prof. Nithaya Chetty added that joint appointments with universities should be a 50/50 split.
- Questions regarding SAAO/SALT concerning Topic #1
“When will the SALT polarimeter be ready and is Target-of-Opportunity observations possible on SALT ?”
Prof Ted Williams responded by saying that it would be 6 months before the beamsplitter comes back and the SALT polarimeter would maybe be ready for the next semester observations.
There is a specific observing program for Target-of-Opportunity observations, and it has been proposed before and worked very well with a 12 hour turnaround so far on SALT.
- Comment made by Prof Roy Booth concerning Topic #1
In order to get our money's worth from instruments like KAT-7, MeerKAT and SKA we need people using it, in the North as well. NASSP North is thus very important. Training courses for this purpose with feedback from students would be a great idea. We should think about educational possibilities e.g. televised lectures.
- Questions regarding KAT-7 concerning Topic #1
“Can KAT-7 be used already?”
Prof Roy Booth responded by saying that KAT-7 is still in the commissioning phase, although test observations are being run. The call for proposals will be made before too long.
- Comment made by Prof Nithaya Chetty concerning Topic #1
Many astronomers have not yet visited the KAT-7 site and the NRF will provide a bus for visits. Shereen Verwoerd is organizing the visits and will propose dates soon.
- Question regarding UCT concerning Topic #1
“How does UCT do undergraduate astronomy practicals, especially with large groups ?”
Prof. Renee Kraan-Korteweg responded that students are divided into smaller groups for practicals and practicals are done for 2nd and 3rd year students in the semester break and using training telescopes. She also commented that we need to keep students in the system and continuing in astronomy and that practicals keep students excited.
Prof Johan Van de Walt commented that radio astronomy practicals are also an option and can be done with training dishes e.g. a DSTV dish.
- Comment made by Prof Markus Bottcher concerning Topic #1
We should focus on the strengths that we have in the North, but collaborations are important for multi-wavelength astronomy. We also rely on the national facilities for practicals and the universities in the North should strengthen their collaborations and involvement with e.g. HartRAO and H.E.S.S. Also the Northern expertise is not covered in the current NASSP curriculum. Prof Roy Booth commented that the current NASSP curriculum needs to be revised.

- Comments made by Prof Sergio Colafrancesco concerning Topic #1

We need more as well as improvement on current collaborations. Fund raising, human capacity building and collaborations are crucial. Also, the timescale before MeerKAT is 3 years and we need to train new astronomers to be ready to use this and take these challenges, and we must have a strategy at universities for training of students, research, research output and employment.

- Comments made by Prof Lerothodi Leeuw concerning Topic #1

UNISA is looking to grow its core supervision and post-doc students, also those that are funded externally and UNISA is open to joint supervision and large projects to get involved in. UNISA is not part of the MeerKAT proposals as they did not have representatives at the time but would like to get involved.

- Comment made by Prof Lerothodi Leeuw concerning Topic#1 § 4

UNISA can offer a role in astronomy growth through e.g. its distance learning astronomy courses, large library and online facilities, but at the moment a process to stop some of the astronomy courses has started and the astronomy degree at UNISA will phase out. The publicity at UNISA astronomy has not been great and also not moving with times / changes in South Africa and we should organize ourselves better.

Prof Piet Meintjies commented that the UFS has a collaboration with UNISA where students from UFS register for astronomy courses at UNISA, and if these courses phase out it would have a big impact on UFS, as they depend on it.

Dr. Michael Gaylard commented that this seems strange in the current times that UNISA astronomy courses are being phased out and that this is an issue that needs to be discussed further.

Dr. Alet de Witt commented that the lack in staff members at UNISA has been the main reason for the discontinuation of astronomy courses and that UNISA did advertise posts but without any luck.

Prof. Renee Kraan-Korteweg responded by saying that the astronomy posts at UNISA were only advertised locally and not to the entire astronomy community in South Africa.

Prof. Patricia Whitelock commented that the UNISA undergraduate courses cannot be stopped as this is specifically important for students in Africa. She also asked if the astronomy community can provide any support to help, and suggests that maybe someone from the NRF could get involved.

- Comment from Prof Chris Theron concerning Topic #1 & 6

UP is the largest residential university in South Africa and does not have astronomy, and this is an issue that needs to be addressed. UP has a very serious intention of starting astronomy and is looking at getting a few staff members and students and maybe some participation in e.g. NASSP to start with. They have had discussions with Prof Roy Booth to get him on board to help over the next few years and they will announce a decision soon.

Dr. Alet de Witt commented that students at UP can take UNISA astronomy courses, as a starting point to get involved in astronomy.

Prof. Patricia Whitelock asked if students at UP can take UNISA courses, and Prof Chris Theron replied saying that they can but in an unofficial way.

- Comment from Prof Piet Meintjies concerning Topic #1 & 4

The UNISA course work is too mathematical and practicals are a problem as it is logistically difficult for UFS students to go to Pretoria to do UNISA practicals. He also mentioned that Boyden observatory could offer something equivalent for practicals.

Prof Roy Booth commented that we should think whether the UNISA way of doing courses via correspondence is viable or old style and should also investigate whether UNISA courses are disappearing.

Prof. Patricia Whitelock commented that as a starting point someone should send an email to UNISA astronomy to see how better integration with the rest of astronomy can be established.

Prof Sergio Colafrancesco commented that Wits University could be another option for undergraduate courses and could offer 6 month intensive course that could be considered for students from Africa as well.

- Comment from Prof. Nithaya Chetty concerning Topic #1 & 5

He encouraged the department of electronic engineering at Durban UT to combine their radio astronomy experiments and demonstrations with visits to HartRAO and KAT-7.

- Questions regarding the Astronomy Desk concerning Topic #2

“A copy of the HCD plan would have been useful before the meeting and why is it not available? Does the astronomy desk have a website? Can someone raise concerns with the Desk as an individual? Is multi-wavelength mandatory and will there be prejudice because of this and will we have access to funding? Why does the Astronomy desk only have astronomers on the panels, but no engineering back-up?”

Dr. Bonita de Swardt responded by saying that the HCD plan is a closed document, and that Kavilan Moodley has provided help with the document, and that it contains only short-term plans and initiatives. The astronomy desk does not have a website, but they do send out newsletters and contact details can be provided as well as visits to universities and facilities, and individual concerns can be raised with the desk. The review panels established by the Astronomy Desk are not closed and input from members is asked to maintain open communication. There are engineers included on some of the panels. The optical and radio division will still be very distinct and there will be no prejudice against projects focused on only one field.

Prof. Nithaya Chetty commented that NASSP is not presented on any of the panels of the Astronomy Desk, and encourage people from NASSP to volunteer.

Prof Sergio Colafrancesco commented that every project should be a multi-wavelength project from the start, and this means integration in the South African facilities, and that all experiments should be integrated in a coherent way and one should look at the big picture.

Prof. Roy Booth and Prof. Renee Kraan-korteweg commented that one cannot force people to do certain things and that dedicated focus should exist, South Africa is currently in a building mode and observers should focus on the individual instruments they are building.

- Comment from Dr. Mike Gaylard concerning Topic #3 & 4

A great concern is encountering Physics Honours students not knowing basics about astronomy, e.g where the Sun goes at night. We should introduce astronomy related practicals for physics departments, and there should be a central depository for these practicals.

Prof. Patricia Whitelock commented that resources is being developed by Kevin Govender for school kids and students with a number of exercises developed to have access to real astronomical data, and can be done in collaboration with real astronomical departments.

Mr. Tony Voorvelt commented that a kit or a range of kits for astronomy practicals for schools and universities can be put together and can be marketed through the SAIP. He also asked whether there would be an interest in such astronomy kits.

- Comment by Dr. Neil Young concerning topic #3 & 4

There are many astronomy resources online, including astronomy lecture material e.g. through itunes. Dr Young has volunteered to investigate the available online resources and lecture material.

6. Key Decisions and Actions to be Taken

- UP has serious intentions of starting astronomy and are having discussion with Prof. Roy Booth to assist them. They will announce a decision soon.
- The undergraduate courses at UNISA are disappearing, this needs to be investigated, maybe someone from the NRF can get involved. An email needs to be send to UNISA to see how better integration with the rest of astronomy can be established.

- Wits university intends to provide undergraduate and post-graduate courses as well as intensive training sessions in astronomy, and Boyden observatory as well as HartRAO can provide practical training.
- UNISA is looking for joint supervision and large projects, like MeerKAT proposals, to get involved with in order to grow astronomy at UNISA.
- Training courses for students to use facilities like KAT-7, MeerKAT and SKA would be essential. A call for proposals for KAT-7 will be made soon.
- The Northern expertise is not covered in the current NASSP curriculum, and the curriculum needs to be revised.
- Shereen Verwoerd is organizing visits to KAT-7 site and will propose dates soon.
- The astronomy community will need updates from the Astronomy Desk on key issues e.g. the HCD plan, funding opportunities and the astronomy agency and a website for this purpose was proposed.
- All facilities should complete the survey send out by the Astronomy Desk.
- The panels of the Astronomy Desk is not closed and astronomers interested should volunteer to be represented on these panels, specifically representatives from NASSP.
- The media could be a good way to do astronomy outreach and possibilities in TV, radio and newspapers should be investigated. Mobile technology for astronomy outreach should definitely be investigated.
- Information on public outreach initiatives and hands-on activities, as well as practical training for students and lecture material should be readily available, distributed online and be in a central repository.
- Astronomy related practicals for physics departments should be introduced.
- It should be investigated whether distance learning, video lectures or intensive training sessions should be used by facilities that do not currently offer undergraduate astronomy training.
- Dr. Neil Young has volunteered to investigate available astronomy online resources and lecture material.
- Mr. Tony Voorvelt can put together astronomy kits for schools and students and he needs to know who would be interested. Can this be marketed through the SAIP ?
- Resources are being developed by Kevin Govender for school kids and students with a number of exercises developed to have access to real astronomical data, and can be done in collaboration with real astronomical departments.
- We need to present some projects in which students and lecturers from non-astronomy departments can participate, as well as joint supervision for students interested in astronomy projects at these universities. Whether this can work needs to be investigated first.
- Universities eager to do astronomy but with a lack of facilities and background will need much support.
- Dr. Mike Gaylard has volunteered to set up a webpage reporting on this meeting.
- More and improved collaborations between facilities are crucial.

7. Adjournment

The meeting was adjourned at 13:00 on 29 January 2013 by Prof. Nithaya Chetty. He noted that holding another astronomy town meeting at the end of the year has been suggested, but nothing has been confirmed yet.