

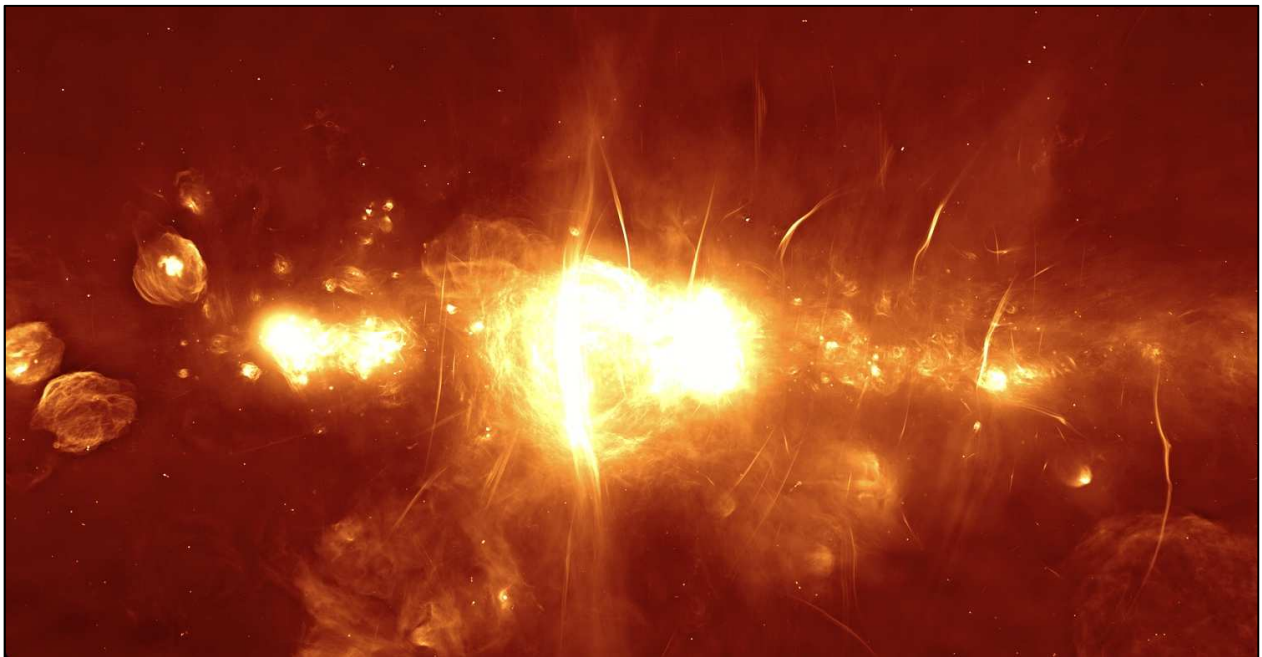
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monthly notes of the astronomical society of southern africa

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In this issue:

News Notes: MeerKat radio telescope inaugurated

SA to host IAU General Assembly

Hirax radio telescope array

Lunar Eclipse July 2018

Fireball reports

ASSA AGM

Colloquia and Seminars

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RECOGNITION	Articles from <i>MNASSA</i> appear in the NASA/ADS data system.

Cover Photo: Unprecedentedly detailed radio continuum image of a $2^{\circ} \times 1^{\circ}$ field around the Galactic Centre produced by the MeerKat Radio Telescope. The conspicuous spicules are produced by high-energy electrons spiralling around magnetic field lines. See page 103 of this issue.



mnassa

Vol 77 Nos 7 & 8

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Editor's Notes

1 The 600th Edition

ASSA Archivist, Chris de Coning has informed me that the April Edition of *MNASSA*, Vol. 77 Nos 3 & 4 was the 600th.

2 Submitting Articles to *MNASSA*

It saves the Editor an enormous amount of time if articles are submitted in a simple, unformatted MSWord document with images attached separately and of about 250 kB size. Just indicate where in the text you want the images. Unfortunately I cannot manage PDF files easily.

3 Articles for *MNASSA*

I am getting progressively more impressed with the ASSA Centre newsletters, which are becoming of an increasingly high standard – well done to all concerned. However, I sometimes find articles that are most appropriate for *MNASSA* and I would like to suggest to authors/observers might consider submitting their work to *MNASSA* first or simultaneously for three reasons:

- Your work will get professional recognition,
- Your work will get a wider readership, and
- It will go into the ASSA records for archiving for future researchers, this applies particularly to observational work

Many thanks and I look forward to receiving more observational material.

Case Rijdsdijk, Editor

News Note: MeerKAT Radio Telescope Inaugurated.

Reveals clearest view yet of the Centre of The Milky Way

Deputy President of the Republic of South Africa, Mr. David Mabuza, today officially inaugurated the MeerKAT radio telescope. After a decade in design and construction, this project of South Africa's Department of Science and Technology has now begun science operations. At the launch event, a panorama obtained with the new telescope was unveiled that reveals extraordinary detail in the region surrounding the supermassive black hole at the Centre of our Milky Way Galaxy (see front cover of this issue). This is one of several very exciting new views of the universe already observed by the telescope.

Fernando Camilo, chief scientist of the South African Radio Astronomy Observatory (SARAO), which built and operates MeerKAT in the semi-arid Karoo region of the Northern Cape said they wanted to show the science capabilities of this new instrument, and the centre of the galaxy was an obvious target. It is unique, visually striking and full of unexplained phenomena -- but also notoriously hard to image using radio telescopes. The centre of the Milky Way, 25 000 light-years away from Earth and lying behind the constellation Sagittarius (the "Teapot"), is forever enshrouded by intervening clouds of gas and dust, making it invisible from Earth using ordinary telescopes. However, infrared, X-ray, and in particular, radio wavelengths penetrate the obscuring dust and open a window into this distinctive region with its unique 4 million solar mass black hole. Although it's early days with MeerKAT, and a lot remains to be optimized, we decided to go for it -- and were stunned by the results.

Farhad Yusef-Zadeh of Northwestern University in Evanston, Illinois, one of the world's leading experts on the mysterious filamentary structures present near the central black hole but nowhere else in the Milky Way found the image remarkable. These long and narrow magnetized filaments were discovered in the 1980s using the Very Large Array (VLA) radio telescope in New Mexico, but their origin has remained a mystery. The MeerKAT image has such clarity, it shows so many features never before seen, including compact sources associated with some of the filaments, that it could provide the key to cracking the code and solve this three-decade riddle.

Yusef-Zadeh adds that "MeerKAT now provides an unsurpassed view of this unique region of our galaxy. It's an exceptional achievement, congratulations to our South African colleagues. They've built an instrument that will be the envy of astronomers everywhere and will be in great demand for years to come."

About the front cover Image

This image, based on observations made with South Africa's MeerKAT radio telescope, shows the clearest view yet of the central regions of our galaxy. At the distance of the galactic centre (located within the white area near image centre), this 2° by 1° panorama corresponds to an area of approximately 1,000 light-years by 500 light-years. The color scheme chosen here to display the signals represents the brightness of the radio waves recorded by the telescope (ranging from red for faint emission to orange to yellow to white for the brightest areas). This image shows a wealth of never before seen features, as well as a clearer view of previously known supernova remnants, star-forming regions, and radio filaments. MeerKAT's 64 dishes or antennas provide 2 000 unique antenna pairs, far more than any comparable telescope. This design feature contributes critically to making high-fidelity images of the radio sky, including this best view in existence of the centre of the Milky Way. It is also advantageous to observe the centre of the galaxy from South Africa, where it passes overhead and is visible for almost 12 hours each day, unlike from northern hemisphere locations.

Radio array telescopes do not measure the very largest, smooth structures in a given region of the sky. That additional information can be obtained using single dish radio telescopes; for the MeerKAT image shown here, that information is from the Green Bank Telescope (courtesy Bill Cotton of NRAO).

News Note: SA to host General Assembly of IAU in 2024

It was announced at the recent General Assembly of the International Astronomical Union in Vienna that the 2024 meeting will be held in Cape Town. The South African bid was the winner amongst several countries that had put forward proposals to host the event.

The South African success was the culmination of a huge effort by the bid committee and others. Members of the SA astronomical community who participated included Prof Markus Boettcher – North-West University, Dr David Buckley – South African Astronomical Observatory/SALT, Prof Roger Deane – University of Pretoria/SARAO, Prof Roseanne Diab (Co-Chair) – Academy of Science of South Africa and University of Kwazulu Natal, Ms Kechil Kirkham – Space Advisory Company, Dr Moses Mogotsi – South African Astronomical Observatory/SALT, Dr Shazrene Mohamed – South African Astronomical Observatory/University of Cape Town, Case Rijdsdijk – Astronomical Society of South Africa, Prof Christo Venter (Co-Chair) – North-West University, Brian Van Soelen, Vanessa McBride, Patrick Woudt, and Adriaan Fourie (CTICC), Daniel Cunnama, Anja Fourie, Carolina Odman, Anja Schroeder and Lorenzo Raynard.



Some of the South African astronomers at the IAU meeting in Vienna.

Several stands at the Vienna Convention Centre advertised South African astronomy and attracted widespread attention. A huge blow-up of the new Galactic Centre map (featured on the cover of this month's *MNASSA*) was prominently displayed.

The IAU General Assembly is a huge event with typically 3000 participants and a budget of order R30 million. It runs for two weeks and each week contains three major symposia as well as many minor sub-meetings. For the SA astronomical community this success will mean years of hard work!

News Note: SKA Telescope Manager Critical Design Review

SARAO (The newly unified SA radio observatories) made a significant contribution to the Telescope Manager consortium, which is one of 12 engineering consortia representing 500 engineers in 20 countries building the SKA Observatory and Telescopes. Nine of the consortia focused on a component of the telescope, each critical to the overall success of the project, while three others focused on developing advanced instrumentation for the telescope. The Telescope Manager consortium was itself comprised of nine institutions in seven countries.

The Telescope Manager consortium was formed in 2013 and was tasked with designing the crucial software that will control and monitor the SKA Observatory and Telescopes, essentially forming its central nervous system. This implies that the Telescope Manager element is connected to all other elements such as the correlator, science processor, dishes and low frequency aperture arrays, and coordinates their actions.

The Telescope Manager will receive thousands of sensor updates per second, and needs to figure out what actions to take based on this information. The Telescope Manager also provides key stakeholders with user interfaces, for example it will provide operators with a view of the health and status of each telescope.

The design of the SKA Telescope Manager has recently been subjected to a Critical Design Review (CDR), and has subsequently passed this stage gate, achieving a CDR closure certificate. The review was held in April of this year, was led by the SKA Organisation, and included a panel of international experts in the field. The Telescope Manager consortium is the first consortium out of twelve to pass this rigorous review.

SARAO led the Telescope Manager System Engineering team involved in the design of this vital component, and also participated in the Management work package. SARAO team members acted as the primary authors of a range of important design artefacts, such as requirement and compliance specifications, interface control documents, construction and verification plans to name a few.

Ray Brederode, Functional Manager for Software at SARAO, and his team comprising Paul Swart, Lize van der Heever and Gerhard le Roux, all from the Software Team at SARAO, participated in the design of the Telescope Manager element. South Africa can be very proud of its contribution to the SKA Telescope Manager design, proving that we have world class engineers able to work on complex problems, like designing the world's largest radio telescope. S

Dr Rob Adam, Managing Director of SARAO said the team is proud that the MeerKAT CAM system was selected as the reference design for TM. Congratulations also go to Professor Yashwant Gupta of GMRT in India, the TM Consortium Chair, for leading the first consortium to successfully achieve CDR.

While the Telescope Manager consortium now formally ceases to exist, the SKA Organisation continues to work with SARAO and the other former consortium members on the System Design and the SKA construction proposal, where its expertise will be required to ensure that the system design works in conjunction with the other elements.

Telescope Consortium members included the South African Radio Astronomy Observatory (SARAO); the Commonwealth Scientific and Industrial Research Council (CSIRO) in Australia; the National Research Council of Canada (NRC), TCS Research and Innovation and Persistent Systems in India; Italy's National Institute for Astrophysics (INAF); Portugal's ENGAGE SKA Consortium through Instituto de Telecomunicações (IT) and the School of Sciences of Porto University; and the UK's

News Note: HIRAX

(HIRAX stands for **H**ydrogen Intensity and **R**ead-time **A**nalysis **eX**periment)

This is a radio telescope array that will map nearly all of the southern sky in radio continuum and neutral hydrogen line emission over a frequency range of 400 to 800 MHz. The primary goal of HIRAX is to use 21-cm intensity mapping to measure baryon acoustic oscillations (BAOs): these are remnant ripples in the distribution of galaxies that are imprinted by primordial sound waves that existed in the early universe. The characteristic BAO length scale can be used as a “ruler” for charting the expansion history of the universe and for shedding light on the nature of dark energy. HIRAX science goals include the following:

- Probe dark energy via 21-cm intensity mapping
- Search for radio transients and pulsars
- Study neutral hydrogen absorbers
- Measure diffuse polarization of the Galaxy
- Cross-correlations with other southern surveys, e.g. LSST
- SKA technology demonstrator

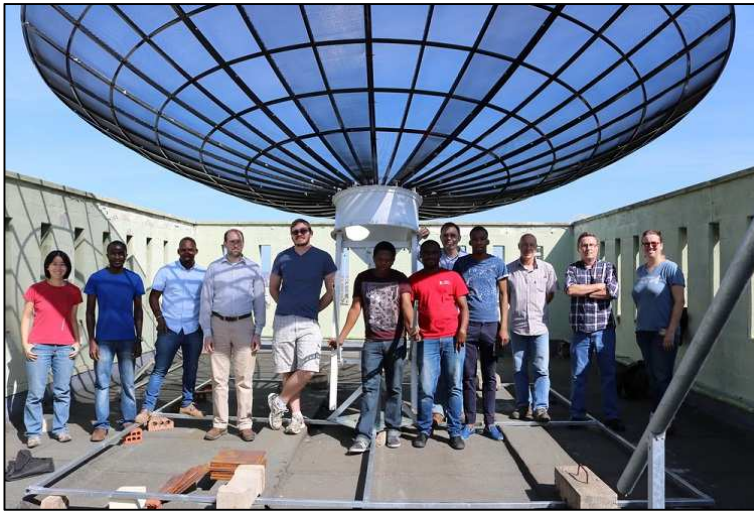


Fig 1: Illustration of the final HIRAX array in the Karoo.

The instrument

HIRAX will be an interferometer that comprises roughly 1000 six-meter dishes placed in a close-packed, redundant configuration, and the tentative deployment location will be the SKA site in the Karoo desert, South Africa. The operating frequency of 400-800 MHz corresponds to a redshift range of 0.8 to 2.5. The dishes will be stationary and will have a 5-10 degree field of view, and the dishes will be periodically repointed in elevation in order to build up coverage of the southern sky. HIRAX is

highly complementary to the Canadian Hydrogen Intensity Mapping Experiment (CHIME) and will share much of the back-end technology, including FPGA-based ICE boards and the GPU correlator.



The HIRAX project was given preliminary approval by the South African National Research Foundation in 2015. The first prototype dish testing has begun, and an initial eight-element array was scheduled for construction and deployment in 2016.

Fig 2: Assembly of the first 6-m prototype dish on the roof of the Durban University of Technology.

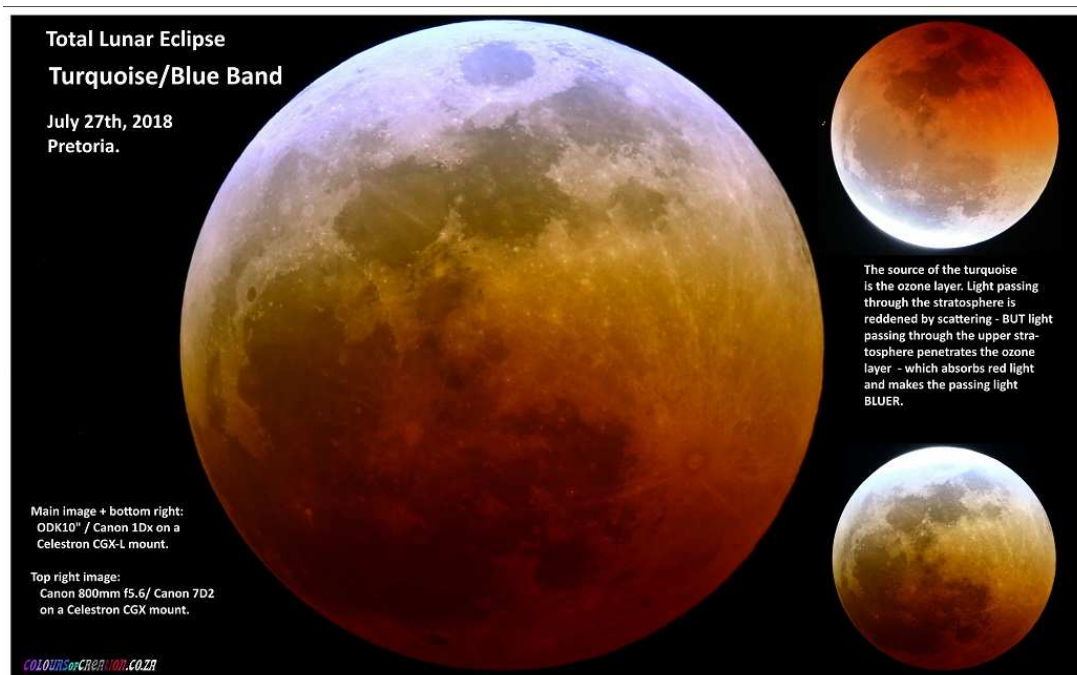
News Note: Lunar Eclipse, 27 July, 2018

Some centres in the South West of South Africa were unfortunately either entirely or partially rained/clouded out. But still many persevered and did get a glimpse of the eclipse accompanied with a bright Mars.

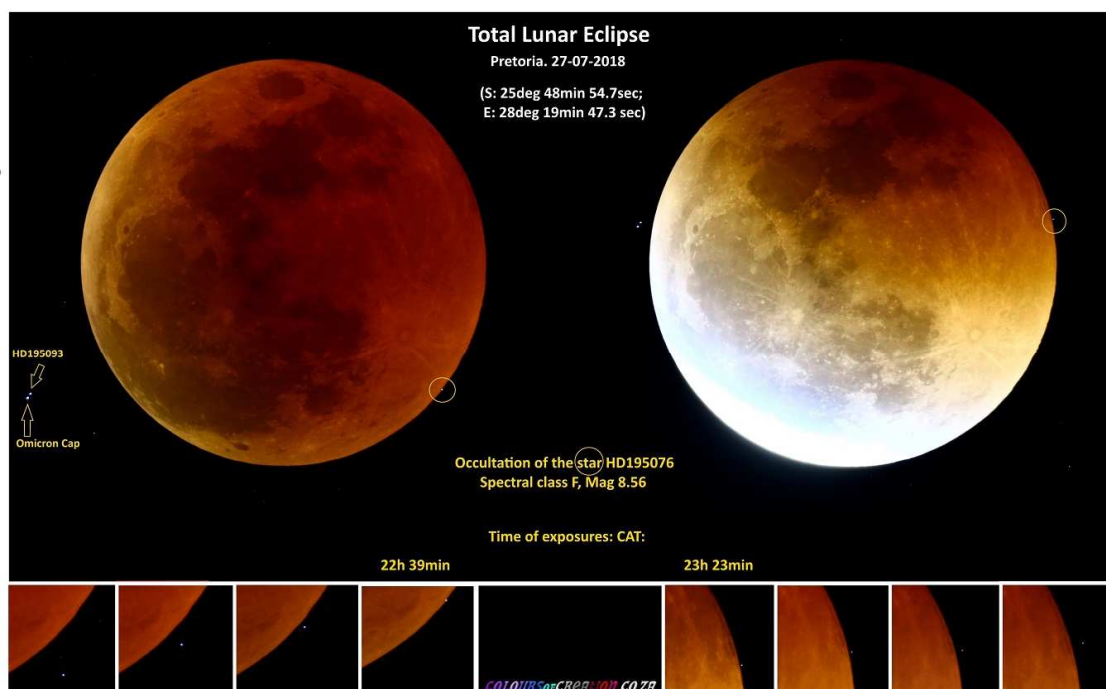
Particularly fortunate were the larger centres; Cape Town, Johannesburg and Pretoria who were able to entertain large crowds having a look at a fairly rare eclipse; the longest of this century and accompanied by an exceptionally large looking Mars nearby. Cape Centre was at the Waterfront and hosted what must have been around 3 000 people!

Johan Moolman, of the Pretoria Centre, captured some spectacular images of the eclipse, including one that showed a distinctive bluish/purplish band before totality. This is most likely caused by sunlight being refracted through the Earth's Ozone layer.

Mars appeared quite close to the eclipsed Moon, and as Mars was approaching opposition it was getting brighter. By late June it was exceeding Jupiter in brightness; by 27 July it was at mag -2.8 when it was only 0.3849 AU from Earth; the closest Mars has been to Earth since August 2003. At this time the Red Planet was 24.3 arcseconds across – substantially larger than normal.



What many others missed was that during the eclipse was the occultation of the star HD195076; an F-type star of mag. 8.56. He managed to time both the disappearance and reappearance as shown in the image below.



New Note: Jocelyn Bell-Burnell wins major prize

A special Breakthrough Prize (see <https://breakthroughprize.org/News/45>) has been awarded to Jocelyn Bell Burnell who discovered the existence of pulsars in 1967 while

a graduate student at Cambridge University (UK). She had to look on when her supervisor was awarded the Nobel Prize in 1974 for what was essentially her insight. Though she has since received many other awards, her new prize of US\$ 3 million is something rather special. She has decided to donate the money to finance PhD studentships for groups of people under-represented in physics.

Dame Jocelyn is currently a visiting Prof of Astrophysics at Oxford and Chancellor of the University of Dundee.

Recent Southern African Fireball Observations, Event Nos. 300-307

Tim Cooper, Bredell Observatory

This article continues the sequential numbering of reported fireball sightings from southern Africa. By definition, a fireball is any meteor event with brightness equal to or greater than visual magnitude (m_v) -4 . The following events were reported to the author and details are reproduced as given by the observer [any comments by the author are given in brackets]. All times were converted to UT unless stated, and all coordinates are for epoch J2000.0.

Event 300 – 2018 February 21 – Noupoot, Northern Cape

Observed by Luis Paulo Camisasca at 21h50. Driving north towards Colesberg on the N9, just past the intersection with Shaw Street, Noupoot, first seen high in azimuth 330° , descending at an angle of 45° towards the right. He said ‘It looked like a large rock with some smaller rocks (or debris) detaching from it, with a surrounding veil, and a tail’. The colour was white/silver. Duration was about 6 seconds.

Event 301 – 2018 February 25 – Gauteng, Free State, Northern Cape

Several reports were received of a bright fireball seen at around 19h00. The locations of eleven reported sightings are shown as Figure 1 and range from Pretoria in the north to near Vanderkloof in the south. The most reliable reports from Gauteng were from Rarda van Oosten and Hannes van Wyk who were able to provide sketches of the path relative to nearby landmarks from their locations in Randburg and Vaalview.

Rarda reported ‘Bright light green trail with white ball in front, about 3 seconds later it looked like an orange explosion with white flash on the horizon. She saw the path start from near the moon [which was 77% illuminated, magnitude -11.9 , and alt/az 42° , 347°] in azimuth 10° , pass almost overhead and slightly to her left, and headed in direction azimuth 190° where it exploded.

Hannes was in Vaalview, Vanderbijlpark and observed the fireball descending in a steep vertical angle in a south-south-west direction. From Hannes sketch I determine the heading was in azimuth 200° . Bright yellow ball which exploded and disappeared about 15° above the horizon. He said he heard possible sounds about 1.5-2 minutes later.

The fireball was also seen by Jonathan Balladon, an airline captain, who was flying from Johannesburg to Cape Town. His location at the time was just north-west of Parys, and he saw the fireball with short path towards the south-east descending at a steep angle of about 70° . Duration was about 5 seconds with multiple 'bursts' and green with red and yellow specks. It was so bright his first officer, who did not see it directly, thought that it was lightning. Jonathan said 'brighter than the moon, I looked out at it because the light shining on the wing attracted my attention, thought it may be lights from another aircraft!'

Further south, location 4 in Welkom saw the fireball towards the east, while location 5 reported 'saw a burning object low on the horizon to the east, first appeared as a white light then turned to orange before disappearing behind a ridge'. The most southerly location was 9, on the shores of Vanderkloof Dam in the south western Free State. The observer commented brighter than the moon, green colour, no persistent train, but object broke in two before burning out in a terminal flash. He gave the path as alt/az $36^{\circ}, 2^{\circ}$ [near iota Gem] to $19^{\circ}, 55^{\circ}$ [near delta Leo].

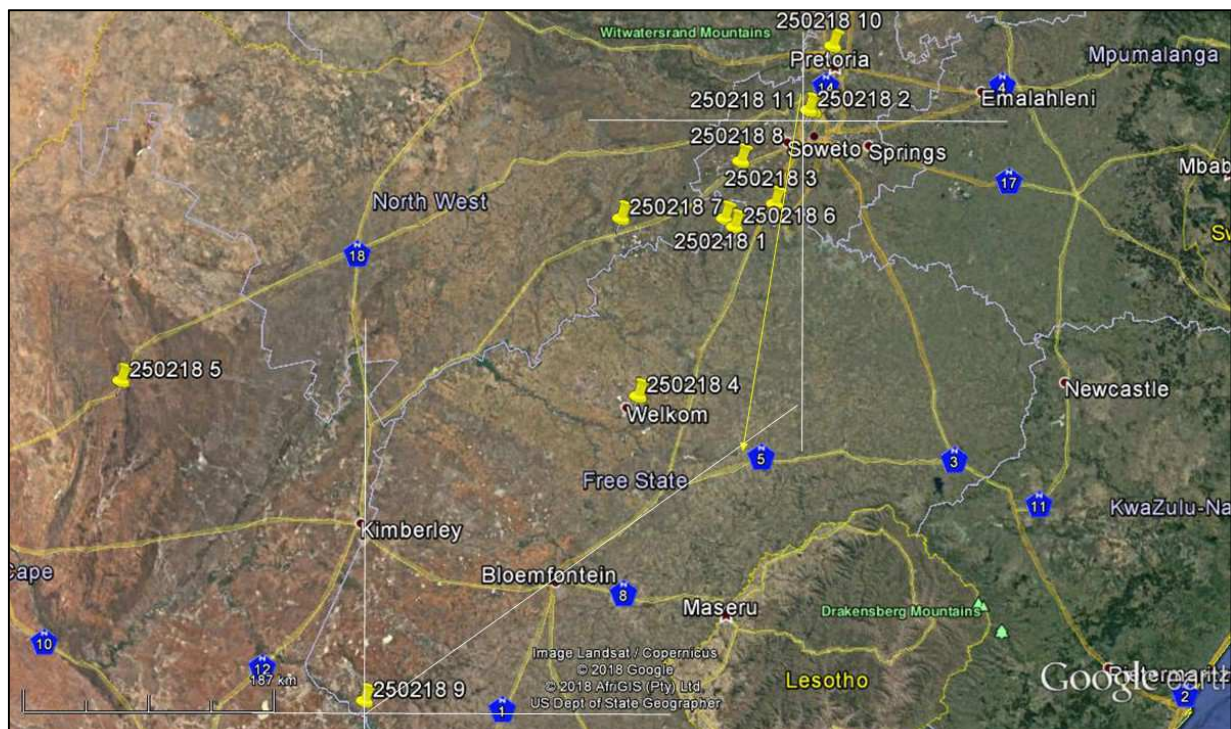


Fig 1: Event 301 – 25 February 2018

Based on these reports the path that best fits the descriptions is shown in Figure 1. The bolide started to the north-east of Pretoria, passed almost overhead and slightly west of Gauteng, and exploded in the vicinity of Senekal in the Free State.

Event 302 – 2018 April 6 – Klerksdorp, North West and Gallo Manor, Gauteng

Observed by Basil Moutzouris from Wilkoppies, Klerksdorp around 04h10. As he moved outside it was already bright morning twilight, when the sound of a light aircraft caught his attention, and on looking up he saw a bright fireball moving from west to east. The centre was white and was surrounded by bright green and blue light, with a white tail. No sounds were heard. Basil estimated the brightness as 3-4 times that of the moon, which was visible at the time, 70% illuminated and magnitude -11.5. The fireball travelled from 45° above the western horizon in azimuth 276°, moved almost directly overhead towards the east before losing sight behind trees at azimuth 101°. Duration was 5-6 seconds. The fireball originated near to the head of Scorpius, with Jupiter in close proximity, and the moon slightly to the right in az/alt 286°, 68°.

Observed by Brett Venter who gave the time as 04h03, while travelling in direction azimuth 341° on Woodmead Drive at the intersection with the M1 freeway, brightness about equal to or slightly brighter than Venus [which was not visible at the time]. Colour was white, but red-orange and green were also observed as the fireball disintegrated into several pieces. Duration was 2-4 seconds, and the meteor left a persistent trail visible as a bright haze for about a second or two. The fireball was first seen at an elevation of 50-60° towards the west, and moved in an upward trajectory towards the south.

Event 303 – 2018 April 9 – Buffels Bay, near Sedgefield, Eastern Cape

Observed by Petri Oosthuizen at 01h55. Facing roughly SW, bright fireball starting at az/alt 255°, 20° and descending at an angle of about 30° from right to left. The path was roughly from beta Crateris to central Vela, and is probably consistent with the anthelion radiants which are active in the constellation of Virgo during April. Bright green colour, duration 1 second, and appeared to pulse in brightness before burning out.

Event 304 – 2018 Jun 1 – Vosloorus, Johannesburg

Observed by Floris Van der Walt at about 19h00 while driving in direction of azimuth 330° on the N3 from Heidelberg towards Johannesburg, he was just before Vosloorus when he saw a white light, much brighter than any star visible from that location at the time and continued for about 5 seconds. It moved from high on his right (north) descending quickly towards the west, ending high above the Johannesburg city skyline, about azimuth 315°. The fireball left a white train and appeared to brighten just before it faded away.

Event 305 – 2018 June 2 – Various

Discovered around eight hours earlier on the morning of 2018 June 2, asteroid 2018 LA plunged into earth's atmosphere at 16h44 UT. With a pre-atmospheric size of about 2 metres and travelling at 17 km/second it produced a bright fireball which was seen over a wide expanse of Southern Africa. Triangulations from several reliable video records indicated it exploded at an altitude of around 27 km over the northern regions of the Central Kalahari Game Reserve in Botswana. A full report will appear elsewhere in *MNASSA*.

Event 306 – 2018 June 3 – Near Matla power station, Mpumalanga

Observed by Desmond Matthee at 16h37 while driving east in direction of azimuth 104° on the R580 from Pretoria to Secunda, immediately before Matla power station, saw a very bright green light, duration two seconds, descending rapidly at an angle of 50-60° from right to left. He said 'it had the appearance of an SOS flare, and appeared to land at the power station'. It disappeared on the horizon at about azimuth 75°.

Event 307 – 2018 July 12 – Various locations, Gauteng

A very bright daylight fireball was seen by many people, the most reliable reports as follows:

Observed by Ampie Britz at 08h23, while travelling in a westerly direction on the N12 between Delmas and Springs off-ramps, he saw it on his right hand side at the top of the windscreen moving from ENE to WSW direction, duration 2 seconds. Colour of the tail was light blue or violet. It disappeared before it reached the horizon.

Observed by Terri Moore at 08h25, from West Street, Sandton. She was standing on her office balcony and first saw the fireball reflected in the tall windows of the building. Turning to face the fireball, she saw it move from altitude 45°, azimuth 254° towards the horizon at a steep angle and slightly to the left. Duration less than 2 seconds. Colours seen were white and green. The fireball left no persistent train, was not seen to disintegrate and no sounds were heard. Terri said 'the head was extremely bright, brighter than the full moon but not as bright as the sun'.

Observed by Leon le Roux at 08h20 am, travelling on Rooihuiskraal Road, Centurion in direction of azimuth 163°, he happened to look out of his right window just as the fireball appeared at about 90° to his direction of travel, started 60° above horizon, ended 20° above horizon, and descended straight downwards, very approximately in azimuth 245-260°. Brighter than the full moon seen in daylight. Duration 2-3 seconds. White, maybe light yellow. No persistent train, but disintegrated into three pieces. The size seemed to be about the same as Venus seen with the naked eye.

Observed by Stella Bezuidenhout at 08h21-08h22 am, walking in University Road behind Pretoria Boys High school, as she looked up she saw a bright ball with long blue/yellow tail, moved very quickly from high overhead in azimuth 340° before burning out in azimuth 320°.

Observed by Claudius Pereira at 08h22 while heading west along Linksfield Road having just crossed over the N3 highway he saw a flash and looked up to see a brightly coloured ball in the top third of his windscreen at azimuth 260°, moving downwards to his left. The ball appeared to be followed by flames, and a smoke trail which he estimated about 10° long but which disappeared almost instantly. The trail split into two about half way, indicating the fireball fragmented during its flight. He saw various colours, including yellow and orange, and red flames.

Despite searching for video footage of this event, none was found. Using the eye witness accounts, I determine the fireball may have terminated over the North West, to the west of Potchefstroom.

Acknowledgements

Thanks to Kos Coronaios (ASSA) and Dr Daniel Cunnama (SAAO) for forwarding various reports from the public. Several reports for Event 301 are from reports on Facebook. The map in Figure 1 was produced from a Google Earth projection.

ASSA AGM: Presidential Address

Moving Towards non-professional Science Involvement

During my predecessors most successful term at the helm of the ASSA my proposal for ASSA Symposium 2018; with the theme

“Amateur Astronomy in the Digital Age”

was accepted and so became the 11th Annual ASSA Symposium: for details see *MNASSA*, **77**, nos. 3 & 4. This theme was chosen as it has been shown that amateurs with fairly limited equipment and using modern digital detectors can make significant contributions, not only to science, but to astronomy in particular. In addition that by inviting both local and overseas professionals to the Symposium there would be a better understanding between the two communities; which, for a variety of reasons, have grown apart since the early ASSA Symposia. So one of the prime motivators for the ASSA Symposium 2018 was to get more ASSA members involved in doing astronomy, and as I hope to show there is much that even ‘armchair’ astronomers can do! I’m very pleased to report that ASSA Symposium 2018 was a great success and I think that I can say with confidence that most of the aims and goals were achieved.

It was already in the early planning stages that Ian Glass approached me with the idea that maybe a part of ASSA Symposium 2018, could be to have a short pre-planning meeting for the 200th Anniversary of the SAAO in 2020. This soon developed into a full 2-day Historical Symposium, with some generous support from the NRF, again details are in *MNASSA*, **77**, nos. 3 & 4.

This also enabled the LOC to invite three overseas speakers and several ASSA members to the ASSA Symposium. What was also encouraging was the fact that many local astronomers offered to present a talk as well; there was thus a good blend of professionals and amateurs. One hopes that the networks created will last and bring more ASSA members to the eyepiece, so to speak, and possibly get some professionals to join the ASSA

The three overseas speakers; Prof Katherine Blundell, from Oxford, Dr Stella Kafka, Director AAVSO and Dr Chris Kyba, GFZ German Research Centre for Geosciences, all pointed out what could be done by amateurs.

I was always under the impression that the plethora of global all-sky surveys was denying amateurs a role in modern astronomy. Stella Kafka put me right on this; she said the amount of data collected was enormous and that the professionals didn't always have the time, the opportunity or the equipment available, to pursue extended monitoring of newly discovered or interesting objects. This has created a window of opportunity for the amateurs. Such monitoring is seen by many to be boring 'donkey work'; they'd rather take some pretty images; see later! But as has been shown by ASSA members, Andre van Staden, Berto Monard, Tim Cooper and others, such 'boring work' can produce good science.

As a spin-off from this, Percy Jacobs, with ASSA Council support, has joined the AAVSO and will act as conduit between the ASSA and the AAVSO. I look forward to more members returning to do some variable star work and liaising with Percy.

Prof Blundell with her Global Jet Project has shown that dogged, patient and continued monitoring of certain objects does eventually pay off. She is currently adding twin spectroscopes operating at two specific frequencies to her network of small telescopes around the globe, in the hope that in the not too distant future a rare discovery could be made – not by observing occasionally and hoping that you are doing it at just the right time; but because by doing it on a continual basis you won't miss the event!

This is a project that I feel the ASSA can support and I will be following up with this in due course.

Several of our members are very actively involved, doing good work as evidenced by the Overbeek Awards, this year and last year, and making significant contributions to Astronomy. I am pleased to say that there are quite a number of other members actively involved following their interests. Such efforts do require a high level of dedication, knowledge and interest, often along with expensive equipment. But there are several other avenues that members can explore, as explained by both Stella Kafka and Chris Kyba at the Symposium, and prominent amongst there are the various Citizen Science projects or programmes.

These are the collection and analysis of data relating to the natural world by members of the general public, typically as part of a collaborative project with professional scientists; for ASSA this means Astronomy, but also things like light pollution.

For example there is the Galaxy Zoo or the Zooniverse which have several subdivisions. In 2007 Dutch school teacher Hanny van Arkel discovered, while she was participating as a volunteer in the Galaxy Zoo, a rare type of astronomical object called a quasar ionization echo, now known as “Hanny’s Voorwerp”. Her discovery has led to significant further research, and is typical of what can be done in the comfort of your home!

SETI@home is an Internet-based public volunteer computing project employing the BOINC software platform created by the Berkeley SETI Research Centre and is hosted by the Space Sciences Laboratory, at the University of California, Berkeley is another of the citizen science projects; there are several others. These projects do not require expensive equipment, can be done from home and are ideally suited for what I call “armchair astronomers”

Other avenues that are available for ASSA members are the many on-line Astronomy courses and discussion groups. For example the ASSA Cosmology group is active, and one can participate merely as an interested person learning a bit more about recent developments on Cosmology; asking a question will elicit an answer from one or more members and so a discussion ensues.

Then occasionally incidental projects such as lunar/Mars parallax exercise in 2009 with a group of Italian astronomers. The idea here was to simultaneously image these objects and calculate their distance using parallax. This is not a new idea, but a great educational exercise, and was published in the European Journal of Physics

Similarly the recent start of the lunar 3-D project is another one of those international collaborations that are fun, but at the same time do some good science. And there are several additional projects that involve ASSA members collaborating with others in International projects, such as that Clyde Foster and Percy Jacobs are doing

I mentioned earlier about taking images – many ASSA members now produce some stunning images as shown by those in the now excellent Newsletters produced by the Centres. And as Johan Moolman, and others, have shown, these can be used to time stellar occultations.

So I believe the opportunities exist for many current inactive members can become more active and share ideas, talk astronomy and do astronomy!

Which finally brings me to an interesting point; from Dr Stella Kafka I learnt that she doesn't use the word **amateur**. She maintains that those who are active observers and contribute valuable data are **non-professionals**. She feels, I think justifiably, that the word **amateur** in this context is negative. But it's a tough one; not all ASSA members, and others around the world, can be classified as **non-professionals**, but do believe that many **amateurs** can become **non-professionals**. So ASSA members I call you to your eyepiece, computer, camera, course or collaboration and start.

Case Rijdsdijk
ASSA President

Council Report

The ASSA Council's prime function is to make sure that the ASSA functions as laid out by its Constitution. Over the years this has been up-dated to keep in step with the maturation of the ASSA as its scope of activities has broadened. But what hasn't changed is the fact that the President has to report to ASSA members at the AGM, the Council's activities for the year.

Council meetings were held on a regular basis and usually held a week after a Financial sub-Committee, FSC, meeting, both via Skype; efficiently handled by Chris Stewart. As was mentioned in the previous Council report, these FSC meetings added greatly to the efficient running of Council meetings.

ASSA Council is now a fairly large body and it is essential that it meets regularly to discuss issues, which, as stated above, it does. But it is becoming a little cumbersome, but still manageable, if a little time consuming. Serendipitously the FSC has evolved into a sort of informal Executive of the ASSA, consisting as it does, of the President, the out-going President, the in-coming President, the Secretary and the Treasurer. Much work is discussed and covered beforehand by e-mail, an Agenda drawn up, so that when the FSC meets issues raised have had time to be rationalized, these are then discussed and decisions taken, that can then be taken forward to Council for further discussion and ratification. This system has enhanced the Councils performance and streamlined the process.

Needless to say, one must never overlook the tremendous input Council gets from its Secretary, Lerika Cross. Hers is the most demanding portfolio, and the smooth running of Council is due in large part to her superb project management skills and experience. The FSC and Council Agendas were clear and detailed, and certainly made my task a lot easier. The Minutes always reflected in great detail, and accuracy, issues discussed!

One issue that needed a substantial amount of time was the investment of the Cooke Scholarship capital. Under good advice, and guidance, from Ronnie Glass, the funds were invested in a SANLAM investment account. As was pointed out by him, unless the funds are invested with a good/reasonable return, the capital would shrink and negatively affect the future of the Cooke Scholarship. On behalf of Council I would like to express my deep gratitude to AJ for managing this so well. Thank you AJ.

The other financial issue that is still outstanding is the ASSET Trust. This has become a bit of a bureaucratic problem, but I feel confident that it will be resolved. I would like to thank Peter Cramb, Tim Cooper and Ian Glass, the trustees, for doing their best to resolve this, and hope that in my next report I will be able to give a positive result.

A word of thanks must also go to Auke Slotegraaf for producing the SGAS which, besides being an excellent publication, it is also becoming a good source of income for the ASSA, enabling members to apply for funding for special projects.

The ASSA has produced two publications, *SGAS* and *MNASSA*, both managed by an Editorial Board. I am pleased to announce that Council has added another, called *Nightfall*, a Deep Sky journal edited by Douglas Bullis, who now joins the Editorial Board.

ASSA finances are in good shape and AJ will present his report later. The regular FSC meetings have certainly contributed to the smooth and efficient running of our financial affairs which are being well managed.

Claire Flanagan is looking after the ASSA Scholarships, but it is with regret that I have to announce that the SAAO/HartRAO scholarships have fallen away and that only the ASSA and the Cooke Scholarship continue; thank you Claire for still continuing with the invaluable work.

Sadly I have to announce that Bosman Olivier is standing down as Membership Secretary, after many years successful management of this important portfolio. He has created a well-structured membership list that makes keeping track of the Country Members easier. Wilmi Nel will take over from Bosman, so good luck Wilmi, welcome, and to Bosman, many thanks for all your efforts.

There is also a new web manager as James Smith has handed over to John Gill from the Durban Centre. Many thanks James and good luck John!

For me there were two highlights this year. First was the ASSA Symposium 2018 and the Historical Symposium; their success was in a large part due to the outstanding support the LOC received from the NRF, SAAO and the ASSA Council. I will enlarge on this in my Presidential Address later. Council's decision, to allocate some of the revenue from the SGAS, to future Symposia, is welcomed. This reminds me, that the next ASSA Symposium, the 12th, is due in 2020. This coincides with the 200th anniversary of the SAAO, so the Centre that plans to host this Symposium, should start planning now!

There were several spinoffs from ASSA Symposium 2018, one of which was that Council decided to support members joining other professional organizations to sustain and help in their observational work and that this member would then collaborate with other ASSA members.

The second was the outstanding effort by the ASSA Cape Centre and the SAAO joining forces at the V&A Waterfront to watch the lunar eclipse. Quoting Eddy; "It almost went tooooo well!" There were around 10 telescopes catering for around 3 000 people, and media coverage was good. Well done Cape Centre and thanks Eddy. The Jhb Centre was also overcrowded.

One failure I need to report is that of my inability to complete the Proxima Stellar Highway project. The southern arm was completed on time in 2015 to mark the 100th of the discovery of our second nearest star, Proxima Centauri, but the northern arm remains in limbo. I hope to see this project completed during my time as President.

Finally I can confidently say that the ASSA is in a healthy state and I look forward to a productive observational year.

Case Rijdsdijk
ASSA President

Award Citation: Overbeek Award – Tim Cooper



Fig 1: Tim Cooper receiving the Overbeek award from the President of ASSA, Case Rijdsdijk.

Tim has a been long standing member of the ASSA, having been awarded a Long Service Award, (2008) along with Honorary Membership (2005) and a President's Award (2006) of the ASSA.

His main interest has been in Comets, Meteors and Asteroids and he has made significant contributions to our understanding of these objects through his meticulous observations and detailed recordings of a large number of these events. These have been published frequently in *MNASSA* and other publications; both nationally and internationally.

His presentation at the recent ASSA Symposium 2018 where he described his participation in the Cameras for All-sky Meteor Surveillance (CAMS) network in conjunction with the SETI Institute was one of the more significant papers at the Symposium. CAMS aim is to detect meteor streams from potentially hazardous comets and this clearly demonstrated his capacity to develop observing equipment and his ability to collaborate internationally.

His recent outstanding efforts as part of the team in tracking down a bolide over Botswana has given the ASSA a prominent standing internationally, after a press briefing in Gaborone, Botswana, highlighting the details of this remarkable event, to be published in *MNASSA*.

I can think of a no more deserving candidate for the Overbeek Award than Tim Cooper.

It was a pleasure to have Danie's sons, Andy and Robin, present at the presentation.

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Award Citation: Long Service – Dr Ian Glass



Fig 2: Dr Ian Glass receiving the ASSA long Service Award from Case Rijdsdijk (Eddy Nijeboer looking on).

Sir Richard van der Riet Woolley sent Ian Glass, then of the Royal Greenwich Observatory, to the Royal Observatory at the Cape in October 1971 and he joined the ASSA in the following year. Appointed to the staff of its successor the SAAO in 1975, he

remained there until he was forced to retire in 1999. He was thereafter a contract employee until the end of 2005 and has since been an unpaid Associate Research Astronomer.

Ian's professional work focused on Infrared Astronomy and he has made significant contributions to both observational work and instrumental development in this field, having published as author or co-author over 220 papers.

His contributions also include a definitive textbook on *Infrared Astronomy* and several other more popular books – most recently *The Royal Observatory at the Cape* and *Nicolas Louis de La Caille*. Before these he wrote *Proxima: The Nearest Star (other than the Sun)*.

For over 46 years Ian has served the Society in various meaningful capacities, which include:

- In organising Symposia, the most recent being the Historical Symposium at the SAAO
- Assistant Editor of Sky Guide
- *MNASSA* Editor and now Assistant Editor
- Member of the Editorial Board for many years
- Member of the selection committee for the SAAO Scholarships
- Member of the ASSA Council as arguably its longest serving member
- A trustee of the ASSET Trust
- President of the ASSA twice

Ian has won several ASSA awards for his contributions to the society. In 1999 he was awarded the Gill Medal; the Society's most prestigious award. In 2003 and 2014

he was awarded the McIntyre Award for his writing and in 2016 he was made an honorary member of the ASSA.

These well-deserved awards reflect the valuable contributions and services to both Astronomy and the ASSA that Ian has made. By giving him this Long service Award ASSA shows its deep appreciation for his continuous support for, and involvement in, its varied fields of endeavour.

Award Citation: Long Service – Case Rijdsdijk



Fig 3: Case Rijdsdijk receiving the Long Service Award from Dr Pierre de Villiers

Case believes that because astronomy uses all of the sciences (mathematics, physics, biology, geology, chemistry), if you can get educators interested in astronomy, the knock-on effect is huge. Consequently, in his tireless - relentless even – efforts to promote science education, there is a particular emphasis on astronomy.

Case studied astronomy under Professor Richard Stoy, Astronomer Royal at the Royal Observatory at the Cape (now the South African Astronomical observatory). After graduating from UCT he went to (the then) Rhodesia, where he re-founded the local ASSA Centre and joined the ASSA in 1974. After teaching at leading schools in Southern Africa he returned to the SAAO in 1995. There he initiated the observatory's Science Education Initiative; re-introduced astronomy into the school's curriculum, managed major outreach programmes for the Department of Science and Technology, SAAO and South African Institute of Physics, and was involved in the development and design of several astronomy and science centres around the world.

Case is currently serving a second term as President of ASSA, is an honorary member of the Society and a recipient of its highest honor, the Gill medal. He is the current Editor of ASSA's journal *MNASSA*. He has also run successful symposia for the Society. As Director of the Education and Public Communication Section, he developed resources for many educational establishments and Science Centres, in addition to presenting numerous talks and workshops at schools and other groups on behalf of ASSA.

The outside activities mentioned above are not only strongly aligned with the objectives of our Society, but necessarily entwined because Case applies experience in each domain to the other. It reflects well upon us to have such an individual as our President. Whilst the Gill medal previously awarded illustrates the Society's esteem for his accomplishments, in conferring this Long Service Award to Case we proffer our thanks and appreciation for his many years of continuous support to the Society. It is richly deserved and long overdue.

Award Citation: President's Award – Magda Streicher

Regular readers of *MNASSA* will be aware that for many, the highlight of each issue was to skip to the Deep Sky article by Magda Streicher and read that first! She has over the last 15 years, or more, written an article on all 88 constellations, often travelling to the northern hemisphere to observe and sketch those.

Images were usually included, but what made her articles unique in the modern age were the beautifully drawn and clear sketches illustrating various aspects of each constellation. Somehow these were often better than some images as descriptive tools, as she could then stress what to look for, and describe it.

She has been invited overseas to speak at prominent gatherings to present her work, most recently at ASSA Symposium 2018 at the SAAO, and has been a regular contributor to several ASSA Centre newsletters. In addition she has published a book, *Award Astronomy Delights*, which covers her first 58 articles along with some additional illustration; some further editions are on the way! To further enrich her articles she has noted and named several interesting asterisms.

Magda was given a President's Award in 2001 and made an Honorary Member of the ASSA in 2009. It is appropriate, and deserving, that she gets another President's award on completion of all 88 constellations.

Editor's note: Magda was unable to attend the AGM as she was overseas.

Section Report: Astrophotography and Imaging

State of Astrophotography and Imaging

The Astrophotography section (formally known as the Imaging section in the ASSA constitution) was originally created to coordinate and promote the use of astronomical imaging technology in amateur observations, and to collect images created by amateur astronomers. In recent years, more and more South African

amateur astronomers have begun using their imaging equipment to collect and provide data to professional astronomers around the world. At the same time, astrophotography seems to be blossoming as an art form in South Africa. The quality of artistic astronomical images produced by both professional and amateur photographers in South Africa continues to improve.

Member activity

The astrophotography section continues to encourage the submission of photographic images of astronomical subjects, which are stored in the ASSA image archive. This archive is kept on Flickr, with all original files kept in a cloud storage folder as backups. The images in the archive are displayed on the ASSA website, under the Gallery section, grouped by photographer and subject. We only accept submissions from South African photographers, or images that were captured in South Africa. We do not require the photographer to be an ASSA member, nor do we refuse submissions based on quality, in line with the requirement that the section work to promote and encourage the art of astrophotography.

Submissions have been on the decline over the past year, with the exception of Clyde Foster's planetary images which continue to flow in at a rapid rate. Despite several planned and unplanned breaks in his observing programme, he has produced such a volume of work that he is now the single most prolific contributor to the ASSA image gallery.

Astrophotography Competition at ScopeX

The section director was on the judging panel of last year's astrophotography competition at ScopeX. The competition was well supported, with many varied entries covering a range of subjects and skill levels. Prizes were awarded to Johan Moolman, Karen Swart and Luan Swart.

Section Director

The current Section Director, Allen Versfeld, has resigned in order to serve in the new Citizen Science Section. In his place, we would like to welcome Martin Heigan. Martin is a professional photographer with an ongoing interest in astronomy and many years' experience in digital animation and image processing. He is an accomplished astrophotographer, and we look forward to his leadership in the coming years.

Section Report: Communication

There was a significant drop in “Ask an Astronomer” this past year, but I am pleased to announce that the ASSA members made great use of the assorted discussion and information groups.

Members also frequently referred queries to the Director, who also either answered or forwarded to the SAAO/SKA/HartRAO those queries about careers and scholarships.

There was of course a flood of communication during the occultation of KBO 2014MU69 in preparation for the new Horizons fly-by on 1 January 2019.

There were also the usual number of astrologically related queries, especially about the so-called planet Nibiru, after it was announced that a large planet, known as *Planet 9*, possibly exists in the Kuiper Belt.

The double Symposia, Historical and ASSA 2018 generated considerable Skype sessions, e-mails and phone calls; I am pleased to say Skype has served us well in the Council and other meetings were held using this facility.

Clyde Foster did a few TV and radio interviews, as did Kos Coronaios.

A collaboration with a group of Italian amateurs and working with ASSA members to create some 3-D imagery of lunar craters, and this is an on-going project.

The event that generated the most communication was of course the total lunar eclipse, which normally would have generated a little interest, but the media picked up that this was to be the “longest lunar eclipse of the century” turned into a bit of a ‘hype’. For the more interest it was also the closest approach of Mars; in the vicinity of the eclipse. Finally for the more knowledgeable, there was also an occultation during the eclipse. All centres had open viewing sessions, weather permitting, with the Johannesburg and Cape Centres both attracting large crowds; the latter over 3 000 at the Waterfront.

Case Rijdsdijk

Section Report: Cosmology

Last year, I was asked to take the section's reins from Maciej's competent grasp. As is normal in a new role, there were things to learn but we seem to have avoided calamity; indeed, the year seems to have progressed quite well.

With the detection of GW150915 and the four subsequent gravitational wave observations, cosmology has become deeply entangled with a number of disciplines. As a result, the Cosmology Section really serves as a means to alert interested members about developments in Cosmology, Particle Physics and occasionally Astrophysics. It is an exciting time for gravity-experimentalists.

Our posts contain an eclectic mixture of press releases, links to articles from a number of journals and pre-prints from the arXiv server at Cornell (<http://arXiv.org>) Keeping things topical requires a reliable list server that will cater for 20-30 posts per month.

We found multiple cases when Yahoo Groups would fail to deliver notifications but a little hunting lead to our relocation to groups.io . It would seem this has been successful. The migration procedure has been made available to the ASSA webmaster and will be posted in the fullness of time.

To conclude, I would like to thank all the members for their contributions. I would have missed many of the alerts were it not for the alerts.

Bruce Dickson

Section Report: Deep-Sky

I'm pleased to present this 26th annual report to the AGM, and to note that the Section has had a good year.

Observing coordinators at the Society's Centres, and organizers of the various star parties, are thanked for their ongoing support. The Section's collaborators are thanked for their work throughout the year.

Magda Streicher continues with her visual review of the Magellanic Clouds, collaborating with Johan Moolman (Pretoria) to work towards a visual observer's atlas of the Clouds. Magda has several interesting writing projects lined up for the coming year, too.

Virtual Observing Pins were awarded to Debbie Abel, John Gill, Sihle Kunene, Brian Finch, Claire Odhav, Pieter Strauss, Jean Senogles, Mike Hadlow and Farouk Amod.

John Gill was awarded two Photographic Deep-Sky Pins, for the Big Five and the Lacaille catalogue.

The ConCards free star atlas was updated and is available for download from the Section's web pages.

The Deep-sky Observer's Companion online database (DOCdb.net) continues to be used as a growing online repository, with 261 registered users (a 5% increase from last year).

Deep-sky astrophotos from several members were received, for which they are thanked. The images were annotated and discussed, and notes added to the DOCdb online database.

Douglas Bullis continues to produce outstanding editions of Nightfall, the Section's newsletter. His vision and plans for this publication are particularly exciting.

Keeping the best for last, is the fantastic news that Doug has agreed to take over the role of Section Director. It's hard for me to imagine a more capable person. Doug is developing several other exciting projects and I will leave it to him to share the enthusiastic news at a future time!

Section Report: Historical

Introduction:

During the past year (Calendar Year 2017) the following has happened concerning the History of Astronomy Section.

Website:

A new section was added to the Archival Webpage on the ASSA Symposia as well as Obituaries of ASSA members.

Archive:

The Archive of ASSA consists of two parts.

1. The unique and irreplaceable material is curated on behalf of ASSA by the University of Cape Town special archive section.
2. Publications of ASSA such as *MNASSA*.

The Archive housing the Publications of ASSA was in a room at the McClean Building on site of the SAAO in Cape Town. In 2010 the room was needed for office space and the ASSA archive was moved to the basement of the 18- inch telescope. This turned out to be damp and dusty and the material was placed in boxes and “disappeared” into storage space at the SAAO. The original room in the McClean building became available again and Ian Glass negotiated that the material can be stored there once more. I would like to thank Ian Glass, Ed and Lynette Foster, Auke Slotegraaf and Allen Cassels who did the necessary hard work on 9 April 2017. The Archive is now again

safe and assessable in its new old room. Because of a lack of space copies of *MNASSA* were reduced to 3 copies per edition (some editions had over 60 copies).

NRF Historical Steering Meeting

Sadly the NRF has scrapped the Astronomy Desk but the initiative of Prof Chetty to promote History of Astronomy (see the report of last year) resulted in the sponsorship of several projects – the SAAO History Symposium, the Hemelliggaam project and a new initiative in conducting historical interviews.

Publications:

Individuals in their private capacities wrote articles with historical content. Please note my appreciation to the following people:

- Case Rijdsdijk continued with his excellent series on privately owned observatories in Southern Africa (*MNASSA* Vol 76 Nos 1 & 2 February 2017)

Obituaries:

MNASSA published obituaries on the following astronomers:

- A.B. Jones by Karen Koch: *MNASSA* Vol 76 Nos 1 & 2 February 2017, pp. 8-10
- R.P. Olowin by IS Glass: *MNASSA* Vol 76 Nos 7 & 8 August 2017, pp. 162-3

Chris de Coning

Section Report: Instrumentation

Activities of the Instrumentation Section largely revolve around communication, outreach, guidance and education, plus the important aspect of encouraging people in the pursuit of their personal instrumentation projects. There is no drive to formally induct members into the Section. Rather, the approach has been to address ASSA members' ad-hoc needs for information on a case by case basis.

In support of the Society's general communication efforts, which equally support the instrumentation Section's goals, the following activities are ongoing:

- Moderate the ASSA FaceBook page
- Moderate the Yahoo! Group mail lists
- Moderate the Telescope Making SA FaceBook page

The Section directly supports the needs of both ASSA members and the general public regarding selection, construction, purchase, maintenance and use of instrumentation. This is mostly done via the Amateur Telescope Making (ATM) class, the Telescope

Making SA FaceBook page, e-mail correspondence, telephonic discussion, and ScopeX.

The distinctly South African “Telescope Making SA” Facebook group attracts members from around the world. International involvement produces an energetic flow of ideas, information, technical assistance and encouragement. Some of the (at times unusual) approaches to instrumentation developed locally have, after being highlighted in this medium, been favorably received and copied abroad. Prospective members are vetted prior to admitting them to the group and appropriate behaviour is gently but firmly enforced. The Telescope Making SA FaceBook page currently has 728 members, an increase of 77 over the last year. An analysis of activity over the 60 days prior to this report is given below for interest.

The ATM class has been continuously active since mid-1991. It attracts a steady stream of newcomers to the art, with a good success rate of people finishing their first instruments. In addition, after completion of their first telescope, a fair number of participants stay on or return in order to tackle more advanced projects. Members come and go according to their needs and available time, work at their own pace on individual projects, and sometimes return after a long hiatus dictated by personal circumstances. The class is run informally in a flexible manner to accommodate the vagaries of members’ lives. Consequently, there is no way to ascertain the actual numbers of people or projects engaged in at any one time. Membership of ASSA, whilst encouraged, is not a prerequisite for participation in the ATM class. A class register is kept as an indication of activity levels, but signing it is not enforced. Since 2005, participants are required to sign an ATM class Manifesto, which set out ground rules and expectations for all parties and includes an indemnity statement. As of July 2018, **291** participants have been recorded (which excludes casual visitors). We are pleased to have been joined by an experienced telescope maker from Japan, who has just started work on the f/3 primary for an 8” Cassegrain.

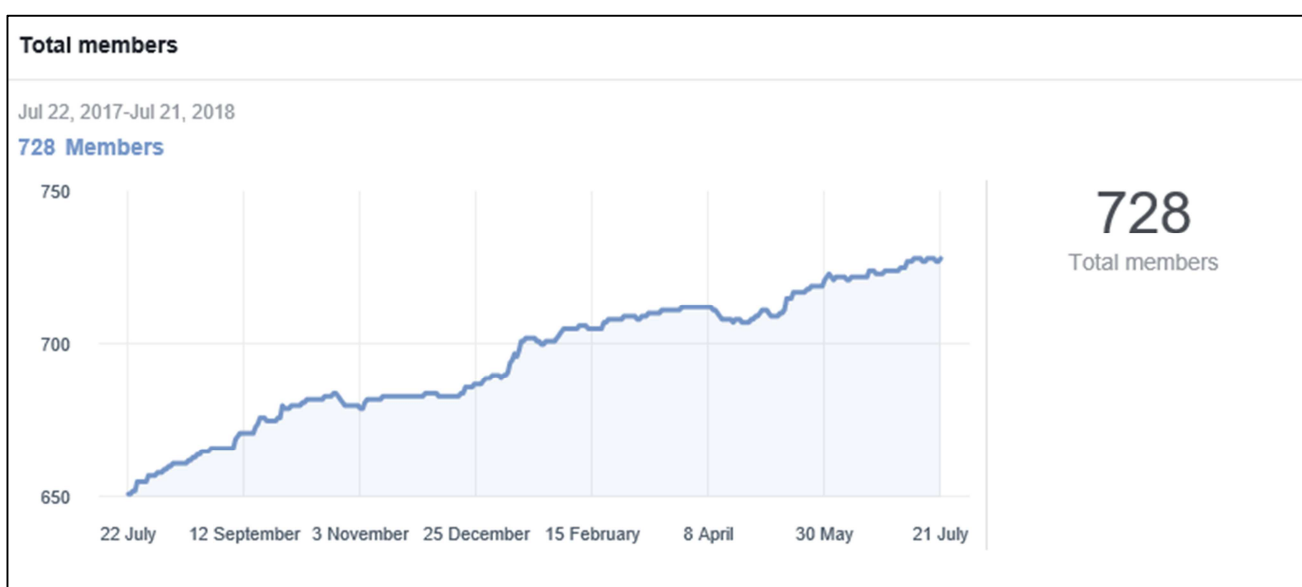
ScopeX, which grew out of the ATM class, has had 16 successful annual events since its inauguration in 2002. In addition to the primary goals of general astronomy outreach and publicizing the Society, ScopeX provides a platform for the telescope making community to exhibit their work and thereby encourage newcomers to engage in this fascinating hobby. Having a plethora of instruments at one place enables visitors and members alike to see, touch, compare and even use a variety of instruments - both commercial and amateur-built or modified. This sparks discussion of ideas, approaches and relative merits, enabling people to make informed choices. ScopeX reports are published separately. The 2017 event was for various extrinsic reasons somewhat quieter than previous events, but the visitor engagement appeared to be much more focused, indicating that most visitors had a true interest

in astronomy/science. ScopeX 2018 is scheduled for 15 September, with the theme of “Space Weather”.

Apart from ScopeX, only one communal project has been initiated within the Section, i.e. construction of a highly portable but rugged telescope for donation to SciBono at ScopeX, which is still underway. However, expertise, materials and useful components are freely shared for individuals’ projects – including Clyde Foster’s asteroid occultation participation. Percy Jacobs has completed two advanced projects (a spectroscope with a 3D-printed body and a Ha solar scope), with which he is contributing to international science projects. An article on the Director’s a portable telescope and camera control system for astrophotography was published in *MNASSA*.

Finally, the Director attended the 2017 Stellafane convention in Vermont, USA, as an invited speaker and a judge for the advanced optics category. Stellafane, which is approaching its centenary, is widely regarded as the Mecca of telescope making. The presentation, together with several exhibits of South African approaches to problem solving, were generally well received, attracted a fair amount of attention and were commended by the mechanical category judges.

Telescope Making SA FaceBook page – Membership distribution



*Fig 1: The group has thus far attracted **728 members** from **101 towns/cities** in **76 countries**.*

The countries from which our membership is drawn are shown in the accompanying table (see next page), listed by decreasing numbers of people from each country.

South Africa	Egypt	Japan	Malaysia
United States	New Zealand	Thailand	Mozambique
India	Sri Lanka	South Korea	Eritrea
Brazil	Portugal	Sweden	Chile
United Kingdom	Netherlands	Namibia	Cuba
Indonesia	Hong Kong	Bulgaria	Costa Rica
Pakistan	Turkey	Ethiopia	Bahrain
Canada	China	Argentina	Austria
Philippines	Colombia	Lebanon	Israel
Bangladesh	Spain	Greece	Nepal
Nigeria	Singapore	Iraq	Afghanistan
Vietnam	Ireland	Norway	Yemen
Italy	Saudi Arabia	Iran	Tanzania
France	Myanmar (Burma)	Madagascar	Tunisia
Mexico	Zambia	Lithuania	Romania
Belgium	Kenya	Morocco	Venezuela
Australia	Croatia	Czech Republic	Russia
Germany	Ukraine	Malta	Slovakia
Algeria	Uganda	Mauritius	Zimbabwe

Telescope Making SA FaceBook page – Demographics

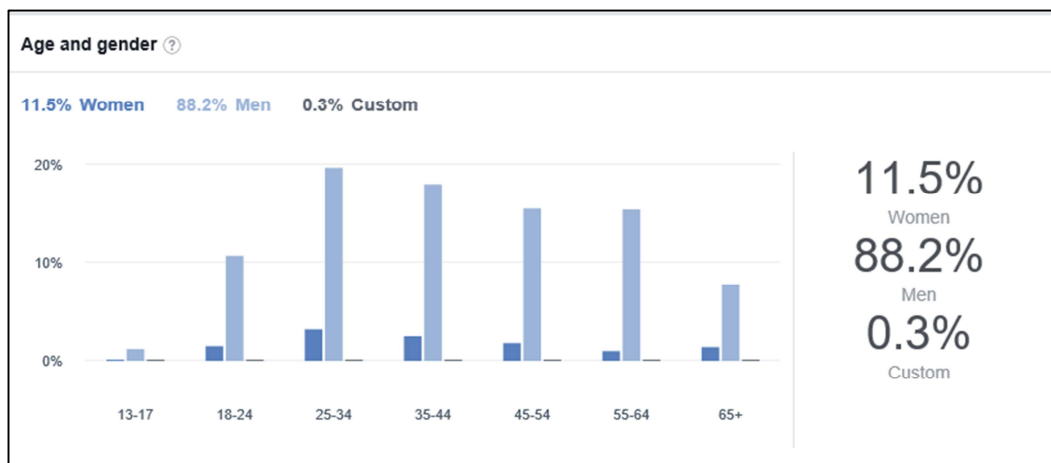


Fig 2: The number of young people and the proportion of women involved bode well for the long-term continuation of the art of telescope making.

Telescope Making SA FaceBook page - Engagement

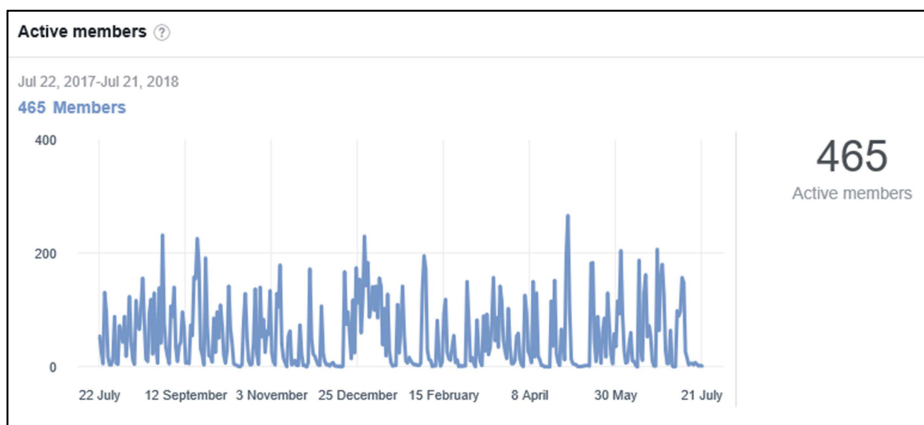


Fig 3: During the last year, 465 members have interacted on the page, 158 new items have been posted, 581 comments have been written, and a further 2113 reactions recorded, for a total of 2862 interactions.

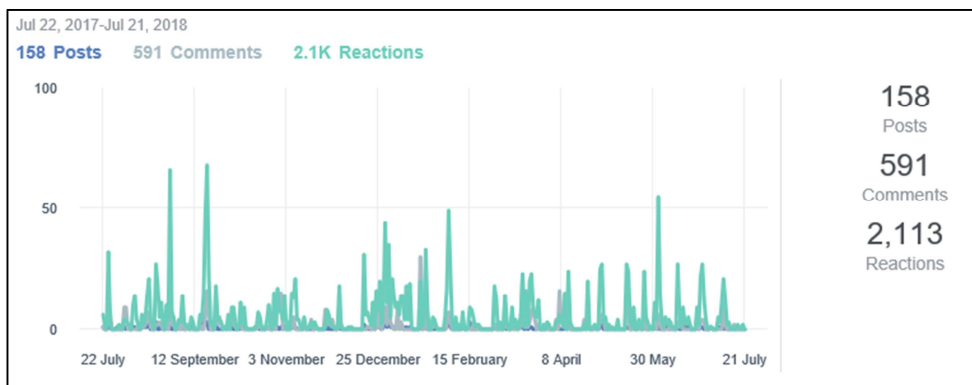


Fig 4: This indicates a continuing healthy level of activity.

Chris Stewart

Section Reports: Observing and Outreach

I have included both Observing and Outreach reports in one, the two going hand-in-hand.

Observing and Outreach events during the past year were advertised and posted using the various channels available, namely the ASSA Facebook page, webpage and ASSA_Discussion group. Sighting reports have been answered using input from specialists, Tim Cooper (Comet, Meteor & Asteroids), and Shallow Sky Director Clyde Foster, satellite input from Greg Roberts was not required. I would like to thank them for their assistance. A special thanks to Tim for co-ordinating the meteor/fireball reports during the course of the year especially the 2 June bolide event.

Pretoria Centre's Michael Poll is thanked for submitting the Centre's observing reports. I have fielded many Outreach queries and calls and these have all been routed through to the ASSA_Discussion group. One of these, the 3D Luna Experiment, is still a work in progress with much input from South African lunar photographers.

For novae and variables I would like to thank Specialist Dave Blane for keeping us up to date during the past year. I successfully imaged Nova Carinae (ASASNN-18fv) during February 2018.

There were many observing opportunities during the course of the year with ASSA members having various successes in observing/imaging these. Of these, one that really stands out for me was the close pass of Asteroid 210 WC9, which I managed to document on the evening of the 15 May 2018. Asteroid 3122 Florence was imaged over three evenings on the 30, 31 September and 1 October.

Comets observed and imaged during the period were 29 Encke, 71P Clarke, C/215 V2 Johnson, C2016 R2 (PANSTARRS), C 2017 01 (ASASSN1) and C/2016 M1 (PANSTARRS).

Our relocation to the Western Cape has gone smoothly with the Southern Cape Astronomy Club hosting astronomy evenings once a month. Two successful outreach events were also held from our new premises. The first was the partial lunar eclipse in August 2017, followed by a total lunar eclipse in July 2018. Live video feeds were supplied to Slooh on both occasions with good results during the August partial eclipse. Internet connectivity issues unfortunately put an early stop to the feed in July 2018. The total lunar eclipse on the 27th July 2018 was a good opportunity for some astronomy related outreach. Claire Flanagan did a fantastic job in setting up an ASSA web page for the event with numerous outreach events held successfully across the country.

From social media reports it is apparent that these were well attended. The Southern Cape Astronomy Club hosted an open event that included visitors from Cape Town and Hermanus. In conclusion I would like to wish everyone clear skies and encourage you to submit your observations to the relevant ASSA sections.

Kos Coronaios
ASSA Observing Director
Outreach Officer

Section Report: Photometry and Spectroscopy

Activity to report

- Regarding Photometry: Jose da Silva, ASSA Member and Pretoria Centre Member, presented his activity at the ASSA Symposium.
- Regarding Spectroscopy, two active members are Jerome Jooste & Percy Jacobs.
- Percy Jacobs is currently supporting AAVSO with the setup of a Database to which active observers may submit calibrated spectra observations

- Percy Jacobs presented his spectroscopy activity at the ASSA Symposium
- Percy Jacobs promoted spectroscopy at the Annual ScopeX event with a display board and solar spectrum observing
- ASSA Spectroscopy Web Site updated

P. Jacobs

Report: Membership Secretary

Since I took over the position of Membership Secretary in 2014/15, the country membership has grown from 95 to 122 paid up members at the end of June 2018.

The previous Membership Secretary left the position in a shambles and the Treasurer and Secretary tried to sort the problem out before I was appointed.

I have managed to compile an Access database with a complete record of members renewals, reception of the SGAS, etc. This database has helped in maintaining reasonably accurate records of the country membership and was used to send annual invoices to the country members. It also helped to compile mailing lists and labels for mailing the SGAS to all paid up members.

I also sent out reminders in October to all members who have not yet paid their renewals and through this means I believe we retained many members who might have fallen off the list due to their non-payment of the subs. It also helped me determine how many labels need to be printed, how many envelopes and stamps were needed.

All applications were responded to as soon as possible by means of a welcoming email which included a reminder of the ASSA communication channels and various services. The further communication to country members was by means of personalized emails.

These records are available to the incoming membership secretary, as an Excel spreadsheet and the master database. A final handover has not yet taken place.

I thank the council for their support during my tenure as Membership Secretary and for the opportunity to serve our country members.

Bosman Olivier

Colloquia and Seminars

These form an important part of a research facility, often as a sort of pre-publication discussion or a discussion of an individual's current research, and as such it is virtually impossible to "publish" this material. However by recording the topics discussed in the form below does indicate to those, who are unable to attend, what current trends are and who has visited to do research: it keeps everyone 'in the loop' so to speak

Also included in this section are the colloquia/seminars at the SAAO, UWC, the Astrophysics, Cosmology and Gravity Centre at UCT, ACGC and the NASSP lectures, aimed the at the students and interested astronomers. In addition there are the SAAO Astro-coffees which are 15-20min informal discussions on just about any topic including but not limited to: recent astro-ph papers, seminal/classic publications, education/outreach ideas and initiatives, preliminary results, student progress reports, conference/workshop feedback and skills-transfer.

SAAO

Title: What do the variations of the unusual radio-loud Seyfert galaxy 3C120 tell us about its mechanics and physical structure?

Speaker: Prof. Hartmut Winkler (University of Johannesburg)

Date: 13 July

Time: 11h00 – 12h00

Venue: SAAO Auditorium

Abstract: 3C120 is a well known Seyfert 1 galaxy with a long history of observation in the optical, radio and high-energy wavelength regimes. The optical spectrum appears to be that of a typical broad-line Seyfert, a class that is usually radio-quiet. 3C120 however has a prominent radio jet, one of the earliest identifications of apparent superluminal jet speeds. The monitoring of the multi-wavelength brightness fluctuations and variation trends has enabled an unusually precise determination of some of the physical and structural details of this system. 3C120 was in the last two years the subject of a new reverberation mapping study utilising the Las Cumbres Observatory robotic telescope network, which includes telescopes at Sutherland. The talk will highlight some of the outcomes of that campaign, and deliberate on possible new insights gained from this effort.

Title: Characterising Star forming and Luminous Infrared Galaxies with the SALT

Speaker: Rajin Ramphul

Date: 19 July

Time: 11h00 – 12h00

Venue: SAAO Auditorium

Abstract: LIRGs in the local universe are known to be highly interacting galaxies with strong star formation in obscured environments. Still, LIRGs also have diversity in terms of morphology and mode and location of star formation. Our work investigate the stellar population properties of a group of 52 starbursts and luminous infrared galaxies (LIRGs) in the local universe ($3.5 \text{ Mpc} < D_l < 280 \text{ Mpc}$) that forms part of the SUpEr-Novae and starBurst in the InfraReD (SUNBIRD) survey. The data was collected with RSS in long-slit mode. The stellar populations of the galaxies were derived by fitting Bruzual & Charlot (2003) templates to the reduced spectra using STARLIGHT software with a Monte Carlo method implemented to recover uncertainties on age, metallicity and extinction. The talk will discuss the age, metallicity and extinction of young star forming galaxies from both an integrated and a spatially resolved perspective. It will also offer an update on the abundances of IR dominated galaxies from the previous work done by Rupke et al. (2008) as well as the possible formation scenario of LIRGs in the local universe

Title: The upgraded GMRT: Deep view of the Radio Sky and synergy with SALT

Speaker: Ishwara Chandra C. H. (IDIA-UCT and NCRA-TIFR)

Date: 16 August

Time: 11h00 – 12h00

Venue: SAAO Auditorium

Abstract: The Giant Metrewave Radio Telescope (GMRT), in India, consists of 30 fully steerable gigantic parabolic dishes of 45m diameter each spread over distances of about 25 km and operates from 100 to 1450 MHz. A major upgrade to the GMRT is nearly complete resulting in seamless frequency coverage from 130 to 1460 MHz with instantaneous bandwidth upto 400 MHz. The upgraded GMRT (uGMRT) is SKA-Pathfinder and offers deep view of the sky at low radio frequencies down to a few tens of microJy/beam, with a resolution of several arc-seconds. Here we present an overview of uGMRT, some early science results and discuss synergy with large optical telescopes such as SALT to search for high-redshift radio loud AGNs.

The **Astronomical Society of Southern Africa** (ASSA) was formed in 1922 by the amalgamation of the Cape Astronomical Association (founded 1912) and the Johannesburg Astronomical Association (founded 1918). It is a body consisting of both amateur and professional astronomers.

Publications: The Society publishes its electronic journal, the *Monthly Notes of the Astronomical Society of Southern Africa* (MNASSA) bi-monthly as well as the annual *Sky Guide Africa South*.

Membership: Membership of the Society is open to all. Potential members should consult the Society's web page assa.saao.org.za for details. Joining is possible via one of the local Centres or as a Country Member.

Local Centres: Local Centres of the Society exist at Bloemfontein, Cape Town, Durban, Hermanus, Johannesburg, Natal Midlands, Pretoria and Sedgfield district (Garden Route Centre). Membership of any of these Centres automatically confers membership of the Society.

Sky & Telescope: Members may subscribe to Sky & Telescope at a significant discount (proof of membership is required). Please contact the Membership Secretary for details.

Internet contact details: email: assa@saao.ac.za Home Page: <http://assa.saao.ac.za>

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Volume 77 Nos 7 & 8

August 2018

CONTENTS

Editor's Notes.....	101
News Note: MeerKAT Radio Telescope Inaugurated.	102
News Note: SA to host General Assembly of IAU in 2024	103
News Note: SKA Telescope Manager Critical Design Review	104
News Note: HIRAX.....	106
News Note: Lunar Eclipse, 27 July, 2018.....	107
Recent Southern African Fireball Observations, Event Nos. 300-307.....	109
ASSA AGM: Presidential Address.....	113
Council Report	116
Award Citation: Overbeek Award – Tim Cooper.....	119
Award Citation: Long Service – Dr Ian Glass	120
Award Citation: Long Service – Case Rijdsdijk.....	121
Award Citation: President's Award – Magda Streicher	122
Section Report: Astrophotography and Imaging.....	122
Section Report: Communication.....	124
Section Report: Cosmology.....	125
Section Report: Deep-Sky	125
Section Report: Historical.....	126
Section Report: Instrumentation	127
Section Reports: Observing and Outreach.....	131
Section Report: Photometry and Spectroscopy	132
Report: Membership Secretary.....	133
Colloquia and Seminars.....	134