Members of the AeSSA and all other aerospace friends –

I am pleased to confirm that our annual flagship event, IASSA 2016, took place on 20 and 21 October 2016 at the CSIR International Convention Centre. The presentations were of excellent quality and the event concluded with a thought-provoking panel discussion on careers in aerospace. The industry visit to the SANSA Space Operations was one of the highlights of this year’s event; we are thankful to all the entities that continue to support IASSA.

In our November newsletter, we feature a summary of IASSA 2016, and two of the winners for Best Presentation by a Student at IASSA 2016 as #AerospacePeople in the series, Movers and Shakers in the South African aerospace domain. A short article on the inaugural Young Professionals Networking event is also included.

We remind you of the AeSSA annual award for ‘Best 4th Year or Honours Degree Project’. The closing date this year is 30 November 2016.

The 2016 Aerospace Challenge was yet again a great flying competition on 29 October 2016 at the new venue, the Johannesburg Model Airplane Club (JOMAC). Read about how this competition is evolving to draw in more participants.

The Ysterplaat Young Falcons and Aerotech Cadets had their passing out – we salute another crop of young aeronautics enthusiasts!

As the 150th anniversary of the Royal Aeronautical Society draws to an end, we invited you to read Management predictions from 1966 – did they get them right?

The AeSSA mourns the passing in 2016 of two stalwarts in the field of aeronautics, notable former AeSSA members Fritz Johl and Sarel Marais, as well as Prof. Jeff Bindon of UKZN. We include some information on their remarkable lives and contributions.

We welcome your input to and comments on our newsletter; please send them to admin@aessa.org.za

I wish you all the best for the remainder of the year and all the best for 2017.

Regards

Glen Snedden
IASSA 2016 delivers quality speakers, technical presentations

Over 100 delegates attended the Aeronautical Society of South Africa’s flagship event, the 2016 International Aerospace Symposium of South Africa, which took place in Pretoria at the CSIR International Convention Centre from 20 to 21 October, 2016. Held under the theme, ‘Aerospace: 150 Years of Progress”, the event was attended by two international speakers, both of whom delivered keynote addresses and participated in the programme, and representatives of industry, academia, science councils and government, who delivered over 30 papers. The event was hosted by the Aerospace Industry Support Initiative of the Department of Trade and Industry, and held in partnership with the Department of Science and Technology. Additional support came from Aerosud, the CSIR, Denel Aerostructures, Qfinsoft, SANSA Space Operations (host of the industry visit) and Simera Technology Group.
Dr Glen Snedden (right), President of AeSSA and Technical Chair of IASSA 2016, noted, “This may have seemed an unlikely theme for a conference in the aerospace domain when we can only claim to have been successfully flying in a controlled fashion for the last 113 years. The Royal Aeronautical Society, however, dates back 150 years: in retrospect, a true sign of the forward thinking… The breathtakingly pace of these achievements leaves me wondering, ‘What is next?’” It was precisely these intriguing possibilities that were interrogated during the two-day event, which delivered presentations and a panel discussion.

Keynote speakers (below, from left) Dr Alex Cenko of Bombs_R_US with the CSIR’s Dr Igle Gledhill, the CSIR’s Maj Gen (SAAF ret.) Des Barker with the AISI’s Marié Botha, and Aifa’s Willem Marais delivered well-prepared and thought-provoking keynote addresses. Boeing’s Karl Rein-Weston (right) gave the Alan Nurick Memorial Lecture. It was attended by Mrs Lynn Nurick, Prof. Nurick’s widow, who handed out the Alan Nurick Memorial medal to the CSIR’s Peter Skinner for the 2015 lecture, and to Karl Rein-Weston.

Technical sessions covered a range of topics, including turbomachinery, control, test flight, space launch, AHRLAC, manufacturing, weapons integration, industry development, and a number of mixed topics. Winners of the prize for best presentation went to Creason Chetty and co-presenter Nalendran Singh of the University of KwaZulu-Natal (as part of the space launch technical session) for SAFFIRE – UKZN’S modular small satellite liquid propellant booster engine, and Dean van Aswegen of the University of the Witwatersrand (as part of the manufacturing technical session) for Damage tolerance improvement for aluminium aircraft skins through laser shock peening. (Both winners feature in another section of this newsletter, #AerospacePeople.)

The event was preceded by a Young Professionals Networking event, held on 19 October at which 20 young people under the age of 35 participated in a think-tank on how to grow and expand the South African aerospace industry (see article below). This input gave momentum to the concluding panel discussion on Building a career in aerospace with panel members Karl Rein-Weston (middle), the CSIR’s Dr Kaven Naidoo (right), and Pfumelani Ndala of Denel Aerostructures (left). Another side-event, the Women in Aerospace breakfast (left) took place on 21 October at the CSIR Knowledge Commons.

NOTE
Engineering News journalist Keith Campbell attended both days and published two articles on the event: South Africa’s fighter programmes have developed the local aerospace sector http://bit.ly/2edJNWL CSIR considering research UAV programme http://bit.ly/2gklAjA
A series of interviews with movers and shakers in the South African aerospace domain

In this newsletter, we feature two of the winners for Best Presentation by a Student at IASSA 2016. Congratulations to Creason Chetty of UKZN and Dean van Aswegen of Wits!

Creason Chetty of the University of KwaZulu-Natal (UKZN)
Technical Session: Space Launch
SAFFIRE – UKZN’s Modular Small-Satellite Liquid Propellant Booster Engine

Creason had a co-presenter, Nalendran Singh, a fellow graduate student from UKZN. The co-authors were Dr Michael Brooks and Professor Graham Smith who are based at UKZN, as well as Dr Glen Snedden from the CSIR.

This study addresses the design of two, independent high-speed centrifugal pumps for the delivery of cryogenic oxygen and kerosene to the first-stage combustion chamber of a small-satellite booster engine. The 25 kN thrust engine forms part of a launch vehicle capable of transporting payloads of 75 kg to a sun-synchronous orbit of 400 km. Each pump is powered by an electric motor and battery pack, as opposed to the conventional gas-driven turbopump. The pumps are single stage and provide a total propellant mass flow rate of 8.64 kg/s at a chamber pressure of 50 bar.

Creason explains, “The development of SAFFIRE began with Nalendran and me. Nalendran's work involves the design and analysis of the oxidiser pump, but we work very closely on many different aspects of the engine.

SAFFIRE is unique due to its centrifugal electropumps. It mitigates the need for complex turbopumps making the overall feed system design simpler. We are currently aware of a US-based company that has developed an engine with a similar concept; however, the company has yet to test the full launch vehicle with the integrated engines.

“The successful completion of SAFFIRE will give local industry the opportunity to launch payloads, for orbit insertion, from South Africa,” Creason confirms.

He is part of the Aerospace Systems Research Group at UKZN and is currently doing his Master's degree; the title of his dissertation is ‘The design and analysis of a kerosene electropump for a modular liquid rocket engine’. He works under the supervision of Dr Brooks and Professor Smith based at UKZN, and the CSIR’s Dr Glen Snedden.

Creason’s plans for the future are to “stay in the aerospace/aeronautic field, specifically in the research and development of turbomachinery”.

For more information in this research, please contact Creason Chetty at creason.chetty@gmail.com or cell: 0765412916
Dean van Aswegen of the University of the Witwatersrand (Wits)

Technical session: Manufacturing

*Damage Tolerance Improvement for Aluminium Aircraft Skins Through Laser Shock Peening*

As presenter of this paper, Dean had the support of co-authors, Prof. Claudia Polese of Wits, and the CSIR’s Chris McDuling.

The summary of the presentation reads as follows:

Damage tolerance of aluminium aircraft skins is a serious structural design and maintenance concern, especially in the South African market where older commercial aircraft are commonly operated. The laser shock peening process provides an innovative way to mitigate the effects of crack propagation and hence extend the fatigue life and improve damage tolerance of aircraft skins. The process involves the engineering of compressive residual stress fields at strategic locations in cracked components in order to drastically reduce the rate at which the crack propagates. This increases the number of cycles between inspections and the components overall operational life.

Dean says, “I prefer research topics that aim to address a problem. I chose this research topic because it addresses a specific issue within the aerospace industry and can provide significant benefits to all aerospace companies, if the process is implemented on an industrial scale.”

Laser shock peening is an emerging technology with only a few research groups spread around the world and even fewer industrial operations which offer the service. The technology has the potential to provide massive fatigue-life improvements in metallic engineering components in industries, ranging from power generation to automotive and aerospace, which in turn can lead to decreased material and maintenance costs.

Dean explains, “My research focused specifically on thin sections that would be commonly used in aircraft fuselage skins. There is no local research on the topic and few international papers on the application of the laser shock peening process to thin sections, as most of the previous research has focused on thicker components.”

Co-author Chris McDuling heads up the Mechanical Testing Laboratory at the CSIR where the fatigue crack propagation testing for the research was carried out. Dean says, “Chris assisted with access to the facility as well as providing expertise and guidance during the testing programme.”

The research has been carried out within a framework agreement with Airbus Germany and the National Aerospace Centre, the University of the Witwatersrand, and the CSIR’s National Laser Centre with bursary funding from the DST-NRF Centre of Excellence in Strong Materials.

Dean is working on his Master’s degree, on the topic, ‘Laser Shock Peening for Fatigue Crack Retardation in Airframe Structures. He presented preliminary results for his MSc research at IASSA 2014. His supervisor is Prof. Polese.

He is currently an associate lecturer at Wits, in the School of Mechanical Industrial and Aeronautical Engineering. He plans to continue his research and further his studies before moving into industry in the future. He says, “My ultimate goal would be to work in an R&D role at an established aerospace company.”

For more information, please contact Dean van Aswegen at dean.vanaswegen@wits.ac.za
The first Young Professionals Networking event took place on 19 October 2016 at the CSIR’s Knowledge Commons as a side-event to the International Aerospace Symposium of South Africa (IASSA). Hosted by the Aerospace Industry Support Initiative, the event was attended by 15 Young Professionals from industry (representing Denel Aerostructures, Simera Technology Group, Airbus Optronics, Falcon Air, and Armscor), the AISI and the CSIR. Boeing’s Karl Rein-Weston also participated in the event, which was supported by the CSIR’s Colleen Botes.

Convened by the CSIR’s Elizna Miles (front row, third from left), the event included a brain-storming session to surface gaps and highlight collaboration opportunities. Elizna says, “We discussed the importance of the transfer of knowledge between Young Professionals and more experienced professionals. An excellent opportunity is to accelerate the development of the South African Regional Aircraft (SARA) to encourage collaboration between Young Professionals.

“The Young Professionals feel that we are at the tipping point for African aerospace collaboration. We are working on innovative new ideas across companies.”

The event concluded with an industry visit to SAB.

Elizna confirms that the event was a great success and will continue as an annual side-event at IASSA. However, to maintain momentum, she will be organising a monthly WebEx meeting to expose the young professionals to how the more experienced professionals at Boeing go about solving problems and come up with new innovative ideas, and in order to encourage the South African Young Professionals to expand and maintain their networks. For more information, please contact Elizna Miles at emiles@csir.co.za
The Aeronautical Society of South Africa (AeSSA) has announced its annual award for ‘Best 4th Year or Honours Degree Project’. Students at any African university or University of Technology are eligible for this award. Submissions may be made by individuals or teams in the final year of a four-year study programme in engineering, science, commerce, law or other disciplines, and whose final year project focuses on the aerospace domain.

Aerospace is one of the most significant economic multipliers, and countries with aerospace industries that are globally competitive are well positioned to benefit significantly from international trade and spillover effects. Dr Glen Snedden, current President of the AeSSA, was instrumental in the conceptualisation of this new award.

He says, “Our intention is to recognise and reward excellence in the study of aerospace topics in a range of disciplines throughout South Africa and Africa.

“By doing so, we contribute to human capital development which is a vital factor in driving innovation for the evolving aerospace industry, which is gaining traction locally, regionally and globally.” The award comprises the Denel Aviation floating trophy and a sponsored prize of R10 000 to the winning individual or team, which will be handed over by a member of Council.

Aspiring students will be required to submit the following:
- A technical report (in English) in the format required by their university
- A hyperlink to a YouTube clip of an audio-visual presentation (in English) of the project
- Contact details of the team leader or sole author
In addition, a supervisor’s report with a short motivation (in English) supporting the submission, is required. The due date for submission is 30 November of each year.

Snedden says, “Judging of the entries will be done by a committee taken from the council of the AeSSA as well as representatives from industry and research institutions. Criteria include the quality of the YouTube presentation, the technical merit of the report and evidence of innovation or ‘out-of-the-box’ solutions to the central problem or problems encountered during the course of the project.”

The Best Engineering Final Year or Honours Degree Project award is one of a number of AeSSA awards, which include prestigious gold medal awards, engineering student awards, The Royal Aeronautical Society (London) Award, and the AeSSA Society Award.

The AeSSA was established in 1911 and is a fully-fledged Division of the Royal Aeronautical Society (RAeS). Membership ranges from highly revered aerospace professionals to enthusiastic amateurs as well as corporate membership for companies.

Enquiries: admin@aessa.org.za
2016 Aerospace Challenge delivers great new designs and loads of fun

“...a great day: sunny, hot and we had some wind to make the flying more interesting but not enough to disrupt the competition”, is how John Monk, AeSSA organiser of the 2016 Aerospace Challenge summarised weather conditions for a great flying competition on 29 October 2016 at the new venue, the Johannesburg Model Airplane Club (JOMAC).

This annual event encourages students to design their own aircraft (typically in a team) under the guidance of their lecturers. John explains, “The competition gives them a target deadline and a day to have fun, compete and compare designs with other students. In many cases, the teams opted to have an experienced pilot fly their models for them. These pilots were volunteers from the flying club venue.”

“The goal of the competition is for the teams to conceptualise, design, construct and fly a radio controlled model aircraft to fly as fast as possible four times along a short course of 150 m, turning at each end (i.e. 600 m distance in total).
Defending champions University of the Witwatersrand (Wits University) won again this year: the sole representative of Wits Candy 2 with John Monk (left).

Second place went to the University of Pretoria (Tuks) Flight Squad (right with John Monk). Tuks has, however, won more events than Wits over the years that this competition has been held.

Certificates were awarded for the top three team places as well as certificates for the ‘best design model’ (Tuks Sky Walkers) (bottom, left), and ‘best built model’ (Tuks The Wrong Brothers) (bottom, right).
Some tongue-in-cheek awards went for ‘best crash’ (Wits Aeronautically Challenged) (top, left), and ‘hard luck’ (Tuks Blackbird 2) (top, right).

John confirms, “The standard of design and construction of the models was the best we have seen in recent years. The flying has also improved, partly due to a number of the local club members doing the flying for the teams, and partly because the models were better built.”

The JOMAC (Johannesburg Model Aircraft Club) field was chosen as it is midway between the two competing universities. The event was held in parallel with a DroneSpace event at the same club.

The 2017 Aerospace Challenge hopes to include individual and industry competitors as well as participation by schools.

For more information, please contact admin@aessa.org.za
The Ysterplaat Young Falcons and the newly formed Aerotech Cadets had a very successful Wings Parade on the base on Saturday, 5 November 2016.

Twenty Young Falcons received wings while three Aerotech Cadets received half wings.

The Cape Flying club flew in no less that 10 of their aircraft, so that each student had the opportunity of a ‘flip’ - some for the first time!

During the march, one of the aircraft gave a low-level ‘salute’ to the group. The cadets and their families then enjoyed refreshments in the hangar.

Col. Alan J. Nelson, Regional Chairman: Western Cape for AeSSA, said, “Congratulations to Lt. Col. Zack Khan, the Youth Development Comptroller, and Lt. Tshefu, the Aerotech Cadet Manager. Their hard work, dedication and passion for the programme contribute immensely to its success.

“Our thanks to the AeSSA Council for its support through the year. Your contributions went a long way to ensure smart gear and turn-out of the Cadets.”

*Visuals courtesy of Bob Corbett*

Management predictions from 1966 – did they get them right?

Library and Publications, 150th Anniversary

To mark the Society’s Centenary in 1966, the Students’ and Graduates’ section asked some of the great names of aviation to predict what Aeronautics would be like in 2016. Jim Connolly, Director at Sundridge Park Management Centre and very active in the Management Studies Group, gave a presentation called Aerospace Management, 2016 AD. We asked Lee Balthazor FRAeS, a Past President of the Society and former Chairman of the Professional Standards Board and Management Studies Group, to look at Connelly’s paper and see what the great man got right.

Jim Connolly FRAeS was a Director at Sundridge Park Management Centre and very active in the Management Studies Group of the Society. He took a view of Aerospace Management 2016 in a lecture to the Society ‘Management 1966-2016’ that was followed by a lively debate.

Read more about Connolly’s assumptions and Balthazor’s comments at http://bit.ly/2fJ2hwA

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Tributes to memorable contributors to aeronautics

The AeSSA mourns the passing in 2016 of two stalwarts in the field of aeronautics, notable former AeSSA member Fritz Johl, who had a long career in the South African Air Force as an instructor, and mechanical engineer Prof. Jeff Bindon of the University of KwaZulu-Natal, who played a significant role in raising the awareness of young people to the possibilities of a career in the field of engineering. Read more about Fritz Johl http://fritzjohl.yolasite.com/ and Jeff Bindon http://bit.ly/2g1PYuH

The AeSSA also mourns the passing of Sarel Marais.