



# AERONAUTICAL SOCIETY OF SOUTH AFRICA

(ASSOCIATION INCORPORATED UNDER SECTION 21)

REGISTRATION NUMBER 2000/026325/08

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**A DIVISION OF THE ROYAL AERONAUTICAL SOCIETY**

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## **AeSSA Newsletter – August 2006**

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### **EDITORIAL**

In this newsletter we focus on the AGM held in May which, as seems to be customary for professional bodies such as ours, was attended by a mere handful of our members. This is a great pity and unfortunately leaves those of us running the affairs of the Society wondering whether the poor attendance indicates total apathy or total satisfaction with the way the Society is being run. In all fairness to our members we dare not assume the latter and the attendance at some of the recent lectures indicates that the former is not true either, so we will simply continue to strive to do our best to improve what the Society offers to members.

The AeSSA is currently putting together a website that can be found at [www.aessa.org.za](http://www.aessa.org.za). The RAeS website can be found at [www.raes.org.uk](http://www.raes.org.uk)

### **REPORT ON THE SOCIETY AGM**

#### **PRESIDENTIAL REPORT BY PROF JAPIE VAN WYK**

In his usual style our President, Prof Japie van Wyk, delivered his report on the year's activities in a relaxed, spontaneous manner guided by a few hand written notes. There is, therefore, no verbatim copy of his report but thanks to the efforts of our Council secretary we have the following summary which was made for the minutes of the meeting:

Prof van Wyk thanked Council for appointing him as President for another year. He highlighted events which took place during the last year:

- The name change to the Aeronautical Society of South Africa was accepted by the Registrar of Companies
- A number of organisations applied for Corporate Partnership.
- Mr Gert Jansen van Rensburg was appointed by the Minister of Public Works to replace Prof van Wyk on the ECSA Council. He has been successful in attaining approval for the AeSSA as a voluntary association.

- The Grading Document has been adapted to South African standards and has been finalised by Mr Rob Jonkers.

- A significant contribution was made by AeSSA members to the evaluation and interviews of applicants for ECSA registration. A large number of engineers employed by the SAAF were processed this year.
- AeSSA's intention to hold a bi-annual conference coinciding with the African Aerospace Defence Exhibition did not materialise, mainly due to the uncertainty about the venue, stemming from repairs to the Waterkloof Airforce Base. AAD will now take place at Ysterplaat Airforce Base, near Cape Town.
- Advanced Manufacturing Technology Strategy: This holds great promise re the vision of manpower training and expanding the technology base in SA. Prof van Wyk thanked Brig Gen John Wesley and Dr Kamal Parker for their efforts.
- A number of planned activities, such as lectures, shows and visits, could not take place for various reasons. However, the lecture presented by Mr David Marshall from London was of great value and well-attended, as well as the lecture on Airshow Safety by Brig Gen Des Barker and the A380 Project by Frank Ogilvy.

Prof van Wyk finished by thanking Council members for their support during the past year.

## **NOTIFICATION OF COUNCIL ELECTION**

Mr Pierre Dippenaar had resigned from Council and Mr Iain McFadyen stepped down and was not available for re-election, although he indicated that he would continue to assist with the website. It was erroneously indicated prior to the meeting that Mr Chris Purnell needed to step down from Council, but he was actually re-elected at the previous AGM. As Dr Craig Law had declared himself available for re-election there were 2 vacancies, for which only two written nominations were received. They were for Dr Kamal Parker and Mr Colin Butler who, in the absence of any nominations from the floor, were duly appointed and welcomed to Council by Prof van Wyk.

The following 13 Council members were thus appointed for the next term:

Prof A J van Wyk (F)	Mr G G Corderley (M)
Mr G H Jansen van Rensburg (M)	Mr K P King (M)
Mr C M Purnell (M)	Dr C Law (M)
Dr R S Hurlin (M)	Dr A Nelson (M)
Mr R Jonkers (M)	Prof J Meyer (F)
Mr C T Butler (M)	Dr K Parker (M)
Gen W Thackwray (C)	

After the AGM, John Monk was co-opted as a Council member with the specific responsibility for maintaining this country's representation at ICAS and liaising between the Society and the CSIR on ICAS matters.

Photographs of the Council members and their contact details are included in this newsletter.

## **INDUCTION OF THE NEW PRESIDENT**

According to the Memorandum and Articles of Association the President is elected by Council at the meeting before the AGM. It was a unanimous decision at this meeting to nominate Prof van Wyk to serve for another term and he had accepted the nomination. Prof van Wyk was therefore inducted without ceremony as there was no hand-over to be conducted.

Prof van Wyk stated that during his new term of office he would like to pursue in particular close collaboration between ECSA and the Civil Aviation Authority, as well as the Flight Test Society representing Test Pilots and Engineers. He would continue to strive towards having much closer ties between AeSSA and the SAAF, as well as SAA. He would attend the RAeS Divisional Conference in London in July.

## **GENERAL**

Under this final agenda item 2 matters of the “last but not least” type were dealt with as follows:

- The award of a Society Scholarship to Jacobus de Vaal. Jacobus, a final year student at the University of Pretoria was a clear winner in terms of both his academic record and his positive outlook on his future career in the aerospace industry in South Africa. This can be judged from his essay, which is a compulsory submission for all applicants for the Society Scholarship, and which is published elsewhere in this newsletter. The presentation of the award and the accompanying cheque for R7000 was made by Prof van Wyk.
- As a final matter before closing the meeting, Prof van Wyk thanked Prof Josua Meyer and his secretary for all the arrangements for the evening which included the venue at the University of Pretoria and the refreshments which were later enjoyed by all present.
- As a fitting close to the AGM, Brig Gen John Wesley presented a paper on a very topical subject “Building a Technology Base for a Sustainable Aerospace Industry in South Africa” providing insights into opportunities that could be explored, particularly post the activities being completed on the Defence Acquisition Programme.

## Council Members for 2006/2007

The first Council meeting after the AGM was well attended by any committee meeting standards – 10 of the 14 members being present. We thus have the majority of the Council members in one group photo supplemented by individual photos of 3 of the remaining members. Unfortunately we have not been able to catch Dr Rob Hurlin with the camera, but we are sure that you all know what he looks like by now!



Back row (LtoR): Kamal Parker, Gert Jansen van Rensburg, Gary Corderley, John Monk, Craig Law, Rob Jonkers.  
Front row: Chris Purnell, Japie van Wyk, Colin Butler, Keith King.



Josua Meyer



Alan Nelson



Maj Gen (Rtd) Thack Thackwray

## 2006 Divisions Conference



The 2006 Divisions Conference was held at Hamilton Place on 20 July with representatives from Australia, New Zealand and South Africa.

*Back Row:* Andrew Little, RAeS deputy chief executive; Gordon Page, President; Capt Nev Hay, New Zealand Division immediate Past President and Graham Roe, Branches Committee Chairman.  
*Front Row:* Ross Barkla, Australian Division Hon Secretary; AVM Peter Nicholson, Australian Division President; Richard Case, External Affairs Board Chairman; David Marshall, President-elect and Prof Japie van Wyk, South African Division President.

## CALENDAR OF EVENTS

A number of events, including the Sir Pierre van Ryneveld lecture and the Major Miller lecture are still in the pipeline but unfortunately the upcoming Africa Aerospace and Defence exhibition has severely restricted the availability of most senior figures in both the industry and the SAAF for the last few months and has necessitated moving these functions forward possibly even to next year, but please watch your emails for further news.

- **September 19 – Flight Test Society of South Africa Symposium\*** This is the inaugural symposium of this Society which is relatively new on the aerospace scene in South Africa. Full details of the symposium may be found in the notice at the end of this newsletter. **\*Please note that this symposium has been approved by the AeSSA Council as suitable material for the granting of CPD credits. All members registered with ECSA should have received an email concerning this. If you have not received it please contact Ilette Strydom.**
- **September 22-24 – Africa Aerospace and Defence 2006.** This premier event in the SA Industry's calendar will be especially appreciated by our members and the general public in the Cape this year, having been moved to Ysterplaat Air Force Base as a result of runway maintenance work at Waterkloof. Many of our members are directly involved in their professional capacity but those who are not should note that 20, 21 and 22 September are trade days and no persons under the age of 16 will be admitted.
- **September 27 – PBMR Helium Test Facility Visit.** Details of this visit have been circulated by email.
- **October 4 – RAeS Lecture in London –(For any members who are visiting the UK.) Quiet Propulsion for Quiet Aircraft.** Full details at the end of this newsletter
- **October 18 – Lecture and Walk-through at Aerosud.** The programme for this visit is still being finalised but it is being planned as an evening function starting at 18:00. Watch your emails for further details
- **November 13-15 – Unmanned Vehicles Africa 2006.** This is an international conference being held at the CSIR. Full details at the end of this newsletter.
- **November 15 – Lecture by the Flight Test Society.** This is a lecture being presented by the Flight Test Society of South Africa relating to Flight Test activities. Details will be published closer to the event.
- **February 2 – Visit to TFDC.** This is a planned visit organised by the Cape Chapter to visit the SAAF Test Flight and Development Centre. Details to follow closer to the event.

## PROFESSIONAL DEVELOPMENT

Ensure your Aeronautical Society membership reflects your aerospace experience.

There is immense value in maintaining high levels of professional competence and looking to improve your knowledge and skills. Focusing on professional development brings you many benefits and improvements.

- Ability to recognise opportunity
- Awareness of the trends and directions in engineering and society
- Effectiveness in the workplace
- Greater ability to assist, influence and lead others by your example
- Confidence in your future employability
- Improved marketability to pursue a fulfilling and rewarding career

Find out more about applying for registration as a Professional Engineer, Professional Technologist, Engineering Technician at the Engineering Council of South Africa. ([www.ecsa.co.za](http://www.ecsa.co.za) )

### Upgrading your AeSSA membership

Part of your ongoing professional development involves looking at your current grade of the Aeronautical Society membership to ensure this reflects your progress and level of responsibility within aerospace. Aeronautical Society designations are internationally recognised and respected, particularly being linked to the Royal Aeronautical Society. All grades are a badge of high standards, achievement and acceptance within the aerospace sector. Find out more today, by contacting the Society at the address given above.

### Notice for Student Affiliate Members

If you are a students Affiliate member and are no longer studying, another grade would now be appropriate. This may be a change to standard Affiliate membership, or for those who have completed their degree course and/or working or intending to work in aerospace or in the aviation related sector, this would be your first opportunity to apply to upgrade to Associate-Member.

## **AeSSA- Voluntary Association Application and ECSA Recognition.**

Paid-up members that are still anxious about their “high” ECSA accounts received during May or June this year, may now be rest assured. Our association’s second VA-application of 10 May 2006, was finally approved by ECSA on 22 June 2006 and the AeSSA is a fully recognized Voluntary Association under auspices of the Engineering Professions Act. The ECSA website is now correctly reflecting the AeSSA status as a recognized ‘VA.’ Members will now be able to view this on the ECSA website – our AeSSA VA number is : **VA A 0022**.

The fact that we could break through this administration hurdle, was mainly due to our satisfactory ratio of fully paid-up AeSSA members, also being active members of ECSA. The requirement to qualify for a Category A Voluntary Association, was met with ‘flying colours’. The current limit set by ECSA, is that a minimum of 30% AeSSA members must also be registered in the appropriate categories of Professional Engineers, Professional Engineering Technicians and or Technologists or Certificated Engineers in the Aeronautical field.

Currently the confirmed ECSA- and AeSSA- member list totals 68 members versus a total of 170 AeSSA members, representing a ratio of 40%. An additional 12 *past ECSA-members* (currently noted as “inactives” on the ECSA – list [check this on the ECSA website]) could possibly be added to our qualification list, but would need individual confirmation. This will be done in due course, but will take additional administrative time and would possibly require that the inactive ECSA members, renew their ECSA applications. The number of registered ECSA members serving on the current AeSSA Council is 8 (eight).

Our next objective would be to address those AeSSA members that have not yet registered with ECSA, to at least register as Candidate Engineers/Technicians/Technologists or, if already having gained sufficient engineering experience, apply for full registration in their applicable categories. Conversely, registered ECSA members in the Aeronautical field, that are not yet AeSSA members, will be motivated to join us. Hopefully, with such a two-pronged approach, we could muster the Aeronautical fraternity in both our organizations, thereby strengthening our collective influence concerning bargaining power, impact in industry and recognition of the Aeronautical engineering profession in general. With a dwindling industry that suffered a lot of set-backs in the recent past, we need to strengthen our resolve and strive to regain a higher level of recognition and participation of current members and really strive to regain the prestige associated with the aeronautical profession.

Regarding the ECSA fees for 2006, fully paid-up AeSSA members are therefore entitled to subtract an amount of R 600.00 (representing the ‘VA’ – discount) from the full ECSA account (in the region of R 1456.00). ECSA undertook to issue updated financial statements during July- August that would reflect the correct status.

Any members that require confirmation of either their AeSSA / ECSA - membership status must please contact either Me Ilette Strydom ([epos@groep7.co.za](mailto:epos@groep7.co.za)) or Gert Jansen van Rensburg ([Gert.JansenvanRensburg@pbmr.co.za](mailto:Gert.JansenvanRensburg@pbmr.co.za))

## **ESSAY BY THE AeSSA SCHOLARSHIP WINNER**

### **Future role of SA aerospace industry and my role in it (By Jacobus de Vaal)** **(reproduced with kind permission by the author)**

The South African Aerospace industry is much more successful than the general public may be aware of. Although not always competing on the same scale as some other countries, South African industries are world leaders in certain fields of the Aerospace industry. The South African company Denel Aerospace Systems is actively involved in developing new advanced UAV (Unmanned Aerial Vehicle) technologies. They are also currently selling the very successful surveillance-UAV Seeker family to international customers. The Seeker is a world class system that has proved itself again and again since it was originally conceived almost 30 years ago.

Other companies, such as Aerosud, are growing rapidly thanks to major deals to do work for the leading international aerospace companies Airbus and Boeing. These multi million dollar deals help to secure the role that the South African aerospace industry plays internationally. Aerosud started as small company employing a few engineers that were originally involved in the development of another South African product; the Rooivalk Attack Helicopter. Today it is a large and successful company with massive international contacts. This demonstrates that the international community recognizes the South African aerospace industry as a worthy contributor. All these examples clearly indicate that the role that South Africa will play in the aerospace industry in future can only expand even more!

As a mechanical engineer in training, it is extremely exciting for me as a student to see the growth in the South African aerospace industry. Instead of dreaming to work for an international aeronautical company, it is possible now to aspire to do the same work in South Africa at a South African company. I have always been interested in the aerospace industry. That is the main reason why I decided to study mechanical engineer. Now, in my final year at university, it is time to seriously consider the future role that I may play in this industry. My first taste of the aerospace industry was when I started doing vacation work at the end of my second year of study. I worked at a small company that develops and manufactures various aeronautical related products – ranging from aerial geological surveying equipment to electronic components for Rooivalk. Every other period of vacation work since then, I have always returned to that company and continued to work on interesting projects such as building and testing composite rotor blades for locally manufactured gyrocopters and building the composite wings of transonic target drones being developed by Denel. I have continued to become more interested and involved in the aerospace industry in South Africa. That opened my eyes to all the cutting-edge work currently being done locally and all the opportunities that exist in this country. South Africa is definitely much more internationally competitive than I originally thought.

The final year project that myself and three other students are involved in, is to develop a UAV that can be used for wildlife surveying and management with the use of high quality optics and infrared cameras. This demonstrates even another application where the aerospace industry can play a major role in future. As people recognize more and more situations where automated flight technologies can be applied, this type of project will become more common and a large variety of new applications will hopefully become available. Doing research in this field and making contact with people already involved in the industry I become convinced that I can also play a role in this industry in a few years' time. At the moment I am seriously considering graduate studies in aeronautical engineering, to ensure that I equip myself as well as I possibly can. By doing this, I hope to improve the contribution that I can make to the South African aerospace industry.

The development of UAV technologies is definitely an area where the South African aerospace industry can make an even larger contribution in future. This technology can be applied to several problem areas unique to the South African environment. This includes patrolling the new gas pipelines between South Africa and Mozambique, monitoring electricity transmission lines stretched over vast areas of our country or even patrolling South African Navy vessels in foreign ports. UAV's can also be used to detect fires in plantations and help to support the South African paper industry, or as mentioned before, help with nature conservation – one of South Africa largest tourist attracting industries. It is clear that the possibilities are endless and that all South Africans can only benefit from these future developments. Humans can be removed from dangerous situations and be replaced by expendable machines. This approach will save lives and also cut costs for the companies involved. Several South African companies and industries can benefit from the developments made by the aerospace industry in the country, boosting the economy even further.

As a qualified engineer, I would like to work for a successful company in the South African aerospace industry one day and help to develop products such as those described above. I would like to ensure, by delivering work of a high standard, that South African industries keep expanding and developing to become major competitors in the international market. With the current success rates and goals achieved so far, this dream might not be too far-fetched at all. Through the quality education that we receive and the vast experience already available in industry, South Africans certainly possess the skills and knowledge required to achieve these goals. All that is necessary is for more and more young (future) engineers, like me, to become involved in this ever expanding industry to ensure that the current growth rate is sustained. The South African aeronautical industry is a healthy and growing industry which has the ability to improve the lives of all South Africans. I hope that my contribution to the aerospace industry can be a lasting and helpful one.

## CONFERENCES AND COURSES

### Flight Test Society of South Africa Inaugural Symposium

*The Twelve Apostles Hotel, Cape Town*

*19 September 2006*

*Topics Include:*

- *Future of Flight Testing in South Africa*
- *SA Aerospace Engineering - Building a Technology Base for a Sustainable Future*
- *Certification of UAVs in South African airspace*
- *“Testing the future” Telemetry Band Augmentation, an Agenda Item at the Next World Radio Conference*
- *Fly by Wire*
- *Rolls Royce: Adour Mk 951 Engine Flight Test Programme*
- *Flight Testing at Marshall Aerospace*
- *SAAB – Gripen RSA Test Programme*

*Formal Dinner Sponsored by: **SAAB***

*Cost: Members - R250, Non Members – R500, includes lunch and formal dinner.*

*<http://www.12apostleshotel.com/>:*

*Additional Accommodation at: The Break Water Lodge and the Cape Castle Hotel, Cape Town,*

*<http://www.proteahotels.com/>*

*Further Enquiries:*

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*Teresa Serothwane, [Terasas@aviation.denel.co.za](mailto:Terasas@aviation.denel.co.za), +27 11 927 4081*

# UNMANNED VEHICLES AFRICA 2006

Increase your technical and competitive advantage by exploring the design, application and costs of Unmanned Vehicles

13, 14, 15 NOVEMBER 2006

CSIR, PRETORIA SOUTH AFRICA

Invest in 3 days and you will have the opportunity to network with and learn from leading industry experts. Attend this conference and learn about:

- Information driven payloads for unmanned vehicles application
- The recent developments in UAV airworthiness certification
- UAV access to UK airspace: Lessons Learnt from the UK
- Unmanned Aerial Vehicles (UAV's) technology research and development
- UK UAV roadmapping methods and advances
- Earth science use of unmanned aircraft systems
- The role that Unmanned Underwater Vehicles (UUV's) will play in the future in Africa
- High level programming support for unmanned water vehicles
- The full autonomous robot Unmanned Ground Vehicles (UGV) in the real world and its abilities
- The measurement of unmanned vehicle systems performance – challenges and opportunities
- Quantifying the real cost of UV's – perceived and tangible



## YOUR DISTINGUISHED SPEAKER PANEL:

DON'T MISS THE EXCLUSIVE PRESENTATION FROM:  
NATIONAL AERONAUTICS AND SPACE ADMINISTRATION (NASA), USA

CENTRE FOR SCIENCE AND INDUSTRIAL RESEARCH (CSIR)

ANGLO PLATINUM UNION SECTOR

SCRIPPS INSTITUTION OF OCEANOGRAPHY

CIVIL AVIATION AUTHORITY (CAA), UK

STELLENBOSCH UNIVERSITY

MINISTRY OF DEFENCE UK

NATIONAL OCEANOGRAPHY CENTRE (NOC)

ADVANCED CERAMICS SOLUTIONS

STERADIAN CONSULTING (PTY) LTD

SOUTH AFRICAN NATIONAL DEFENCE FORCE (SANDEF)

SOUTH AFRICAN NAVY

JANE'S INFORMATION GROUP

AERONAUTICAL SOCIETY OF SOUTH AFRICA (A DIVISION OF THE ROYAL AERONAUTICAL SOCIETY)

ADVANCED MANUFACTURING TECHNOLOGY STRATEGY (AMTS) SOUTH AFRICA

SCAI INTERNATIONAL

QINETIQ, UK

## Don't Miss Out On The In-Depth Practical Full Day Workshop:

A Practical Insightful And Informative Demonstration of UAV's – The Vulture And The Seeker - LT Col. Jean Kritzinger, Project Officer SOUTH AFRICAN NATIONAL DEFENCE FORCE (SANDEF)

**PLUS! PLUS! PLUS!**  
**BOOK AND PAY BEFORE**  
**THE 21<sup>ST</sup> OF AUGUST 2006**  
**AND**  
**SAVE R1000.00**

## HEAR WHAT PAST DELEGATES HAD TO SAY ABOUT IQPC'S PREVIOUS CONFERENCES

*"Just a brief note to let you know how much I enjoyed the opportunity to attend your recent conference. The agenda and array of topics was excellent and the list of speakers was outstanding"*  
– Vice President, Lockheed Martin

*"Thank you, this conference was an excellent learning experience"* – Manager Technical, ARMSCOR

*"It has been a wonderful and well organised conference. Looking forward to the next conference as a follow-up to this one"* – Staff Officer, M.O.D. Uganda

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# The Application of the Finite Element Method in Practice

## A Weapon of Mass Destruction in the Arsenal of the Structural Engineer?

As with the military equivalent, the Structural Engineer's own WMD is too little understood and there is all too often a tendency for it to be used freely by people who do not fully appreciate the possible dangers.

Finite Element Analysis has been around for some 35 years, and has been the primary tool in engineering some magnificent projects, but has also – inadvertently – been responsible for some spectacular failures! As with any tool, the proper use of FEA requires a thorough understanding. The question is what is it that has to be understood? Opinions seem to vary...

Academia will teach you the theory of Finite Element Analysis, and if you pay attention you will come away from a university course with a thorough understanding of stiffness matrices, matrix inversions, Barlow and Gauss points, Cholesky decomposition and a myriad of other very technical names and procedures! But you will be little closer to using FEA correctly as an engineering tool than you were before you wrote your cheque for the course fees.

After you have given Academia their opportunity, you may go on another course – this one offered by the software house that is peddling the FEA program that you have been advised to get. Now you will learn shortcuts on how to create a FE model, how to produce enormously client-impressing colour pictures of stresses, strains, forces and moments. You will become an expert in pre-processing and a post-processor of renown.

But - you still will not be an effective (or safe) FEA designer.

FEA is full of pitfalls that await the overconfident and unwary, and you can either learn these by trial and error (and error is where the WMD analogy might just come true), or you can spend a few days learning how to correctly use this remarkable tool.

"The Application of the Finite Element Method in Practice" is one of those rare technical courses in which every aspect is of practical use. It is a course that was first presented twenty years ago and which has undergone a continuing process of development and improvement by the author and presenter, Roland Prukl. Mr Prukl first became involved in Finite Element Analysis shortly after the method was developed, and has become an authority on the subject. His knowledge not only extends to the theory of FEA, but more importantly to the practical application. Over many years he has learned where are the pitfalls (and they are numerous), how a structure is most effectively modelled (and why), how to analyse and interpret the output, and how to watching for the indicators that tell you that you have realistic answers or a questionable model. Mr. Prukl also found over the years many serious errors in a number of well known finite element programs.

Roland Prukl's course is the only one currently available that guides and helps the structural engineer in using this design tool, and is essential for anyone who uses FEA – or who is managing a design team in which FEA is used.

The course has been approved for Continuing Professional Development in terms of the requirements by the Engineering Council of South Africa (ECSA) – No. SAICEstr06/00018/08 and participants will receive 5 credit points. Details of the course, including course dates, can be found on [www.FiniteElements.Net](http://www.FiniteElements.Net).

To register for the course, please contact Dawn Hermanus at  
The South African Institution of Civil Engineering (SAICE): (011) 805-5947 or  
[dhermanus@saice.org.za](mailto:dhermanus@saice.org.za)

# Quiet Propulsion For Quiet Aircraft

*4th October 2006*

*No.4 Hamilton Place, London*

In the 1970s and 1980s the move to the high bypass ratio engine enabled a significant step forward in reducing the noise of civil aero-engines. Since then we have seen steady improvements in noise through the adoption of improved acoustic attenuation treatment and evolutions in engine design. Now that the vast majority of the civil aircraft fleet is powered by high bypass ratio engines, the evolutionary improvements in engine noise, still the main source of aircraft noise, are insufficient to maintain the overall noise reductions expected around airports in the face of increasing traffic. Thus novel engine designs or acoustic attenuations are needed to meet future requirements.

This conference will discuss potential future engines and the programmes of work being undertaken to bring them to reality. The event will be of use to legislators, airport operators, aircraft, engine and nacelle designers.

To Register online visit [www.aerosociety.com/conference](http://www.aerosociety.com/conference)