Table of contents

1. An Introduction to the Landscape ..............................................Page 3

2. The Project
   2.1 The objectives .........................................................................Page 3
   2.2 The activities ........................................................................Page 5
   2.3 The partners ..........................................................................Page 5
   2.4 The expected impact ...............................................................Page 5

3. SA Aeronautics & Air Transport Organisations
   3.1 Air traffic management ...........................................................Page 6
       Increasing time efficiency
   3.2 Aircraft design .......................................................................Page 9
       Improving cost efficiency
   3.3 Environment ..........................................................................Page 20
       Greening of air transport
   3.4 Innovative design and manufacturing ...................................Page 23
       Pioneering the air transport of the future
   3.5 Safety .....................................................................................Page 38
       Ensuring customer satisfaction and safety
   3.6 Security ..................................................................................Page 46
       Protection of aircraft and passengers
   3.7 Cross cutting ..........................................................................Page 53
       Multi disciplinary
1. An introduction to the landscape

An active and flourishing aerospace industry is seen by many countries as a critical and pervasive generator of new cutting edge technologies that will not only drive innovation in aeronautics and space, but through dissemination into other sectors, will also serve to improve the capability and prosperity of a country as a whole.

South Africa is fortunate enough to be one of these countries and can demonstrate a long and proud history of aerospace innovation, research, development and manufacturing. For instance, South Africa was already manufacturing full aircraft in the late 1920s (Hawker Hartebees) and today has turned that early step and many subsequent innovations into long standing partnerships with many of the world’s leading aerospace original equipment manufacturers, such as Airbus and Boeing.

The aerospace sector in South Africa (SA) and Africa consists of a range of stakeholders in general aviation, commercial aviation, military aviation, air traffic management, aircraft part and system manufacturing, integration, propulsion avionics, sensors, ICT systems, and advanced manufacturing, including university and science council based fundamental research into new materials (titanium and natural composites for example), advanced modelling and industrialization efficiency.

Likewise, the SA government has for well over a decade been active in its support of this industry through a wide range of complimentary mechanisms and has assigned certain roles to various departments in order to ensure adequate growth takes place. Figure 1 below gives a brief history of the South African government’s role in developing these mechanisms, Figure 2 illustrates the various resulting support mechanisms and Figure 3 gives the operational landscape and responsibilities as defined on an innovation value chain.

The mechanisms indicated by these figures exist not only to actively respond to the needs of government, but also to support local Research and Technology (R&T) efforts, assist the local industry with its growth imperatives, and more importantly to develop the necessary strategic partnerships with existing and potential international stakeholders.

The EU and SA have enjoyed a privileged political, economic and developmental partnership for many years now, which has resulted in a range of tangible benefits to both through mechanisms such as:

- A bilateral Trade, Development and Cooperation Agreement (TDCA) concluded in 1999;

<table>
<thead>
<tr>
<th>Year</th>
<th>Event</th>
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<tbody>
<tr>
<td>2000</td>
<td>The South African government's Department of Trade &amp; Industry (DTI) undertakes its first study into the local aerospace industry.</td>
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<tr>
<td>2002</td>
<td>The South African government's Department of Science &amp; Technology (DST) develops the Advanced Manufacturing Technology Strategy (AMTS) as a response.</td>
</tr>
<tr>
<td>2003</td>
<td>The Director-General’s strategic framework is developed and coordinated, leading to the establishment of the A400 M Programme.</td>
</tr>
<tr>
<td>2004</td>
<td>Government sets up aerospace industrial support initiatives. The AMTS, NACoE and CAV enter Phase II operation.</td>
</tr>
<tr>
<td>2005</td>
<td>The CAV “Sod-turning” takes place in August, with an emphasis on SMME enterprise support.</td>
</tr>
<tr>
<td>2006</td>
<td>The AISI, AMTS and NACoE host a joint stand at the African Aerospace &amp; Defense show (AAD2006).</td>
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<tr>
<td>2007</td>
<td>The NACoE and Airbus enter into a joint venture for the development of advanced aeronautics research and education.</td>
</tr>
<tr>
<td>2008</td>
<td>The AISI Aerospace Supply Chain Improvement Programme (ASCIP) enters Phase III operation.</td>
</tr>
<tr>
<td>2009</td>
<td>The AISI, AMTS and NACoE host a joint pavilion at the African Aerospace &amp; Defense show (AAD2008).</td>
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<tr>
<td>2010</td>
<td>The DTI’s National Aerospace Industry Support Initiative (AISI) is initiated.</td>
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Figure 1. A brief history of the South African government-led aerospace support mechanisms

- SA-EU development cooperation activities through the European Programme for Reconstruction and Development (EPRD);
- The European South African Science and Technology Advancement Programme (ESA STAP), and more importantly to the actual aerospace R&T industry;
- The AeroAfrica-EU project.

2. The Project

AeroAfrica-EU aims to promote European and South African research co-operation in aeronautics and air transport.

A platform will be created to enhance co-operation between these two entities and the potential for participation of other African countries will also be explored, as defined by the objectives below.

This Co-ordination and Support Action is supported by the EU 7TH Framework Programme (FP7), with co-funding from the South African Department of Science and Technology.

2.1 The objectives

The intention of the AeroAfrica-EU project is to create a platform for enhancing aeronautics and air transport (R&T) cooperation between the EU and SA, and to promote the participation of other African countries in such cooperation.

- To explore the potential for enhancing cooperation through a mapping of aeronautics and air transport R&T cooperation between the EU and SA, as well as other African countries;
- To develop and enhance networks and partnerships in identified technical themes ideally suited for mutually beneficial aeronautics and air transport R&T cooperation;
- To promote participation in the aeronautics and air transport activities of FP7 through focused information and advisory services, and
- To establish an aeronautics and air transport R&T policy dialogue to also support economic and development cooperation.
Note: the Department of Defence is also active in support of military and defence research

Figure 3. The operational landscape for the South African aerospace sector
Note: the Department of Defence is also active in support of military and defence research
2.2 The activities

(1) Mapping
Various interactions between EU and SA (and African) partners in all sectors will be collated and analysed.

Workshops will be held where SA, African and EU researchers can discuss the mapping and identify further areas for cooperation.

The project website will also facilitate communication and dissemination of relevant information to a broad audience.

(2) Networks
SA researchers and institutions will be actively promoted to their EU counterparts. Thematic-focused workshops, awareness sessions and international aeronautics and air transport conferences hosted in Europe and in Africa will be utilised to showcase the project and European / African research projects.

(3) Supporting FP7
Activities under this objective are aimed at encouraging African aeronautics researchers to participate in FP7. This will be achieved through a portal on the project website specifically facilitating external communication and raising awareness. The project will provide assistance and information on the functioning of FP7, and offer access to knowledge and expertise to aid successful participation in FP7.

(4) R&D Co-operation
The project will work on creating a policy framework to allow all those responsible for aeronautics and air transport research to meet and discuss issues of relevance to the respective communities, identify areas of cooperation, and define mechanisms to foster greater collaboration in addressing air transport challenges so as to also support economic and development cooperation. The intention is ultimately to prepare a policy paper on the links between aeronautics and air transport R&D cooperation with the political, economic and development cooperation between South Africa and Europe.

2.3 The expected impact
The AeroAfrica-EU initiative represents an attempt to significantly capture the aeronautics and air transport capabilities and needs of the EU and SA in a complementary manner, useable as qualitative tools to enhance further cooperation. The success of the AeroAfrica-EU project shall be measured through:

- An increase in Africa’s participation in the FP7 programme;
- An increase in the active R&T networks and partnerships between Africa and Europe;
- The extent to which the relationships are mutually beneficial and are defined by joint identification of collaborative needs and priorities.

2.4 The partners
A step-change in aviation Air Traffic Management (ATM) systems and procedures is vital to accommodate the projected growth of three times more aircraft movements over the next 3-5 years and thereby improving punctuality in all weather conditions and reducing significantly the time spent in travel-related procedures at airports while maintaining safety. Research into new innovative ATM systems within the context of the Single European Sky Air traffic Research System (SESAR) initiative is therefore of paramount importance. Integrating air, ground and space components, together with traffic flow management and systems aimed at more aircraft autonomy are of significance and need to be addressed. Likewise design aspects of aircraft to improve handling of passengers and cargo, novel solutions for efficient airport use and connecting air transport to the overall transport system will also be addressed.

This research theme corresponds to the Highly Time-Efficient High Level Target Concept in ACARE’s research agenda. It aims to produce a significant reduction in journey time through maintaining flight times within schedule and minimising the time that passengers have to spend in airports whilst travelling.

**Air Traffic and Navigation Service (ATNS)**

**About the organisation**
ATNS is responsible for air traffic control in approximately 10% of the world’s airspace. Their services extend further than the familiar air traffic control service, into the provision of vitally important aeronautical information used for all flight planning purposes as well as search and rescue activities and the maintenance of a reliable navigation infrastructure.

**International/ local activities**
- The supply of aeronautical information services, technical maintenance and aerodrome services;
- Alert, search and rescue co-ordination services;
- Management of the flexible use of airspace through the Central Airspace Unit (CAMU);
- Support for special events and special requirements such as test flights, demonstration flights, etc;
- The implementation and maintenance of a terrestrial-based navigational structure;
- The training of licensed air traffic controllers and technical staff through the Aviation Training Academy (ATA).

**Capabilities/ Skills/ Expertise**
- Air traffic control
- Planning and implementation of CNS systems
- Air traffic modelling and simulation
- ATM - advice planning procedure development, audits, investigations, training, management support information, advice, reporting on any aspect of the ATM system

**Areas of interest**
Harnessing the ATM OPS concept (ICAO) to:
- Reduce gate to gate carbon footprint
- Increase efficiency - reduction in delays
- Road mapping the management of airspace from now to 2025

**Contact person**
Arthur Bradshaw

**Tel**
+27(0)11 965 1864

**Address**
Private Bag X15, Kempton Park 1620, Gauteng

**Email**
atns.advisors@gmail.com

**Website**
www.atns.com
## Council for Scientific and Industrial Research (CSIR)

### About the organisation
CSIR is a uniquely South African organisation, committed to innovation. It provides technology solutions and information to support sustainable development and economic growth in the context of national priorities.

### International/ local activities
- Passenger transport service design and delivery
- Operations research and modelling
- Feasibility of sky liberalisation in Africa
- Partner in FP6 SIMBA and FP7 STADIUM projects

### Capabilities/ Skills/ Expertise
- Efficient and sustainable air transport network design
- Operations and business model design.
- Feasibility of sky liberalisation in Africa.
- Development and improvement of accident research methods in the southern African region

### Areas of interest
- Passenger transport service design and delivery
- Operations research and modelling

### Contact persons
Mathetha Mokonyama
Position: FP7 National Contact Point: Transport
Tel: +27(0)12 841 4732
Email: mmkonyama@csir.co.za
Website: www.csir.co.za

## SAAB Avtronics (SAAB Avi)

### About the organisation
Saab serves the global market with world-leading products, services and solutions from military defence to civil security. Its most important markets today are Europe, South Africa, Australia and the US.

Saab has around 13,200 employees. Annual sales amount to around SEK 25 billion, of which research and development account for about 20 per cent of sales. The global defence industry is currently undergoing an extensive transformation.

To adapt to the new conditions in the industry, Saab has divided operations since 1 January 2010 into five business areas: Aeronautics, Dynamics, Electronic Defence Systems, Security and Defence Solutions, and Support and Services.

### Capabilities/ Skills/ Expertise
- Development of avionics systems
- Development of airborne HUMS systems
- Development of reconnaissance systems
- Development of flight control systems
- Acquisition of A/C data and converting into management information

### Areas of interest
- HUMS, prognostics, modular avionics and data networks, life cycle management

### Contact person
Henk du Plessis
Position: Hums R&D coordinator
Tel: +27(0)12 789 4422
Address: P.O Box 8792, Centurion, 0046
44 Oak Avenue, Building 10, Highveld Technopark, Centurion, 0046
Email: henk.duplessis@za.saabgroup.com
Website: www.saabgroup.com
**Tellumat**

**About the organisation**
Tellumat’s business is aimed at the communications, defence and contract manufacturing markets. They use two key strategies to develop the group’s businesses:
- a product strategy which involves defining, developing, manufacturing and marketing innovative products for South African and world markets;  
- and a services strategy which seeks to provide a comprehensive range of services that complements our products and meets our customers’ needs.

---

**International/ local activities**

**Telecommunications**
- Telecoms
- Wireless solutions

**Defence:**
- Defence CT
- Radar
- SIA Solutions

**Manufacture:**
- Electronic
- Mechanical

**Services:**
- Quality assurance
- Technology

---

**Capabilities/ Skills/ Expertise**

- UAV Subsystems, data links, contract design and manufacturing, systems architecture
- Development and manufacture of data communications systems
- Research and design, project management & systems engineering, including product industrialisation

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**Areas of interest**

- SESAR, avionics, systems and equipment, guidance and control, avionics

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**Contact persons**

<table>
<thead>
<tr>
<th></th>
<th>Robert Logie</th>
<th>Shareef Hoosain</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Position</strong></td>
<td>Business Development Manager</td>
<td>Project Manager</td>
</tr>
<tr>
<td><strong>Tel</strong></td>
<td>+27(0)21 710 2167</td>
<td>+27(0)21 710 2324</td>
</tr>
</tbody>
</table>
| **Address**      | 64-74 White Road, Retreat, 7945 | 64-74 White Road, Retreat, 7945;  
|                  | PO Box 30451, Tokai, Cape Town, 7966 | PO Box 30451, Tokai, 7966 Cape Town |
| **Email**        | rlogie@tellumat.com          | shoosain@tellumat.com        |
| **Website**      | www.tellumat.com             | www.tellumat.com             |
3.2 Aircraft Design
(Improving cost efficiency)

Fostering a competitive supply chain able to halve the time-to-market, and reduce product development and operational costs, will result in more affordable transport for all citizens. Research will focus on improvements to the whole business process from conceptual design to product development, manufacturing and in-service operations, including the integration of the supply chain. This theme embraces all the costs arising in the design and operation of the whole air system and mirrors the Highly Cost Efficient High Level Target in ACARE’s Strategic Research Agenda. It will address the tools and technologies required to enhance the whole enterprise process. It will include both the developments needed to deliver zero-maintenance aircraft, as well as ‘lean’ airport, aircraft and air traffic management operations to give a substantial reduction in operating costs.

South African organisations have interest and capabilities in the following:

- Aerodynamics and aircraft design
- Design and manufacturing
- Flight testing

Aerotechnic

About the organisation
Aerotechnic has been serving the airline industry since 1994 as:
- Stockist and distributor of aircraft spare parts (new/overhauled/repaired) for commercial aircraft in the civil aerospace industries
- Commercial representation of manufacturers
- Follow-up of components under repair
- Stock holding

Capabilities/ Skills/ Expertise
- Management of Components under Repair and Overhaul
- Management of Consignment Stock
- Aircraft paint - paint handling facilities, with training as well as colour tinting and mixing capability
- ERP and supply chain management software development
- Total Engine Health Management Support Program
- Spare Parts Manager

Areas of interest
Supply chain and manufacturing optimization software

Contact person
JP Guyeu

Position
CEO and Director

Tel
+27(0)21 386 4360

Address
86, Mobile Road - Airport Industria II, Cape Town

Email
chopin@aerotechnic-group.com

Website
www.aerotechnic-group.com
Aerosud was formed in 1990. The first major contract involved the re-engining of the Mirage F1 Fighter with the Klimov RD33 engine used in the Mig 29 fighter.

Towards 1995, they embarked on diversification into the commercial aviation market with the design of galleys and other interior systems. Today they are an internationally recognised supplier for interior systems.

Aerosud now manufacture around 2000 parts and assemblies a day and supply these to the assembly lines of Airbus, Boeing, BAE Systems, Agusta Westland Helicopters and Spirit AeroSystems.

Their projects involve both civil and military aviation engineering and their activities cover design, development, prototyping, manufacture and in-service support.

### International/ local activities

- Single source supplier to both Airbus and Boeing

### Capabilities/ Skills/ Expertise

- Structural Fabrication
- Composite forming and engineering
- Thermoplastic vacuum forming
- Custom Design and Development
- Aircraft and Interior Refurbishment

Prototype design and development to full scale multi component production lines

Programmes include:
- Digital design and verification
- CNC programming and optimisation
- Research into continuous fibre reinforced thermoplastic and thermoset processes
- Development of methodologies and technologies for DM.
- Focus on laser sintering
- Fluid forming of aero metals
- Process improvement and development in ultra-high strain or super plastic regions
- Robot welding
- Light aircraft design and prototyping for future product development

### Areas of interest

- Composites in general, rapid manufacturing of composites, assembly/ joining of composites, Flammability Smoke, Toxicity, Heat Release (FSTH)
- Simultaneous 5-Axis machining of aluminium, simultaneous 5-Axis machining of titanium
- Hydroforming, Titanium forming
- Process development, equipment development, design standards for processes

### Contact person

Deon Labuschagne - Managing Director

Tel: +27(0)12 662 5000

Address: Corner of Van Ryneveld Ave & Van Der Spuy Str, Pierre Van Ryneveld, Pretoria, 0157

Email: deon@aerosud.co.za

Website: www.aerosud.co.za
### Council for Scientific and Industrial Research (CSIR)

<table>
<thead>
<tr>
<th>About the organisation</th>
<th>CSIR is a uniquely South African organisation, committed to innovation. It provides technology solutions and information to support sustainable development and economic growth in the context of national priorities.</th>
</tr>
</thead>
</table>
| **International/ local activities**                                                     | • 3D laser build up of Iconel alloys  
• Carbon nanotubes  
• Casting of thin-walled structures  
• Casting processes for aerospace components  
• Development and improvement of accident research methods in the southern African region  
• Development of NDT techniques for composites  
• Efficient and sustainable air transport network design. Operations and business model design  
• Environmentally friendly civilian aircraft engines - partner in FP6 project VITAL  
• Feasibility of sky liberalisation in Africa  
• Femtosecond laser micromachining  
• Laser cladding and welding  
• Partner in Fantasia FP6 programme  
• Piezoelectric actuators and motors  
• Polymer nanocomposites  
• Powder based processing of titanium alloys  
• Processes for the primary production of titanium  
• Natural fibre reinforced composites for aerospace industries  
• Semi-solid metal forming of aluminium and magnesium alloys  
• Silicon nanoparticle synthesis  
• Surface modification of ceramics and intermetallics  
• THz Photonics for passenger scanning (contraband and weapons)  
• UAV design and development  |
| Framework Programme project participation:                                              | • VITAL  
• FANTASIA  
• EUDEULAS  
• FUTURE  
• FFAST |
Capabilities / Skills / Expertise

**CSIR DPSS: Aeronautic Systems Group:**
- Numerical, experimental and structural aerodynamics research and modeling
- Advanced fluid-structure interaction modeling
- Advanced free surface modeling
- Multidisciplinary design and optimisation
- Aeroelasticity, flutter prediction and flutter flight tests
- Turbomachinery design and analysis,
- Aerodynamic test and evaluation, and characterisation CFD, and wind-tunnel testing.

**CSIR Materials and Manufacturing - Fibres and Textiles:**
- Development and analysis of fibre and textile based materials. Notable expertise in non woven technology, polymeric reinforcement.

**CSIR MSM Metals and Metals Processes:**
- Research and development in metals and alloys, with a focus on light metals, production, processing, and characterisation.

**CSIR National Laser Centre Laser Materials Processing Group:**
- Development of technologies for laser welding, laser metals deposition, laser surface engineering and laser micro-processing.

**CSIR National Laser Centre Biophotonics Research Group:**
- Primary focus is development and improvement of various therapeutic and diagnostic medical applications of lasers.

**CSIR NCNRM:**
- Design, modelling, synthesis, characterisation and fabrication of nano-structured materials.

**CSIR MSM Sensor Science and Technology:**
- Research and development of smart structures and materials from strategic basic research through to industrialisation.

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**Contact persons**

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<thead>
<tr>
<th>Position</th>
<th>Email</th>
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</tr>
</thead>
<tbody>
<tr>
<td>CSIR Aerospace Initiative; Assistant NCP</td>
<td><a href="mailto:aerospace@csir.co.za">aerospace@csir.co.za</a></td>
<td><a href="mailto:gsnedden@csir.co.za">gsnedden@csir.co.za</a></td>
<td><a href="mailto:fprinsloo@csir.co.za">fprinsloo@csir.co.za</a></td>
</tr>
<tr>
<td>Competency Area Manager, MSM</td>
<td><a href="mailto:gsnedden@csir.co.za">gsnedden@csir.co.za</a></td>
<td><a href="mailto:fprinsloo@csir.co.za">fprinsloo@csir.co.za</a></td>
<td></td>
</tr>
<tr>
<td>R&amp;D Contracts Manager, National Laser Centre</td>
<td><a href="mailto:fprinsloo@csir.co.za">fprinsloo@csir.co.za</a></td>
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</table>

**Tel**

+27(0)12 841 4838  
+27(0)12 841 4955  
+27(0)12 841 4448

**Website**

[www.csir.co.za](http://www.csir.co.za)
### Denel Saab Aerostructures

#### About the organisation
With over 60 years experience in the aerostructures market, the company is a leading designer and manufacturer of complex metallic and composite aerostructures for the military and commercial aviation sector. These aerostructures are supplied to Original Equipment Manufacturers and other aerostructure suppliers in cooperation with aircraft manufacturers, such as Airbus, AgustaWestland, Boeing and Saab.

#### International/ local activities
The team inherits vast experience / expertise from the projects listed below and applies this to engineering projects for a large international customer base:
- Rooivalk Combat Support Helicopter - concept through detail design, flight-testing, development and integration to service support and qualification.
- SAAB/BAe Gripen - NATO Pylons detail structural and electrical design and industrialisation.
- Fairchild/Dornier728 - Fuselage structural design in conjunction with GECI.
- Cargo Lifter airship - Centre Keel concept and preliminary design.
- Cheetah - Comprehensive modifications with new under carriage and new combat leading edge for the wing.
- ACE - All graphite composite trainer aircraft was totally designed and manufactured in conjunction with South Africa's Council for Scientific and Industrial Research (CSIR).
- Gripen - Fighter weapons integration work packages for South African Air Force.
- Airbus A400M - Topshells on centre fuselage, Wing to fuselage fairing.

#### Capabilities/ Skills/ Expertise
Denel Saab Aerostructures' Engineering team has a long track record in the full development and certification of complex metallic and composite structures, for international military- and commercial markets, of rotary and fixed wing products. It uses best industry norm software and tools and holds a full range of world class engineering capabilities in the following areas and sub-disciplines (see: http://www.denelsaab.co.za/engineering.html):
- Concept/Preliminary Design
- Design Engineering
- Mass and Balance Engineering
- Configuration Management
- Structural Engineering
- Structural Testing
- Certification Testing
- Operations:
  - Machining
  - Sheet metal
  - Special processes
  - Composites
  - Assembly

#### Areas of interest
Design and manufacturing

#### Contact person
Shalan Chetty - Director

#### Tel
+27(0) 12 671 2858

#### Address
Nellmapius Drive, Irene

#### Email
marketing@denel.co.za

#### Website
www.denelsaab.co.za
Diomedes Innovations (Pty) Ltd

About the organisation

Diomedes is a research and development company with advanced design expertise for mechanical and aeronautical engineering.

Due to vast experience in engineering design, Diomedes has established a high level of skill and creativity as well as sound methods and tools to find the best design to meet the required specification.

Although capable of doing production on a small scale, the main emphasis lies in developing new products and technologies.

Diomedes endeavours to play a role in advancing the South African research and development landscape and entertains close cooperation with academic institutions, mainly with the University of Pretoria.

International / Local activities

Research into aircraft configuration design, composite materials, turbine design

Capabilities / Skills / Expertise

- Prototype development
- General mechanical engineering design (specialised machinery, test rigs, jigs, etc.)
- Airframe design
- Ultra light structures
- Aircraft design/flight mechanics, configurational optimisation
- CFD
- Solid modelling (CAD)
- Basic workshop capabilities for prototyping (welding, cutting, grinding, drilling, milling, lathe work, etc.)
- Composite material manufacturing capabilities
- Training of students

Areas of interest

Green aircraft, flight physics, aerodynamic design and drag reduction

Contact person

Joachim Huyssen

Position

Managing Director

Tel

+27(0) 12 346 3606

Address

PO Box 13884, Hatfield, 0028

Email

info@diomedes.co.za

Website

www.diomedes.co.za
**Finite Element Analysis Services (FEAS)**

**About the organisation**
Provision of advanced computational modelling software and consulting services. Wide local presence with an international holding company.

**Capabilities/ Skills/ Expertise**
Software vendor and advanced modelling consultation services

**Areas of interest**
Advanced modelling and optimisation of aircraft structures and systems

**Contact person**
Greg Mitchell - Director

**Tel**
+27 (0)21 556 6462

**Address**
Unit 3C4 Ther Avenues, Parklands, 7441, South Africa

**Email**
greg@feas.co.za

**Website**
www.feas.co.za

---

**Jonker Sailplanes CC**

**About the organisation**
The company was formally founded in 2004. The JS-1 Revelation sailplane was designed by Jonker Sailplanes at the School for Mechanical and Material Engineering of the North West University in Potchefstroom, which offered the advantages of a university environment, such as the state-of-the-art design software, testing facilities, a composite materials workshop etc.

The highly promising design phase was soon followed by work on the prototype. The company gained useful experience through its sailplane repair facility, renowned countrywide for its high quality work on composite sailplanes and motorgliders.

In 2003, the wing design of the JS-1 Revelation was completed and verified with the assistance of Delft University in Holland. It proved highly efficient and uncompromised. In 2005, Jonker Sailplanes officially moved to their new production facilities at Potchefstroom Airfield where the JS-1 Revelation racing sailplanes are now being produced. The company’s large-bed CNC-milling machine is used for accurate in-house mould production. The facilities have been expanded to allow series production of the JS-1 Revelation following successful test flight and certification programs.

**International / Local activities**
Construction of sailplanes (gliders), maintenance on sailplanes

**Capabilities/ Skills/ Expertise**
- Design of gliders, construction with composite materials, maintenances and repairs of composite materials
- Aerodynamics
- Structural design
- Flutter testing
- Metal and composite manufacturing
- Services

**Contact person**
Uys Jonker

**Tel**
+27(0)18 285 1035

**Address**
P.O. Box 1575, Potchefstroom Airfield, Potchefstroom

**Email**
uyj@jonkersailplanes.co.za

**Website**
www.jonkersailplanes.co.za
Overberg Test Range/Baan (OTB)

About the organisation

OTB, a division of the South African industrial group Denel, is a well established test facility close to the southernmost tip of Africa specialising in the in-flight testing and evaluation of missiles and aviation systems for the local and international aerospace industries. OTB develops and services national and international niche markets for flight tests and related services to the maximum benefit of all its stakeholders. OTB also conducts long-range artillery tests.

OTB was developed in the mid eighties as an integrated facility with the flexibility to allow multipurpose applications. Since final qualification in 1991, OTB has proved its ability to manage and execute a large variety of flight tests, rendering invaluable performance evaluation services to defence forces and the armaments industry.

International/ local activities

Flight testing of missiles and aviation systems

Capabilities/ Skills/ Expertise

- As a multipurpose test range, OTB caters for the full spectrum of aircraft and missile flight testing, with the capability of tracking 3 flying objects simultaneously using tracking instruments as well as cooperative targets supplying GPS position via telemetry, in real-time. It caters for tracking of an aircraft, target and missile (launched/ﬁred at the target from the aircraft)
- The following types of tests are catered for: air to air tests; air to surface (land or sea) tests; surface to surface (land or sea) tests; anti-tank tests, also from helicopter; aircraft performance, carriage and release clearance, avionics evaluation
- Because of the diversity of tests, many of the instruments are mobile and can be deployed at various sites on the range as required
- A base leg of 70km along the coast is available to cover tests taking place over the sea
- Longer distances can be covered by electromagnetic instruments (radars and telemetry stations) and/or deployment of instruments on existing remote sites, outside the range area
- OTB supports the principle of a turn-key service
- A modern SANDF airbase (TFDC) adjacent to OTB can accommodate all types of aircraft

Contact person
Abrie van der Walt - Manager (Systems)
Tel +27(0)28 445 2000
Address Private Bag x12, Bredasdorp, 7280
Email otbinfo@otb.co.za
Website www.otb.co.za

Robin Coss Aviation

About the organisation

RCA best known for building two and four-seater Vans RV Aircraft. It is the only professional build facility in South Africa, approved by Van’s Aircraft Inc, to manufacture and maintain the full range of Van’s RV two and four-seater aircraft. RCA is the first and only Lycoming approved kit engine assembly facility outside the USA. RCA services and maintains all RV’s under SACAA AMO 1147. The RCA team further provides a spray painting service for aircraft, specializing in rotary wing.

Infrastructure
Aircraft manufacturing and certification facilities

International / Local activities
Aircraft manufacturing technologies

Capabilities/ Skills/ Expertise
- Suppliers of ab-initio and advanced training aircraft
- Lycoming Engine Assembly
- Aircraft Maintenance
- Custom Aircraft & Helicopter Spray Painting
- EA Rescue / EMS Medical Interiors for Fixed & Rotor Wing Aircraft

Areas of interest
Aircraft design

Contact person
Robin Coss
Position CEO and Founder
Tel +27 (0)21 385 1601
Address PO Box 832, Howard Place, Cape Town, 7450
Email info@cossaviation.com
Website www.cossaviation.co.za
University of Cape Town (UCT)

Blast Impact and Survivability Research Unit (BISRU):
In 2003, BISRU was accredited as a formal research group; primarily due to a request from industry to form a Centre of Excellence in Blast Protection and Survivability. The objective of BISRU is engineering research that saves lives - in particular in scenarios where humans are subjected to blast and impact situations.

The objective of the research work during the past 25 years has been and continues to be to strive to reduce risk of injury and save lives through fundamental principles of science and engineering, using experimental, analytical and computational tools and techniques to understand the mechanics and dynamics of blast and impact loads.

Aeronautical Research Group:
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- Core capabilities include the application of synthetic fuels to current and future engine technologies and fuel and engine based research.
- Infrastructure includes gas turbine test cell; emissions monitoring; combustion visualisation.
- Research programmes are focused on semi- and fully synthetic jet fuel.

Capabilities/ Skills/ Expertise
- Corrosion, wear, and thermal testing
- Fibre metal laminates
- Heat treatment and specimen preparation
- Semi- and fully synthetic jet fuel
- Analytical, computational and experimental analysis of blast events, including transportation accidents
- Development of new metal alloys, polymers, ceramics and hard materials
- Flight mechanics and applied aerodynamics
- Fracture mechanics research
- Fuel and engine based research
- Materials characterisation and development of new materials
- Theoretical and computational modelling of structural mechanics and fluid dynamics.

Areas of interest
Aerodynamics and aircraft design

Contact persons
Professor Gerald Nurick (BISRU)  Tel  +27(0)21 650 3234
Professor Chris Redelinghuys (Aeronautical Research Group)  Tel  +27(0)21 650 2699
Adjunct Professor Andy Yates  Tel  +27(0)21 650 2699

Address
Faculty of Engineering and the Built Environment, Private Bag X3, Rondebosch, 7701
Faculty of Engineering and the Built Environment, Private Bag X3, Rondebosch, 7701
Faculty of Engineering and the Built Environment, Private Bag X3, Rondebosch, 7701

Email
Gerald.Nurick@uct.ac.za
Chris.Redelinghuys.uct.ac.za
Andy.Yates@sasol.com

Website
www.bisru.uct.ac.za
www.ebe.uct.ac.za/research/groupings
www.safl.uct.ac.za
### University of Pretoria (UP)

#### About the organisation

The Faculty of Engineering, Built Environment and Information Technology at UP is a leading and dynamic faculty that is one of the foremost providers of high-level intellectual capital and research in the country. The Faculty is renowned for its unique approach to innovation, its international status and links with industry.

The Department of Mechanical and Aeronautical Engineering is one of 14 departments in the Faculty of Engineering, Built Environment and Information Technology, and is the largest Department of Mechanical Engineering in South Africa.

Three Groups operate in the aeronautics research domain: Dynamic Systems, Thermalfluids Research and Design and Manufacturing.

#### Capabilities/ Skills/ Expertise

<table>
<thead>
<tr>
<th>Dynamic Systems Group:</th>
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</thead>
<tbody>
<tr>
<td>• Damage detection, vibration monitoring and control</td>
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<tr>
<td>• Vehicle dynamics</td>
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<tr>
<td>• Computer-aided analysis of dynamical systems</td>
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<table>
<thead>
<tr>
<th>Thermofluids Research Group:</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Heat transfer</td>
</tr>
<tr>
<td>• Electronics cooling</td>
</tr>
<tr>
<td>• Gas turbines</td>
</tr>
<tr>
<td>• Design optimisation</td>
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<table>
<thead>
<tr>
<th>Design and Manufacturing Group:</th>
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</thead>
<tbody>
<tr>
<td>• Biomechanics</td>
</tr>
<tr>
<td>• Lubricity of diesel</td>
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#### Areas of interest

<table>
<thead>
<tr>
<th>Dynamic Systems Group</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Vibration monitoring and diagnostics</td>
</tr>
<tr>
<td>• Vibration measurement and analysis</td>
</tr>
<tr>
<td>• Structural dynamic design and analysis</td>
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<tr>
<td>• Vehicle dynamics</td>
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<tr>
<td>• Computational solid mechanics.</td>
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<tr>
<th>Thermofluids Research Group:</th>
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<tbody>
<tr>
<td>• Enhanced heat transfer</td>
</tr>
<tr>
<td>• Electronics cooling</td>
</tr>
<tr>
<td>• Micro channel condensation</td>
</tr>
<tr>
<td>• Optimisation with constructal theory.</td>
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<tr>
<th>Design and Manufacturing Group:</th>
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<tbody>
<tr>
<td>The Group is also actively involved in the establishment of a centre of excellence for mining machinery and equipment and running the mechanical workshops of the Department, which also acts as a manufacturing facility for the Faculty. Areas of interest include:</td>
</tr>
<tr>
<td>• mine health and safety</td>
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<tr>
<td>• biomechanics</td>
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<tr>
<td>• lubricity of characteristics of diesel fuel</td>
</tr>
</tbody>
</table>

#### Contact person

<table>
<thead>
<tr>
<th>Professor Josua Meyer</th>
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</thead>
<tbody>
<tr>
<td>Position Head of Department</td>
</tr>
<tr>
<td>Tel +27(0) 12 420 3104</td>
</tr>
<tr>
<td>Address Department of Mechanical and Aeronautical Engineering, University of Pretoria, Pretoria, 0002</td>
</tr>
<tr>
<td>Email <a href="mailto:josua.meyer@up.ac.za">josua.meyer@up.ac.za</a></td>
</tr>
<tr>
<td>Website <a href="http://web.up.ac.za/default.asp?ipkCategoryID=2163&amp;subid=2163&amp;ipklookid=7&amp;parentid=">http://web.up.ac.za/default.asp?ipkCategoryID=2163&amp;subid=2163&amp;ipklookid=7&amp;parentid=</a></td>
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</table>
**University of the Witwatersrand (WITS)**

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One of the major developments in departmental activities was the introduction in 1962 of a part-time postgraduate coursework programme in Industrial Engineering leading to the Graduate Diploma in Engineering degree. In 1971, an Aeronautical Engineering degree was offered for the first time as an alternative to the Mechanical Engineering degree, with sponsorship from the aeronautical industry.

The School of Mechanical, Industrial and Aeronautical Engineering is also host to the National Aerospace Centre (NAC) (formerly the National Aerospace Centre of Excellence (NACoE)), and the Aerospace Manufacturing Processes and Materials group (AMPM).

Founded in 2005 under the Aerospace Industry Support Initiative (AISI) of the Department of Trade and Industry (DTI), the National Aerospace Centre is in a special class of centres (centres of excellence) which aim to further the interests of a particular industry at the highest levels by leveraging government funding in research initiatives further to the government’s goal of creating a knowledge-based economy in South Africa. This includes promoting participation by South African universities, universities of technology and companies in contract research and development for industry giants such as Airbus Industrie and Boeing, as well as partnerships with various European universities and companies.

Originally a focus area within the NAC, the Aerospace Manufacturing Processes and Materials group is now an semi-autonomous entity under the directorship of Mr Philip Haupt AMPM primarily engages in promoting development within the South African aerospace manufacturing sector.

### Capabilities/ Skills/ Expertise

- Aerodynamic and structural design
- Control systems
- Fundamental research into flow phenomena with a focus on unsteady and compressible flows
- Experimental and analytical modelling of composites
- Modelling of metallurgy and materials
- Programme for development of aerospace materials and manufacturing processes, with local and international partners

### Areas of interest

- Flight physics, propulsion, design systems and tools
- Development of an ultralight aircraft
- Flexible wing tips
- Maching optimisation
- Materials modelling (turbine and process modelling, life assessment)
- Research in aeronautics and aerodynamics
- Residual stresses in composites, environmental degradation, dynamic stress concentration
- Shock wave dynamics (supersonic flight)
- Titanium beneficiation (alloy development, processing, characterisation)
- UAV in-flight refuelling

### Contact person:

**Professor Ted Moss**

**Position**

Head of School

**Tel**

+27 (0)11 717 7332

**Address**

Private Bag 3, Wits, 2050

**Email**

[edward.moss@wits.ac.za](mailto:edward.moss@wits.ac.za)
3.3 Environment
(Greening of air transport)

The greening of air transport means developing technologies to reduce the environmental impact of aviation with the aim of halving the amount of carbon dioxide (CO₂) emitted by air transport, cutting specific emissions of nitrogen oxides (NOₓ) by 80% and halving perceived noise. The targets reflect the Ultra Green High Level Target Concepts developed by the Advisory Council for Aeronautical Research in Europe (ACARE) in its strategic research agenda. Reducing soot, water vapour and particulates emissions will also be tackled.

The research will address green engine technologies, alternative fuels, novel aircraft/engine configurations, intelligent low-weight structures, improved aerodynamic efficiency, airport operations and air traffic management, as well as manufacturing and recycling processes.

The ‘Clean Sky’ Joint Technology Initiative will bring together European R&D stakeholders to develop ‘green’ air vehicle design, engines and systems aimed at minimising the environmental impact of future air transport systems.

South African organisations have interest and capabilities in the following:

- Low emissions combustions
- Noise control
- Service and network design
- Sustainable and green engines

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**National Metrology Institute of South Africa (NMISA)**

<table>
<thead>
<tr>
<th>About the organisation</th>
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<tbody>
<tr>
<td>NMISA is responsible for maintaining the SI units and to maintain and develop primary scientific standards of physical quantities for SA and compare those standards with other national standards to ensure global measurement equivalence. It must also provide reference analysis in the case of a measurement dispute and maintain and develop primary methods for chemical analysis to certify reference materials for SA and the region.</td>
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<table>
<thead>
<tr>
<th>International / Local activities</th>
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<tbody>
<tr>
<td>Feasibility studies for stations for monitoring greenhouse gas emissions</td>
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<tr>
<td>Nanomaterials measurement (emerging area)</td>
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<table>
<thead>
<tr>
<th>Capabilities/ Skills/ Expertise</th>
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<tr>
<td>NMISA provides calibration, measurement and analytical services to its customers. The NMISA laboratories also provide consulting service for problem solving and the implementation of new systems in the metrology field. Proficiency testing schemes for calibration and testing laboratories under contract are also available. Some areas sell products, e.g. certified reference materials. Of particular relevance are:</td>
</tr>
<tr>
<td>- Certification of gas materials</td>
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<td>- Analysis of trace impurities in gas mixtures</td>
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<tr>
<th>Contact person</th>
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<tbody>
<tr>
<td>Wynand Louw - Director</td>
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<table>
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<tr>
<th>Tel</th>
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<td>+27(0)12 841 4152</td>
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<tr>
<th>Address</th>
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<tbody>
<tr>
<td>Private Bag X34, Lynnwood Ridge, Pretoria, 0040</td>
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<table>
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<tr>
<th>Email</th>
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<tbody>
<tr>
<td><a href="mailto:info@nmisa.org">info@nmisa.org</a></td>
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- Flight mechanics and applied aerodynamics
- Fracture mechanics research
- Fuel and engine based research
- Materials characterisation and development of new materials
- Theoretical and computational modelling of structural mechanics and fluid dynamics.

### Areas of interest
- Aerodynamics and aircraft design
- Flight mechanics and applied aerodynamics
- Fracture mechanics research
- Fuel and engine based research
- Materials characterisation and development of new materials
- Theoretical and computational modelling of structural mechanics and fluid dynamics.

### Contact persons
- **Professor Gerald Nurick (BISRU)**
  - Tel: +27(0)21 650 3234
  - Email: Gerald.Nurick@uct.ac.za
  - Website: [www.bisru.uct.ac.za](http://www.bisru.uct.ac.za)

- **Professor Chris Redelinghuys (Aeronautical Research Group)**
  - Tel: +27(0)21 650 2699
  - Email: Christiaan.Redelinghuys.uct.ac.za
  - Website: [www.ebe.uct.ac.za/research/groupings](http://www.ebe.uct.ac.za/research/groupings)

- **Adjunct Professor Andy Yates**
  - Tel: +27(0)21 650 2699
  - Email: Andy.Yates@sasol.com
  - Website: [www.safl.uct.ac.za](http://www.safl.uct.ac.za)
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Capabilities/ Skills/ Expertise

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- Control systems
- Fundamental research into flow phenomena with a focus on unsteady and compressible flows
- Experimental and analytical modelling of composites
- Modelling of metallurgy and materials
- Programme for development of aerospace materials and manufacturing processes, with local and international partners

Areas of interest

- Flight physics, propulsion, design systems and tools
- Development of an ultralight aircraft
- Flexible wing tips
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- Research in aeronautics and aerodynamics
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- Shock wave dynamics (supersonic flight)
- Titanium beneficiation (alloy development, processing, characterisation)
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Contact person: Professor Ted Moss
Position Head of School
Tel +27 (0)11 717 7332
Address Private Bag 3, Wits, 2050
Email Edward.moss@wits.ac.za
Website www.wits.ac.za/academic/ebe/Mecheng
3.4 Innovative Design and Manufacturing
(Pioneering the air transport of the future)

Europe’s ambitions in future aeronautics were described in the ‘Vision 2020’ report and the EU’s Transport White Paper which form the basis of ACARE’s Strategic Research Agenda. This research theme stretches the Vision 2020 horizon to explore and pioneer the more radical, revolutionary, environmentally efficient and innovative technologies that might configure the step changes required in the air transport of the second half of this century.

Research will address aspects such as new propulsion and lifting concepts, new forms of guidance and control, new ideas for the interior space of airborne vehicles, new airport concepts - including the concept of off-shore air stations, alternative concepts of air transport system operation - including personal transport systems and the use of urban-space, and its integration with other transport modes.

This area will pioneer the air transport of the future addressing the longer term challenges of aviation with accessible and innovative combinations of technologies which will lead to significant steps forward in air transport.

South African organisations have interest and capabilities in the following:

- Composite materials
- Light metals and metals processing
- Nano technologies
- Rapid prototyping and direct manufacturing
- Smart composites
- Smart materials

AAT Composites (Pty) Ltd

AAT Composites is a high-technology design and manufacturing company specialising in performance composite parts for the aerospace and aviation industries. Aerodyne Technology and later Aerodyne Aviation Technology, the forerunners of AAT Composites, was founded in 1983.

It established itself as a leader in the design and manufacture of innovative high performance products using advanced composite materials and became well known in the Aerospace and Sport markets for products that range from bicycles to primary structures for supersonic aircraft.

During the 1990’s Aerodyne was restructured into a group of 4 companies with a view to improving focus on a diversified product and market range. One of these 4 companies grew into AAT Composites, which specialises in the design and manufacture of composite parts for aircraft interior structures, mainly related to seating.

AAT Composites has strong international links with the controlling shareholder being Recaro-AS International GmbH and exporting 100% of its product to Europe and the USA. Other applications are also being developed.

A key capability is that of high volume manufacture of sophisticated composite parts. The company has a proven moulding capacity in epoxy and phenolic prepreg of more than 10 000 items per month.

Most of the company’s production is sold to Recaro (Germany), Contour (UK), Sicma (France) and BE Aerospace (USA and Ireland). The result is that AAT’s products are used on many leading international airlines in the USA, Europe, Africa, the Middle East and the Far East.
### Aerosud

**About the organisation**

Aerosud was formed in 1990. The first major contract involved the re-engining of the Mirage F1 fighter with the Klimov RD33 engine used in the Mig 29 fighter.

Towards 1995, they embarked on diversification into the commercial aviation market with the design of galleys and other interior systems. Today they are an internationally recognised supplier for interior systems.

Aerosud now manufacture around 2000 parts and assemblies a day and supply these to the assembly lines of Airbus, Boeing, BAE Systems, Agusta Westland Helicopters and Spirit AeroSystems.

Their projects involve both civil and military aviation engineering and their activities cover design, development, prototyping, manufacture and in-service support.

**International/local activities**

- Single source supplier to both Airbus and Boeing

**Capabilities/ Skills/ Expertise**

- Structural Fabrication
- Composite forming and engineering
- Thermoplastic vacuum forming
- Custom Design and Development
- Aircraft and Interior Refurbishment

Prototype design and development to full scale multi component production lines

Programmes include:

- Digital design and verification
- CNC programming and optimisation
- Research into continuous fibre reinforced thermoplastic and thermoset processes
- Development of methodologies and technologies for DM.
- Focus on laser sintering
- Fluid forming of aero metals
- Process improvement and development in ultra-high strain or super plastic regions
- Robot welding
- Light aircraft design and prototyping for future product development

**Areas of interest**

- Composites in general, rapid manufacturing of composites, assembly/joining of composites, Flammability Smoke, Toxicity, Heat Release (FSTH)
- Simultaneous 5-Axis machining of aluminium, simultaneous 5-Axis machining of titanium
- Hydroforming, Titanium forming
- Process development, equipment development, design standards for processes

**Contact person**

Deon Labuschagne - Managing Director

**Tel**

+27(0)12 662 5000

**Address**

Corner of Van Ryneveld Ave & Van Der Spuy Str., Pierre Van Ryneveld, Pretoria, 0157

**Email**

deon@aerosud.co.za

**Website**

www.aerosud.co.za

---

### Capabilities/ Skills/ Expertise

- Composites manufacture:
  - Product development
  - Tooling
  - Manufacturing
  - Production
  - Quality control

**Areas of interest**

- Composites manufacture

**Contact person**

Sias van der Westhuizen

**Position**

CEO

**Tel**

+27(0)21 850 7000

**Address**

2 Boundary Road, PO Box 897, Strand 7139

**Email**

sias@aatcomposites.com

**Website**

www.aatcomposites.com
African NDT Centre (Pty) Ltd

About the organisation
African NDT Centre, also known as ANDTc, specialises in providing training and inspection services in the field of non-destructive testing (NDT).

ANDTc was established in 2003 to create a centre of excellence in NDT, involved with:
• Training, examinations and certification to international standards
• Inspection services to the aerospace industry
• Research and development
• Level 3 consultancy to all industry sectors

In 2007 Aerosud, a local company well established in the international aerospace industry, acquired a 50% shareholding in ANDTc. This association laid the cornerstone for the planned relocation in 2009 of ANDTc to a state of the art and purpose designed building in the Centurion Aerospace Village from where ANDTc will continue with its mission to serve the South African aerospace industry and the NDT industry in general.

Capabilities/ Skills/ Expertise
• Non-destructive testing
• Highly qualified ANDTc Level 2 and/or Level 3 PCN & EN4179 personnel can assist with the inspection of a specimen or part in the aerospace industry Using the most relevant of the four main NDT methods namely RT, PT, UT and MT
• ANDTc supply training under the PCN and SNT-TC-1A scheme in the four main NDT methods namely MT (Magnetic Particle), PT (Penetrant Testing), UT (Ultrasonic Testing) and RT (Radiographic Testing) as well as Radiation Safety

Areas of interest
NDT technique development for composite materials

Contact person
Mr Hennie Fourie
Position
General Manager
Tel
+27(0)12 665 3248
Address
14 Pieter Street, Technopark, Highveld, Centurion
Email
hennie.fourie@andtc.com
Website
www.andtc.com

Advanced Technologies and Engineering (ATE)

About the organisation
ATE is a private South African company with 20 years of experience in initiating and executing large and complex defence programs world-wide, offering integrated solutions up to platform level. ATE customises aircraft and defence systems to suit new program and upgrade requirements:
• Fixed wing combat and trainer aircraft
• Combat and transport helicopters
• Armoured vehicle systems
• Unmanned Air Vehicles (UAVs)

Capabilities/ Skills/ Expertise
• International systems house, integrating, developing and manufacturing complete systems.
• SA R&D focused on avionics and navigation
• Large development and production facility

Areas of interest
Development and production of:
• navigation systems
• tactical UAVs
• avionics systems
• composite helicopter rotor blades.

Contact person
Dr Jim Huston
Tel
+27(0)11 266 7715
Address
998 – 16th Road, Halfway House, 1685
Email
jim.huston@ate-aerospace.com
Website
www.ate-group.com
### Cape Peninsula University of Technology (CPUT)

**About the organisation**

The Smart Alignment Systems Research Group (SASRG) in the Department of Mechanical Engineering is a National Research Foundation (NRF) funded project and falls within the Institution's advanced manufacturing niche focus area. The group's main technology focus lies in the development of smart and adaptive materials and structures.

The Department is also involved in Advanced Manufacturing Technologies with specific focus on tooling design and manufacture, rapid prototyping and rapid manufacturing.

**Capabilities/Skills/Expertise**

- **Shape Memory Alloys (SMAs)** embedded into polymer/ glass fibre composites/carbon fibre composites, which effectively create an adaptive structure. Work which initially led to a Doctorate in Technology (DTech) is now being carried out on 'teaching/training' these alloys to perform as actuators.

- **Fibre Optic technology** is a subject actively researched in the SASRG, exemplified by the work of embedding optical fibres into modern lightweight composites with a view to detecting unwanted excessive displacement, crack initiation and propagation. This work, which initially earned a DTech, led to the current activity, at MTech level, in more specialised applications, including the use of fibre optics encoded with Bragg gratings. This work renders increased sensitivity to the optic fibre as a sensor which will signal the SMAs to respond as actuators in morphing the surface or “healing” a crack etc.

- **Piezoelectric materials**, commercially available, fulfil another range of activity for sensors and actuators, compared to the basic function of SMAs as actuators. The subject is receiving focused attention at CPUT with a number of research projects in progress. The complex behaviour exhibited by piezoelectric material is a desirable feature for components utilised in industrial manufacturing processes, particularly in the aerospace and automotive industries. Examples of applications include the tiny accelerometers used in automotive impact safety airbags; the small gyroscopes used for the directional control of vehicles, helicopters or unmanned UAVs; tiny vibration controllers or micropumps.

- **Micro Electrical Mechanical Systems (MEMS)** describe most of the above-mentioned activities of the SASRG. The design of components for such micro systems is an extremely exciting and very specific activity, requiring sophisticated computer capability. Typical devices include MicroGyros, MicroAccelerometers, and MicroBolometers. A commercial, state-of-the-art, software package has been acquired and used by researchers.

- **Rapid Prototyping Technologies** are used in the manufacture of complex shaped components used in the Aerospace Industry. The SASRG utilises the three prototyping machines in the Department of Mechanical Engineering to achieve this goal.

**Areas of interest**

- Shape memory alloys, piezoelectric smart materials, fibre optic technology, micro electrical mechanical systems, rapid prototyping technologies, re-configurable or morphing wings for use on UAVs

**Contact person**

Keith Jacobs

**Position**

Associate Dean: Faculty of Engineering

**Tel**

+27(0)21 959 6757

**Email**

JacobsK@cput.ac.za

**Website**

www.cput.ac.za; www.adaptronics.co.za
### Central University of Technology (CUT)

**About the organisation**

The Central University of Technology specialises in Rapid Prototyping (RP) technology, used to shorten time-to-market in the development of new products. The Centre for Rapid Prototyping and Manufacturing (CRPM) adopts a concurrent engineering approach, allowing changes at critical stages – not feasible using conventional techniques, to accelerate new product development, based on CAD, reverse engineering, rapid prototyping (SLA, SLS and Sanders 3D printing), soft tooling and sand casting. Through collaboration these offerings have been broadened to include industrial design, finite element modeling, process modeling, rapid tooling and investment casting. Once concepts are proven, the master files can be used directly to produce tooling or patterns for EDM. CRPM can provide limited amounts of product for testing and marketing while the final manufacturing processes are being developed.

**Capabilities/ Skills/ Expertise**

- Focus on development of rapid tooling and rapid manufacture technologies and use of such technology to support research in other areas.
- Development and mechanical testing of direct metal laser sintered titanium lattice parts
- Alumide sintered moulds for press tooling in aerospace
- Direct manufacture of parts for Aerosud and CSIR programmes

**Areas of interest**

- Laser sintering
- Stereolithography
- Vacuum casting
- Reverse engineering tools

**Contact person** Gerrie Booysen  
**Position** Operational Manager: CRPM  
**Tel** +27(0)51 507 3526  
**Address** Private Bag X20539, Bloemfontein, 9300, South Africa  
**Email** gbooysen@cut.ac.za  
**Website** www.cut.ac.za/crpm

### Centre of Excellence in Strong Materials

**About the organisation**

The DST / NRF Centre of Excellence in Strong Materials (CoE-SM) is a major South African Research Network hosted by the University of the Witwatersrand, in partnership with the Nelson Mandela Metropolitan University, the Universities of Johannesburg, KwaZulu-Natal and Limpopo, the Council for Minerals Technology (MINTEK) and the Nuclear Energy Corporation of South Africa (NECSA). There are more than 30 researchers over 80 postgraduate students active in the Centre from a number of disciplines including physics, chemistry, ceramics, metallurgy, chemical and mechanical engineering.

**Capabilities/ Skills/ Expertise**

- Research programmes of the Centre involve the prediction, design, synthesis, evaluation, development and exploitation of strong materials.
- Fundamental research into materials with distinctive properties under extreme conditions, including: carbon nanotubes, composites, hardmetals, ceramics, diamonds, alloys and new materials.
- Phase stability, phase synthesis and characterisation, computational modelling of phases and prediction of properties, mechanical testing, sps equipment on order

**Areas of interest**

Aerostructures, propulsion, aerostructures, platform to stimulate the development of breakthrough technologies and concepts enabling step changes in aviation

**Contact person** Profesor Lesley Cornish  
**Position** Director  
**Tel** +27(0)11 717 6876  
**Address** Private Bag 3, Wits, 2050  
**Email** lesley.cornish@wits.ac.za  
**Website** www.wits.ac.za/centres/strongmaterials
# Council for Scientific and Industrial Research (CSIR)

## About the organisation

CSIR is a uniquely South African organisation, committed to innovation. It provides technology solutions and information to support sustainable development and economic growth in the context of national priorities.

## International/ local activities

- 3D laser build up of Iconel alloys
- Carbon nanotubes
- Casting of thin-walled structures
- Casting processes for aerospace components
- Development and improvement of accident research methods in the southern African region
- Development of NDT techniques for composites
- Efficient and sustainable air transport network design. Operations and business model design
- Environmentally friendly civilian aircraft engines - partner in FP6 project VITAL
- Feasibility of sky liberalisation in Africa
- Femtosecond laser micromachining
- Laser cladding and welding
- Partner in Fantasia FP6 programme
- Piezoelectric actuators and motors
- Polymer nanocomposites
- Powder based processing of titanium alloys
- Processes for the primary production of titanium
- Natural fibre reinforced composites for aerospace industries
- Semi-solid metal forming of aluminium and magnesium alloys
- Silicon nanoparticle synthesis
- Surface modification of ceramics and intermetallics
- THz Photonics for passenger scanning (contraband and weapons)
- UAV design and development
- Framework Programme project participation:
  - VITAL
  - FANTASIA
  - EUDEULAS
  - FUTURE
  - FFAST

## Capabilities / Skills / Expertise

### CSIR DPSS:Aeronautic Systems Group:
- Numerical, experimental and structural aerodynamics research and modeling
- Advanced fluid-structure interaction modeling
- Advanced free surface modeling
- Multidisciplinary design and optimisation
- Aeroelasticity, flutter prediction and flutter flight tests
- Turbomachinery design and analysis,
- Aerodynamic test and evaluation, and characterisation CFD, and wind-tunnel testing.

### CSIR Materials and Manufacturing - Fibres and Textiles:
- Development and analysis of fibre and textile based materials. Notable expertise in non woven technology, polymeric reinforcement.

### CSIR MSM Metals and Metals Processes:
- Research and development in metals and alloys, with a focus on light metals, production, processing, and characterisation.

### CSIR National Laser Centre Laser Materials Processing Group:
- Development of technologies for laser welding, laser metals deposition, laser surface engineering and laser micro-processing.

### CSIR National Laser Centre Biophotonics Research Group:
- Primary focus is development and improvement of various therapeutic and diagnostic medical applications of lasers.

### CSIR NCNSM:
- Design, modelling, synthesis, characterisation and fabrication of nano-structured materials.

### CSIR MSM Sensor Science and Technology:
- Research and development of smart structures and materials from strategic basic research through to industrialisation.
<table>
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<tr>
<th>Contact persons</th>
<th>Beeuwen Gerryts</th>
<th>Willie du Preez</th>
<th>Francois Prinsloo</th>
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<tr>
<td>Position</td>
<td>CSIR Aerospace Initiative; Assistant NCP</td>
<td>Competency Area Manager, MSM</td>
<td>R&amp;D Contracts Manager, National Laser Centre</td>
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<tr>
<td>Tel</td>
<td>+27(0)12 841 4838</td>
<td>+27(0)12 841 4955</td>
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<tr>
<td>Email</td>
<td><a href="mailto:aerospace@csir.co.za">aerospace@csir.co.za</a></td>
<td><a href="mailto:gsnedden@csir.co.za">gsnedden@csir.co.za</a></td>
<td><a href="mailto:forinsloo@csir.co.za">forinsloo@csir.co.za</a></td>
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<td>Website</td>
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**Daliff Precision Engineering**

**About the organisation**

Established in 1972, Daliff Precision Engineering has become known as one of the leaders in the field of machined components for the aerospace, avionics/electronics and defence industries within South Africa.

The core of Daliff’s business strategy is ongoing R&D and the investment in new technology and equipment, not only to increase the available machining capacity, but to ensure that the capacity is internationally competitive.

**Capabilities/ Skills/ Expertise**

- Lean & Continuous Improvement Program
- Development of titanium machining technology.
- High speed machining of light alloys, with particular reference to cutter technology and clamping methods

**Materials worked**

- All ranges of aluminium
- All ranges of treatable and non treatable steels (including 17-4 PH, S/S, etc)
- All polymers
- Titanium
- Kvar
- Invar
- Inconel
- Molybdenum
- Tungsten-copper
- Carbon
- Bronzes (Al-, Ph-, etc.)

**Areas of interest**

Light metals and metals processing

**Contact person**

Rowland Chute

**Position**

Chairman

**Tel**

+27(0)21 386 1851

**Address**

17 Milan Street, Airport Industria, Cape Town
PO Box 292, Eppindust, 7475, South Africa

**Email**

rowland@daliff.co.za

**Website**

www.daliff.co.za
### Element Six (Pty) Ltd

**About the organisation**

Element Six is one of the leading suppliers of supermaterials – materials whose exceptional properties are unique or outperform others in their class. The group's products are used across a wide range of industries from mining and construction to consumer electronics, within medicine and for oil and gas production.

Business activities are organised into:
- Advanced Materials,
- Hard Materials,
- Oil & Gas and Technologies.

The company has production sites in the China, South Africa, Sweden, The Netherlands, Ukraine, Germany, Ireland and the UK with a global sales organisation. Research is carried out at dedicated laboratories in the UK and South Africa. The company has been working in the world of supermaterials for more than 50 years.

**International / Local activities**

Diamond tooling, PCBN tooling, application to metal, composite, fibre-reinforced, rock cutting, machining, wear parts, heat sinks

**Capabilities/ Skills/ Expertise**

- Behaviour understanding of machining science and tool failure.
- Analytical capability (SEM, XRD) Properties

**Areas of interest**

Flight physics, systems and equipment, maintenance and disposal, production

**Contact person**

Richard Bodkin

**Position**

Section Head - Behaviours and Properties

**Tel**

+27(0)11 812 9296

**Address**

Debid Road, Nuffield, Springs, 1559, Gauteng, South Africa

**Email**

richard.bodkin@e6.com

**Website**

[www.e6.com](http://www.e6.com)

### Jonker Sailplanes CC

**About the organisation**

The company was formally founded in 2004. The JS-1 Revelation sailplane was designed by Jonker Sailplanes at the School for Mechanical and Material Engineering of the North West University in Potchefstroom, which offered the advantages of a university environment, such as the state-of-the-art design software, testing facilities, a composite materials workshop etc.

The highly promising design phase was soon followed by work on the prototype. The company gained useful experience through its sailplane repair facility, renowned countrywide for its high quality work on composite sailplanes and motorgiders.

In 2003, the wing design of the JS-1 Revelation was completed and verified with the assistance of Delft University in Holland. It proved highly efficient and uncompromised. In 2005, Jonker Sailplanes officially moved to their new production facilities at Potchefstroom Airfield where the JS-1 Revelation racing sailplanes are now being produced. The company's large-bed CNC-milling machine is used for accurate in-house mould production. The facilities have been expanded to allow series production of the JS-1 Revelation following successful test flight and certification programs.

**International / Local activities**

Construction of sailplanes (gliders), maintenance on sailplanes

**Capabilities/ Skills/ Expertise**

- Design of gliders, construction with composite materials, maintenances and repairs of composite materials
- Aerodynamics
- Structural design
- Flutter testing
- Metal and composite manufacturing
- Services

**Contact person**

Uys Jonker

**Tel**

+27(0)18 285 1035

**Address**

P.O. Box 1575, Potchefstroom Airfield, Potchefstroom

**Email**

uys@jonkersailplanes.co.za

**Website**

[www.jonkersailplanes.co.za](http://www.jonkersailplanes.co.za)
### National Metrology Institute of South Africa (NMISA)

**About the organisation**

(NMISA) is responsible for maintaining the SI units and to maintain and develop primary scientific standards of physical quantities for SA and compare those standards with other national standards to ensure global measurement equivalence. It must also provide reference analysis in the case of a measurement dispute and maintain and develop primary methods for chemical analysis to certify reference materials for SA and the region.

**International / Local activities**

Feasibility studies for stations for monitoring greenhouse gas emissions
Nanomaterials measurement (emerging area)

**Capabilities/ Skills/ Expertise**

NMISA provides calibration, measurement and analytical services to its customers. The NMISA laboratories also provide consulting service for problem solving and the implementation of new systems in the metrology field. Proficiency testing schemes for calibration and testing laboratories under contract are also available. Some areas sell products, e.g. certified reference materials. Of particular relevance are:

- Certification of gas materials
- Analysis of trace impurities in gas mixtures

**Contact person**

Wynand Louw - Director
Tel +27(0)12 841 4152
Address Private Bag X34, Lynnwood Ridge, Pretoria, 0040
Email info@nmisa.org
Website www.nmisa.org

### Nelson Mandela Metropolitan University (NMMU)

**About the organisation**

The NMMU is a publicly-funded Higher Education Institution based in Port Elizabeth and George. The NMMU was formed from a merger between the Port Elizabeth Technikon and the University of Port Elizabeth in 2005, and offers a range of qualifications from certificate and diploma programmes to degree programmes, including postgraduate studies.

Within the School of Engineering, the Friction Processing Research Institute and the Automotive Components Technology Station focus on providing support for enterprises within the engineering and manufacturing sector. The entities have a specific focus on innovative technology development and transfer to grow knowledge in the field of friction processing, process optimisation, modelling, design and material testing and characterisation

**Capabilities/ Skills/ Expertise**

Manufacturing technology:
The focus of this research programme is the development and improvement of discrete part manufacturing processes, for the automotive and related industries.

Friction stir welding:
Friction Stir Welding (FSW) was invented at the World Centre for Materials Joining UK (TWI) in 1991 and is now being applied (under license) to an increasing number of joining applications worldwide primarily in aluminium alloys, although several facilities (including the NMMU) have reported results on Titanium alloys and steels. The main advantage of the FSW process is the improved fatigue life of the resultant component compared to conventional fusion welding processes. The Friction Stir Welding (FSW) process development system at NMMU is a leading edge system developed by MTS Systems Corporation. The platform provides the research team at NMMU with advanced capability and versatility to explore a wide range of FSW technology applications and facilitate the transition of FSW from the laboratory to the production floor.

**Areas of interest**

Friction stir welding, fatigue testing and machining of titanium (Ti6Al4V)

**Contact person**

Proffessor Danie. G. Hattingh
Position Associate Professor, Director: Centre for Manufacturing and Mechatronics
Tel +27(0)41 504 9122
Address Automotive Components Technology Station (ACTS), Nelson Mandela Metropolitan University, Summerstrand (North), Gardham Avenue, M-block, Room M038
Email Danie.Hattingh@nmmu.ac.za
Website www.nmmu.ac.za
### South African Airways Technical (SAAT)

**About the organisation**

SAAT Technical (SAAT), a full-service maintenance, repair and overhaul organisation is the largest and most advanced maintenance provider on the African continent. SAAT Technical has more than 30 years experience in the field as a world-class aircraft maintenance organisation. The company has had full, and uninterrupted, FAA certification, since the late nineteen eighties, serving an increasing number of local and international airlines.

While its main operations comprise extensive premises at Johannesburg International Airport, it also services customers at Cape Town, Durban and smaller airports.

SAAT Technical has a staff complement of 2904, two thirds of which are maintenance-related staff, with a strong base of technical and engineering skills. The remainder form the support structure, including engineering, logistics, quality assurance, finance and human resources.

### Capabilities/ Skills/ Expertise

- In-service technical problems on aircraft
- MRO and cargo conversions

### Areas of interest

- Composite materials

### Contact person

Dave van Zutphen

**Position**

Senior Manager

**Tel**

+27(0)11 978 9993; +27 (0) 11 978 9007

**Address**

Private Bag x12, Room 309, Hangar 8, O R Tambo International Airport, 1627

**Email**

davevanzutphen@flysaa.com; SATMarketing@flysaa.com

**Website**

http://www.flysaa.com/saa_technical/

### Stellenbosch University (SUN)

**About the organisation**

Electronic Systems Laboratory (ESL):

ESL is a Computer and Control Systems Group laboratory in the Department of Electrical and Electronic Engineering at the University of Stellenbosch. It provides opportunities to graduate students and industries to become involved in joint developments of significant size. ESL aims to maintain skills in computers, data communications, imaging and system simulation through prototype developments with industry.

Centre of Expertise (CoX) in Autonomous Flight:

The ESL forms a major part of the CoX in Autonomous Flight at Stellenbosch University. The CoX specialises in developing and implementing complex embedded control, automation and information systems.


### Areas of interest

- Fixed wing control
- Rotary-wing control
- Airship automation
- Regulation and Certification
- Path planning
- Onboard diagnosis
- Collision avoidance
- System ID
- Experimental vehicle control
  - CR Ducted Fan
  - Tilt-wing VTOL
- Support
- Avionics and simulation

### Contact person

Thomas Jones

**Position**

Associate Professor

**Tel**

+27(0)21 808 4319

**Address**

Stellenbosch University, Private Bag X1, Matieland, 7602

**Email**

Jones@sun.ac.za

**Website**

www.esl.ee.sun.ac.za
### About the organisation

**Blast Impact and Survivability Research Unit (BISRU):**  
In 2003, BISRU was accredited as a formal research group; primarily due to a request from industry to form a Centre of Excellence in Blast Protection and Survivability. The objective of BISRU is engineering research that saves lives - in particular in scenarios where humans are subjected to blast and impact situations.

The objective of the research work during the past 25 years has been and continues to be to strive to reduce risk of injury and save lives through fundamental principles of science and engineering, using experimental, analytical and computational tools and techniques to understand the mechanics and dynamics of blast and impact loads.

**Aeronautical Research Group:**  
The Department of Mechanical Engineering has recently embarked on a number of research projects in the field of aeronautical engineering.

Although the BSc(Eng) in mechanical engineering at the University of Cape Town is a general degree without specialisation and the Department had not been doing much aeronautical research in the past. The appointment of Professor Chris Redelinghuys a few years ago has led to the establishment of such a research focus. Chris’ formal postgraduate education has been in the field of aeronautical engineering and he has substantial local and international industrial experience in flight vehicle simulation and design, particularly related to flight mechanics and applied aerodynamics. He is currently the Western Cape Representative of the National Aerospace Centre.

**Sasol Advanced Fuels Laboratory:**  
The focus of the Sasol Advanced Fuels Laboratory is on medium to long-term synthetic-fuel applications research. There is also a conscious intent to build capacity for Sasol’s future growth. The research work entails the study of combustion in engines, and it ranges from the study of current synthetic fuels in current engines to future fuels and future engine concepts.

- Core capabilities include the application of synthetic fuels to current and future engine technologies and fuel and engine based research.
- Infrastructure includes gas turbine test cell; emissions monitoring; combustion visualisation.
- Research programmes are focused on semi- and fully synthetic jet fuel.

### Capabilities/ Skills/ Expertise

- Corrosion, wear, and thermal testing
- Fibre metal laminates
- Heat treatment and specimen preparation
- Semi- and fully synthetic jet fuel
- Analytical, computational and experimental analysis of blast events, including transportation accidents
- Development of new metal alloys, polymers, ceramics and hard materials
- Flight mechanics and applied aerodynamics
- Fracture mechanics research
- Fuel and engine based research
- Materials characterisation and development of new materials
- Theoretical and computational modelling of structural mechanics and fluid dynamics.

### Areas of interest

- Aerodynamics and aircraft design

### Contact persons

<table>
<thead>
<tr>
<th></th>
<th>Professor Gerald Nurick (BISRU)</th>
<th>Professor Chris Redelinghuys (Aeronautical Research Group)</th>
<th>Adjunct Professor Andy Yates</th>
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<tbody>
<tr>
<td><strong>Tel</strong></td>
<td>+27(0)21 650 3234</td>
<td>+27(0)21 650 2699</td>
<td>+27(0)21 650 2699</td>
</tr>
<tr>
<td><strong>Address</strong></td>
<td>Faculty of Engineering and the Built Environment, Private Bag X3, Rondebosch, 7701</td>
<td>Faculty of Engineering and the Built Environment, Private Bag X3, Rondebosch, 7701</td>
<td>Faculty of Engineering and the Built Environment, Private Bag X3, Rondebosch, 7701</td>
</tr>
<tr>
<td><strong>Email</strong></td>
<td><a href="mailto:Gerald.Nurick@uct.ac.za">Gerald.Nurick@uct.ac.za</a></td>
<td><a href="mailto:Chrisiaan.Redelinghuys@uct.ac.za">Chrisiaan.Redelinghuys@uct.ac.za</a></td>
<td><a href="mailto:Andy.Yates@sasol.com">Andy.Yates@sasol.com</a></td>
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<td><strong>Website</strong></td>
<td><a href="http://www.bisru.uct.ac.za">www.bisru.uct.ac.za</a></td>
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<td><a href="http://www.saf@uct.ac.za">www.saf@uct.ac.za</a></td>
</tr>
</tbody>
</table>
### University of Johannesburg (UJ)

**About the organisation**

UJ is situated in Johannesburg, Gauteng Province. The Engineering Faculty is constituted of various departments. The research activities are multi-disciplinary and include Electrical, Electronic and Mechanical Engineering.

UJ has a well-established infrastructure for research on optical fibre sensors and optical fibre communication and has published extensively in these fields, both at local and international conferences and in accredited journals over a period of several years. A number of patents have been registered.

Currently, research is focused also on the application of fibre optics to transducers for various applications including inertial measurement units for aerospace applications.

**Capabilities/ Skills/ Expertise**

#### Transducers based on optical fibre sensors

- **Measurement of force, moment, pressure, acceleration, temperature and torque** has been achieved, with particular emphasis on the reduction of electromagnetic interference (EMI) and thermal effects where it is particularly negative to measurement accuracy or ability. The measurements can be carried out in rotating or stationary scenarios without the loss of accuracy or introduction of significant noise on the measured signal (no slip rings or telemetry involved). A large number (100 or more) of different parameters can be measured and transmitted through a single fibre. The sensors measure strain to a sensitivity of 1 micro-strain and frequency up to 250 Hz. The application of optical fibre sensors in wind tunnel balances with improved accuracy, stiffness and reduced temperature effects has been studied and demonstrated. Temperature changes can be tracked to 4000 °C per second at temperatures below 200 °C. Optical fibre sensors can be imbedded in composite materials and composite thermo-plastics for use in structural testing, operational testing and health monitoring. The applications include aerostructures on engines and engine components.

#### Smart material activators

- **Developmental research** has been conducted in this field for the past five years particularly aimed at small deflections of small components (MEMS) at high frequencies. This work can be applied in flight control, excitation of vibration (flutter testing) and active flutter damping. The actuators can be linear or rotational. Piezoelectric actuation is employed. The research activities currently also focus on the use of electroactive polymers for actuation. The sensors/transducers and actuators together offer a wide spectrum of potential applications in high frequency measuring/control systems for safety, health monitoring and performance in aeronautics.

#### Machining of titanium alloys

- **Light weight metallic materials such as titanium, aluminium and magnesium** are used extensively in the aerospace industry. They are usually subjected to stringent design and operational requirements, which are usually a function of the manufacturing process followed. The effect of high performance machining (including high speed machining) on the surface integrity of certain titanium alloys is currently being investigated. Thermodynamic and mechanical aspects relating to these high performance machining processes are also being evaluated. The studies involve experimental testing and numerical modelling of the influence of various parameters on the machinability of titanium alloys.

### Areas of interest

- Smart composites

### Contact person

**Prof Japie van Wyk**

**Tel**

+27(0)11 559 2109 / +27(0)11 489 2424

**Address**

Dept of Mechanical Engineering, PO Box 524, Auckland Park, 2006

**Email**

japievw@uj.ac.za

**Website**

www.uj.ac.za
### University of KwaZulu-Natal (UKZN)

**About the organisation**

UKZN's School of Mechanical Engineering has a number of aerospace-related projects underway:
- work on aerospace thermal management systems;
- building of a hybrid-fueled sounding rocket;
- development of an airship-type unmanned aircraft and
- an investigation of gas turbine flow dynamics in conjunction with the CSIR.

**Capabilities/ Skills/ Expertise**

- Development of smart bolts for mining and aerospace applications, amongst other smart load sensors
- Control engineering
- Focus on refining and improving properties of smart materials, primarily TRIP steels, for use as structural health monitoring sensors
- Quantitative feedback design, interaction, multiloop control, system integration

**Areas of interest**

- Control related
- Modular large scale systems

**Contact person**

Edward Eitelberg

**Position**

Professor

**Tel**

+27(0)31 260 2762

**Address**

King George V Avenue, Glenwood, Durban

**Email**

etelberg@ukzn.ac.za

**Website**

www.ukzn.ac.za

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### University of Limpopo (UL)

**About the organisation**

The Materials Modelling Centre at the University of Limpopo was established a decade ago with the support of the NRF, The Royal Society, CSIR and Eskom, while several other organisations came on board later. In computational modelling of materials, advanced computers and special softwares are used to predict properties of and uses for new materials applicable in the energy, manufacturing, transportation and minerals sectors, before they are made physically in laboratories. This approach has significant cost-reduction and safety benefits in industries and predictions.

The centre uses a variety of state-of-the-art computational modelling techniques in application to energy storage devices, minerals, metal alloys and polymers. The hi-tech modeling procedures have helped towards understanding the properties of platinum-based and other alloys, as well as the complex processes relating to platinum group metals separation and beneficiation. The centre's philosophy is to follow the current trend of modelling across length and time scales, a procedure that involves feeding information from quantum mechanical to classical scales, as well as to mesoscopic and macroscopic scales, and studying the exchange of information between these layers.

**Capabilities/ Skills/ Expertise**

- Computational modelling of precious metal alloys
- Aero structures

**Areas of interest**

Investigation of titanium, light weight components

**Contact person**

Dr Hasani Chauke

**Position**

Senior Researcher

**Tel**

+27(0)15 268 2206

**Email**

chauke@ul.ac.za

**Website**

www.ul.ac.za
The Faculty of Engineering, Built Environment and Information Technology at UP is a leading and dynamic faculty that is one of the foremost providers of high-level intellectual capital and research in the country. The Faculty is renowned for its unique approach to innovation, its international status and links with industry.

The Department of Mechanical and Aeronautical Engineering is one of 14 departments in the Faculty of Engineering, Built Environment and Information Technology, and is the largest Department of Mechanical Engineering in South Africa.

Three Groups operate in the aeronautics research domain: Dynamic Systems, Thermofluids Research and Design and Manufacturing.

<table>
<thead>
<tr>
<th>Capabilities/ Skills/ Expertise</th>
<th>Dynamic Systems Group:</th>
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<tbody>
<tr>
<td></td>
<td>• Damage detection, vibration monitoring and control</td>
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<th>Areas of interest</th>
<th>Dynamic Systems Group</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>• Vibration monitoring and diagnostics</td>
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<td></td>
<td>• Vibration measurement and analysis</td>
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<td>• Structural dynamic design and analysis</td>
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<td>• Vehicle dynamics</td>
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<td>• Computational solid mechanics.</td>
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<tr>
<td>Thermofluids Research Group</td>
<td>• Enhanced heat transfer</td>
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<td></td>
<td>• Electronics cooling</td>
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<td></td>
<td>• Micro channel condensation</td>
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<td></td>
<td>• Optimisation with constructal theory.</td>
</tr>
<tr>
<td>Design and Manufacturing Group</td>
<td>The Group is also actively involved in the establishment of a centre of excellence for mining machinery and equipment and running the mechanical workshops of the Department, which also acts as a manufacturing facility for the Faculty. Areas of interest include:</td>
</tr>
<tr>
<td></td>
<td>• Mine health and safety</td>
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<td></td>
<td>• Biomechanics</td>
</tr>
<tr>
<td></td>
<td>• Lubricity of characteristics of diesel fuel.</td>
</tr>
</tbody>
</table>
## University of the Witwatersrand (WITS)

Wits has established itself at the industrial and commercial heart of South Africa as a centre for education and research of the highest quality. Wits’ mission is to build on this foundation in a way that takes account of its responsibilities within South Africa today; and to maintain and enhance its position as a leading university in South Africa, in Africa, and in the world by sustaining globally competitive standards of excellence in learning, teaching and research.

One of the major developments in departmental activities was the introduction in 1962 of a part-time postgraduate coursework programme in Industrial Engineering leading to the Graduate Diploma in Engineering degree. In 1971, an Aeronautical Engineering degree was offered for the first time as an alternative to the Mechanical Engineering degree, with sponsorship from the aeronautical industry.

The School of Mechanical, Industrial and Aeronautical Engineering is also host to the National Aerospace Centre (NAC) (formerly the National Aerospace Centre of Excellence (NACoE)), and the Aerospace Manufacturing Processes and Materials group (AMPM).

Founded in 2005 under the Aerospace Industry Support Initiative (AISI) of the Department of Trade and Industry (DTI), the National Aerospace Centre is in a special class of centres (centres of excellence) which aim to further the interests of a particular industry at the highest levels by leveraging government funding in research initiatives further to the government’s goal of creating a knowledge-based economy in South Africa. This includes promoting participation by South African universities, universities of technology and companies in contract research and development for industry giants such as Airbus Industrie and Boeing, as well as partnerships with various European universities and companies.

Originally a focus area within the NAC, the Aerospace Manufacturing Processes and Materials group is now an semi-autonomous entity under the directorship of Mr Philip Haupt AMPM primarily engages in promoting development within the South African aerospace manufacturing sector.

### Capabilities/ Skills/ Expertise

- Aerodynamic and structural design
- Control systems
- Fundamental research into flow phenomena with a focus on unsteady and compressible flows
- Experimental and analytical modelling of composites
- Modelling of metallurgy and materials
- Programme for development of aerospace materials and manufacturing processes, with local and international partners

### Areas of interest

- Flight physics, propulsion, design systems and tools
- Development of an ultralight aircraft
- Flexible wing tips
- Maching optimisation
- Materials modelling (turbine and process modelling, life assessment)
- Research in aeronautics and aerodynamics
- Residual stresses in composites, environmental degradation, dynamic stress concentration
- Shock wave dynamics (supersonic flight)
- Titanium beneficitation (alloy development, processing, characterisation)
- UAV in-flight refuelling

### Contact person:

**Professor Ted Moss**

**Position**

Head of School

**Tel**

+27 (0)11 717 7332

**Address**

Private Bag 3, Wits, 2050

**Email**

Edward.moss@wits.ac.za

**Website**

[www.wits.ac.za/academic/ebe/Mecheng](http://www.wits.ac.za/academic/ebe/Mecheng)
3.5 Safety
(Ensuring customers satisfaction and safety)

Improving air transport safety and security means ensuring that irrespective of the growth of air traffic, there will be fewer accidents and aircraft will be more secure against hostile actions.

Under FP7, research under this theme will seek to attain quantum leaps in passenger choice and schedule flexibility, while achieving a five-fold reduction in accident rate. New technologies will enable a wider choice of aircraft / engine configurations ranging from very large, wide-body airliners, medium size craft, business jets, tilt-rotor aircraft, to personal small-size vehicles with the highest levels of safety as well as comfort, health conditions and services. Research will include the adaptation of airport and air traffic operations to 24-hour utilisation at acceptable community noise levels.

This theme relates to the 'Highly Customer-Orientated High Level Target Concept' of ACARE’s Strategic Research Agenda, in particular focusing on the safety objective.

South African organisations have interest and capabilities in the following:

- Accident research
- Automatic onboard conflict recognition
- Autonomous flight
- Communications, navigation and surveillance (CNS)
- Controller pilot data link communication (CPDLC)
- Integrated surveillance systems

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**African Astronautics (Afrinautics)**

Afrinautics is a new company populated with seasoned and experienced professionals and entrepreneurs who have come together with the singular intention of bringing advanced surveillance and security technology solutions to the global marketplace to help ensure the safety of all individuals. African Astronautics has met with representatives of the defence, civil and private sectors across South Africa and the Southern African Development Community to discuss their respective needs for airborne surveillance and security solutions.

The representative customer requirements are diverse and cut across a number of technological and jurisdictional domains, which include, among others, defense, law enforcement, exclusive economic zones and environmental. African Astronautics also provide turnkey solutions, which include diverse airborne platforms, integrated sensors, comprehensive training and supply chain logistics support to multiple government entities seeking to establish a national program. In addition, African Astronautics will provide training and life cycle support for all programs.

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Capabilities/ Skills/ Expertise

Airborne surveillance and security related products and services for the defence, civil and private sectors in Africa, Middle East, Latin America and Asia.

Regional and national security demands the utilisation of a range of technologies from manned to unmanned systems, which will provide near- and real-time information on a common operational picture. The platforms include commercial satellites, tethered aerostats, aircraft, and unmanned aerial vehicles. The platforms are capable of hosting a range of sensors such as electro-optical, near infrared, and synthetic aperture radar, which support day/night, all weather surveillance. In addition, these systems are configured with line of sight and/or satellite communications equipment to support the dissemination of the information. The mission systems have been designed to support land, air, and sea surveillance and security operations.

A range of security sensors and information management systems to provide technologies in support border control, diplomatic visits, sports events, critical infrastructure such as inner city streets, airports, ports/harbours, etc.

Areas of interest

- Integrated spatial security solutions, air transport solutions
- Avionics, guidance and control

Contact person

Etienne Louw

Position

Director, Spatial security solutions

Tel

+27(0)12 844 0900

Address

Unit U18, Enterprise Building, The Innovation Hub, Pretoria, 0087
70 Okapi Rd, Monument Park, Pretoria, 0181

Email

elouw@afrinautics.com

Website

www.afrinautics.com

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Advanced Technologies and Engineering (ATE)

About the organisation

ATE is a private South African company with 20 years of experience in initiating and executing large and complex defence programs world-wide, offering integrated solutions up to platform level. ATE customises aircraft and defence systems to suit new program and upgrade requirements:

- Fixed wing combat and trainer aircraft
- Combat and transport helicopters
- Armoured vehicle systems
- Unmanned Air Vehicles (UAVs)

Capabilities/ Skills/ Expertise

- International systems house, integrating, developing and manufacturing complete systems.
- SA R&D focused on avionics and navigation
- Large development and production facility

Areas of interest

Development and production of:

- navigation systems
- tactical UAVs
- avionics systems
- composite helicopter rotor blades.

Contact person

Dr Jim Huston

Tel

+27(0)11 266 7715

Address

998 – 16th Road, Halfway House, 1685

Email

jim.huston@ate-aerospace.com

Website

www.ate-group.com
### Cape Peninsula University of Technology (CPUT)

**About the organisation**

The Smart Alignment Systems Research Group (SASRG) in the Department of Mechanical Engineering is a National Research Foundation (NRF) funded project and falls within the Institution's advanced manufacturing niche focus area. The group's main technology focus lies in the development of smart and adaptive materials and structures.

The Department is also involved in Advanced Manufacturing Technologies with specific focus on tooling design and manufacture, rapid prototyping and rapid manufacturing.

**Capabilities/ Skills/ Expertise**

- **Shape Memory Alloys (SMAs)** embedded into polymer/ glass fibre composites/carbon fibre composites, which effectively create an adaptive structure. Work which initially led to a Doctorate in Technology (DTech) is now being carried out on 'teaching/training' these alloys to perform as actuators.

- **Fibre Optic technology** is a subject actively researched in the SASRG, exemplified by the work of embedding optical fibres into modern lightweight composites with a view to detecting unwanted excessive displacement, crack initiation and propagation. This work, which initially earned a DTech, led to the current activity, at M Tech level, in more specialised applications, including the use of fibre optics encoded with Bragg gratings. This work renders increased sensitivity to the optic fibre as a sensor which will signal the SMAs to respond as actuators in morphing the surface or "healing" a crack etc.

- **Piezoelectric materials**, commercially available, fulfil another range of activity for sensors and actuators, compared to the basic function of SMAs as actuators. The subject is receiving focused attention at CPUT with a number of research projects in progress. The complex behaviour exhibited by piezoelectric material is a desirable feature for components utilised in industrial manufacturing processes, particularly in the aerospace and automotive industries. Examples of applications include the tiny accelerometers used in automotive impact safety airbags; the small gyroscopes used for the directional control of vehicles, helicopters or unmanned UAVs; tiny vibration controllers or micropumps.

- **Micro Electrical Mechanical Systems (MEMS)** describe most of the above-mentioned activities of the SASRG. The design of components for such micro systems is an extremely exacting and very specific activity, requiring sophisticated computer capability. Typical devices include MicroGyros, MicroAccelerometers, and MicroBolometers. A commercial, state-of-the-art, software package has been acquired and used by researchers.

- **Rapid Prototyping Technologies** are used in the manufacture of complex shaped components used in the Aerospace Industry. The SASRG utilises the three prototyping machines in the Department of Mechanical Engineering to achieve this goal.

**Areas of interest**

Shape memory alloys, piezoelectric smart materials, fibre optic technology, micro electrical mechanical systems, rapid prototyping technologies, re-configurable or morphing wings for use on UAVs.

**Contact person**

Keith Jacobs

**Position**

Associate Dean: Faculty of Engineering

**Tel**

+27(0)21 959 6757

**Email**

JacobsK@cput.ac.za

**Website**

www.cput.ac.za; www.adaptronics.co.za

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### Citijet Air Charter (Pty) Ltd Hyperspectral Aviation (Citijet)

**About the organisation**

Providing aerial platform, i.e. aircraft, helicopters for survey, sensor fitment and operating

**Capabilities/ Skills/ Expertise**

Safe operation of aircraft and helicopters for aerial survey and sensor platforms

**Areas of interest**

Aircraft and helicopter fitment of pods and substructures

**Contact person**

Bo Burger

**Position**

CEO

**Tel**

+27(0)11 659 0914

**Email**

boburg@worldonline.co.za
## Council for Scientific and Industrial Research (CSIR)

### About the organisation

CSIR is a uniquely South African organisation, committed to innovation. It provides technology solutions and information to support sustainable development and economic growth in the context of national priorities.

### International/ local activities

- 3D laser build up of Inconel alloys
- Carbon nanotubes
- Casting of thin-walled structures
- Casting processes for aerospace components
- Development and improvement of accident research methods in the southern African region
- Development of NDT techniques for composites
- Efficient and sustainable air transport network design. Operations and business model design
- Environmentally friendly civilian aircraft engines - partner in FP6 project VITAL
- Feasibility of sky liberalisation in Africa
- Femtosecond laser micromachining
- Laser cladding and welding
- Partner in Fantasia FP6 programme
- Piezoelectric actuators and motors
- Polymer nanocomposites
- Powder based processing of titanium alloys
- Processes for the primary production of titanium
- Natural fibre reinforced composites for aerospace industries
- Semi-solid metal forming of aluminium and magnesium alloys
- Silicon nanoparticle synthesis
- Surface modification of ceramics and intermetallics
- THz Photonics for passenger scanning (contraband and weapons)
- UAV design and development

Framework Programme project participation:
- VITAL
- FANTASIA
- EUDEULAS
- FUTURE
- FFAST

### Capabilities / Skills / Expertise

**CSIR DPSS:Aeronautic Systems Group:**
- Numerical, experimental and structural aerodynamics research and modeling
- Advanced fluid-structure interaction modeling
- Advanced free surface modeling
- Multidisciplinary design and optimisation
- Aeroelasticity, flutter prediction and flutter flight tests
- Turbomachinery design and analysis,
- Aerodynamic test and evaluation, and characterisation CFD, and wind-tunnel testing.

**CSIR Materials and Manufacturing - Fibres and Textiles:**

**CSIR MSM Metals and Metals Processes:**
- Research and development in metals and alloys, with a focus on light metals, production, processing, and characterisation.

**CSIR National Laser Centre Laser Materials Processing Group:**
- Development of technologies for laser welding, laser metals deposition, laser surface engineering and laser micro-processing.

**CSIR National Laser Centre Biophotonics Research Group:**
- Primary focus is development and improvement of various therapeutic and diagnostic medical applications of lasers.

**CSIR NCNSM:**
- Design, modelling, synthesis, characterisation and fabrication of nano-structured materials.

**CSIR MSM Sensor Science and Technology:**
- Research and development of smart structures and materials from strategic basic research through to industrialisation.
**Elmer Group**

Elmer Airport Systems (EAS) is an independent consulting and airport engineering and airline consulting company and has considerable experience in airport upgrades and construction. EAS was founded in 2001 in order to address the growing requirement for a full service turn-key systems integrator for upgrading, as well as construction of new, airports in Africa and the Middle East.

EAS has access to solutions and systems that provide the client with complete command and control of all aspects of the airport, and is also able to provide solutions for airline owners and managers. EAS is able to integrate systems into a solution that exactly meets the need of the client today and is expandable into the foreseeable future:

- **Landside** - vehicles arriving and parking, drop off and pick up zones, check-in and commercial areas, security systems;
- **Airside** – movement of all vehicles on the apron, taxiway and runway areas, emergency services provision, air traffic control, perimeter security, logistics (such as fuel, food, cleaning, baggage and cargo, etc.);
- **Airlines** – avionics; check-in systems – baggage and cargo handling, security, biometric controlled access; assessments of present operating systems; start up of new airlines and revitalisation existing airlines; Business Plans; routes, PAX, feasibility studies, expansion studies; integration – baggage handling, catering, technical services; airline operations; agency – travel, service, cargo

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**Contact persons**

<table>
<thead>
<tr>
<th>Name</th>
<th>Position</th>
<th>Tel</th>
<th>Email</th>
</tr>
</thead>
<tbody>
<tr>
<td>Beeuwen Gerryts</td>
<td>CSIR Aerospace Initiative; Assistant NCP</td>
<td>+27(0)12 841 4838</td>
<td><a href="mailto:aerospace@csir.co.za">aerospace@csir.co.za</a></td>
</tr>
<tr>
<td>Willie du Preez</td>
<td>Competency Area Manager, MSM</td>
<td>+27(0)12 841 4955</td>
<td><a href="mailto:gnedden@csir.co.za">gnedden@csir.co.za</a></td>
</tr>
<tr>
<td>Francois Prinsloo</td>
<td>R&amp;D Contracts Manager, National Laser Centre</td>
<td>+27(0)12 841 4448</td>
<td><a href="mailto:fprinsloo@csir.co.za">fprinsloo@csir.co.za</a></td>
</tr>
</tbody>
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**Denel Dynamics**

Denel Dynamics, a division within the Denel Group, is a leader in systems technology. The core business covers tactical missiles, precision-guided weapons and unmanned aerial vehicles. Denel Dynamics has successfully developed, produced, integrated and supported electronic and mechanical engineering systems since 1963, establishing a sound technology base and infrastructure along the way.

As a leader in systems technology, the business has extensive experience in developing tactical missiles and precision-guided weapon systems for South Africa and the international market. A major milestone achieved in 2009 was the successful flight trial of the 5th generation short-range A-Darter air-to-air missile; a joint development programme with Brazil. The genuinely inclusive nature between the teams of these two countries to develop this missile is highly commended by the leadership of both countries.

Denel Dynamics is also dedicated to the domain of unmanned aerial vehicles (UAVs). In revealing its more advanced Seeker 400 in 2008, the company reinforced its position as a leader in the area of tactical UAVs.

A wide range of products along with world-class facilities, excellent customer support record and a formalized quality control system (e.g. ISO 9001 and 14000), add up to an impressive capability in the design, development, manufacture, supply and provision of services.

**Capabilities/ Skills/ Expertise**
- Development, integration and production of electronic and mechanical defence systems
- Relevance in development of UAVs

**Areas of Interest**
- Autonomous flight

**Contact person**
- Jan Wessels - CEO

**Tel**
- +27(0)12 671 1001

**Address**
- PO Box 7412, Centurion, 0046

**Website**
- www.deneldynamics.co.za
### SRS Aviation

#### About the organisation
SRS Aviation provides a variety of convenient, personalised and secure air charter services.
Passenger lists, background and baggage checks are controlled and conducted by select personnel. The company is able to add further value to the service by offering exclusive, preferred departure and arrival times so that clients can board directly from ground transportation, ensuring privacy and comfort at all times.

SRS Aviation also offers 24-hour operational support, which includes weather, flight tracking and contingency planning.

#### Capabilities/ Skills/ Expertise
- Passenger and charter services development

#### Areas of interest
- Passenger safety

#### Contact person
- Rhulani Sambo
- Position: Operations manager
- Tel: +27(0)11 794 6484
- Address: 712 Puttik Avenue, Sundowner x11, Randburg 2154, South Africa
- Email: sambo@srsaviation.co.za
- Website: www.srsaviation.co.za
Stellenbosch University (SUN)

About the organisation

Electronic Systems Laboratory (ESL):
ESL is a Computer and Control Systems Group laboratory in the Department of Electrical and Electronic Engineering at the University of Stellenbosch. It provides opportunities to graduate students and industries to become involved in joint developments of significant size. ESL aims to maintain skills in computers, data communications, imaging and system simulation through prototype developments with industry.

Centre of Expertise (CoX) in Autonomous Flight:
The ESL forms a major part of the CoX in Autonomous Flight at Stellenbosch University. The CoX specialises in developing and implementing complex embedded control, automation and information systems.


Areas of interest

- Fixed wing control
- Rotary-wing control
- Airship automation
- Regulation and Certification
- Path planning
- Onboard diagnosis
- Collision avoidance
- System ID
- Experimental vehicle control
  - CR Ducted Fan
  - Tilt-wing VTOL
- Support
- Avionics and simulation

Contact person

Thomas Jones
Associate Professor
+27(0)21 808 4319
Stellenbosch University, Private Bag X1, Matieland, 7602
jones@sun.ac.za
www.esl.ee.sun.ac.za
Capabilities/ Skills/ Expertise

• Aerodynamic and structural design
• Control systems
• Fundamental research into flow phenomena with a focus on unsteady and compressible flows
• Experimental and analytical modelling of composites
• Modelling of metallurgy and materials
• Programme for development of aerospace materials and manufacturing processes, with local and international partners

Areas of interest

• Flight physics, propulsion, design systems and tools
• Development of an ultralight aircraft
• Flexible wing tips
• Maching optimisation
• Materials modelling (turbine and process modelling, life assessment)
• Research in aeronautics and aerodynamics
• Residual stresses in composites, environmental degradation, dynamic stress concentration
• Shock wave dynamics (supersonic flight)
• Titanium beneficiaiton (alloy development, processing, characterisation)
• UAV in-flight refuelling

Contact person: Professor Ted Moss
Position: Head of School
Tel: +27 (0)11 717 7332
Address: Private Bag 3, Wits, 2050
Email: Edward.moss@wits.ac.za
Website: www.wits.ac.za/academic/ebe/Mecheng
3.6 Security
(Protection of aircraft and passengers)

Research in this theme will be aimed at enhancing protection measures including preventing hostile action and aircraft misuse. Topics will include security measures in the cabin and cockpit designs and automatic control, as well as security aspects of airspace management and airport operations.

The aim is to make a successful attack of any kind on an aircraft causing injury, loss, damage or disruption to travellers or other citizens impossible. This research theme will address aircraft security systems including cockpit and cabin monitoring and protection, as well as controlled aircraft operation and landing from the ground, secured airspace management and communication networks, as well as airport security systems. Protection of aircraft and passengers is paramount and the systems will include improved data and identification methods, auto recovery and improved security design of aircraft. The theme corresponds to ACARE’s Ultra Secure Air Transport System High Level Target Concept.

South African organisations have interest and capabilities in the following:

- Communication
- Contraband detection
- Data links

### Advanced Technologies and Engineering (ATE)

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<thead>
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<td>• Unmanned Air Vehicles (UAVs)</td>
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<tr>
<td>Capabilities/ Skills/ Expertise</td>
<td>International systems house, integrating, developing and manufacturing complete systems. SA R&amp;D focused on avionics and navigation Large development and production facility</td>
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<tr>
<td>Areas of interest</td>
<td>Development and production of:</td>
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<td></td>
<td>• navigation systems</td>
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<tr>
<td>Contact person</td>
<td>Dr Jim Huston</td>
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<tr>
<td>Tel</td>
<td>+27(0)11 266 7715</td>
</tr>
<tr>
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### Capabilities/ Skills/ Expertise

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A range of security sensors and information management systems to provide technologies in support border control, diplomatic visits, sports events, critical infrastructure such as inner city streets, airports, ports/harbours, etc.

### Areas of interest

- Integrated spacial security solutions, air transport solutions
- Avionics, guidance and control

### Contact person

**Etienne Louw**

**Position**

Director, Spatial security solutions

**Tel**

+27(0)12 844 0900

**Address**

Unit U18, Enterprise Building, The Innovation Hub, Pretoria, 0087
70 Okapi Rd, Monument Park, Pretoria, 0181

**Email**

elouw@afrinautics.com

**Website**

www.afrinautics.com
## ANSYS

### About the organisation
ANSYS offers high technology, harsh environment, control, measurement and process improvement systems incorporating a wide range of electronic, electro-optic and software technologies. The company offers complex, rail trackside measurement, communication and signalling to Transnet, Metrorail and the mining industry.

Weapon system integration, thermal and visual surveillance / sighting imaging systems and stabilised platforms for air, land and sea applications are on offer. To industrial and security corporate, thermal imaging, process measurement, maintenance automation and other systems are on offer.

### Capabilities/ Skills/ Expertise
- Development of health and condition monitoring systems for vehicles, buildings and production process plants
- Design and integration of monitoring and control systems in the rail, defence and industrial environments
- Rail trackside measurement, communication and signalling to Transnet, Metrorail and the mining industry
- Thermal and high performance visual imaging sensors for defence, security and industrial use
- Automated maintenance systems for critical infrastructure owned by State and large companies
- Manufacturer of precision optical components and subassemblies

### Areas of interest
Aircraft condition monitoring systems

### Contact Information
- **Tel:** +27(0)12 346 3141
- **Address:** PO. Box 95361, Waterkloof, Pretoria, 0145
- **Email:** geninfo@ansys.co.za
- **Website:** www.ansys.co.za

## African Defence Systems (ADS)

### About the organisation
ADS was established in 1994 resulting from the merger of Teklogic (Pty) Ltd and UEC Projects (Pty) Ltd into Altech Defence Systems (Pty) Ltd. The company was subsequently acquired by Thales International, the third largest defence company in the world, in 1999 and renamed African Defence Systems (Pty) Ltd.

ADS through Teklogic and UEC, has over 35 years experience as a development and systems integration contractor to the South African National Defence Force, as well as other government and para-statal organisations and executes contracts for foreign defence clients.

### Capabilities/ Skills/ Expertise
- Cost effective turnkey systems in its core business of command and control, and associated training solutions in the defence of land, sea and air
- Design, development and integration and support of sophisticated, high-technology electronics for defence applications
- Providing enhancements and upgrades to existing systems
- Maintenance and support services

### Areas of interest
Advanced manufacturing of aircraft control and command systems

### Contact Information
- **Contact person:** Francois Lopez
- **Tel:** +27(0)11 313 91 23
- **Address:** 968 Richards Rd, Halfway House, Midrand, 1685
- **Email:** francoisl@adsmr.co.za
- **Website:** www.ads.co.za
### Cobham Satcom

**About the organisation**

Cobham's products and services have been at the heart of sophisticated military and civil systems for more than 75 years, keeping people safe, improving communications, and enhancing the capability of land, sea, air and space platforms. The company has four divisions employing more than 12,000 people on five continents, with customers and partners in more than 100 countries and annual revenue of some £1.9bn / US$3 billion. The Group's capabilities are now increasingly focused around C4ISR and safety and survival.

**International / Local activities**

Development and production of:
- Mechanically and phase-steered L-band antennas and avionics systems
- Satcom and communication systems
- Aeronautical satellite communication (development and manufacturing)
- Supplier to aircraft industry

**Capabilities/ Skills/ Expertise**

- International systems house. SA R&D focused on avionics and communication
- Avionics design and development
- Antennas for comms, satcom modems

**Areas of interest**

Avionics, communication/ navigation ATM/ATC

**Contact person**

Marius du Plessis

**Position**

Business Development Manager

**Tel**

+27(0)12 700 7014

**Address**

Highveld Office Park, Charled de Gaulle Crescent, Highveld Extension 8, 0169
PO Box 11590, Centurion, 0046

**Email**

Marius.duplessis@cobham.com

**Website**

www.cobham.com

### Incomar

**About the organisation**

Incomar designs and manufactures smart sensors for integrated security and aerospace systems

**Capabilities/ Skills/ Expertise**

- System integration
- Electro optic sub-system assembly and testing
- Electro-mechanical sub-system assembly and testing
- Electronic board assembly
- Electronic board rework (CSP device level)
- Specialized PCB modification
- Conformal coating/treatment
- Prototype board manufacture
- Specialised loom manufacture

**Areas of interest**

- Systems integration
- Packaging and applying products at system level
- Smart composites

**Contact person**

Friedl Swanepoel

**Tel**

+27(0)12 665 4056

**Address**

PO Box 10613, Centurion, 0046

**Email**

fswanepoel@incomar-sa.com

**Website**

www.incomar-sa.com
**Mechem**

**About the organisation**

MECHEM had its origins as the Applied Chemistry Unit (ACU) of the CSIR tasked with R&D of mechanical and chemical solutions to defence-related. In 1991, MECHEM changed its focus to commercial demining. MECHEM is a subsidiary of Denel (Pty) Ltd and wholly owned by South African government. MECHEM, a world leader in creating a safer environment through providing cost effective:

- Mine action services
- Battle area clearance solutions
- Contraband detection services
- Mine protection vehicles
- Ancilliary equipment
- Training

**Capabilities/ Skills/ Expertise**

Explosives and drug detection technology relevant to civil aviation

**Areas of interest**

- Contraband detection
- Vehicle upgrade and modification for multi role deployment

**Contact person**

Ashley Williams

**Position**

CEO

**Tel**

+27(0)12 640 3000

**Address**

PO Box 686, Stellenbosch, 7599

**Email**

AshleyWi@mechem.co.za

**Website**

www.mechemdemining.com

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**Radiant Antennas**

**About the organisation**

The company designs and manufactures world class military and professional/commercial communications antennas and tactical masts. Used by military forces all over the world, Radiant's antennas are designed to withstand the rigorous demands of military use in harsh environments.

**Capabilities/ Skills/ Expertise**

- Design and manufacture of world class military and professional/commercial communications antennas and tactical masts
- Development and manufacture of VHF and UHF antenna and mast systems

**Areas of interest**

Data links

**Contact person**

Ashley Williams

**Position**

CEO

**Tel**

+27(0)12 804 2645

**Address**

368B Selbourne Avenue, Lyttelton, 0157

**Email**

sales@radiant-antennas.com

**Website**

www.radiant-antennas.com

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**Reutech Radar Systems (RRS)**

**About the organisation**

RRS was founded in 1987 as a division of ESD, which was formed in the early 1980’s through an amalgamation of Barlows Electronic Systems and Marconi South Africa. The company's radar capability has broadened significantly over the past decades with the local development and manufacture of a wide range of search and tracking radars for the South African National Defence Force's requirements.

**Capabilities/ Skills/ Expertise**

RRS has established an extensive technology base to support the development, manufacture and maintenance of a wide range of radar subsystems, including positioners, shock absorbers, antennas, microwave passive components, solid state RF power amplifiers, radar transceivers, frequency synthesisers, signal processors and display systems.

**Areas of interest**

Innovation in radar systems

**Contact person**

Phumudzo Netangaheni

**Position**

Business Manager: Technology

**Tel**

+27(0)11 652 5564

**Address**

PO Box 686, Stellenbosch, 7599

**Email**

phumudzon@rrs.co.za

**Website**

www.rrs.co.za
# SAAB Avtronics (SAAB Avi)

**About the organisation**

Saab serves the global market with world-leading products, services and solutions from military defence to civil security. Its most important markets today are Europe, South Africa, Australia and the US.

Saab has around 13,200 employees. Annual sales amount to around SEK 25 billion, of which research and development account for about 20 per cent of sales. The global defence industry is currently undergoing an extensive transformation.

To adapt to the new conditions in the industry, Saab has divided operations since 1 January 2010 into five business areas: Aeronautics, Dynamics, Electronic Defence Systems, Security and Defence Solutions, and Support and Services.

**Capabilities/ Skills/ Expertise**

- Development of avionics systems
- Development of airborne HUMS systems
- Development of reconnaissance systems
- Development of flight control systems
- Acquisition of A/C data and converting into management information

**Areas of interest**

HUMS, prognostics, modular avionics and data networks, life cycle management

**Contact person**

Henk du Plessis

**Position**

Hums R&D coordinator

**Tel**

+27(0)12 789 4422

**Address**

PO Box 8792, Centurion, 0046
44 Oak Avenue, Building 10, Highveld Technopark, Centurion, 0046

**Email**

henk.duplessis@za.saabgroup.com

**Website**

www.saabgroup.com

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# Stellenbosch University (SUN)

**Electronic Systems Laboratory (ESL):**

ESL is a Computer and Control Systems Group laboratory in the Department of Electrical and Electronic Engineering at the University of Stellenbosch. It provides opportunities to graduate students and industries to become involved in joint developments of significant size. ESL aims to maintain skills in computers, data communications, imaging and system simulation through prototype developments with industry.

**Centre of Expertise (CoX) in Autonomous Flight:**

The ESL forms a major part of the CoX in Autonomous Flight at Stellenbosch University. The CoX specialises in developing and implementing complex embedded control, automation and information systems.


**Areas of interest**

- Fixed wing control
- Rotary-wing control
- Airship automation
- Regulation and Certification
- Path planning
- Onboard diagnosis
- Collision avoidance
- System ID
- Experimental vehicle control
  - CR Ducted Fan
  - Tilt-wing VTOL
- Support
- Avionics and simulation

**Contact person**

Thomas Jones

**Position**

Associate Professor

**Tel**

+27(0)21 808 4319

**Address**

Stellenbosch University, Private Bag X1, Matieland, 7602

**Email**

Jones@sun.ac.za

**Website**

www.esl.lee.sun.ac.za
Tellumat

**About the organisation**
Tellumat’s business is aimed at the communications, defence and contract manufacturing markets. They use two key strategies to develop the group’s businesses:
- a product strategy which involves defining, developing, manufacturing and marketing innovative products for South African and world markets;
- and a services strategy which seeks to provide a comprehensive range of services that complements our products and meets our customers’ needs.

**International/local activities**

<table>
<thead>
<tr>
<th>Telecomunications</th>
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<tr>
<td>- Telecoms</td>
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<td>- Wireless solutions</td>
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<th>Defence:</th>
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<td>- Defence CT</td>
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<td>- Radar</td>
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<td>- SIA Solutions</td>
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<th>Manufacture:</th>
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<td>- Electronic</td>
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<td>- Mechanical</td>
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<tr>
<th>Services:</th>
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<tbody>
<tr>
<td>- Quality assurance</td>
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<tr>
<td>- Technology</td>
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**Capabilities/ Skills/ Expertise**
UAV Subsystems, data links, contract design and manufacturing, systems architecture
- Development and manufacture of data communications systems
- Research and design, project management & systems engineering, including product industrialisation

**Areas of interest**
SESAR, avionics, systems and equipment, guidance and control, avionics

**Contact persons**

<table>
<thead>
<tr>
<th>Robert Logie</th>
<th>Shareef Hoosain</th>
</tr>
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<tbody>
<tr>
<td>Business Development Manager</td>
<td>Project Manager</td>
</tr>
<tr>
<td>Tel: +27(0)21 710 2167</td>
<td>Tel: +27(0)21 710 2324</td>
</tr>
<tr>
<td>Address: 64-74 White Road, Retreat, 7945 PO Box 30451, Tokai, Cape Town, 7966</td>
<td>Address: 64-74 White Road, Retreat, 7945; PO Box 30451, Tokai, 7966 Cape Town</td>
</tr>
<tr>
<td>Email: <a href="mailto:rogie@tellumat.com">rogie@tellumat.com</a></td>
<td>Email: <a href="mailto:shoosain@tellumat.com">shoosain@tellumat.com</a></td>
</tr>
<tr>
<td>Website: <a href="http://www.tellumat.com">www.tellumat.com</a></td>
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### 3.6 Cross-cutting
(Multi-disciplinary)

<table>
<thead>
<tr>
<th>Council for Scientific and Industrial Research (CSIR)</th>
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<tbody>
<tr>
<td><strong>About the organisation</strong></td>
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<tr>
<td>CSIR is a uniquely South African organisation, committed to innovation. It provides technology solutions and information to support sustainable development and economic growth in the context of national priorities.</td>
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<tr>
<td><strong>International/local activities</strong></td>
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<tr>
<td>• 3D laser build up of Inconel alloys</td>
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<td>• Carbon nanotubes</td>
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<td>• Casting of thin-walled structures</td>
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<td>• Casting processes for aerospace components</td>
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<td>• Development and improvement of accident research methods in the southern African region</td>
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<td>• Development of NDT techniques for composites</td>
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<td>• Efficient and sustainable air transport network design. Operations and business model design</td>
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<td>• Environmentally friendly civilian aircraft engines - partner in FP6 project VITAL</td>
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<td>• Feasibility of sky liberalisation in Africa</td>
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<td>• Femtosecond laser micromachining</td>
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<td>• Laser cladding and welding</td>
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<tr>
<td>• Partner in Fantasia FP6 programme</td>
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<tr>
<td>• Piezoelectric actuators and motors</td>
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<td>• Polymer nanocomposites</td>
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<td>• Powder based processing of titanium alloys</td>
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<td>• Processes for the primary production of titanium</td>
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<td>• Natural fibre reinforced composites for aerospace industries</td>
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<td>• Semi-solid metal forming of aluminium and magnesium alloys</td>
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<td>• Silicon nanoparticle synthesis</td>
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<td>• Surface modification of ceramics and intermetallics</td>
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<td>• THz Photonics for passenger scanning (contraband and weapons)</td>
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<td>• UAV design and development</td>
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<td>Framework Programme project participation:</td>
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<td>• VITAL</td>
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<td>• FANTASIA</td>
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<td>Capabilities/ Skills/ Expertise</td>
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<thead>
<tr>
<th>Contact persons</th>
<th>Beeuwen Gerryts</th>
<th>Willie du Preez</th>
<th>Francois Prinsloo</th>
</tr>
</thead>
<tbody>
<tr>
<td>Position</td>
<td>CSIR Aerospace Initiative: Assistant NCP</td>
<td>Competency Area Manager, MSM</td>
<td>R&amp;D Contracts Manager, National Laser Centre</td>
</tr>
<tr>
<td>Tel</td>
<td>+27(0)12 841 4838</td>
<td>+27(0)12 841 4955</td>
<td>+27(0)12 841 4448</td>
</tr>
<tr>
<td>Email</td>
<td><a href="mailto:aerospace@csir.co.za">aerospace@csir.co.za</a></td>
<td><a href="mailto:gsnedden@csir.co.za">gsnedden@csir.co.za</a></td>
<td><a href="mailto:fprinsloo@csir.co.za">fprinsloo@csir.co.za</a></td>
</tr>
<tr>
<td>Website</td>
<td><a href="http://www.csir.co.za">www.csir.co.za</a></td>
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</tbody>
</table>
### Desert Charm Trading 36 (Desert Charm)

**About the organisation**

The company is intensively involved in the provision of Aviation, Air Transport, Business Support, Management and Leadership Development Professional Consulting Services.

Desert Charm has expertise in the areas of Business Administration, Aviation (Civil and Military), Research and Development, Operations Management, Logistics, Construction, Infrastructure Development, Capacity Building, Regional and Town Planning, Executive Education and Training, etc.

**Contact person**  
Blessing Musarurgwa

**Position**  
Managing Director / COE

**Tel**  
082 955 8620

**Address**  
PO Box 414119, Craighall, Johannesburg, 2024

**Email**  
smithoneloa@ananzi.co.za

### Lechabile Quality Strategies (LQS)

**About the organisation**

The company is a Manufacturing, Aircraft Maintenance and Systems Assurance Consulting company and offers services in the Defense, Aerospace, and Information Communications and Technology (ICT) areas.

Since its inception in 1998, LQS concentrated in the defense industry where a bulk of the work consisted of Quality Assurance within aerospace projects.

The company migrated to the ICT Industry at the beginning of 1999 and established an electronics assembly and interconnection loom manufacturing facility in 2000.

In addition to the main areas of business, LQS also has a joint venture business division. Current ventures include Reprorisk, a risk management system company and LQ-Software, a software development company.

**Contact person**  
William Makwinja

**Tel**  
+27(0) 12 671 1336

**Address**  
P.O. Box 4236, Halfway House, 1685, South Africa

**Email**  
lqs@lechabileqs.co.za

**Website**  
www.infotech.co.za/lqs
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Please contact us should you require further information or if you are interested in collaborating with South African Organisations.

E-mail: info@aeroafrica-eu.org  
Website: www.aeroafrica-eu.org