
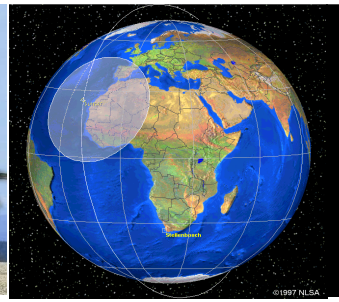
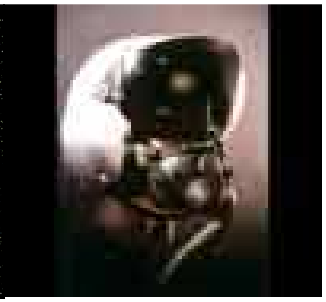
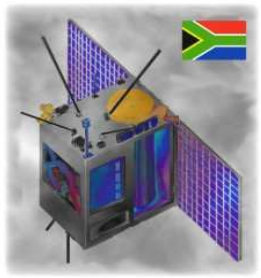
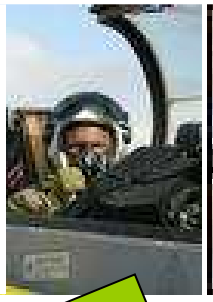


The South African Ae e Lands

The aerospace industry is that industry which covers the R&D, design, manufacture, support, maintenance, conversion and upgrade of both rotary and fixed wing aircraft and spacecraft, as well as their relevant subsystems and components

MRAeS

t: EU FP7

ice and Technology

lic of South Africa

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SA Historical Background

- **Developed in isolation**
  - Political dispensation 1970-1990
  - Mainly in the military sector
  - Driven by strategic requirements
  - DRDB funding
- **Protected from external competition**
  - Captured market
  - Lack of international customer knowledge
  - Little cooperation between companies
- **Manufacturing infrastructure**
  - Developed to meet strategic military needs not commercial production
  - No real knowledge of concepts such as “Lean Manufacturing”

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South Africa – EU-UK S&T Cooperation Agreement

- S&T Cooperation Agreement signed in 1996
- S&T key element of new South Africa – EU Strategic Partnership & Trade, Development and Cooperation Agreement
- FP4-FP6: more than 200 South African participations across disciplines
- South Africa regarded as one of the more active "third country" FP partners
- FP7 status: International Cooperation Partner Country (i.e. participates with EC funding contribution)
- Promising success in first FP7 calls

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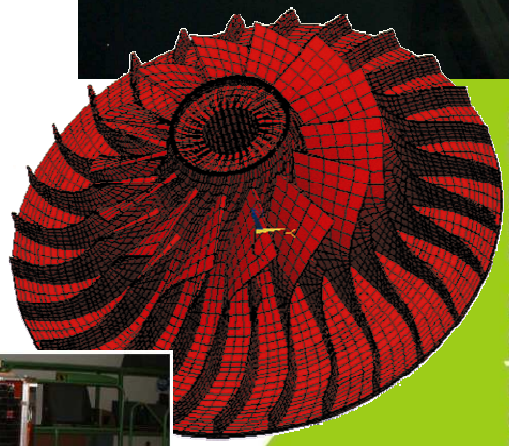
Brief International Track Record

- *Dassault, Snecma, France*
- *Agusta, BAe, Bombardier, Embraer*
- *Boeing, IAI, Rolls-Royce, General Electric, USA*
- *Denel, Rolls Royce RB211 program*
- *Klimov, Russia*
- *SAAB, Volvo Aero, Sweden*
- *Partnering*
  - Rolls-Royce Corporation, USNavy, RCAF & NRC Canada
    - ***Turbine hot-end stress analysis and life assessment***
  - Armscor
    - ***Procurement support, Air Vehicle Systems research***
  - CSIR, Denel Aerospace, ONERA, MTU
    - ***Upgrade and support of engine systems***
  - Stellenbosch University, MIT, Fraunhofer IWU ICT
    - ***Centre for Automotive Engineering (CAE)***
    - ***Turbomachinery Laboratory***
  - CUT, TNO, Netherlands
    - ***Rapid tooling and manufacturing technology***



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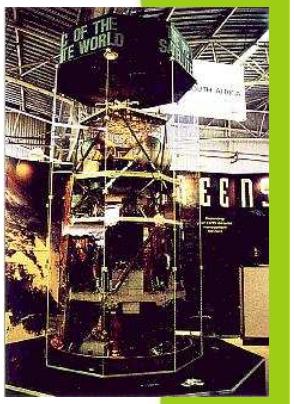
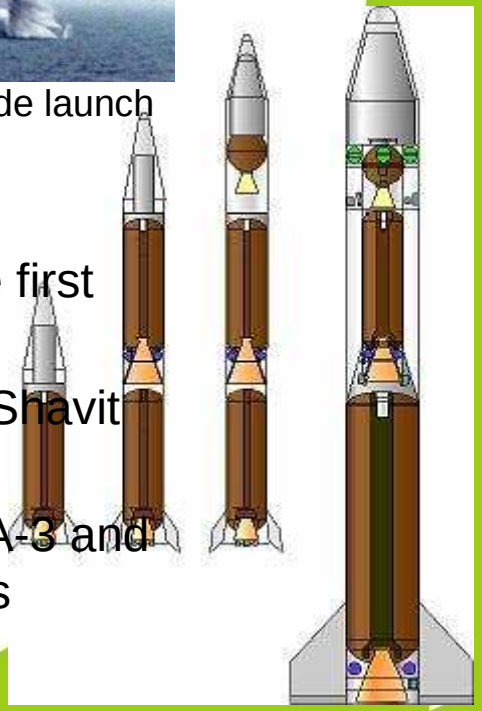
Brief International Track Record

- Somchen Rocket Motor Cast Pits
  - Rocket motor propellant casting pits
- Rooi-Els Rocket Motor Test Facility
  - Rocket motor testing



- Howteq
  - Design, assembly, integration, launch preparation, and project management of space activities.
- Advena/Kentron Circle
  - Development and production of deliverable nuclear weapons

- Overberg Test Range
  - Flight tests on sophisticated missile and aviation systems; qualified to provide launch services for LEO satellites.
- RSA-1 : an intermediate-range single-stage ballistic missile
- RSA-2 an intermediate-range ballistic missile, consisting of the first and second stages of the RSA-3;
- RSA-3, believed to be identical to the Israeli Jericho II missile/Shavit launch vehicle. T
- RSA-4 ICBM/satellite launcher was a planned follow up of RSA-3 and was in the process of being developed before the program was cancelled in 1994.



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Why a focused SA-UK S&T partnership?

- EU- UK is historically SA's most important partner for international S&T collaboration
- UK one of the leading knowledge generation and innovation economies in the world, SA desire to integrate global knowledge economy
- Internationalisation of SA S&T
- Connection to global research
- Increase of research funding to 2%GDP
- Air traffic in SA up to 15 million pa set to increase by 7%

Company	Country	Annual Sales (RB)*	% Military
Boeing	USA	463	30%
Lockheed	USA	285	80%
EADS	EU	250	25%
BAE Sys	UK	204	80%
Raytheon	USA	186	80%
Thompson CSF	France	72	70%
Finmeccanica	Italy	45	50%
Denel Aviation	***S. Africa***	***5.6***	***80%***
AeroSud	***S. Africa***	***4.4***	***1%***
SAA Technical	***S. Africa***	***3.2***	***0%***

* ~2003/4 figures
Using an exchange rate of R7=$1

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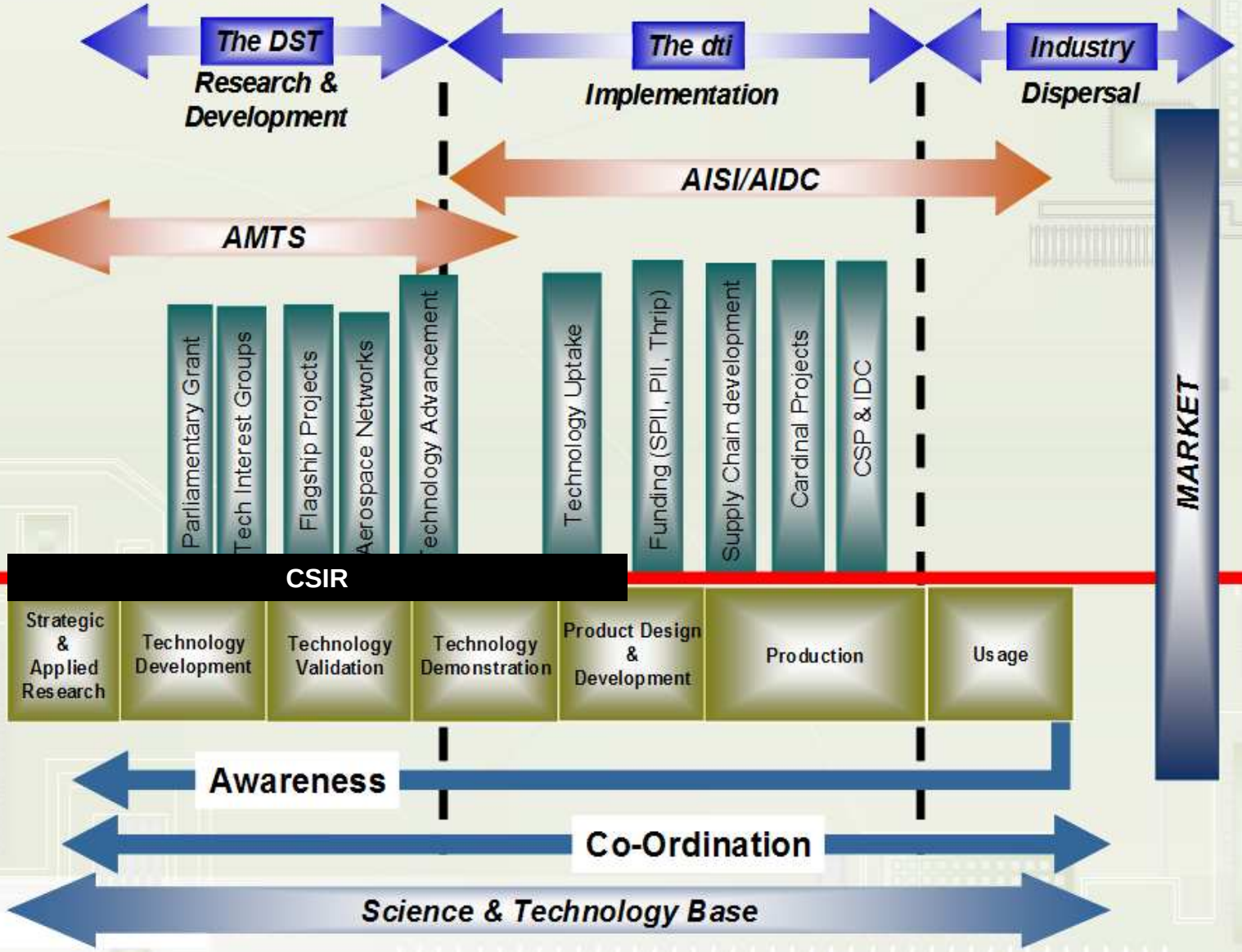
Technology and Sector Advancement using the Value Chain



University R&D Competencies

AIR VEHICLE

- Propulsion — WITS
- Airframe — UKZN
- Flight controls — SU

VUT · DUT · CSIR · CPUT

PAYLOAD

- Sensors — UJ
- Sensor Control — NMMU
- Sensor Da Link — CSIR
- Delivery System — UCT

COMMAND & CONTROL

- Control — UP
- Data Link — UKZN
- Mission Planning — SU

SYSTEM ENGINEERING

- Integration — UJ
- Modelling — UCT
- System Specificatio — UP
- Design and Developmer — WITS
- Certificatior — SU

LOG SUPPORT

- Operational
- Tactical — CSIR
- Specialised

TRAINING

- Operator
- Maintenance
- Payload Support

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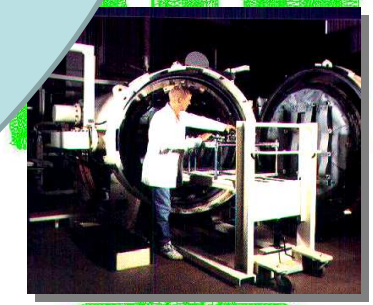
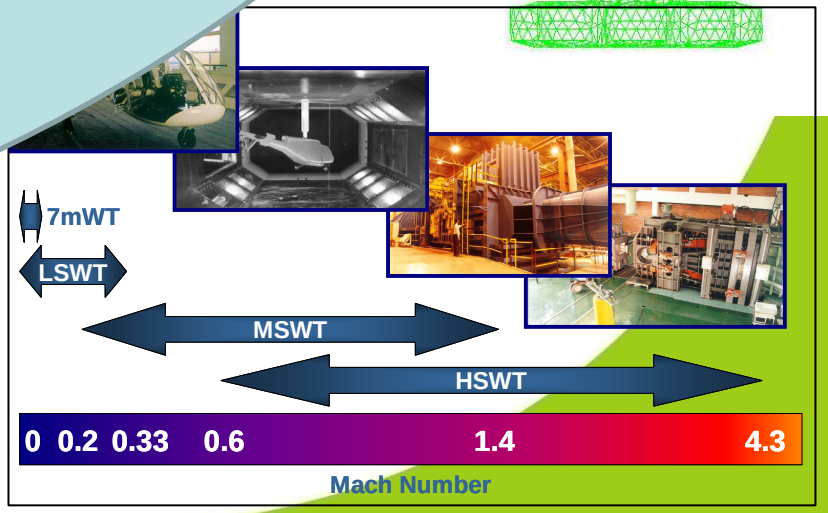
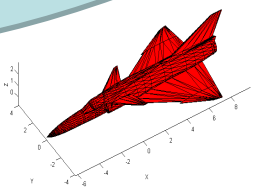
Council Scientific Industrial Research

- Material Science and manufacturing
- Sensor Science and Technology
- Def… …d Security –

~$100million Funding







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The Nature of our industries

SunSpace INNOVATIVE SATELLITE SOLUTIONS

AEROSUD

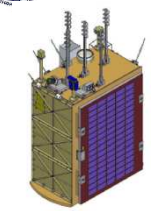
DENEL

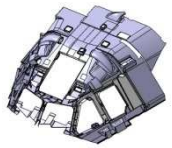
Tier 1

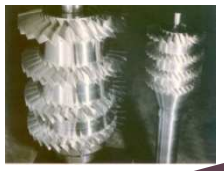
Tier 2

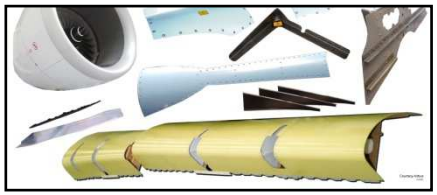
Tier 3

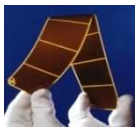
Tier 4











- UAV, mini satelites and Missiles are remaining OEM levels with design authority
- tier 1 – aircraft galleys, fuselage sub-systems aircraft seat, fixed wings, helicopter rotors, fully integrated or embedded sensor packs

- tier 2 – winglets, wing fairings, wing and tail-plane sections, sub assemblies, motherboards, e-BUS, optical packs, packaged sensors
- Aerosud, Denel Dynamics, SAAB, Incomar, ANSYS, AAT, Tower35, ATE

- tier 3 – sub assembly componen widgets, couplings, gimbal housings, sensors , pylons
- Kentron, ProtoClea, CSIR, Grinte TMI, Epsilon, MMS, MegChem, SAATech

- tier 4,5 – small component monolith manufacturers and suppliers – sheet metal, raw materials, bolts, nuts, rivets, electronics components
- HulAl,SABolt, RECARO

Desire to move from sub-tier to tier 1 suppliers of OEMs

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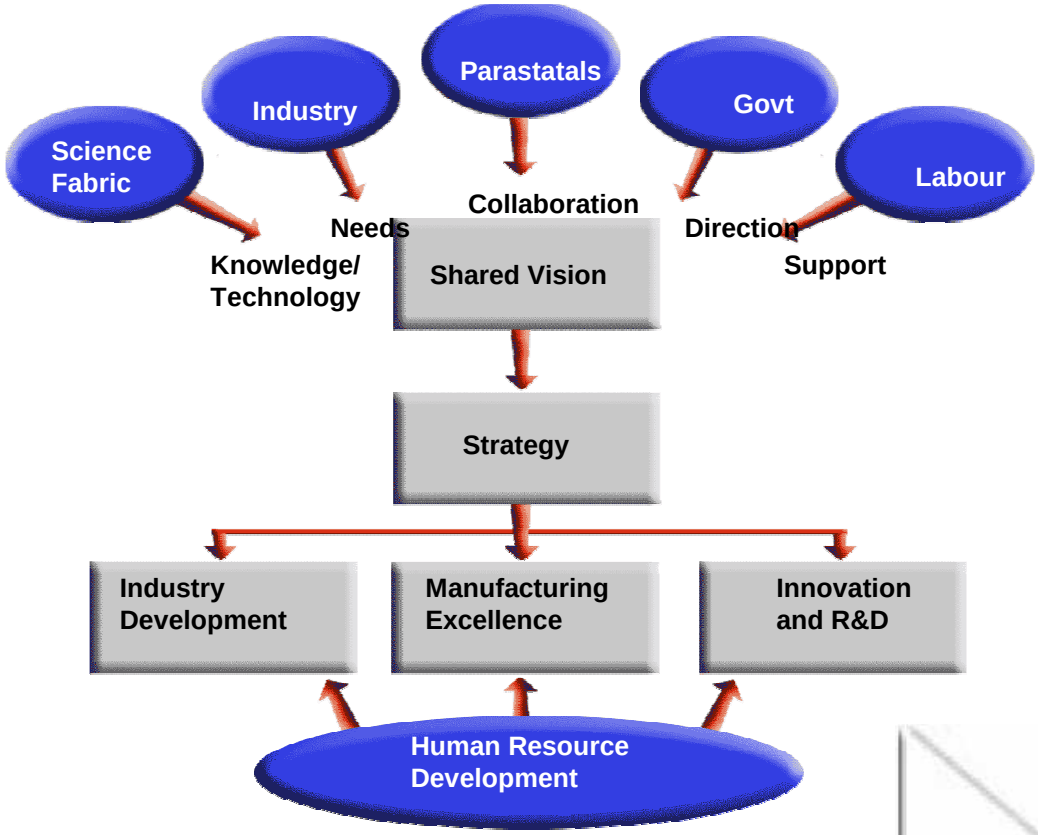

amts

advanced manufacturing technology strategy

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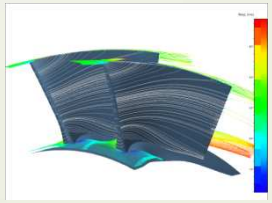
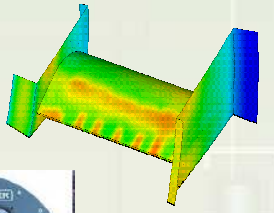
Industry Sectors \ Technology Focus Areas	Advanced Materials	Product Technologies	Production Technologies	Logistics	Cleaner Production Technologies	ICT in Manufacturing	Standards, Accreditation, Quality and Metrology
Aerospace							
Automotive (& Transport)							
Clothing & Textiles							
Chemicals							
Metals (& Minerals)t							
Cultural / Craft Industries							
Capital Goods							
Small & Medium Enterprise Development							

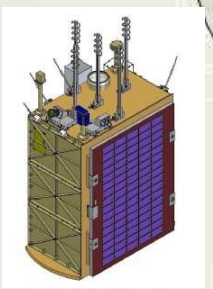
Current Stakeholders

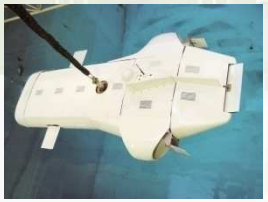
11/24/2006

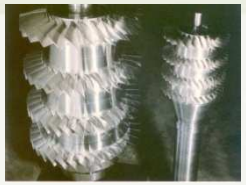


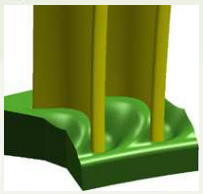
IMPRO
CONLOG
PKN
SAMES
SAAB
CPUT
DAS
SU
ANSYS
UCT
TELUMAT
UP
SUNSPACE
SST
CONLOG
WITS
CSIR
AIDC
AMTS
SHURLOC
PGKZN
VUT
PGWC
INCOMAR
CEFIM











Higher Educational Institutions

Government

Aerospace Industries

Electronics Industries

Technology Advancement Program

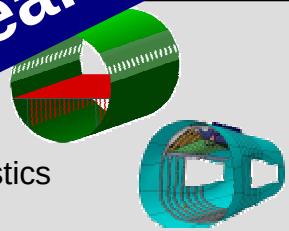
***Aim: Development** of advanced manufacturing and material tec gies that impact on **competitiveness**, through **targeted** projects in the aeros omotive sectors.*

~ R 95 Million over 3 years*

~ R 150 Million over 3 years*

Advanced Composite Materials

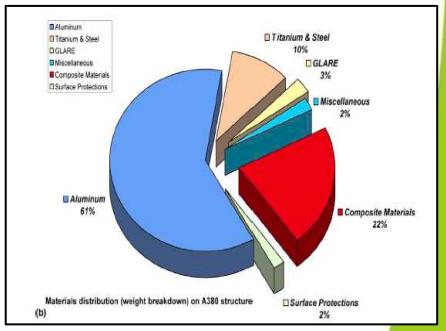
- Manufacturing processes – functional
- Out of autoclave Thermo-sets, V CFRTP
- Development of new hybri - paint on plastics
- Natural fibre comp osites



European Community requirement for >70% recyclable material in Automotives and Aerospace components

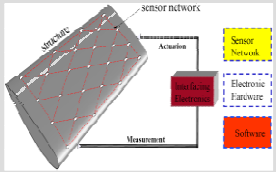
Ad t Metals

- Casting of Al, Mg, Ti.
- H formance machining of light metals
- Laser Sintering and ablation technology
- Metal hydro-forming, bonding and joinin
- Reduced Weight and costs



Advanced Ele

- Sensors – i rking, telematics
- Stru itoring
- Smar – Micro-Electro-Mechanical devices



On board navigation, autonomous guidance and control system, airbag technology.

Smart Local and Global Partnerships

Fraunhofer, OEMs, DLR, CRC, Science Councils, Universities, Govt, Industries

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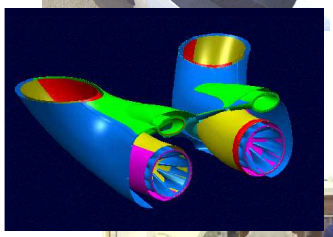

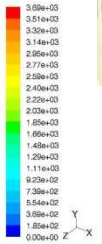

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Centurion Aerospace Village

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Current Framework Program Involvement

- VITTAL- AeroSys, CSIR -FP6 (Top Up)
- FANTASIA – National Laser Centre, CSIR – FP6
- ALFA-BIRD- SynFuel JETA1, SASOL, FP7
- FUTURE- Flutter Dynamics, SU, CSIR, FP7

AAT.2007.6.2.1. Novel Air Transport Vehicles – Stellenbosch, Wits and Johannesburg universities
AAT.2007.6.2.2. Guidance and Control – Stellenbosch University
AAT.2007.6.1.4. Life-Cycle - CSIR
AAT.2007.5.1.1. Aerostructures – University of Cape Town
AAT.2007.6.1.1. Lift – Wits University, University of Pretoria
AAT.2007.4.4.1. Integrated approach to life-cycle based development of aircraft structures - CSIR

AAT.2007.4.2.6. Maintenance – Denel Aviation, Tshwane university of Technology
AAT.2007.4.1.5. Production – Denel/SAAB AeroStructures
AAT.2007.4.1.2. Aerostructures – University of Cape Town
AAT.2007.3.3.1. Aerostructures – Cape Peninsula University of Technology
AAT.2007.3.1.2. Noise and Vibration – university of Pretoria

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2008 Call...

- ***International Co-operation***
- All areas in this … especially encouraged to …
- Safety, in line w…
- Environment, in…
- The stimulation … from International Cooperation Pa…-Supporting proposals.
- In order to enha… search actions with Russia – and ot… uth Africa are identified below… actions and upon existing collabo… areas of mutual interest will be explored…

Co-operation with So…

EU-South Africa Aeron… Symposium in April 2007 (Pretoria) and at the EU… bic areas for increased co-operation identified so …

- application of advance…
- advanced electronics …
- software development…

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Commitment to Cooperation: Support Instruments

- **European South African Science and Technology Advancement Programme (ESASTAP)**
  - **Information portal and partner search databases: http://www.esastap.org.za**
    - **contact@esastap.org.za – helpdesk**
  - **NCP Network – dedicated National Contact Points for all thematic areas**
  - **Brussels Office**
- **Specific funding instruments**
  - **FP7 Seed Funding Instrument**
  - **FP7 Strategic Co-investment Funding**

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FP7 Mobility Instruments

- **Marie Curie International Outgoing Fellowships**
- **Marie Curie International Incoming Fellowships**
- **International Research Staff Exchange Scheme (IRSES)**
  - **Coordinated joint programme of exchange, by seconding and hosting eligible researchers, technical and management staff for short periods**
  - **Dedicated South African funding available**

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Other RSA funding instruments

- **NRF-Royal Society Joint Programme**
  - **Travel & Subsistence for networking**
- **National Research Foundation grants**
  - **Exchanges, equipment access, events, consultations – to be applied for by South African researchers**
  - **Bilateral co-funded instruments (country2country)**
- **Innovation Fund**
  - **National South African programme – possible to associate international partners**
- **Technology Human Resources for Industry Programme**
  - **National South African programme – possible to associate international partners**

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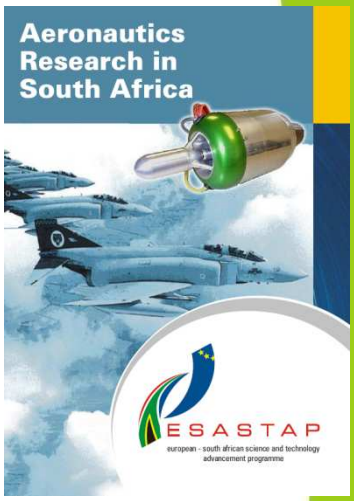
Activities of Note...



- *2007 South African International Aerospace Symposium –*

  19, 20 April 2007 – Pretoria SAIAS2007

  22 Keynote speakers including 10 international from Airbus, Boeing, SAAB, Fraunhofer, MIT, Stanford, Delft, NASA, Rolls Royce and MTU

  300 attendees, joint SA-EU funded

  (Aerospace in RSA - position and status in the context of the global aerospace landscape)
- *2008 South African International Aerospace Symposium*

  14-16 September 2008 – Cape Town

  Coupled with AAD2008 - AMD

  DoD/DST/dti/dpe Event

  (Africa Theme, work done, progress in programs, and call for papers)

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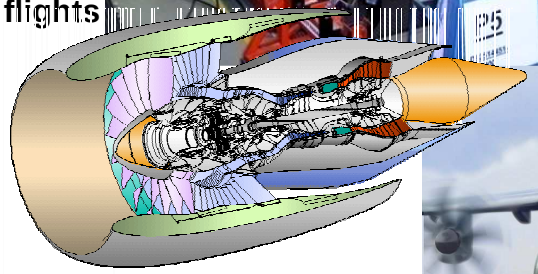
Way forward…

- **European Aeronautics: A Vision for 2020**

  The Goals for 2020

  - **80% cut in NO_x emissions**
  - **Halving perceived aircraft noise**
  - **Five-fold reduction in accidents**
  - **Air traffic system capable of handling 16 million flights year**
  - **50% cut in CO_2 emissions per pass-Km**
  - **99% of all flights within 15 minutes of timetable**

- **South African National R&D and Integrated Manufacturing Strategy**
  - **A vision for 2014**



AIRBUS EADS FLABEL TAI DENEL AEROSUD

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Contact Information

- **Department of Science and Technology www.dst.gov.za**
  - www.amts.co.za
  - www.tshumisano.co.za
  - www.innovationfund.ac.za
  - www.esastap.co.za
  - www.nrf.co.za
  - www.ska.ac.za
  - www.meraka.org.za
  - www.salt.ac.za
- **Department of Trade & Industry www.dti.gov.za**
  - www.wits.ac.za/centres/nacoe/
  - www.tasaweb.co.za
- **Councils for Scientific & Industrial Research**
  - www.csir.co.za
  - www.mintek.co.za
- **Department of Defence www.dod.mil.za**
  - www.sadid.co.za

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