



AERONAUTICAL SOCIETY OF SOUTH AFRICA (AeSSA)

A Division of the Royal Aeronautical Society

**Opportunities in Aerospace
by
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Opportunities in Aerospace

A Historic Perspective of the SA Aeronautical Environment

1st Era – Strategic Imperative of Self-sufficiency (Late 60's to Early 90's)



Impala
(MB326)



Impala
Mk II

Kudu
Bosbok



Roovalk
Oryx
Cheetah

Characteristics:

- Military
- Limited Volume
- Single Client
- Initially Build-to-Print

Benefits:

- Manufacturing Skills
- Design Skills
- Facilities

Downsides:

- Highly Cyclical
- Essentially unsustainable

Opportunities in Aerospace

A Historic Perspective of the SA Aeronautical Environment

2nd Era – Defence Industrial Participation (*“Defence Packages” 1994 Onwards*)

“Self-Sufficiency”

Progressive
Emergence from
Arms Embargo



BAE SYSTEMS

Characteristics:

- Military, Limited Volume
- Declining Def. Budgets
- Single Client
- Largely Build-to-Print

Benefits:

- Limited Skills Retention
- “Export” Opportunities
- OEM Investment in SA

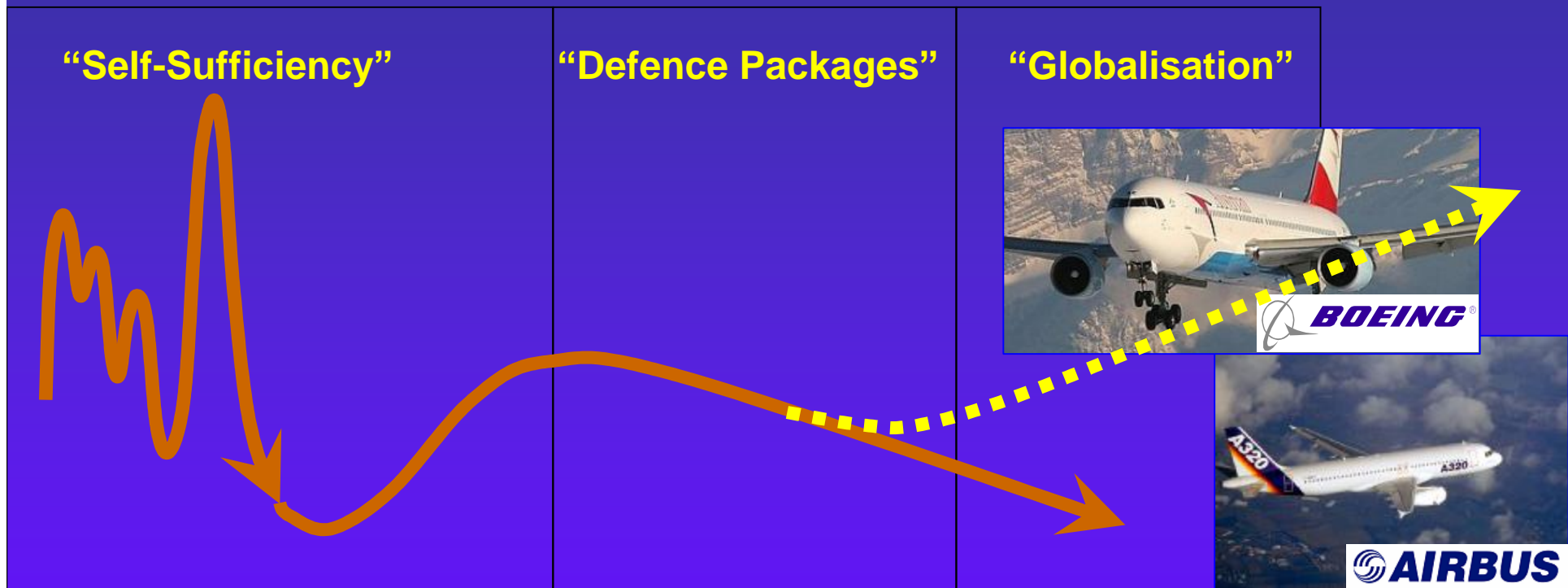
Downsides:

- Highly Cyclical
- Essentially unsustainable

Opportunities in Aerospace

A Historic Perspective of the SA Aeronautical Environment

3rd Era – DTI Industrial Participation (SAA Fleet Renewal – 2001 Onwards)



Characteristics:

- Largely Build-to-Print
- Growing Civil Aviation
- Growing Export Content
- Increasing Volumes

Benefits:

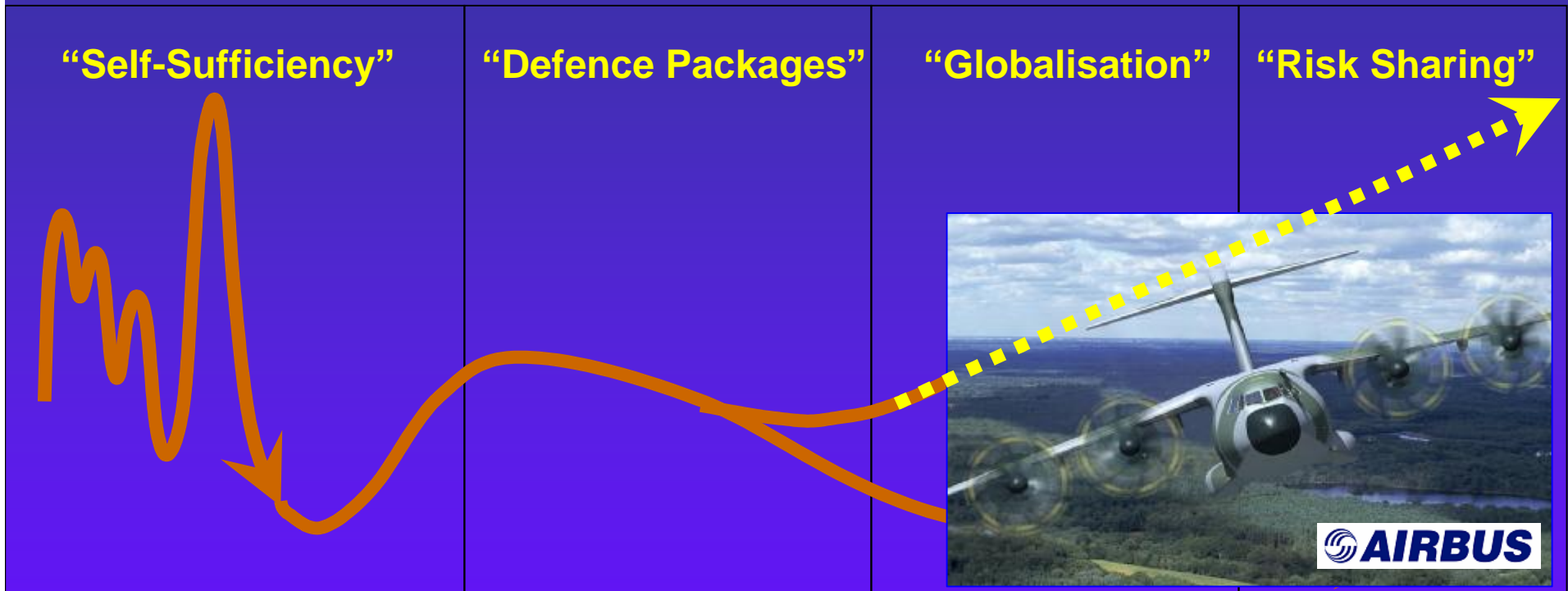
- Skills Revival
- Job Creation
- Growing Export
- Volume Production Skills

Downsides:

- Limited Design Content
- Threat from other “Offset” Targets, “LCE’s”
- High Start-up Cost

Opportunities in Aerospace
 A Historic Perspective of the SA Aeronautical Environment

4th Era – RISK SHARING: Airbus A400M Program (2005 Onwards)



Characteristics:

- Design and Build
- Risk Sharing
- Venture Capital Need
- L. Term **Sustainability**

Benefits:

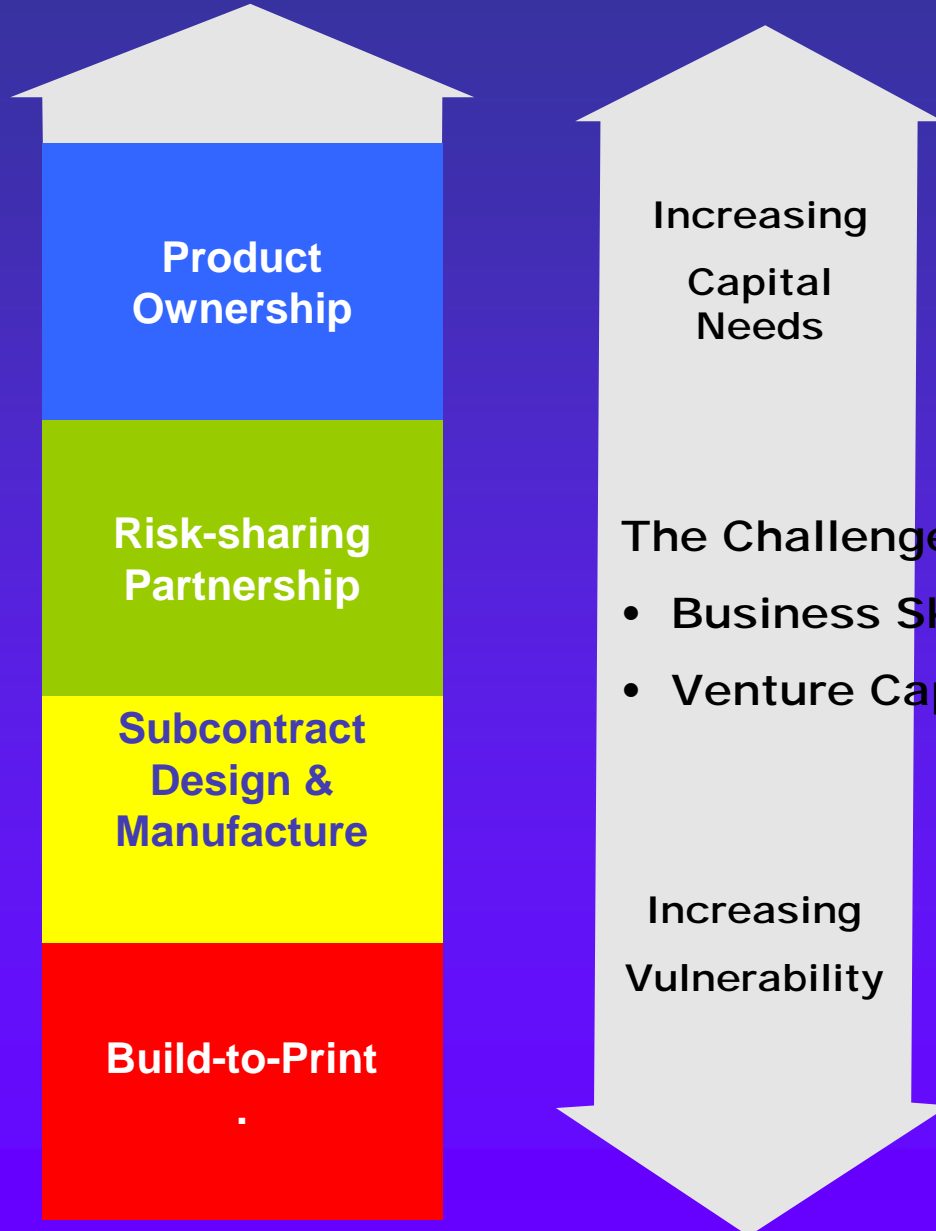
- Skills Growth
- Job Creation
- Long Term Security
- OEM Investment in SA

Downsides / Challenges:

- Commercial Risk Sharing
- High Start-up Cost
- **CAPITAL NEEDS!**
- **FOREX RISK!!**

Opportunities in Aerospace
The Needs of the SA Aeronautical Sector

Securing Market Share - **Increasingly SMART Supply**



Product
Ownership

Risk-sharing
Partnership

Subcontract
Design &
Manufacture

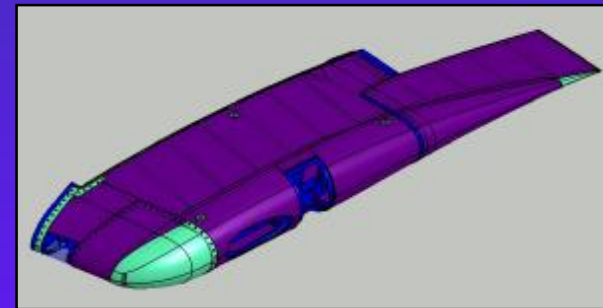
Build-to-Print

Increasing
Capital
Needs

The Challenge:

- Business Skills
- Venture Capital

Increasing
Vulnerability



Opportunities in Aerospace
The Needs of the SA Aeronautical Sector

Research

The Ambit:

Aeronautical...

- Design & Manufacture
and associated
- Technologies

Maintenance
Repair and
Overhaul

Education

Flight
Operations

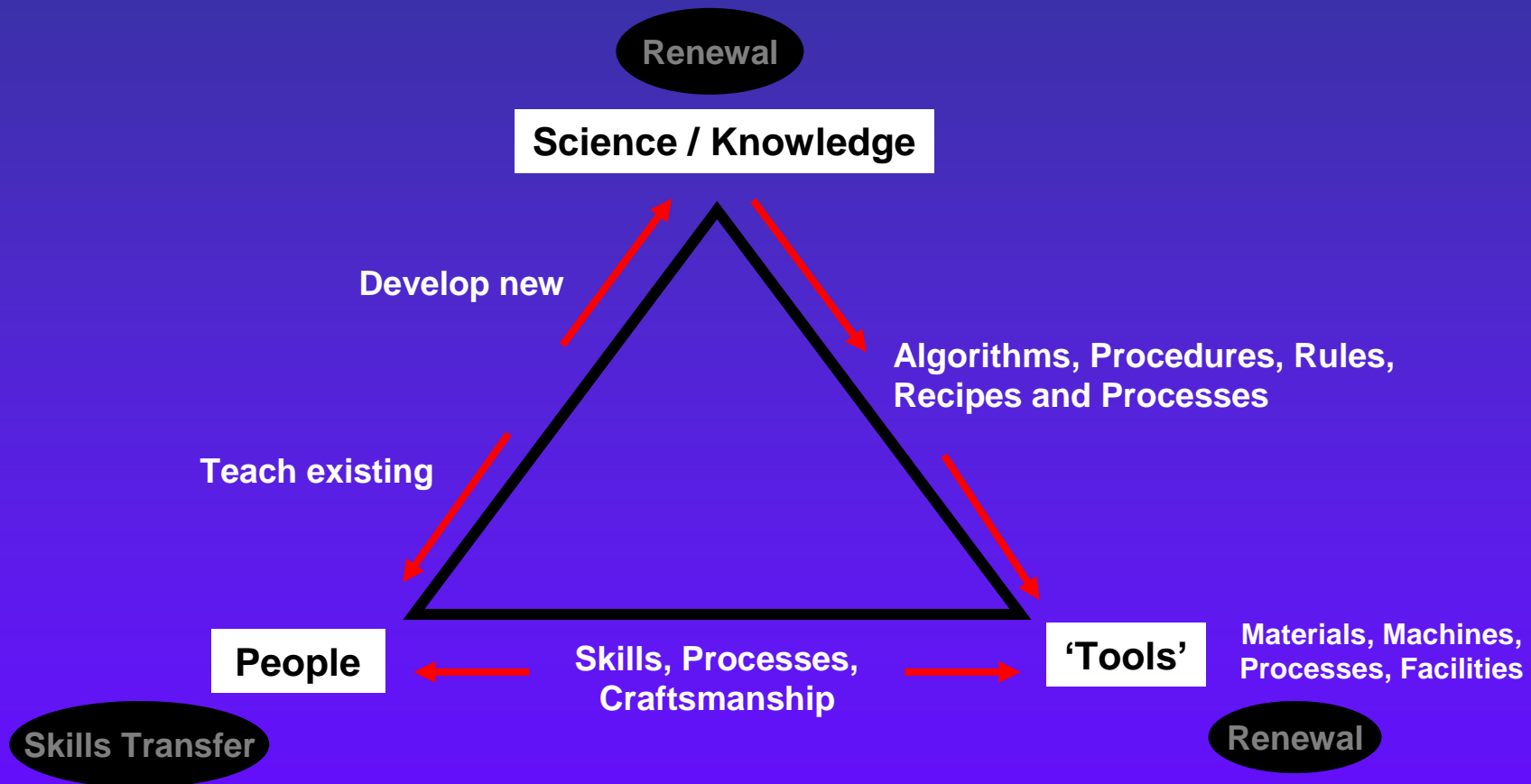
Avionics

Weapon
Systems

Space

Opportunities in Aerospace
The Needs of the SA Aeronautical Sector

'Technology is Created Capability'



Opportunities in Aerospace
The Needs of the SA Aeronautical Sector

Challenges & Opportunities to meet new demand

- Minimal Investment in Aerospace Activities from mid 90's until recently
- Ageing Engineering Cadre
- Effectiveness of School development projects
- Sector has been re-energised with Government initiatives from the DTI & DST
- Prime Sectors in the Aerospace Field
 - Aircraft Design & Flight Testing
 - Aircraft Manufacturing
 - Aircraft Maintenance
 - Air Operations
- Secondary Sectors in the Aerospace Field
 - Space
 - Electronics, Avionics, Weapon Systems
 - Education
 - Aviation Writers, Historians
 - Civil Air Patrol, Paramedics



Opportunities in Aerospace

Career Opportunities in Aeronautics in SA



Aircraft Design & Testing

Aerodynamicist

Responsible for the layout and shape of aircraft and to carry out wind-tunnel tests

Education: Matric, Engineering Degree

Job Opportunities: Airlines, Aircraft Manufacturers

Design Engineer

Responsible for Design of Structures, Stress, Fatigue, Powerplant, Systems

Education: Matric, Engineering Degree

Job Opportunities: Airlines, Aircraft Manufacturers, Air Force

Electronics Engineer

Responsible for Design of Electrical Systems, Avionics, Communication Systems

Education: Matric, Engineering Degree

Job Opportunities: Airlines, Aircraft Manufacturers, Air Force

Test & Certification Engineer

Responsible to Develop Test Plans, Test Equipment and carry out Certification

Education: Matric, Engineering Degree

Job Opportunities: Airlines, Aircraft Manufacturers, Air Force

Scientist

Careers include Metallurgy (Materials Science), Chemist (Molecular Structures)

Education: Matric, Bachelor of Science Degree

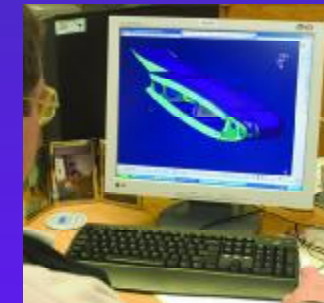
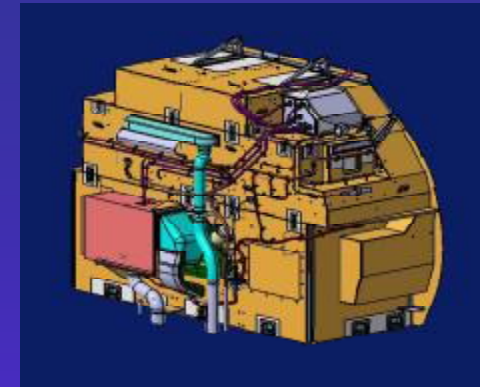
Job Opportunities: Airlines, Aircraft Manufacturers

Crash Site Investigator

Carries out investigation and analysis of Aviation Accidents

Education: Matric, Engineering Degree

Job Opportunities: Airlines, Civil Aviation Authority, Air Force



Opportunities in Aerospace

Career Opportunities in Aeronautics in SA

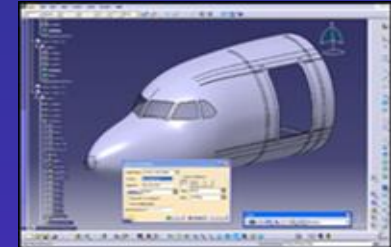
Aircraft Manufacturing

Design Draughtsman

Produces drawings from which aircraft are built

Education: Matric, Trade Apprenticeship, Engineering Diploma

Job Opportunities: Aircraft Manufacturers



Aircraft Technician

Assembly of Structures, Engines, Systems

Education: Matric, Trade Apprenticeship, College Diploma Preferred

Job Opportunities: Aircraft Manufacturers



Electronics Technician

Construction of Electrical Systems, Avionics, Instruments

Education: Matric, Trade Apprenticeship, College Diploma Preferred

Job Opportunities: Aircraft Manufacturers



Tool & Jig Maker

Manufacture of precision tools and jigs to aid building aircraft structures

Education: Matric, Trade Apprenticeship, College Diploma Preferred

Job Opportunities: Aircraft Manufacturers



Aircraft Fabricator

Manufacture of Sheetmetal or Composite aircraft structures

Education: Matric, Trade Apprenticeship, College Diploma Preferred

Job Opportunities: Aircraft Manufacturers



Quality Control Technician

Carries out Inspection of Aircraft Structures and Systems

Education: Matric, Trade Apprenticeship, College Degree Preferred

Job Opportunities: Aircraft Manufacturers



Opportunities in Aerospace

Career Opportunities in Aeronautics in SA



Aircraft Maintenance

Flight Line Mechanic

Responsible to prepare aircraft for flight after re-build or maintenance

Education: Matric, Trade Apprenticeship, College Degree Preferred

Job Opportunities: Airlines, Fixed-Base Operators, Air Force



Aircraft Mechanic

Responsible to carry out maintenance tasks on Airframe, and Systems

Education: Matric, Trade Apprenticeship, College Degree Preferred

Job Opportunities: Airlines, Fixed-Base Operators, Air Force



Powerplant Mechanic

Responsible to carry out maintenance tasks on Engines and Transmission Systems

Education: Matric, Trade Apprenticeship, College Degree Preferred

Job Opportunities: Airlines, Fixed-Base Operators, Air Force



Electronics Technician

Responsible to carry out maintenance tasks on Electrical, Avionics, Communications

Education: Matric, Trade Apprenticeship, College Degree Preferred

Job Opportunities: Airlines, Fixed-Base Operators, Air Force



Instrument Technician

Responsible to carry out maintenance tasks on Aircraft Instrumentation

Education: Matric, Trade Apprenticeship, College Degree Preferred

Job Opportunities: Airlines, Fixed-Base Operators, Air Force

Armament Mechanic

Responsible to carry out maintenance tasks on Armament, and load Armament

Education: Matric, Trade Apprenticeship, College Degree Preferred

Job Opportunities: Air Force

Opportunities in Aerospace

Career Opportunities in Aeronautics in SA



Flight Crew

Airline Pilot
Responsible to fly passengers on Airliners
Education: Matric, Commercial and Airline Transport Licence
Job Opportunities: Airlines, Fixed-base operators



Corporate Pilot
Responsible to fly Cargo, Executives on large aircraft
Education: Matric, Commercial Pilots Licence
Job Opportunities: Airlines, Fixed-base operators, Large Companies

Military Pilot
Flies Military aircraft - from trainers, helicopters, transport to fighter aircraft
Education: Matric, Air Force Academy
Job Opportunities: Air Force



Flight Instructor
Trains prospective pilots
Education: Matric, Commercial Pilot's Licence, Instructor Pilot Ratings
Job Opportunities: Airlines, Fixed Base Operators, Air Force

Flight Test Pilot
Responsible to carry out qualitative and quantitative flight test performance and handling qualities
Education: Matric, Commercial Pilot's Licence, Test Pilot's Course
Job Opportunities: OEM's, Airforce



Flight Test Engineer
Responsible to carry out quantitative flight test analysis
Education: Matric, University Degree & Flight Test Engineers Course
Job Opportunities: OEM's, Airforce

Opportunities in Aerospace

Career Opportunities in Aeronautics in SA

Air Operations

Airport Designer

Carries out design and layouts of Airport Infrastructure

Education: Matric, Engineering Diploma

Job Opportunities: Airports Company, Air Force

Air Traffic Controller

Responsible to control aircraft movement in the sky and on the ground

Education: Matric, Air Traffic Control Certificate

Job Opportunities: Airports Company, Civil Aviation Authority, Air Force

Airways Engineer

Responsible for Radar, Navigational Aids Infrastructure

Education: Matric, Engineering Degree

Job Opportunities: Airports Company, Civil Aviation Authority, Air Force

Flight Dispatcher

Prepares Flight Plans, Routes, Aircraft Scheduling

Education: Matric, Engineering Diploma

Job Opportunities: Airlines, Fixed-Base Operators, Air Force

Meteorologist

Analyses weather data and prepares weather reports for flight crew

Education: Matric, Bachelor of Science

Job Opportunities: Airports Company, Airlines, Cargo Operators, Air Force

Aircraft Ground Operator

Responsible to refuel, marshal, load aircraft at Airport

Education: Matric, Aircraft Ground Course

Job Opportunities: Airlines, Fixed-Base Operators, Air Force



Opportunities in Aerospace
Role Players in the SA Aeronautical Sector

Aeronautical Institutions within SA

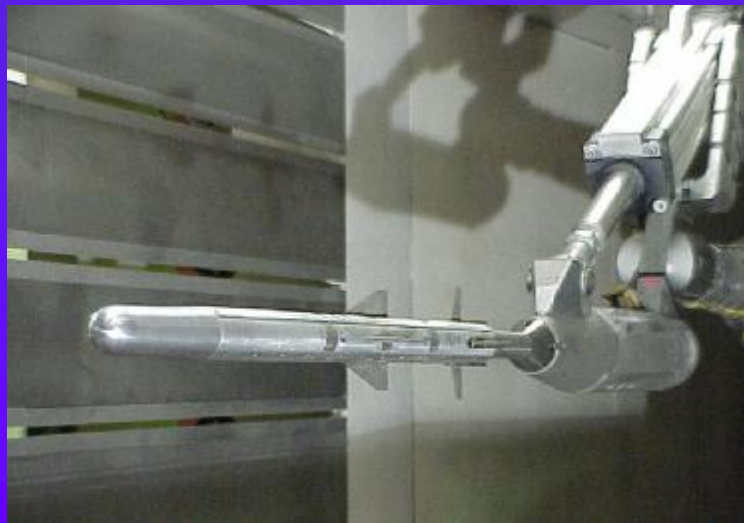
- Academic Institutions – Universities, University of Technologies
- Research Institutions – CSIR, AMTS
- Industry – Denel, Aerosud, ATE, SAA, Turbomeca, Airlines, Maintenance Organisations
- Government – CAA, DTI, DST, NACOE
- Society's and Councils – AeSSA, Flight Test Society, ECSA



Opportunities in Aerospace
Role Players in the SA Aeronautical Sector

Council for Scientific and Industrial Research

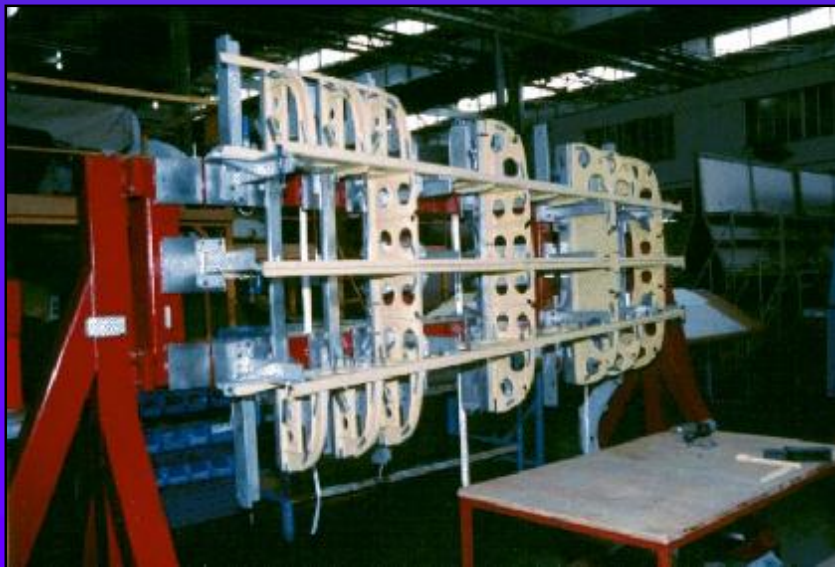
- Applied Research in
 - Aeronautics
 - Materials Science
 - Systems Modelling
 - Space – Earth Observation, Satellite Tracking



Opportunities in Aerospace
Role Players in the SA Aeronautical Sector

Denel SAAB Aerostructures

- Design and Manufacture of Aircraft Structures
 - Metal Fabrications
 - Composites
 - Advanced Machining Technologies
 - Design Engineering, Stress, Fatigue



Opportunities in Aerospace
Role Players in the SA Aeronautical Sector

Denel Aviation

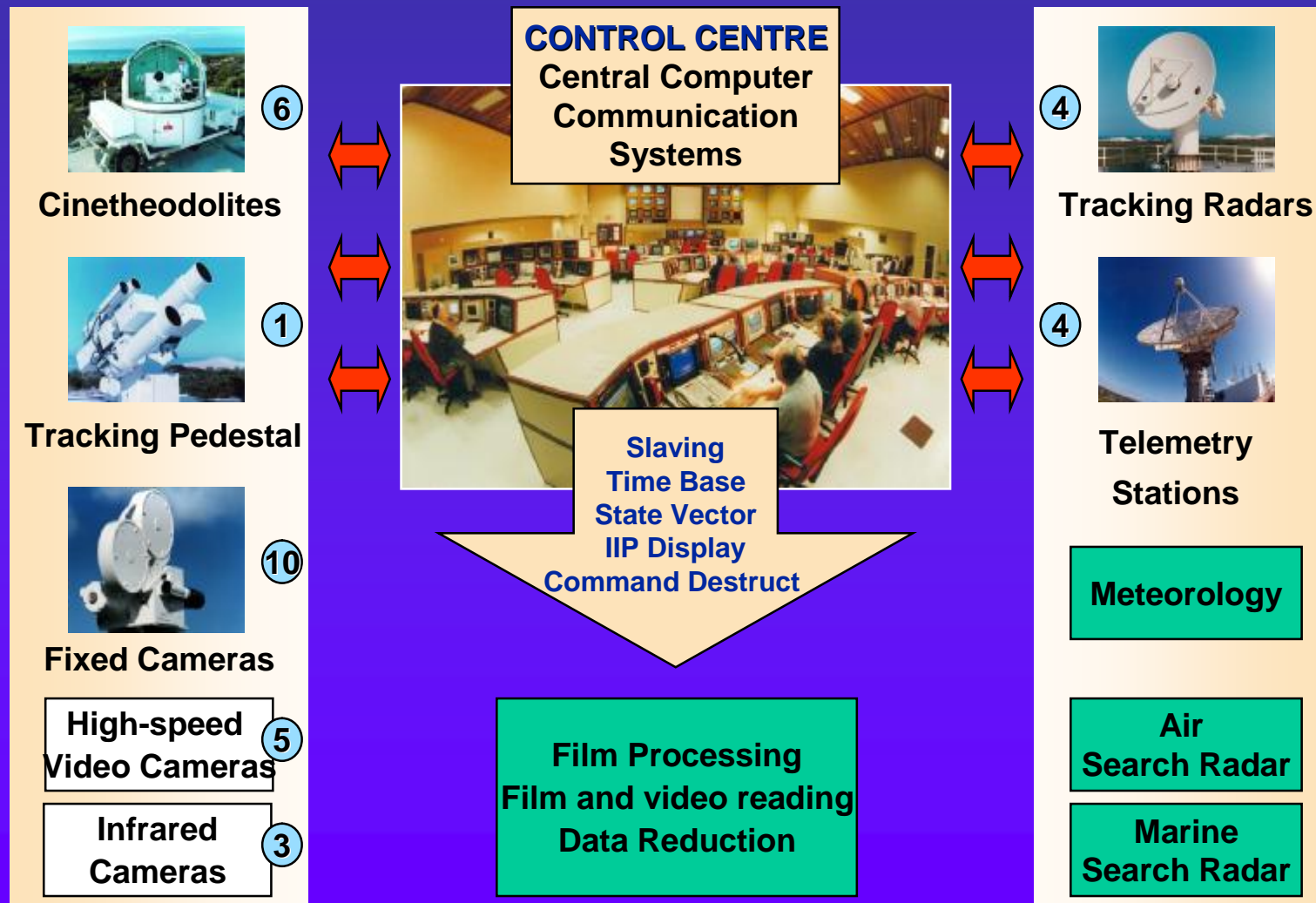
- System Level Supply and Maintenance
 - Depot Level Maintenance
 - System Engineering
 - Engineering Design
 - Aircraft Upgrades



Opportunities in Aerospace
Role Players in the SA Aeronautical Sector

Denel Overberg Test Facility – System Level Test and Evaluation

- Performance Measurement, Missile Tracking, Telemetry



Opportunities in Aerospace
Role Players in the SA Aeronautical Sector

Denel Dynamics

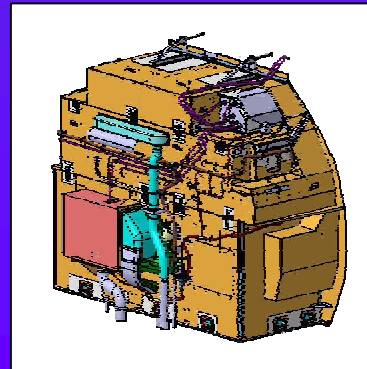
- System Level Supply Missiles, UAVs
 - System Engineering
 - Engineering Design
 - System Modelling
 - Missile and UAV build



Opportunities in Aerospace
Role Players in the SA Aeronautical Sector

Aerosud

- System Level Supply Aircraft
 - System Engineering
 - Engineering Design
 - Aircraft Upgrades
- Aircraft Design and Manufacturing
 - Engineering Design, Analysis, Testing
 - Metal Fabrications
 - Composite Fabrications



Opportunities in Aerospace
Role Players in the SA Aeronautical Sector

Advanced Technologies and Engineering (ATE)

- System Level Supply Aircraft
 - System Engineering
 - Engineering Design
 - Aircraft Upgrades
- Aircraft Design and Manufacturing
 - Engineering Design, Analysis, Testing
 - Metal Fabrications
 - Composite Fabrications



Opportunities in Aerospace
Role Players in the SA Aeronautical Sector

South African Airways

- Aircraft Maintenance and Overhaul
 - Aircraft Performance Analysis
 - Aircraft Maintenance
 - Aircraft Modifications



Opportunities in Aerospace
Role Players in the SA Aeronautical Sector

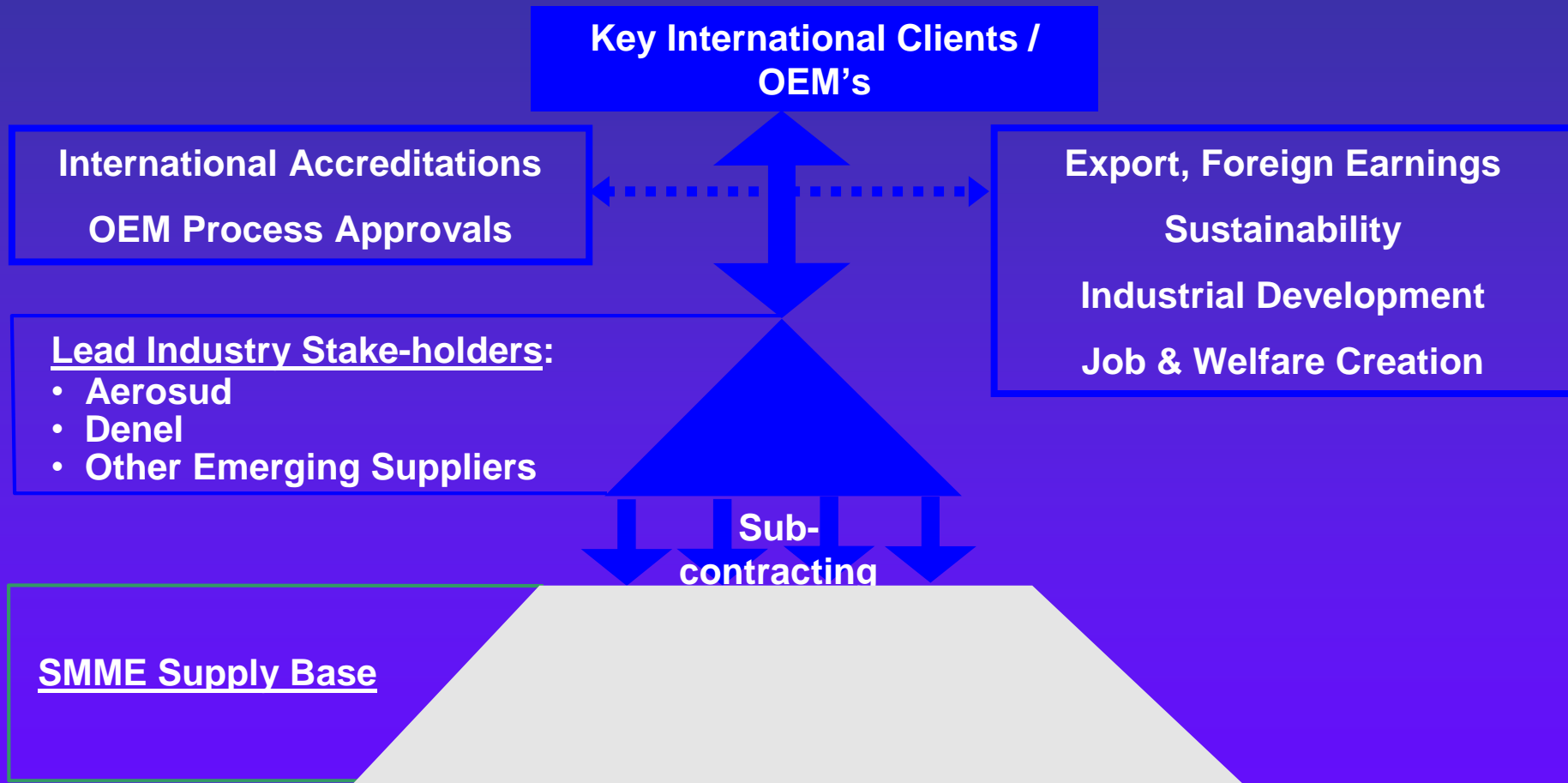
Turbomeca Africa

- Aircraft Engines & Transmission Manufacturing and Maintenance
 - Engine Performance
 - Engine Overhaul
 - Transmission Overhaul
 - Part Manufacture



Opportunities in Aerospace
Role Players in the SA Aeronautical Sector

Government Initiatives – Establishment of Centurion Aviation Village



The DTI Aero-mechanical Clustering Model (similar to Motor Industry Parks)



Opportunities in Aerospace Role Players in the SA Aeronautical Sector



AeSSA & FTSSA

- Aeronautical Society of South Africa
 - Peer group of Aeronautical Professionals registered as a Voluntary Association with ECSA
 - Provide accreditation of University courses in Aeronautical disciplines
 - Provide guidance to Government in developing Engineering Professionals
 - Arrange lectures and conferences to promote the profession
 - Provide bursaries and awards to School level & Engineering Students
 - Facilitate Visits to various institutions
- Flight Test Society of South Africa
 - Affiliated to AeSSA
 - Peer group of Flight Test Pilots and Flight Test Engineers
 - Provide accreditation of Flight Test Engineering Work

Your Role?

- In Conclusion
 - Opportunities abound in Aerospace as a re-emerging sector of the economy
 - There is a variety interesting disciplines
 - The sector is in dire need of new blood
 - There are many opportunities for you to take part in



Reach for the Skies

Thank You