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IDEAS THAT WORK

8-9 October 2015 | CSIR ICC

**Supporting the
Industrialisation of
Aerospace
Technologies**

Ms Marié Botha

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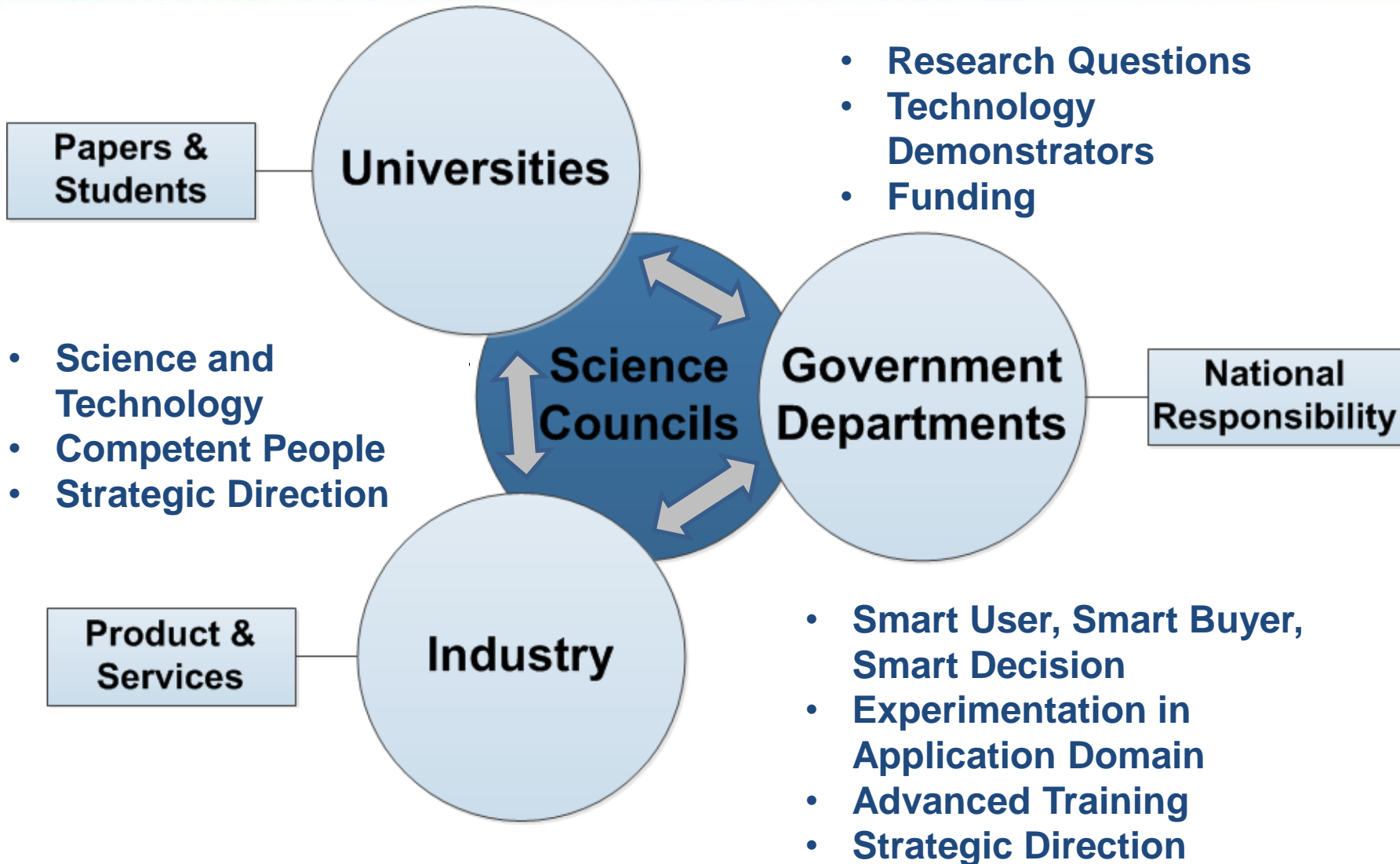
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Ideas that work

Overview



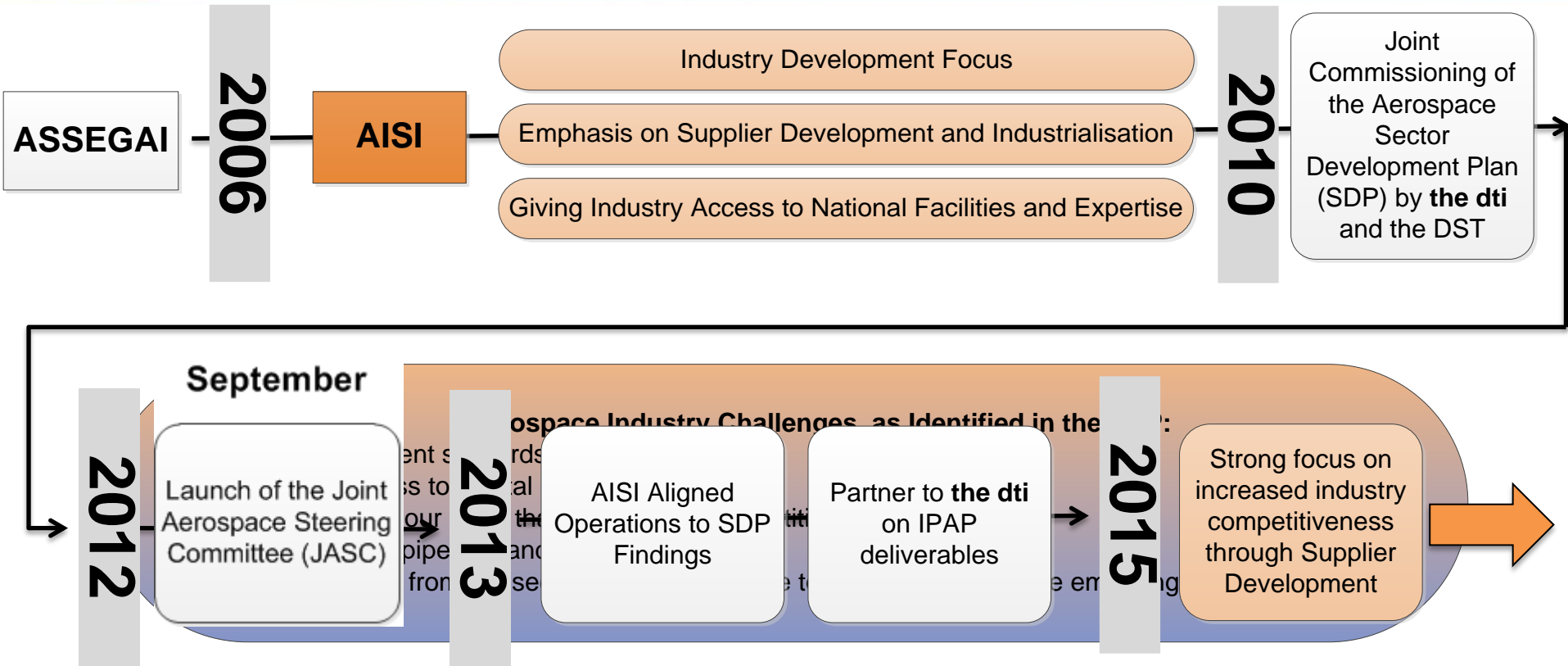
- Best practice
- History of the Aerospace Industry Support Initiative
- CSIR as a vehicle for aerospace industry development
- Enhancing localisation and industrialisation
- AISI industrialisation successes

Best practice for the development of aerospace technology



The history of the Aerospace Industry Support Initiative (AISI)

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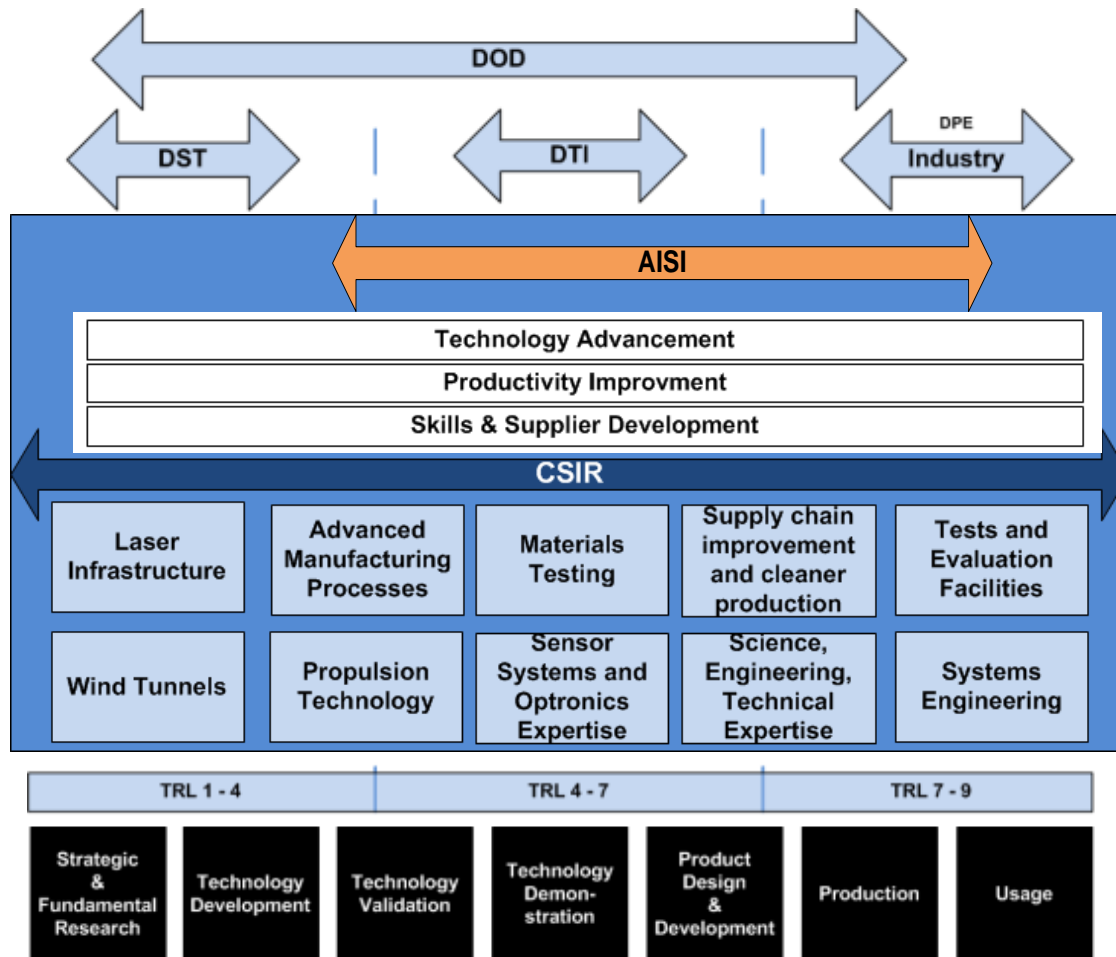
Main AISI focus areas as guided by SDP

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- **Industry Development and Technology Support**
 - Advanced Manufacturing and Processing Technology
 - Composite Materials
 - Avionics
- **Supplier Development Incentive Programme**
 - Supplier Development Enablers for SMMEs
 - Standards and Accreditations
 - Supply Chain Improvement Interventions and Manufacturing Process Optimisation
- **Sector Strategic Support Initiatives**
 - JASC Flagship Projects
 - JASC Secretariat

CSIR as a vehicle for aerospace industry development

“...through directed and particularly **multi-disciplinary research** and **technological innovation**, to foster, in the **national interest** and in fields which in its opinion should receive preference, **industrial** and **scientific development**, either by itself or in co-operation with principals from the private or public sectors, and thereby to contribute to the improvement of the quality of life of the people of the Republic...” – Act 46 of 1988, as amended by Act 71 of 1990



Why aerospace requires a technology injection to enhance industrialisation

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Track Cans



Communications & IFF



Interiors

CFRTP Clips



Avionics Suites



Systems Engineering



AHRLAC Development



AIRBUS MILITARY



Composite Sub-Assembly Design and Manufacture

Roivalk spin-off technologies in local industry

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Roivalk Project Benefits Realised

TECHNOLOGY STREAMS

OEM/Integrator	*			*	*															
Aerostructures	*			*																
Propulsion	*																			*
Avionics									*	*		*						*	*	*
Sensors			*							*										
Information Tech		*								*			*							
Materials	*																			
Other Systems		*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*



AISI ensuring local industrialisation capability: An example

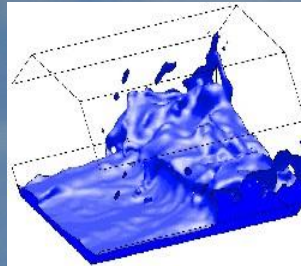
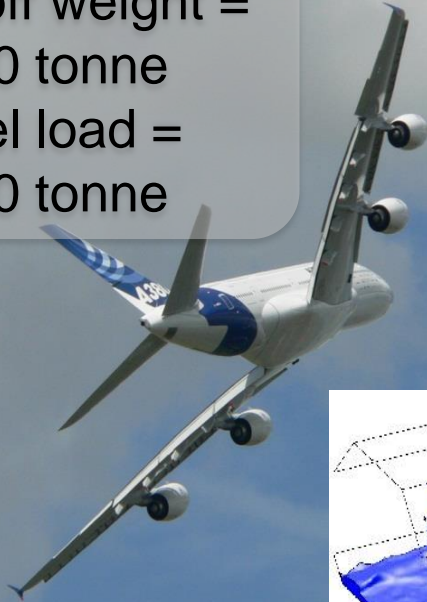
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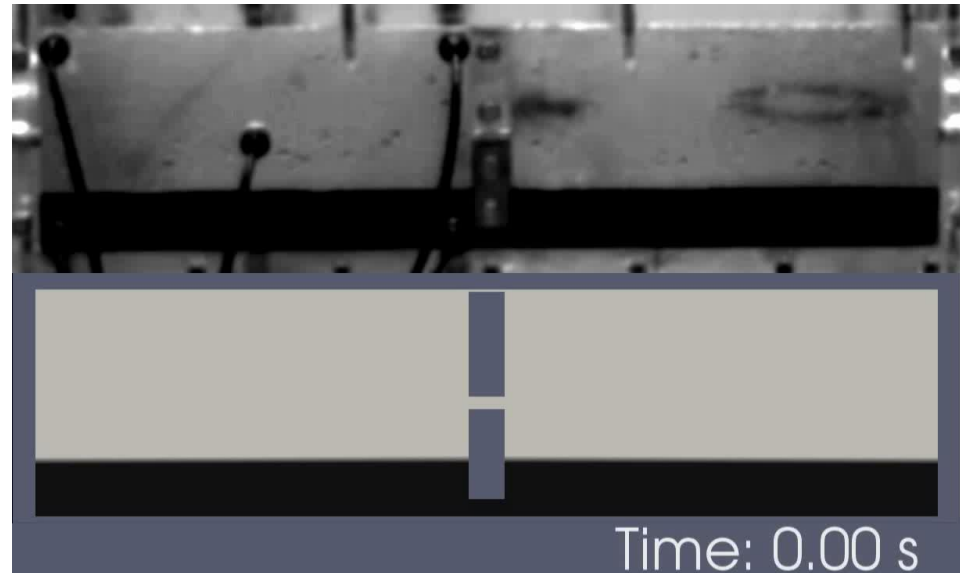
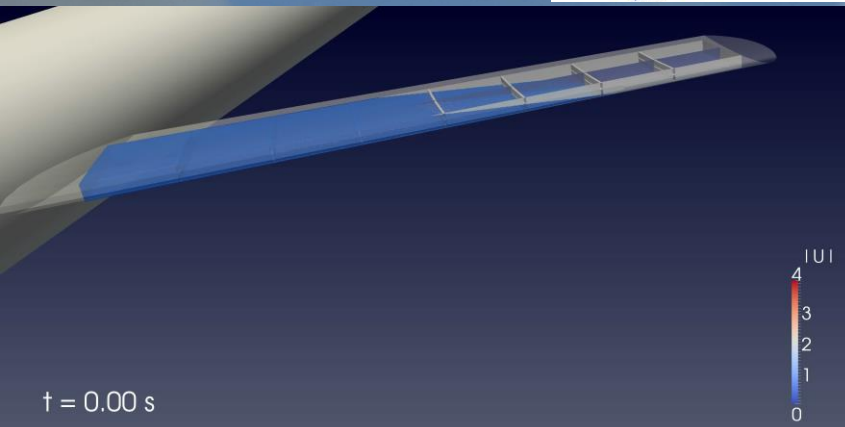
AISI ensuring local industrialisation capability: Fuel sloshing example

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Take off weight =
560 tonne
Fuel load =
290 tonne

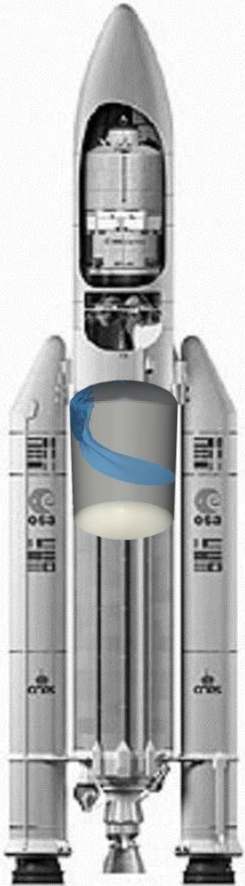


- Liquid Fuel Structure Interaction Modelling
- If we know what the load against the structure will be, we can optimise the structure

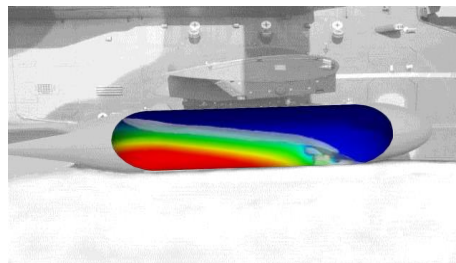


AISI ensuring local industrialisation capability: Fuel sloshing example

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- Industrialisation of a Technology that was funded by **DST**, **CSIR** and **Airbus**
- External Fuel Tank of the **Rooivalk** to be used to demonstrate Technology
 - Denel Aerostructures has **Design Authority**
 - Enables Denel Aerostructures to **Validate Technology**
- Benefits:
 - **Accurately Design** components for Fuel Tanks
 - **Cheaper Manufacturing** due to knowledge of forces against structures during design phase
- Gives Denel Aerostructures the ability to **compete in Global Markets**



AISI industrialisation successes: Micro gas turbine engines

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Cape Aerospace
Technologies



Western Cape

- The lack of a propulsion systems capability in South Africa has been identified as a deficiency in the aerospace industry.
- In an effort to reignite the local micro gas turbine propulsion market, Cape Aerospace Technologies has developed the CAT 200 KS gas turbine engine.
- First gas turbine prototype since the late 1980s.

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AISI industrialisation successes: Radiation screening services

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Heliocentric Technologies
ZA



Gauteng

- Radiation effects on satellite electronic components have proven to be a major problem that affects the longevity of satellites in the space environment.
- Heliocentric provides radiation screening and mitigation services for satellite components.
- Reliable screening instruments and processes, which accurately simulates prolonged exposure to radiation.

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AISI industrialisation successes: Stellar gyro development

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NewSpace Systems



Western Cape

- Satellites use different systems for orbit and attitude control. These control systems ensure the intended orbit of the satellite is followed and calculate the necessary adjustments, should they drift out of orbit.
- NewSpace Systems has developed a novel, attitude control system for low-cost, small and nanosatellites.

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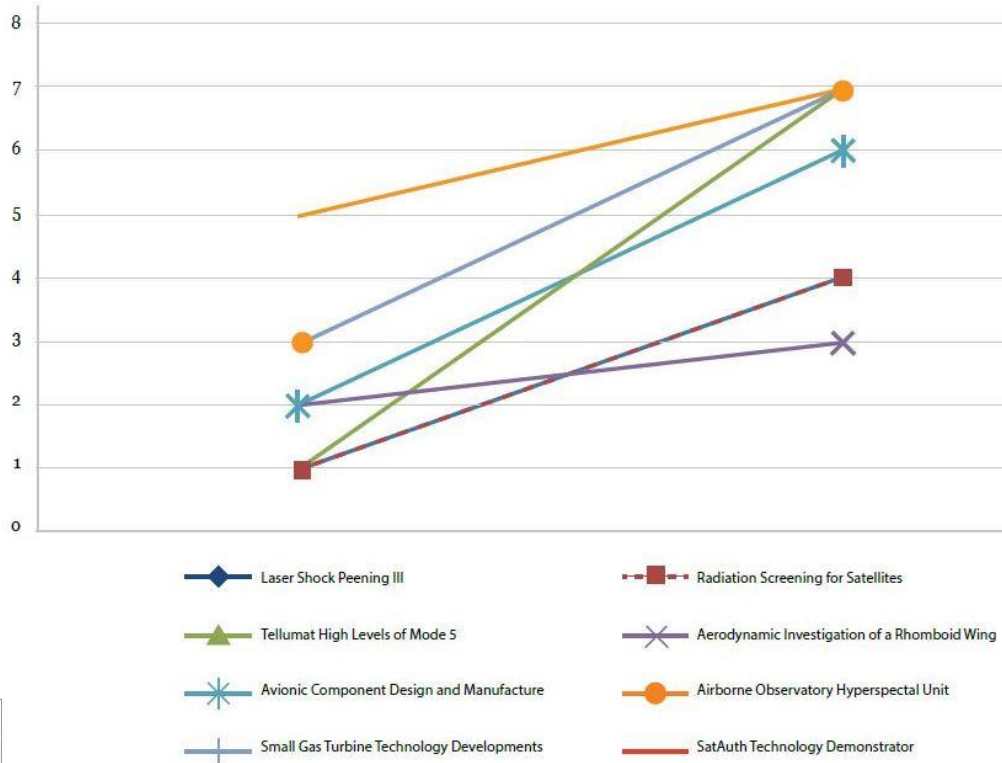
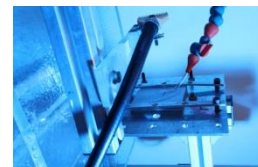
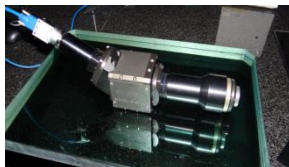
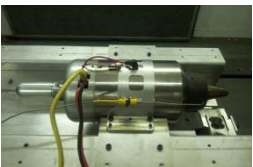
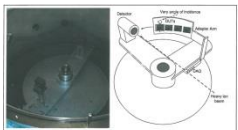
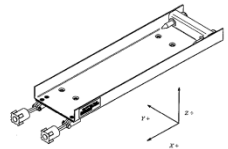
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AISI interventions improves TRLs - 2014/15

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Technology readiness Levels



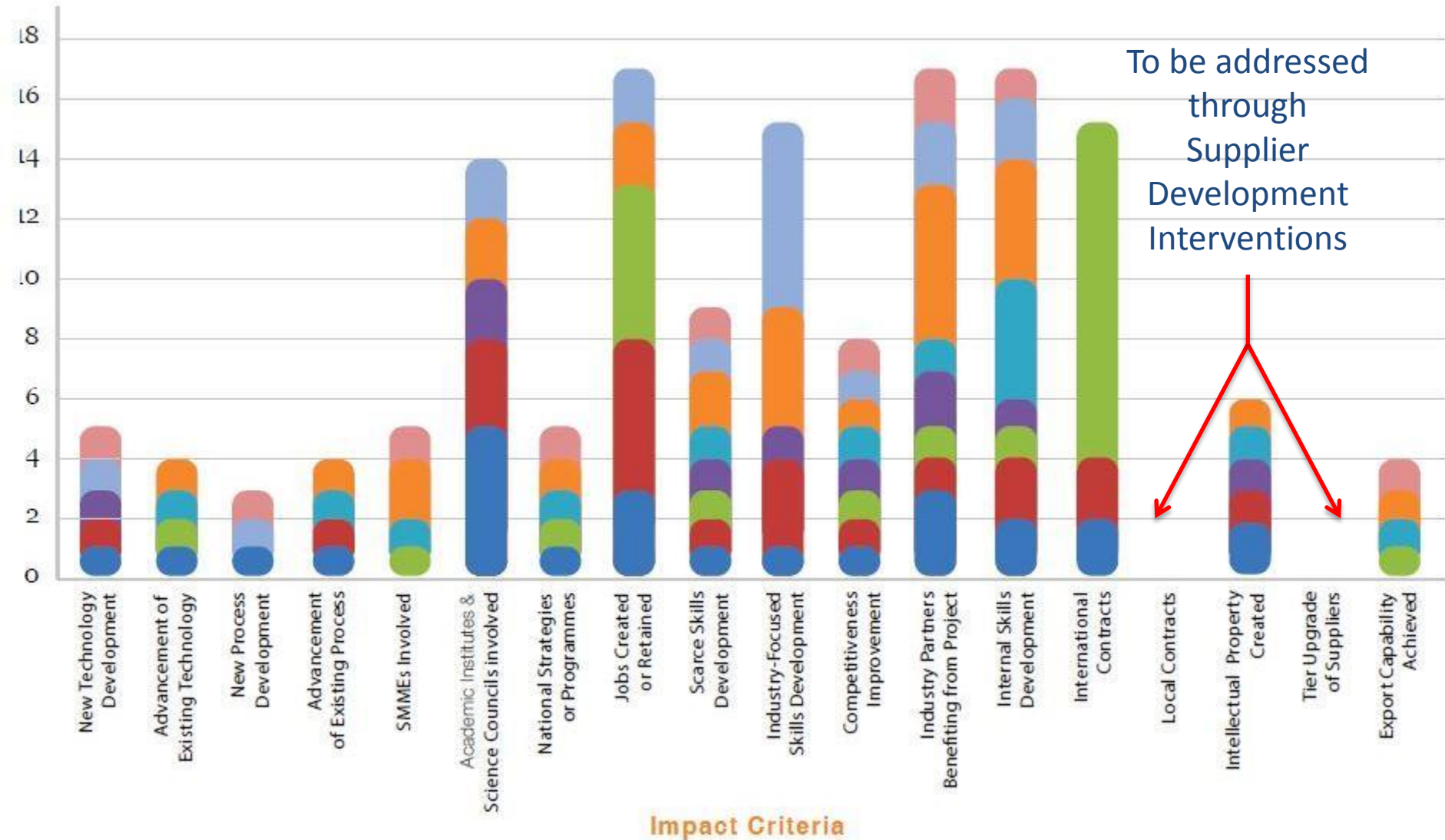
- 31 Projects
- 64 Organisations and SMMEs
- 15 New Technology Developments

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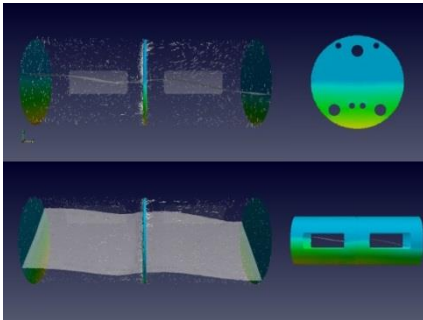
AISI high-level impact 2014/15

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Supplier development through the AISI

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- Technology Transfer & Skills Transfer
 - Collaborating with OEMs to enable SMME manufacturing base



- Enabling Mechanisms
 - Supplier Development Enablers for SMMEs
 - Standards and Accreditations
 - Supply Chain Improvement Interventions and Manufacturing Process Optimisation



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A century of South African aerospace

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1911



SA Aeronautical Society formed

1920



SAAF formed

1945

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CSIR established

1964



Atlas Aircraft Corporation established

1968



Aeromacchi MB-326 Impala

1970



Allouette / MRO

1980



Oryx / Super Puma conversion

1983



Cheetah / Design Authority

1990



Rooivalk / OEM

1995



Ace / all composite turbo prop trainer

1996



Gulfstream G150

1999



SunSat Development

2000



Gripen

2003



A109

2005



Airbus A400M

2011



AHLRAC

2014



SEEKER 400
1st flight

2014



SARA
Concept

*Courtesy of Mr Theo Kleynhans, CEO, Denel Aerostructures

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Thank you

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