MINISTRY OF DEFENCE

AIR

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- Programme Balance
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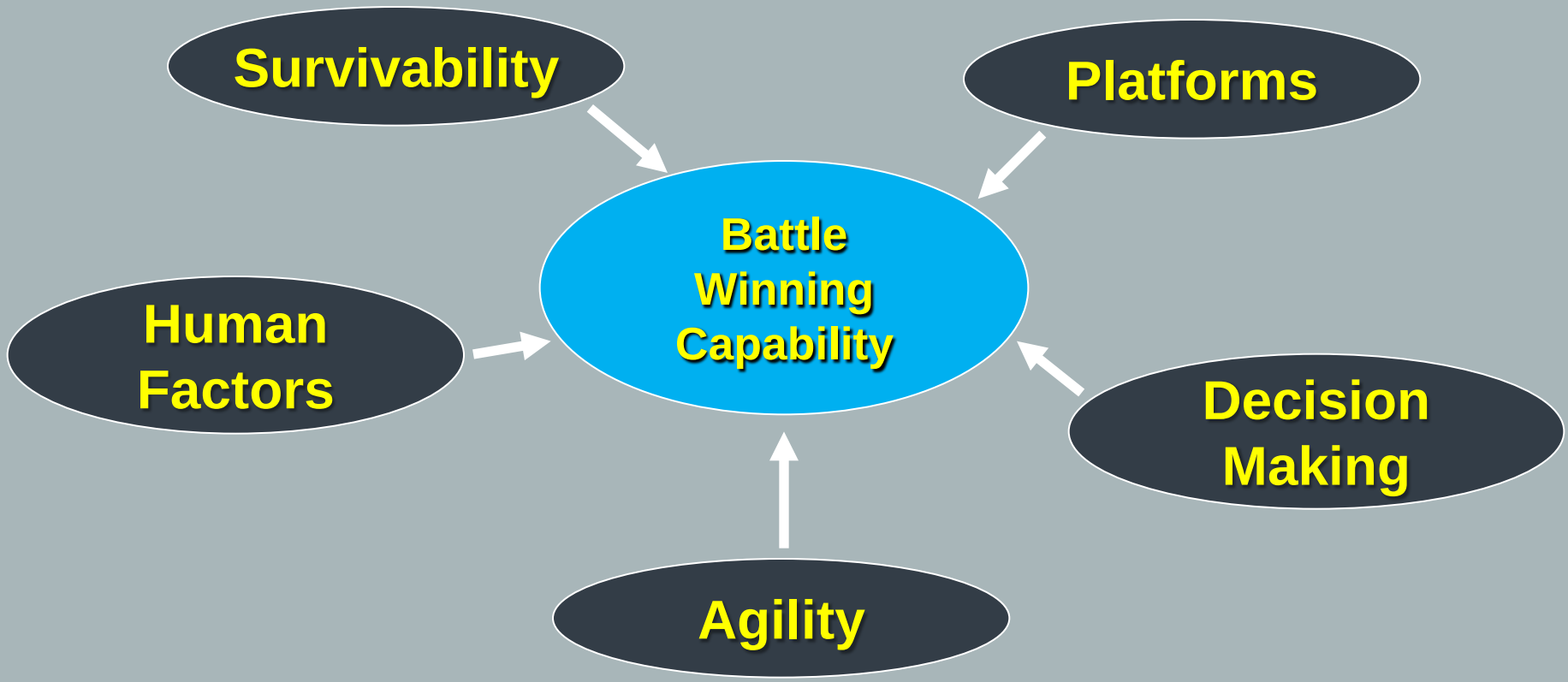
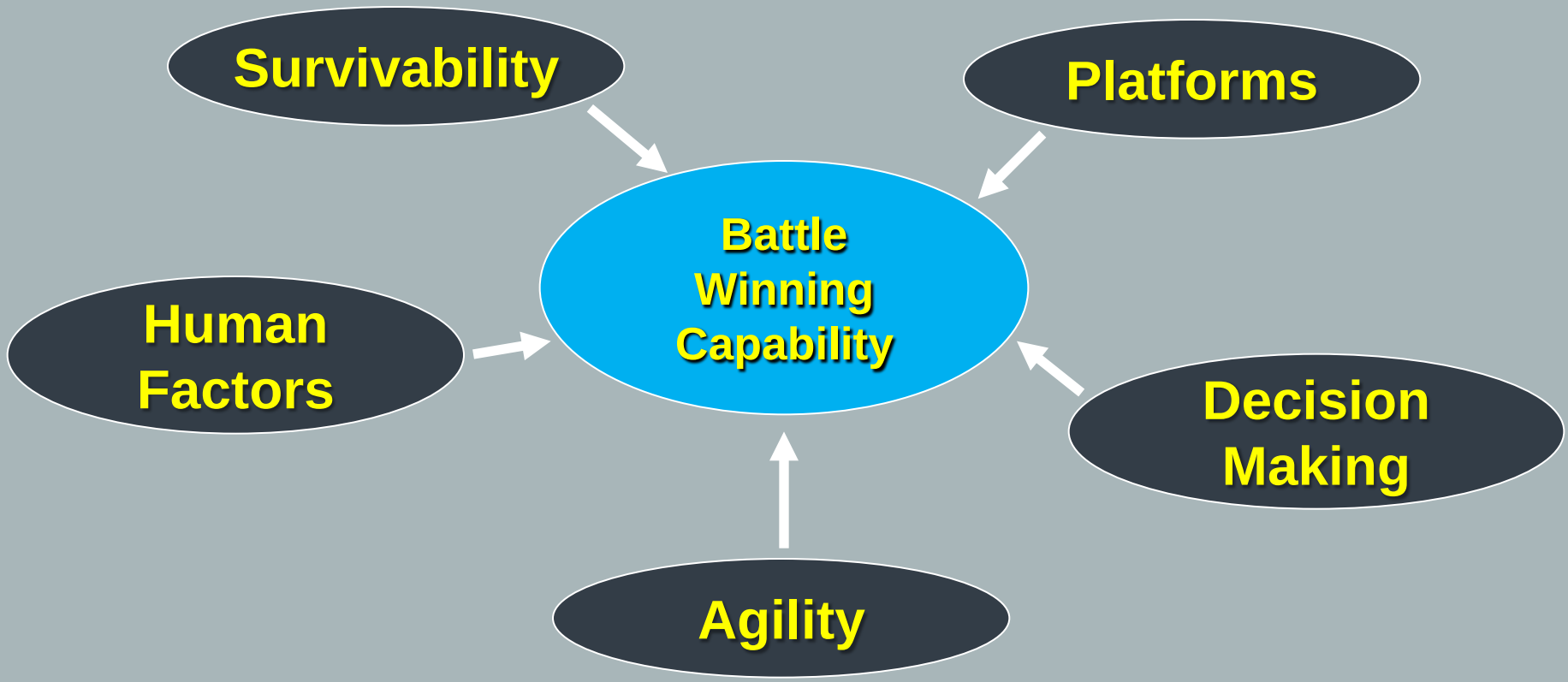
Scope

Scope

S+ T Thrusts


Survivability
Platforms
Battle Winning Capability
Human Factors
Decision Making
Agility

S+ T Thrusts


Survivability
Platforms
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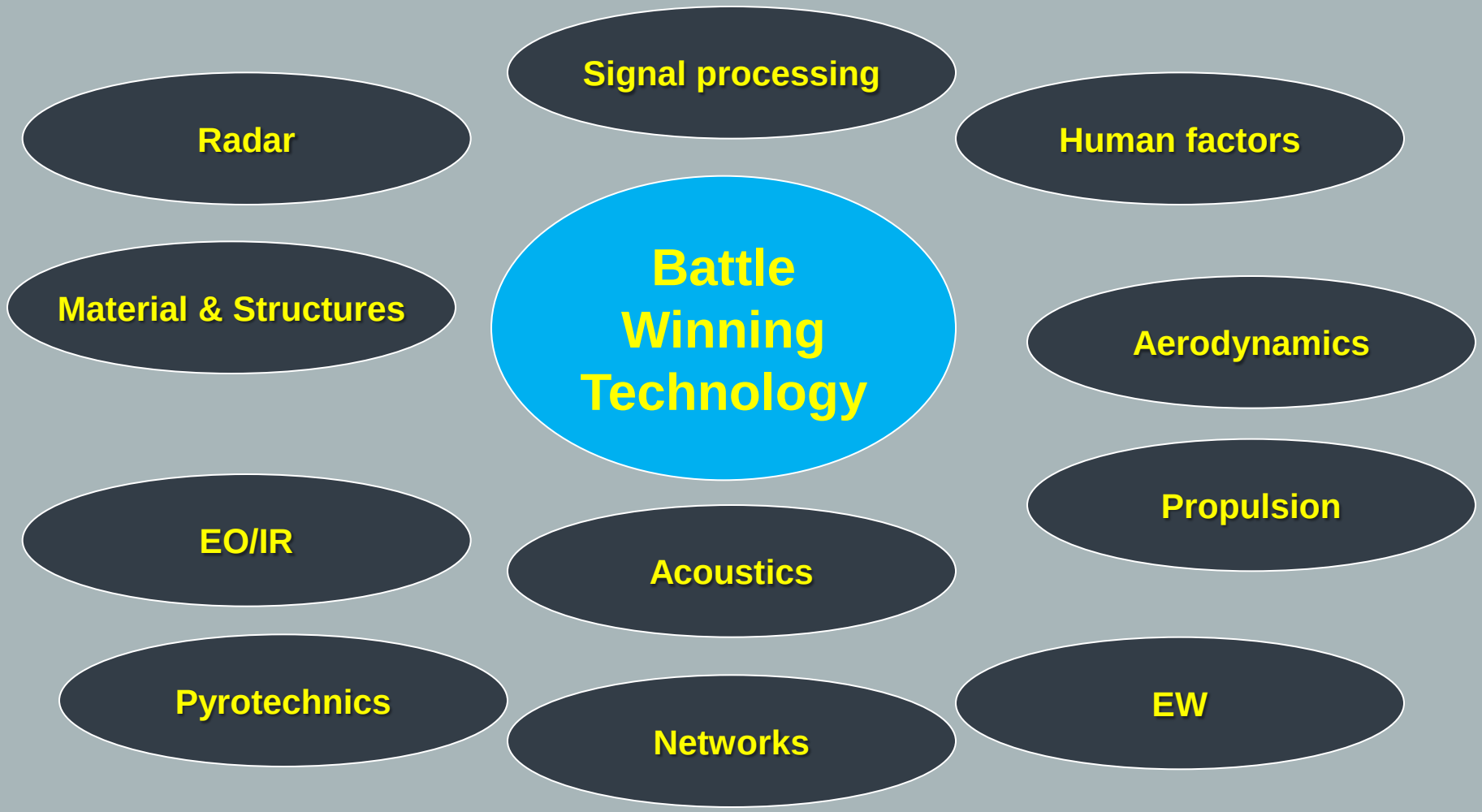
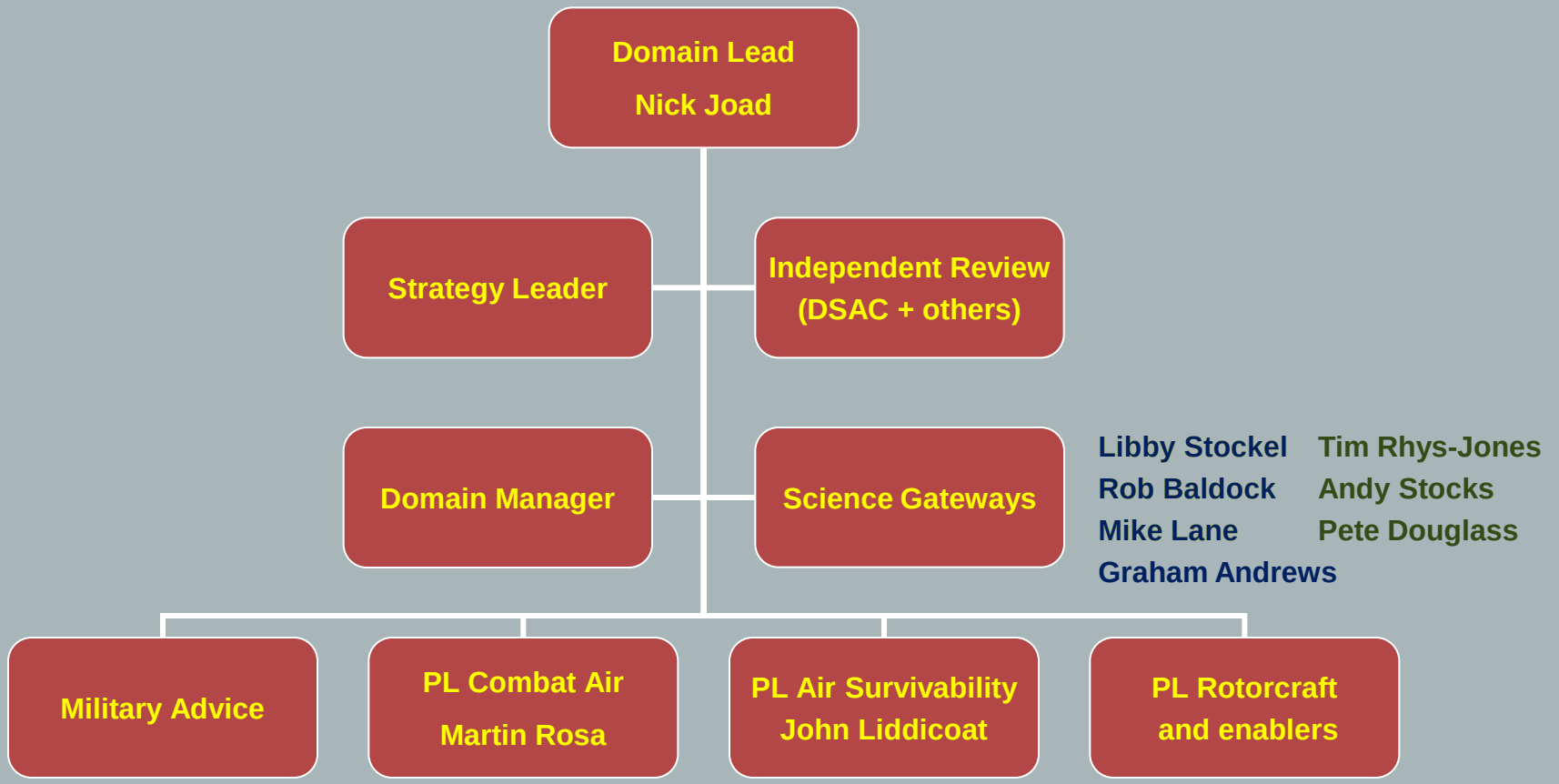
Technology


Signal processing
Radar
Human factors
Material & Structures
Battle Winning Technology
Aerodynamics
Propulsion
EO/IR
Acoustics
Pyrotechnics
Networks
EW

Programme Office



Advice Team

Contracting Mechanisms

- Contractors
- CDE
- DSTL
- Contract Bulletins www.contracts.mod.uk
- MOD web site www.science.mod.uk

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Research Examples

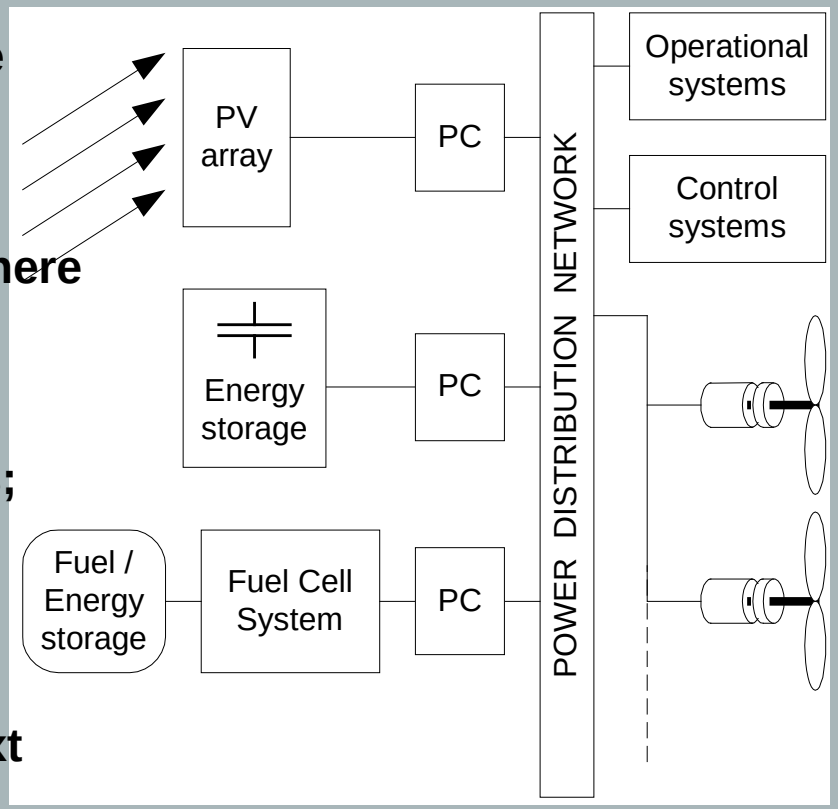
Very Long Duration Propulsion (*Rolls-Royce, Sheffield University, Nottingham University*)

Endurance of chemical-fuelled aircraft propulsion systems limited. Investigate power& propulsion systems giving an endurance of a week.

Propose an 'all-electric' architecture where sources of power are not mechanically coupled to the propulsion system.

Combines Photovoltaic wing coverings; high efficiency electrically driven propellers; fuel cell and battery power sources.

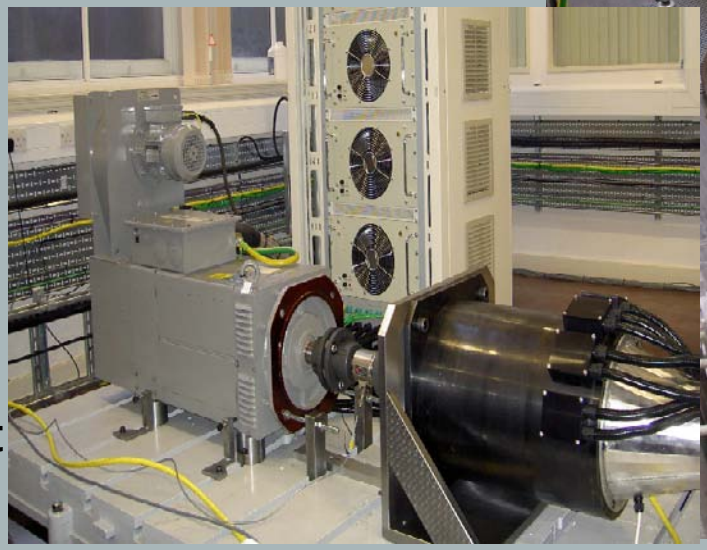
Successful simulations completed. Next stage is design and demonstration of elements of the architecture.



UAV Power Management Test Facility (*Rolls-Royce / Manchester University*)

Fully kitted-out, flexible electrical test facility with ability to integrate multiple electrical loads and power sources. Could be used to enhance the performance of future UAVs.

Can examine high speed response of electrical networks and the introduction of elements to enable the implementation of intelligent control, re-configurability and fault management.



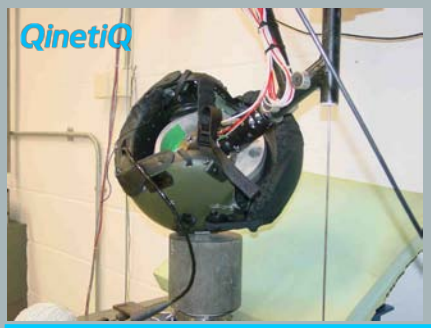
Aircrew Protection & Survival

Solutions to reduce aircrew injury risk during emergency while maintaining aircrew capability

Identifying strategies to reduce the risk of ejection injuries through the use of computer simulation

Identifying solutions to improve to provide enhanced aircrew crash impact protection

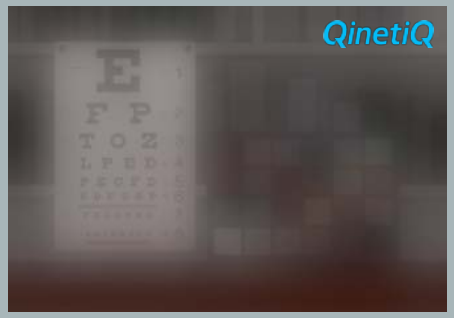
Understanding the impact of Laser Eye Protection on aircrew vision



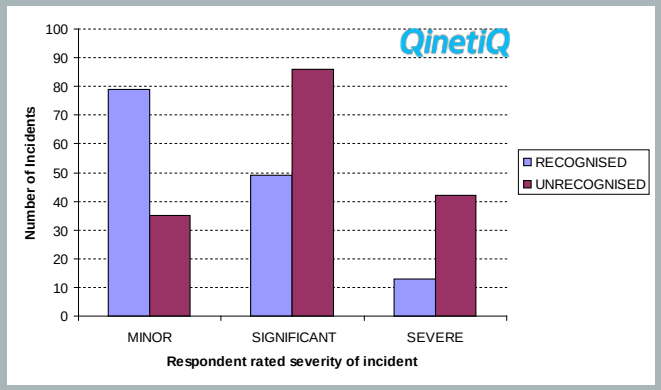
Defining head protection requirements for aircrew, in collaboration with US Army research laboratories

Aircrew Protection & Survival

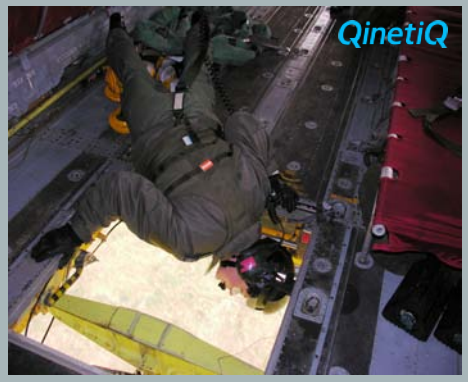
Strategies and equipment to maintain optimum aircrew performance



Understanding the effects of hypoxia on vision at 10,000ft for RW high altitude operations



Identifying targeted strategies to reduce the number of accidents & incidents attributable to disorientation in flight



Strategies to minimise injuries in aircrew due to equipment & tasks

Providing innovative noise protection solutions to meet legislation requirements

Improved Air Decision Making

QinetiQ

"Delivery of coordinated and timely effects through improved air decision making"

Requirements

- Current Operations feedback
- Future Tactical Mission Integration
- Coherent cross-domain capability

Demonstration

Mission Enabling Technologies

TIARA Flight Trials – Dec 09

"Fast Jet MMS networked using both Link-16 and VMF, enabling co-ordinated ops with RW via on-board data link gateway – a UK first"

International Research Collaboration

MOD-AFRL Strike Warrior II

Joint Synthetic Environment Trials

"AFRL – Agile Command

plus

MOD – Agile Mission"

USAF operators and AFRL technologies and integrated in UK trial

Exploitation

OMPS – Julius Chinook

DAMM CCD

[dstl]

08 March 2010

Dstl is part of the Ministry of Defence

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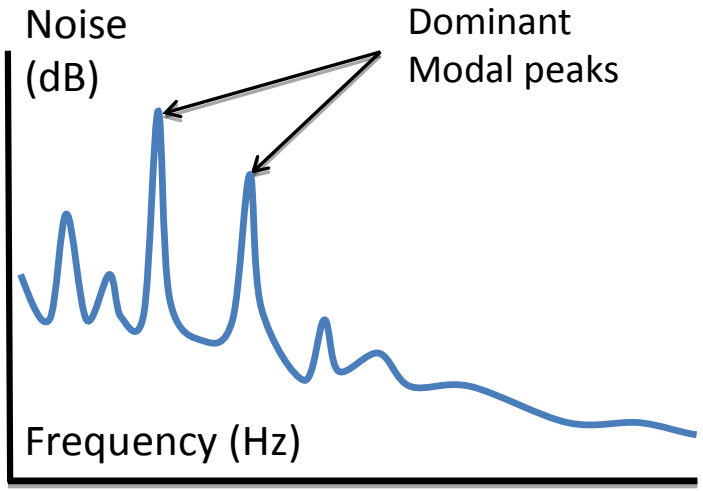
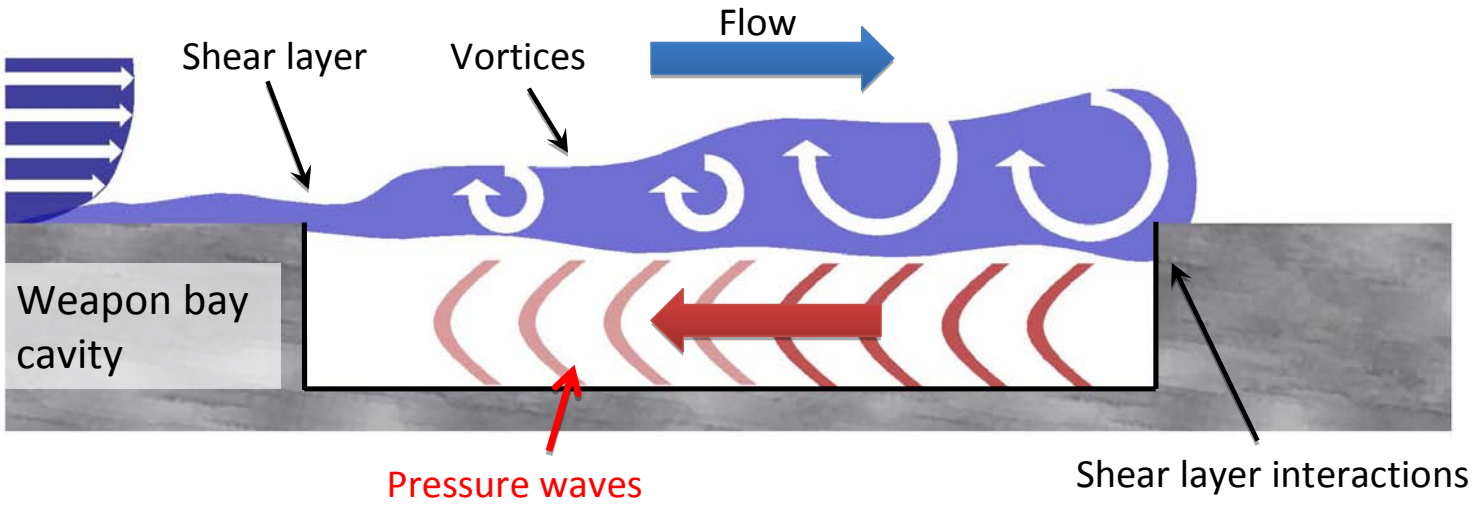
CDE Projects

Weapon Bay Noise Attenuation

- Stores and component damage
- Noise levels up to 175dB
- Strong modal peaks
- Transonic & supersonic regimes



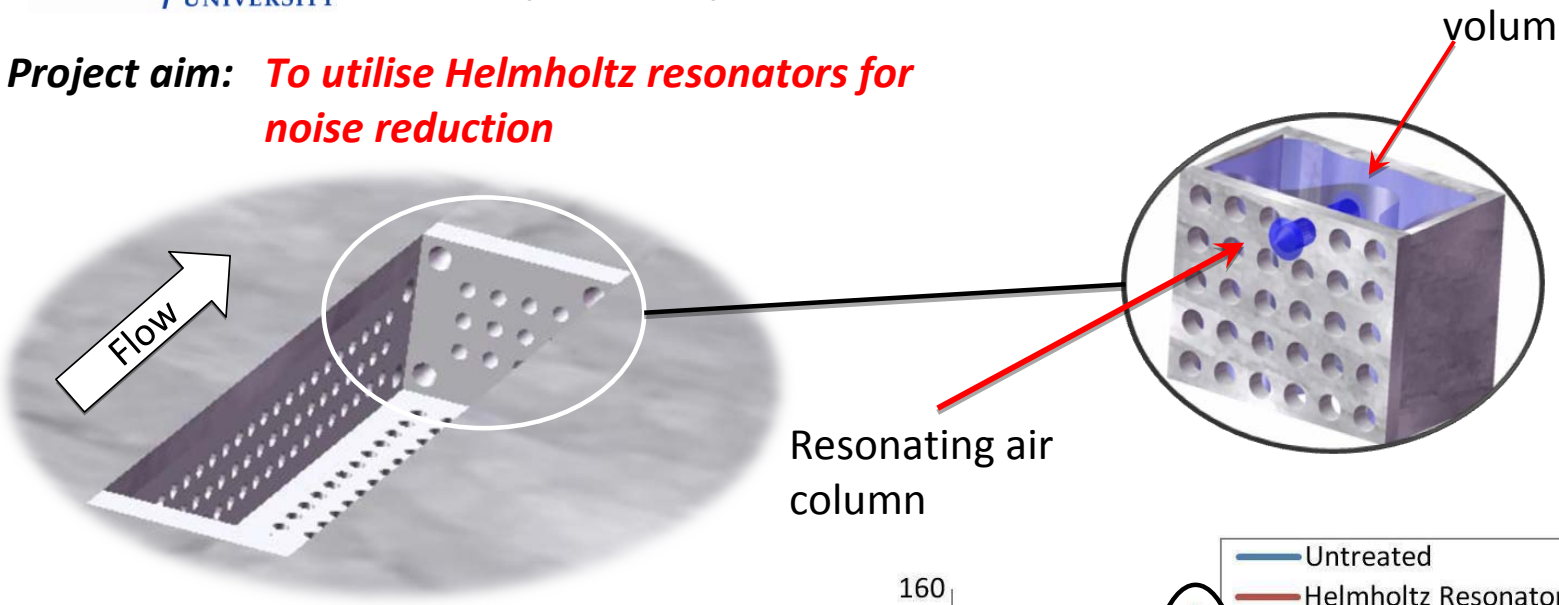
Cavity noise spectra



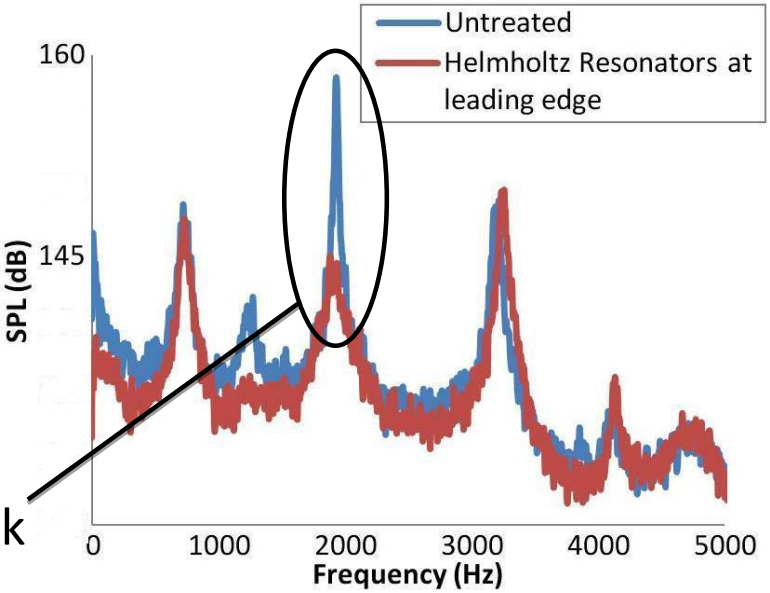
Cranfield UNIVERSITY

Weapon Bay Noise Attenuation

Project aim: ***To utilise Helmholtz resonators for noise reduction***

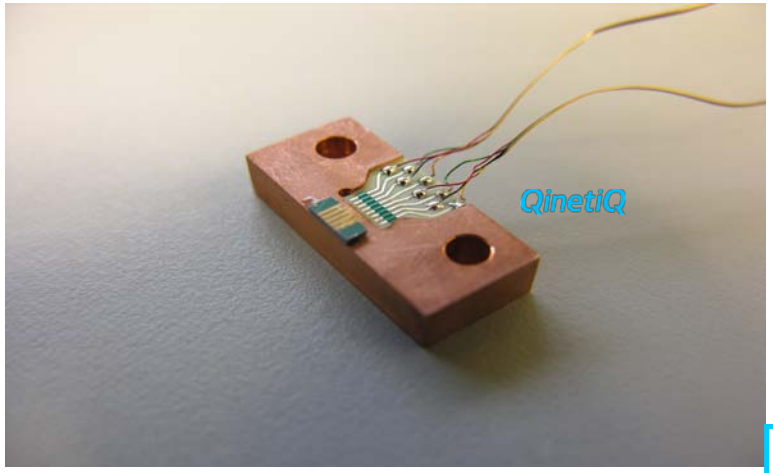


- Tuned to modal frequency
- Fully passive method
- No airframe drag increase expected
- Successful initial tests at Mach 0.9
- 14dB reduction in largest modal peak

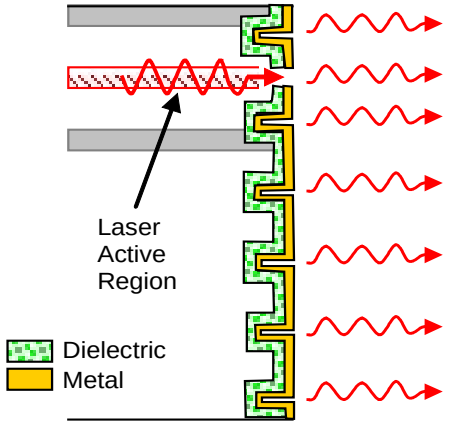


CDE Project to Demonstrate Plasmonic Laser Source

Aim: Develop novel semiconductor laser sources to enable compact, cost effective directed infrared countermeasures systems.



QinetiQ



Compact semiconductor lasers emitting in the 3-5μm range emerging from laboratory

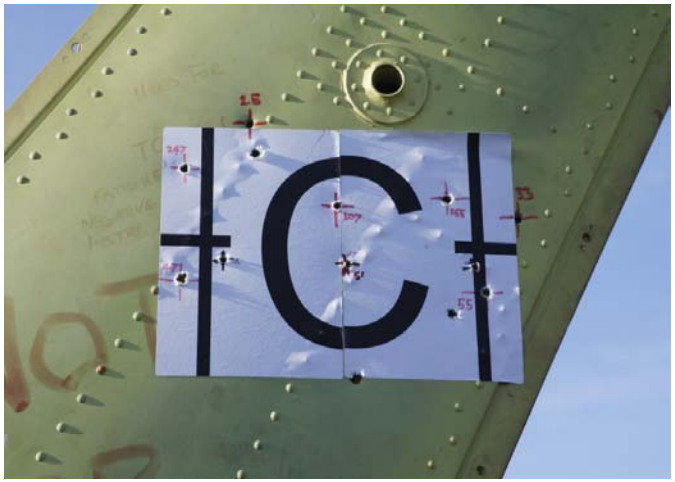
Metallic structures on the emitting facet reduce large beam divergence of these lasers. Reduces the requirement for expensive and large optics.

QinetiQ

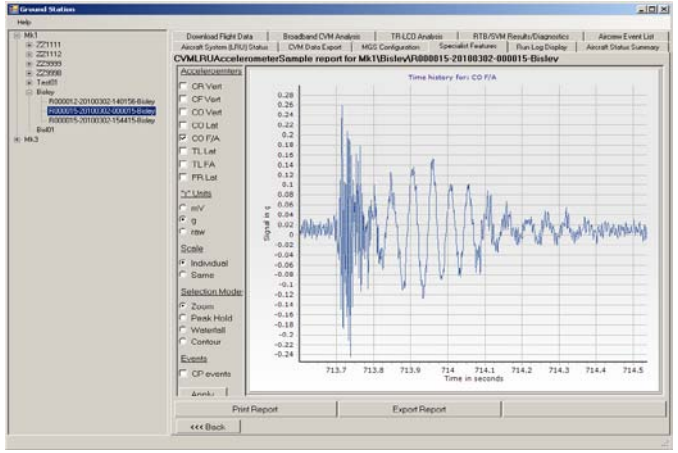
Hostile Hit Indication – Live Firings, Bisley, 2nd Mar 10

- Trials are assessing the feasibility of using vibration data to detect airframe hits
- Airframe sections instrumented with accelerometers
- Target areas marked up

Preliminary Results



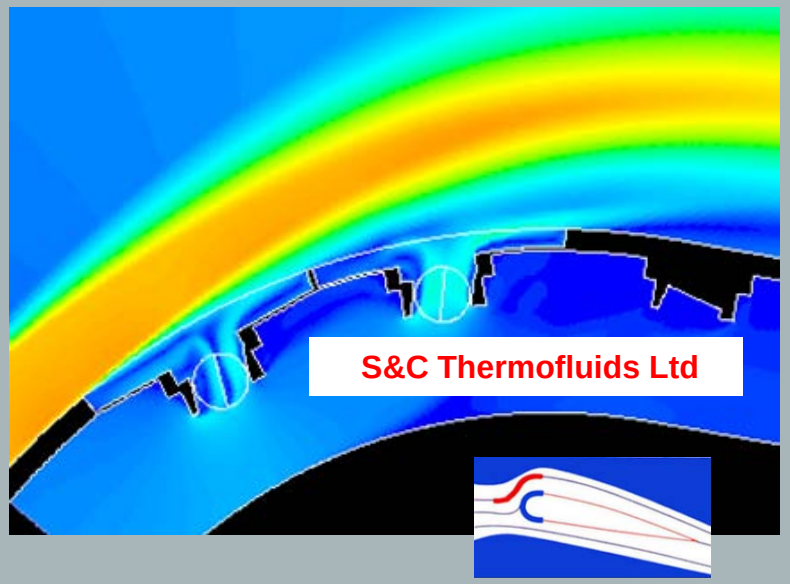
- Direct hits ***and*** near misses can be detected
- The raw data will be mixed with aircraft operational vibration data during post-processing
- Next step: Can solution resolve shooter direction?



Gas Turbine Thrust Efficiency

- S&C Thermofluids

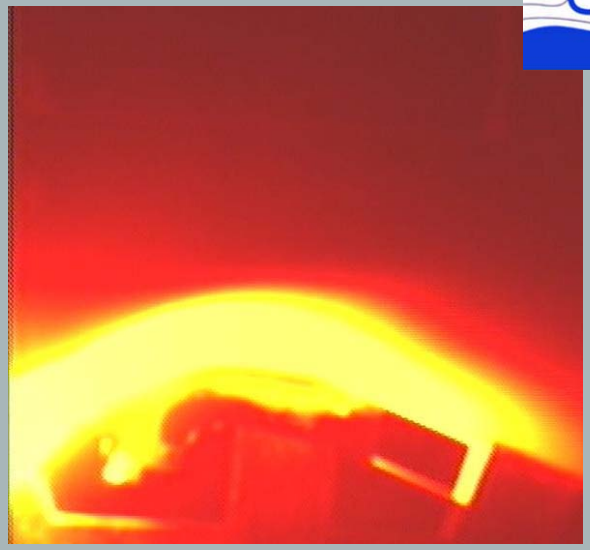
- Flow control to enhance mixing and thrust efficiency.
- SME 10-50.
- Medium value
- Medium risk
- High payback
- Good exploitation potential



2D CFD model with 2 valves open

Gas Turbine Thrust Efficiency

S&C Thermofluids Ltd

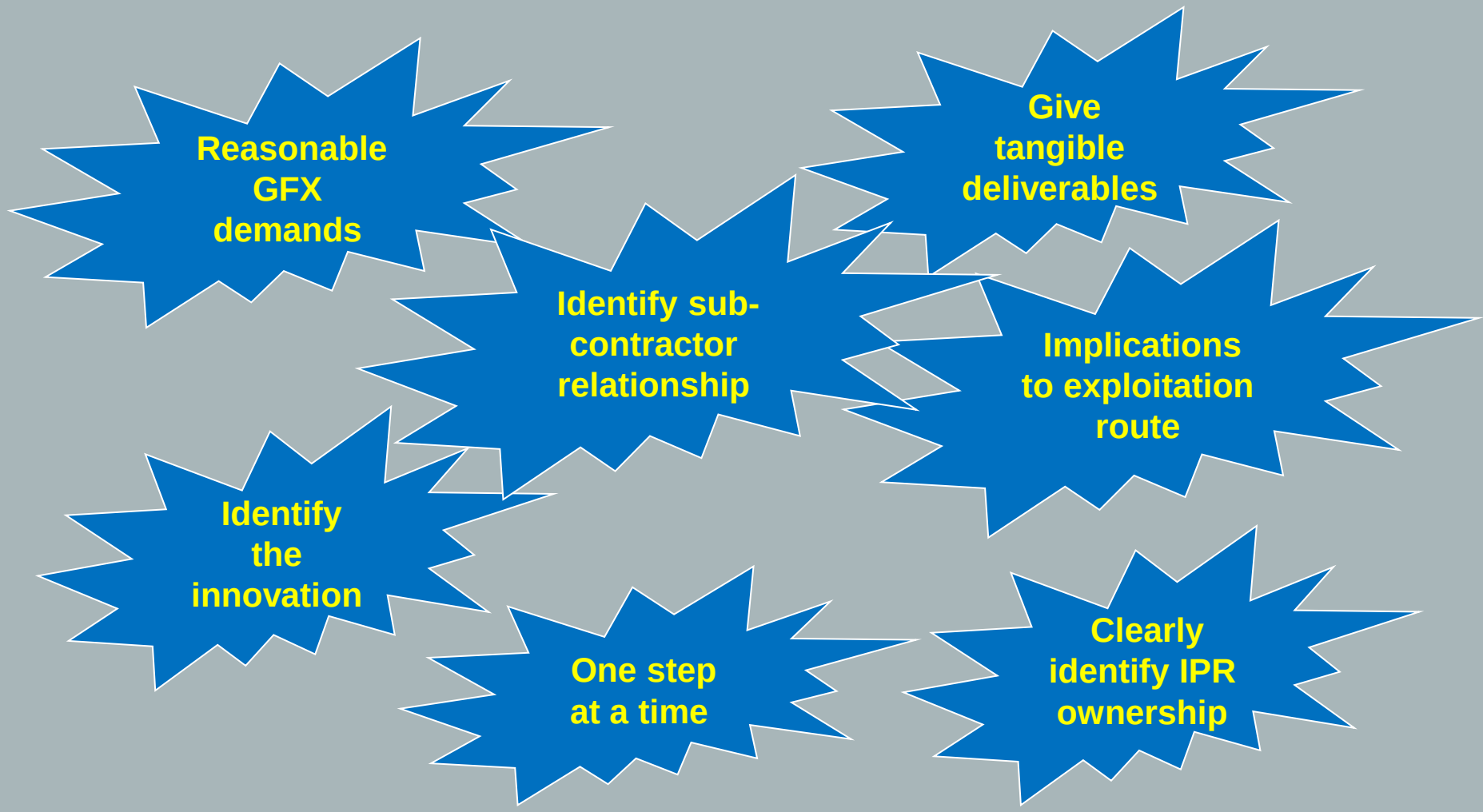


Valve chambers closed

Valve chambers open

IR image of exhaust flow over Coanda surface

Bid Hints


Reasonable GFX demands
Give tangible deliverables
Identify sub-contractor relationship
Implications to exploitation route
Identify the innovation
One step at a time
Clearly identify IPR ownership

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Questions?