

Research and Technology Organisations (RTOs)

Function	Example
Strategic Research	Research of longer term national (and economic) importance
Technology Support	Contract services to industryLong range technology researchSupport to SME's
Support to Policy Development	Precautionary researchExpertise
Technical Standards	Engineering standardsVerification/Certification
National Facilities	Big infrastructure





Air Breathing Engines using Conventional & Alternative Fuels



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- ~50% reduction in SFC or ~70% reduction in aircraft fuel burn per passenger since the 1960s (~3% per year (1960s))
- Approaching the region of limited return on the innovation 'S' curve

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Major components of an hybrid propulsion system



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Electric Motors/Generators

 Large capacity light weight electric motors from current 2-4 kW/kg to 14 (7x increase) by 2020





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Ref: NATO–AVT 209-09, 'Electric Flight – Potential and Limitations' by M. Hepperle, German Aerospace Center, Jan. 2013 Ref: March 25, 2015 Press release "Siemens unveils electric motor for aircraft

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Who is Working in <u>Current</u> Propulsion Technologies

Who is Working in Future Propulsion Technologies



"Factories of the Future"

This new era will be marked by highly agile, networked enterprises that use information and analytics as skillfully as they employ talent and machinery to deliver products and services. In advanced economies, manufacturing will drive innovation, productivity growth and exports:

- · Materials and technology innovation
- · Process innovation
- · Product design innovation

Manufacturing needs to focus on the transformation of the present factories, towards 'Factories of the Future':

- · Re-usable, flexible, modular
- · Intelligent, digital, virtual, affordable
- · Easy-to-adapt, operate and maintain
- · Highly reliable



Source: EU Commission, Factories of the Future

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NRC's – Top RTO Practices for Success

- · Understand drivers for industry change
- · Focus, determine, understand & measure end-user needs
- Projects
 - · Agree upon clear, measurable project goals
 - · Refine projects with customer feedback
 - · Formal program/project development process
- Coordinate development & support commercialization
- · Coordinate R&D resources with long range business plans
 - · Hire/maintain the best people and expertise
 - · Cross-functional teams
- Manage risk understand client risk thresholds keep evergreen at project, program and interface levels

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