Safety Risk Management – Challenges in a Multi-Sector Business

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SM ICG Industry day - Bern

Trusted to deliver excellence

Rolls-Royce

What is the challenge?

- Rolls-Royce are a large, complex organisation – **Multiple products, Multiple geographical locations**

- Involved in the introduction of Safety Management Systems (SMS) requirements for Design, Production, Maintenance and Maintenance Training organisations – **Multiple Disciplines – not just Design**

- Different parts of Rolls-Royce are overseen by different Authorities – **Multiple Authorities – not only Airworthiness Authorities**

The principles of any SMS must be globally applicable

Rolls-Royce

A Large Civil Aerospace Company

- More than 30 types of commercial aircraft
- Almost 13,000 engines in service
- A Rolls-Royce powered aircraft takes off or lands every 2.5 seconds
- 40,000 employees in more than 50 countries
- RB211 and Trent families of engines

Rolls-Royce

Corporate and Regional (Small and medium engines)

- **Powering 7 new business jets in the past decade**
- **Over 2,400 aircraft**
- **Turbofans, turboprops and Turboshafts**

- **M250**
  - **Over 31,000 engines**
  - **Over 220 million flight hours**
  - **Over 170 airframe applications**

AE2100

AE3007

BR710

BR715

BR725

Tay

RR500 Turboprop

M250 Turboprop/turboshaft

RR300

CTS800

Rolls-Royce

Defence Aerospace

- 16,000 engines in service
- 160 customers
- 103 countries
- Combat jets
- Helicopters
- Transporters
- Trainers
- Tactical aircraft
- UAV

Rolls-Royce

Marine

- 4000 customers
- 30,000 vessels
- Commercial and Naval vessels
- Engines
- Propulsors
- Ship design
- Controls
- Deck machinery
- Stabilisation and manoeuvring systems

Rolls-Royce

Power Systems

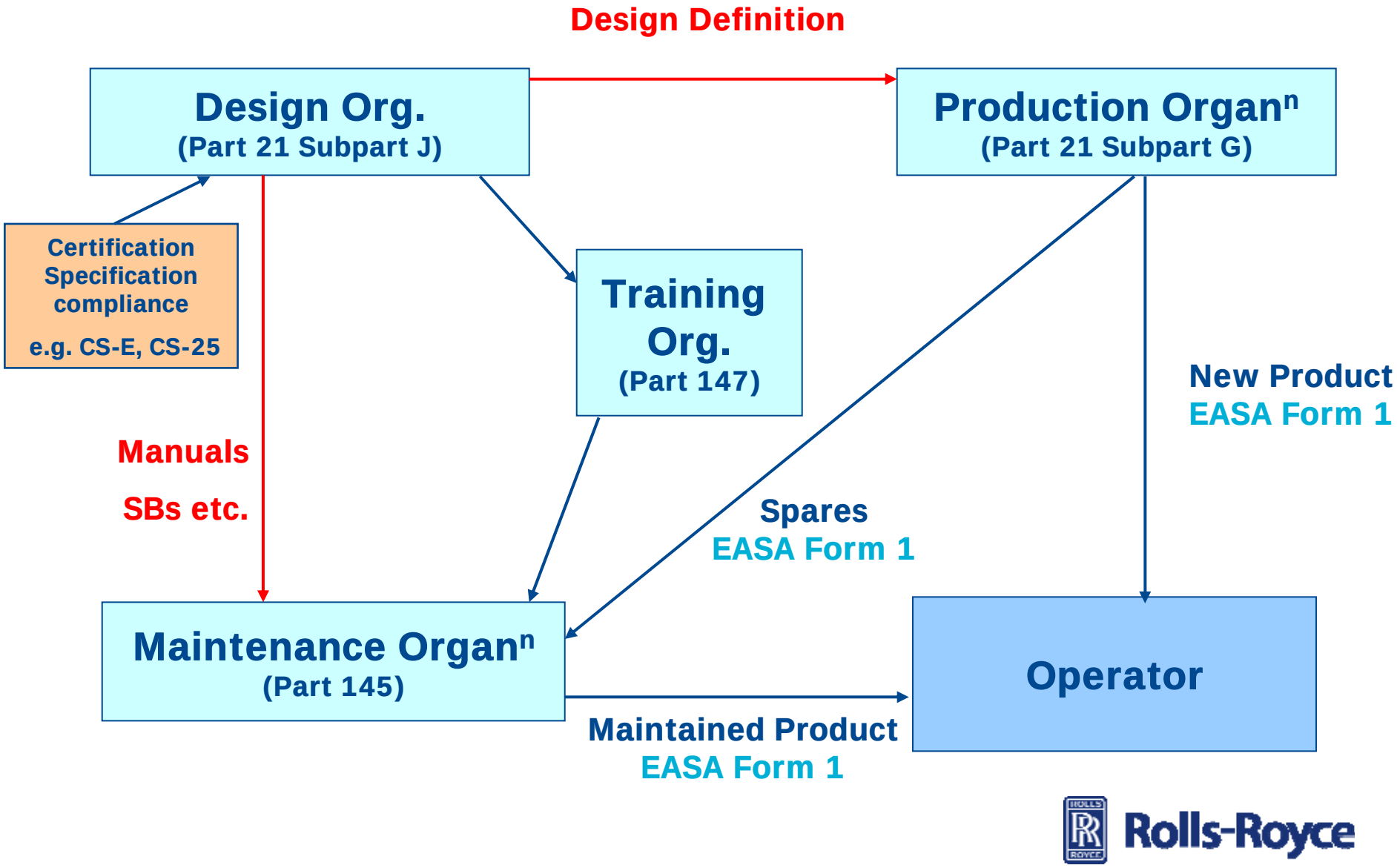
- Engines for ships, land, rail and defence vehicles
- Propulsion systems
- Energy Systems
- Fuel injection systems
- 11,000 people

- Previously Tognum AG
- Marketed under MTU and MTU onsite Energy
- Bergen Engines AS
- L'Orange fuel injection systems

A diverse range of products – not just aero engines

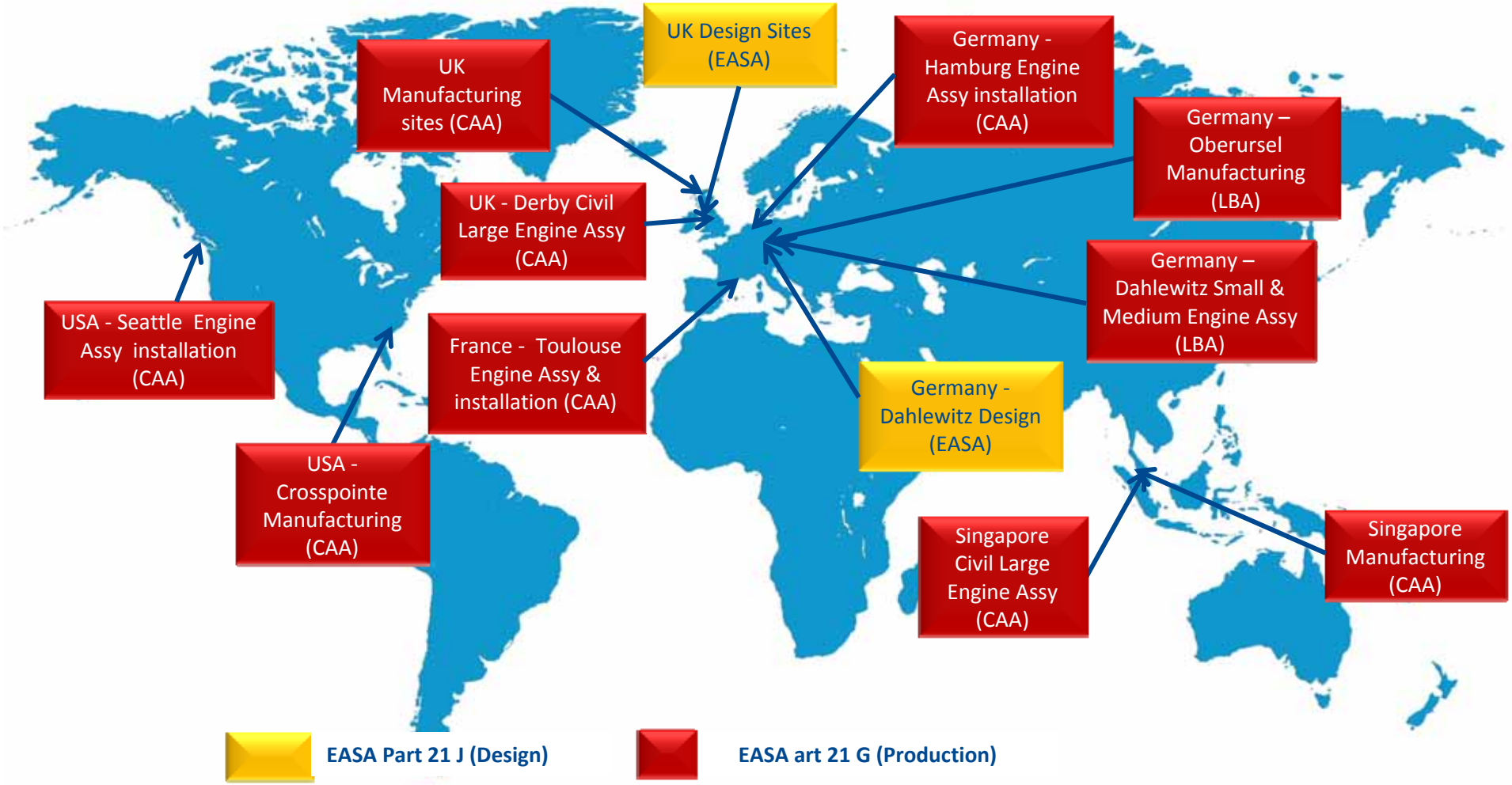
Rolls-Royce

European Regulatory Framework - simplified



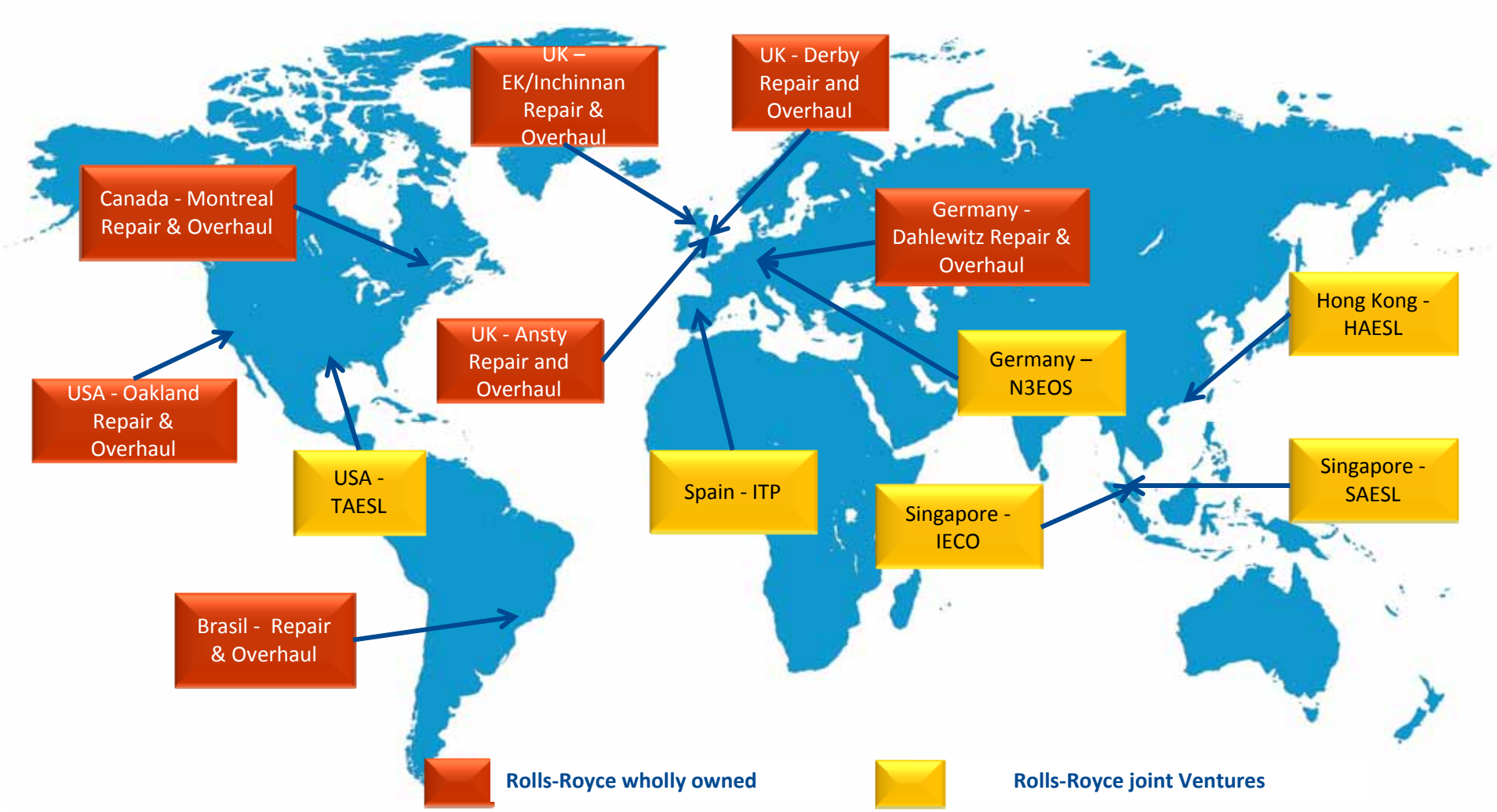
Rolls-Royce

Rolls-Royce Design & Production EASA Part 21 Approvals



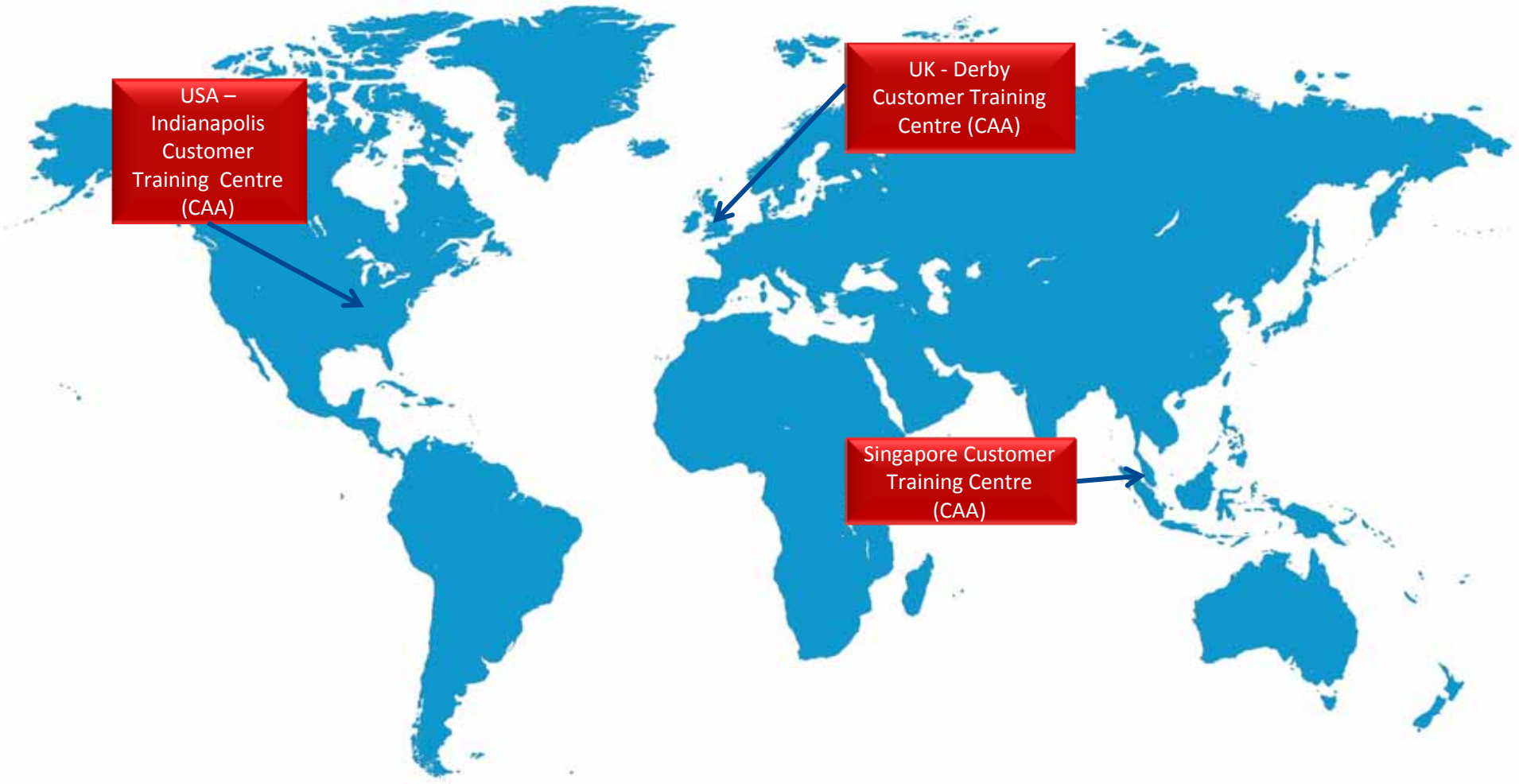
Rolls-Royce

Rolls-Royce Civil Engine Regulatory Approved Maintenance locations



Rolls-Royce

Rolls-Royce EASA Part 147 Approval



Rolls-Royce

Approvals held by Rolls-Royce

Design Organisation Approvals (EASA) for UK and Germany
FAA TC Holder for USA products

Production Organisation Approval (CAA and LBA)
FAA PC Holder for USA products

Maintenance Organisation Approval (CAA and LBA)
Canada, Brasil, USA and many others depending on customers' requirements

Approved Maintenance Training/Examinations (CAA)
Multiple sites – UK, USA, Singapore

Rolls-Royce

Key parts of an SMS

- **Safety policy and objectives** – including identification of *Safety Accountabilities*
- **Safety risk management** – including Hazard identification and safety risk assessment and mitigation
- **Safety Assurance** – Safety performance monitoring and measurement
- **Safety Promotion** – Safety training and communication

When applied to the diverse range of products, the answers to these questions may be quite different

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Types of Product Safety Risk

Product Design Risks

- Examples – uncontained debris, loss of control, fire
- Vary across businesses – single engine fighter v civil twin v tunnel thrusters

Conforming Product Risks

- Not implementing controls to keep the product safe through life
- Not following defined processes and standards

Generic Risks

- That could impact product safety in any sector and function of the business
- Examples - outsourcing, overload, personnel changes, growth, governance, culture

Competency Risks

- Ensuring people in product safety related roles are suitably qualified and experienced

Rolls-Royce

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Going forward…..

The Work of the SM ICG is very important:

- Standardisation
- Common understanding and interpretation

Requirements should be objective based, not prescriptive

- To achieve the safety objectives and be flexible enough to be applied to all products in a complex organisation
- Not just a box ticking exercise

Committed to working together

- To develop the SMS regulations, advisory material and tools

Rolls-Royce