



Rolls-Royce

Rolls-Royce: Serving the nuclear industry

Rolls-Royce

trusted to deliver excellence

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Rolls-Royce proprietary information



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WE ARE A POWER SYSTEMS AND SERVICE GROUP

CIVIL AEROSPACE



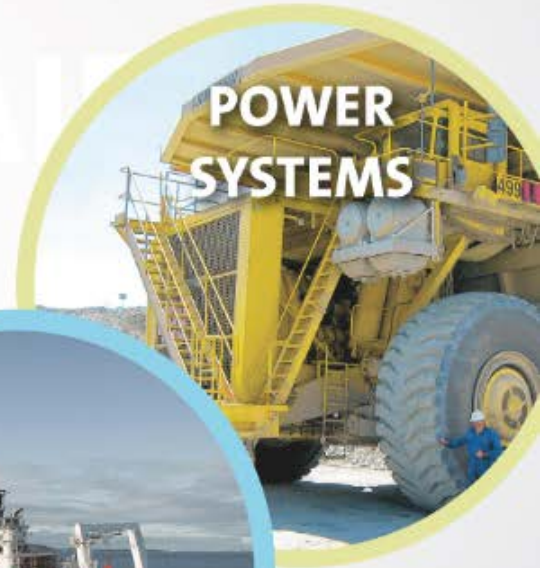
**DEFENCE
AEROSPACE**



NUCLEAR



**POWER
SYSTEMS**



MARINE



REVENUE
£13.4bn

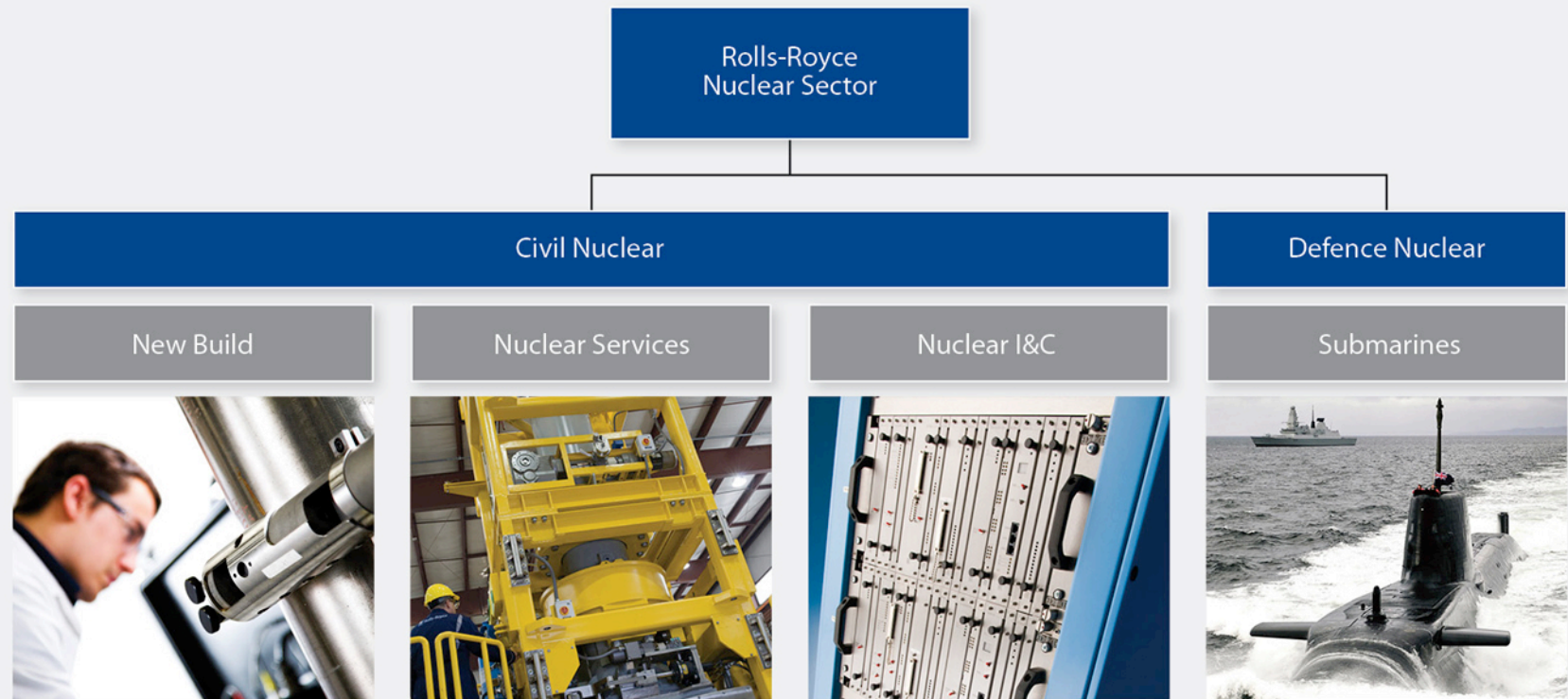
PROFIT
£1.4bn

ORDER BOOK
£76.4bn

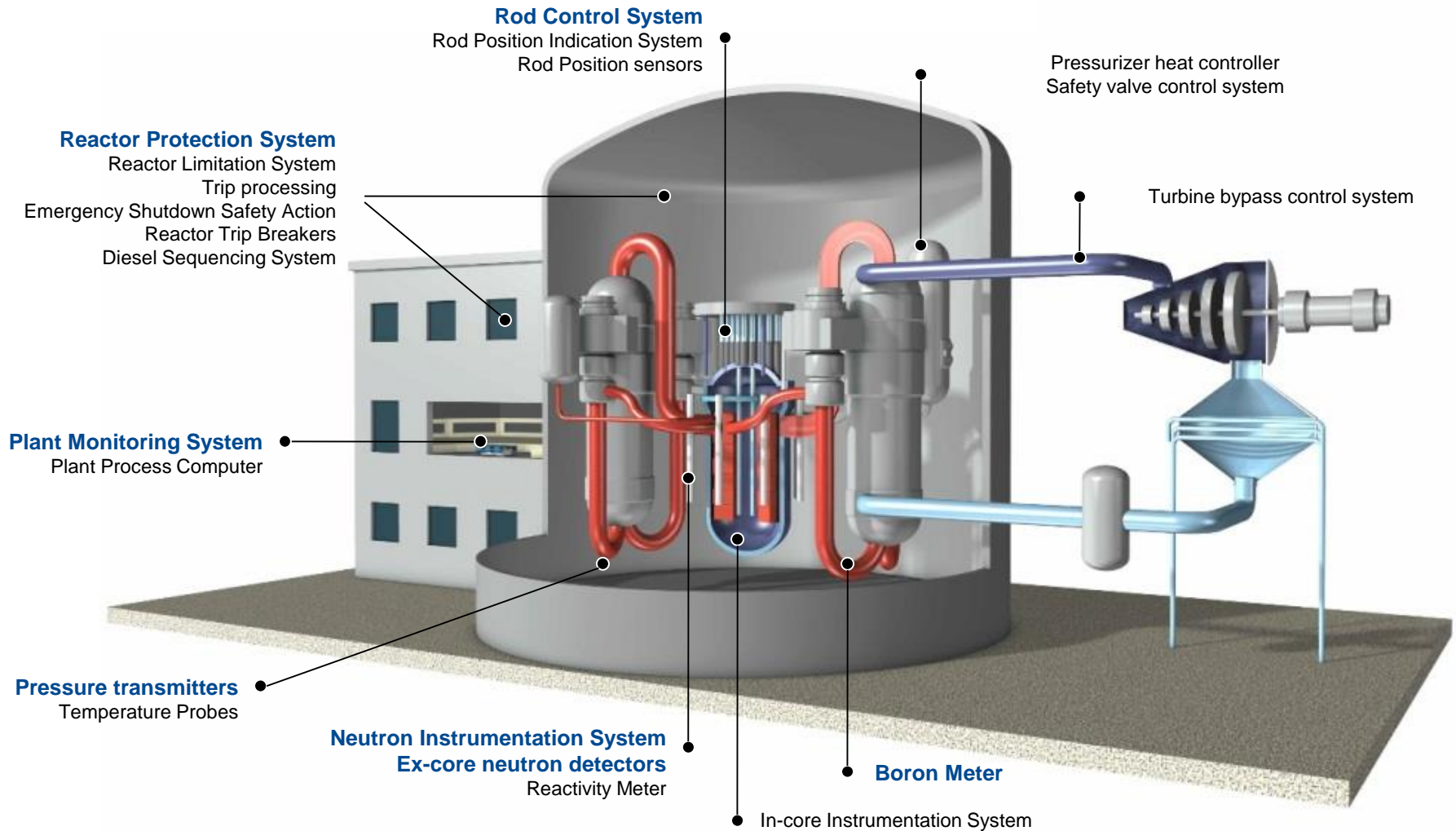


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How the Nuclear Sector is structured

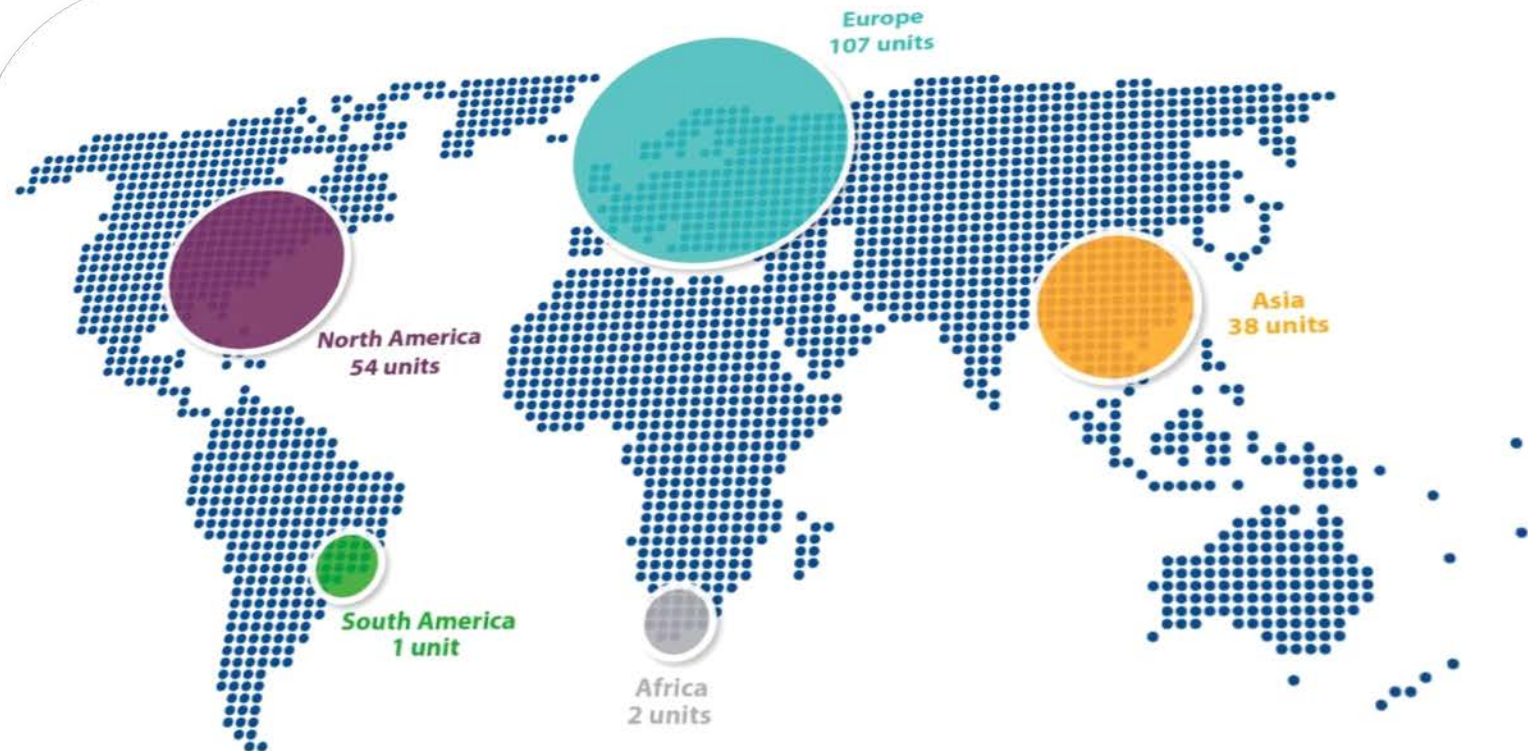


A complete range of I&C systems



Our I&C references

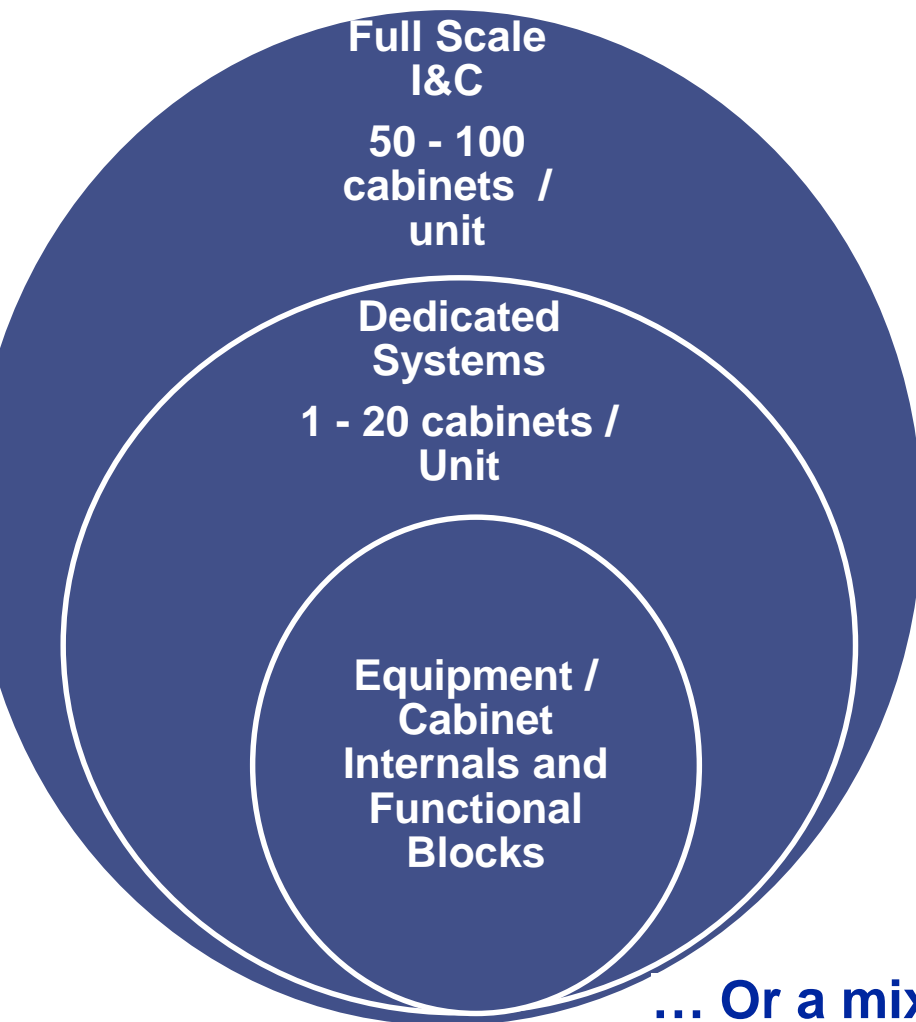
200 reactors in 20 countries



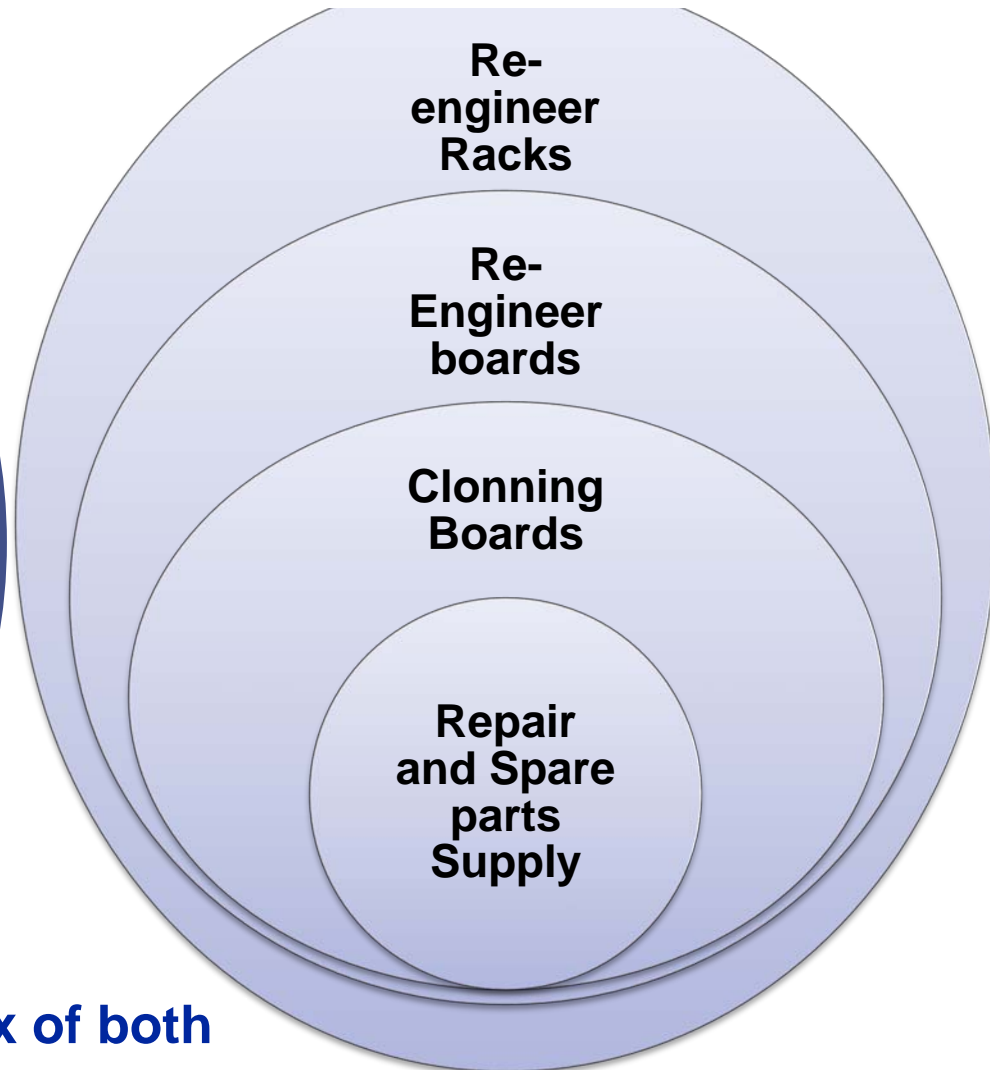
Multiple Strategies for I&C Life Extension

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Modernization Approach



Component FFF Approach



... Or a mix of both



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Full Scale - Multiple Systems Retrofit



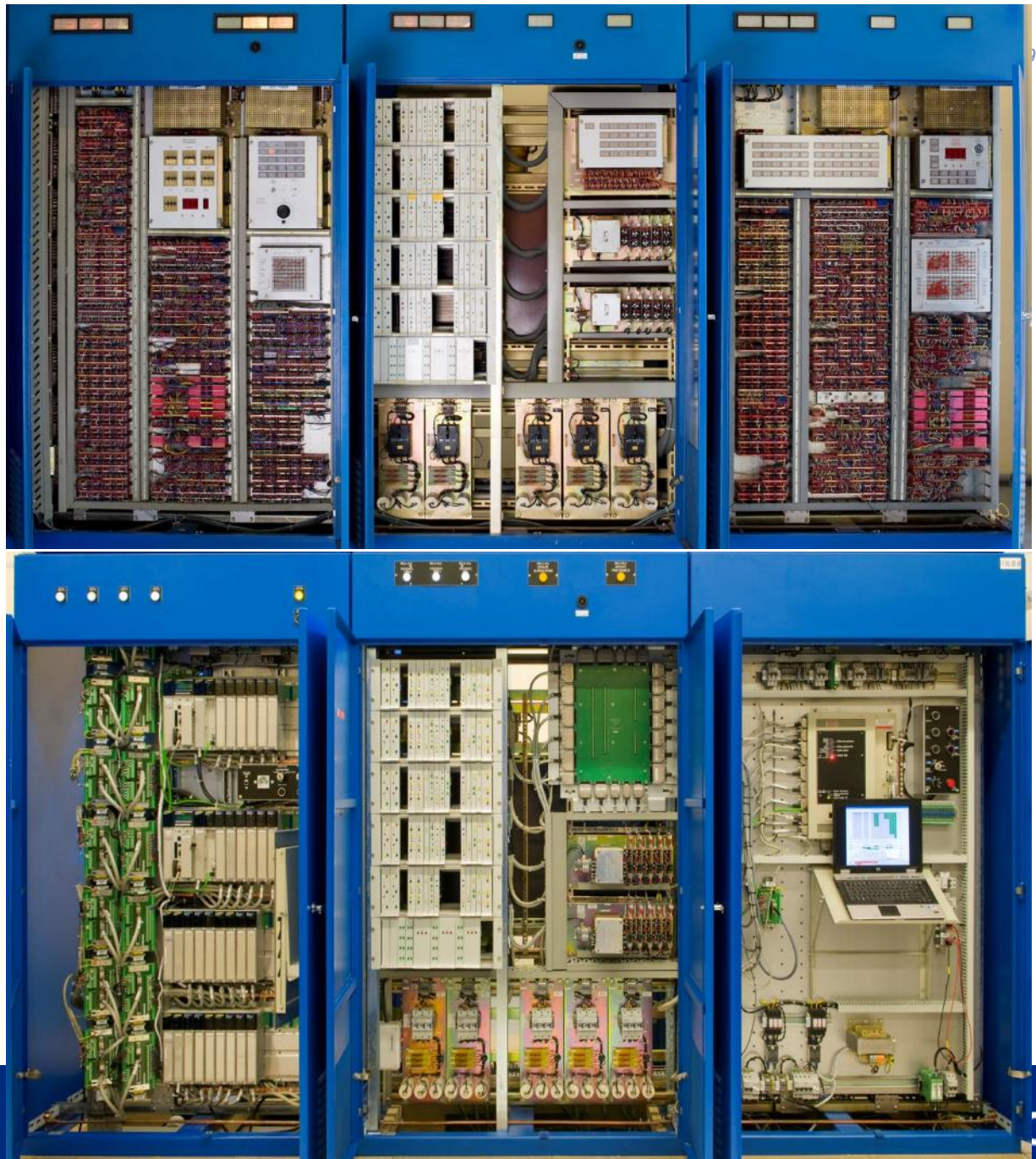
- VD3 1300 MW Modernization / Dukovany / Elsa at Loviisa

System Replacement



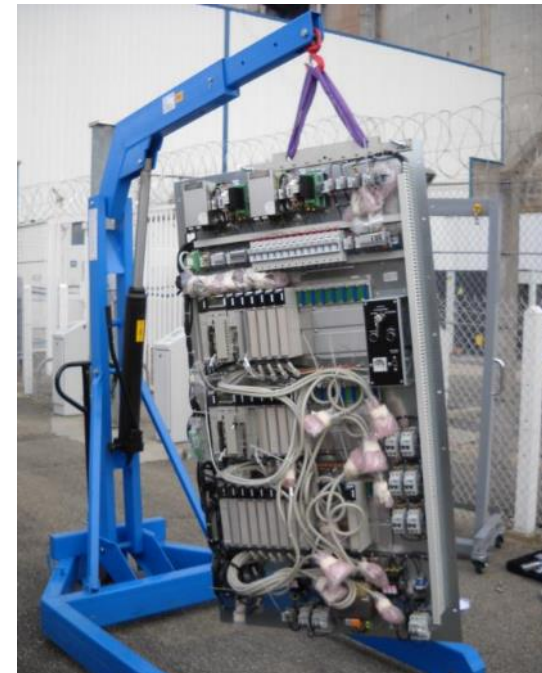
- Neutron Instrumentation System, Plant Process Computer, Boronmeter...

Partial Replacement



Partial Replacement

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Component FFF - Rack Replacement

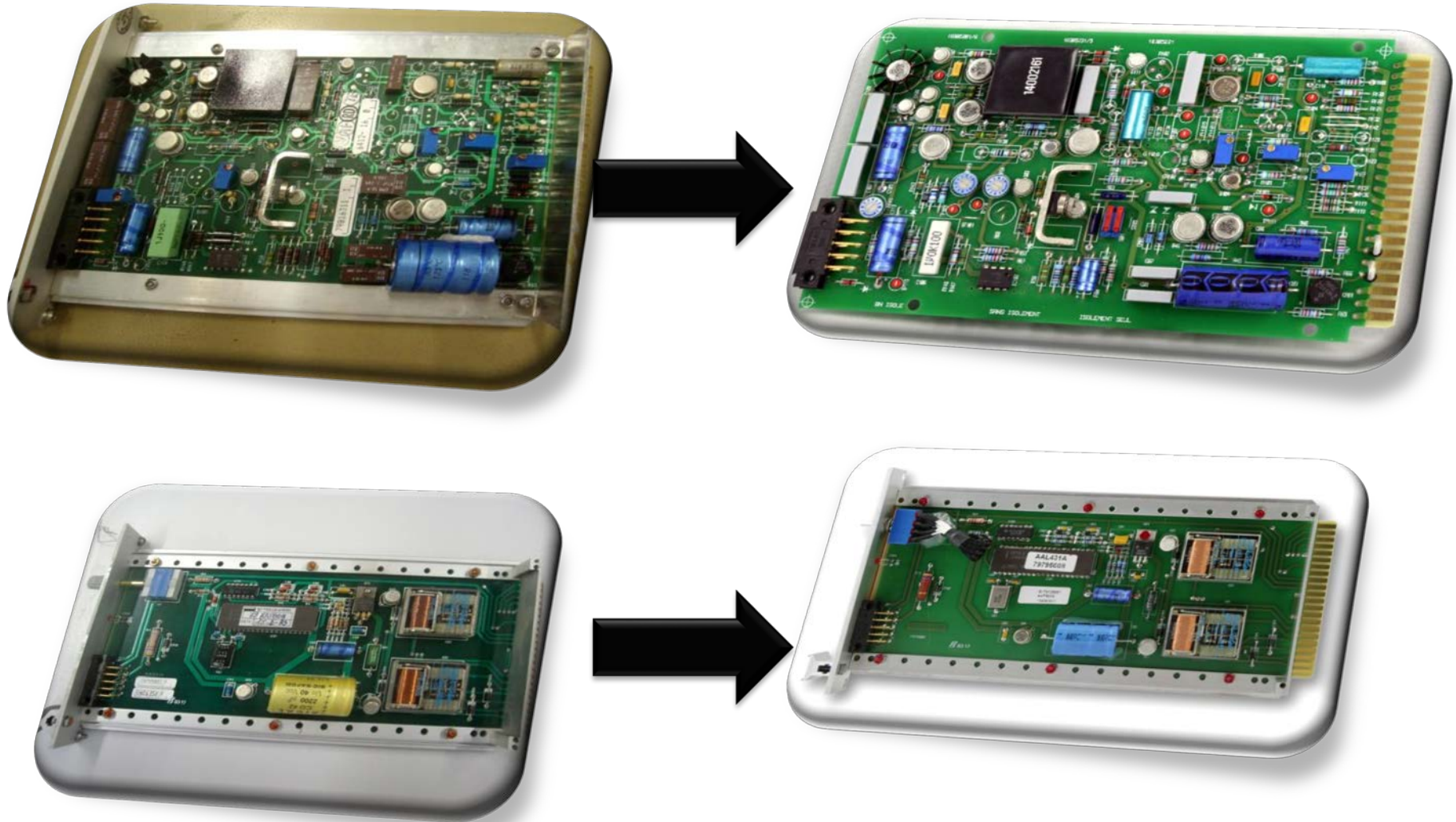
11



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Component FFF – Board Replacement

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Drivers for Decision

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Drivers for decision on the preferred strategy (could be a mix of several approaches depending on the situation)



I&C Life Extension – Lessons Learned

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- There is not a definitive method to extend the lifetime of I&C. Need to **adapt the approach** to the context and the status of existing I&C and obsolescence issues. Rolls-Royce has performed all types of I&C life extension projects successfully
- **Turn Key** projects where operator has a hands-off approach is very difficult if not impossible. The utility must have a strong engineering team and knowledge to providing adequate input data and work with the suppliers in all phases
- Prior to contract signature, **project implementation strategy** must be carefully planned. A long phase of preparation through predesign or conceptual design is necessary, even for smaller scopes. Many months, if not years are required depending on project complexity. This secures the project and gives confidence to all parties
- **The safety authority** has to be strongly engaged during the project as a stakeholder and involved very early in the project



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I&C Life Extension – Lessons Learned

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- Setting **realistic targets**. Utility and suppliers must be honest with each other
- Then nothing works exactly according to plan. **Change** will be often during modernization projects execution. So we need a framework and collaborative state of mind between supplier and utility to make the project successful
- Project organization with focus on **People** and not only procedures to develop close working relationships. Then good project practice must be implemented



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