

Overall I&C Design – I&C Architecture

Optimum overall I&C architecture design solutions considering latest rules and standards, based on worldwide experiences and proven engineering processes

Challenge

Operators of nuclear power plants (NPPs) require cost effective Instrumentation & Control (I&C) solutions with high quality and reliability.

The variations of regulator specific design constraints on overall I&C architectural design has led to multiple varying I&C designs and national specific interpretations. In addition, new safety and regulatory requirements, plant upgrades, long-term operation and lifetime extension measures can lead to significant challenges in design, licensing and cost.

Acting as the central nerve system of the NPP, the overall I&C architect engineers have to cooperate with all other major disciplines such as safety, process, electrical and civil. A productive collaboration based on mutual recognition of the disciplines, challenges, and the thorough planning of the overall life cycle by application of the latest system engineering methodologies, is needed to lay the track for a successful project execution.

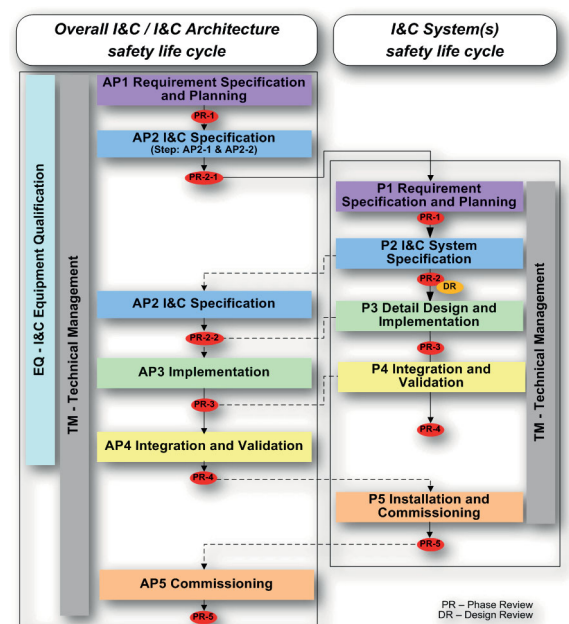
Solution

Framatome has designed, engineered and developed I&C solutions for most operating types of reactors worldwide. From overall I&C architecture to self-standing systems design, we deliver support for licensing, qualification, verification and validation, cybersecurity and human factors engineering throughout the entire lifecycle. Thanks to our long lasting experiences and proprietary qualified safety products, we offer technical expertise, comprehensive customer support, and cost-effective solutions.

Proven processes, incorporation of the latest rules and standards and many years of operational experience are key for a successful project realization. We provide a complete set of capabilities required for overall I&C architecture design as well as for I&C system architecture design that includes country specific licensing and qualification know-how.

Our unique integration engineering experience, including third-party systems, rests on a profound OEM and non-OEM expertise from many nuclear power plants built worldwide.

Framatome's proven overall engineering process helps to optimize the interdisciplinary collaboration of the participating stakeholders under consideration of all relevant technical and operational aspects. This helps to guarantee optimum I&C systems performance.



Connections between the overall I&C safety life cycle and the safety life cycles of the individual I&C systems – following EC 61513 (2011)

Customer benefits

- Planning, design and construction of overall I&C from one single source - ensuring effective integration
- Increased system reliability with complete analysis of all I&C architecture and I&C systems needs during the I&C lifecycle
- Highly experienced experts provide comprehensive design solutions and licensing support
- Qualification experience for most world wide NPP operating countries
- Confidence through Framatome NSSS knowledge thanks to OEM experience from more than 100 NPPs built
- One trusted source for proprietary I&C platform portfolio for all safety-relevant applications in NPPs

Your performance
is **our** everyday **commitment**

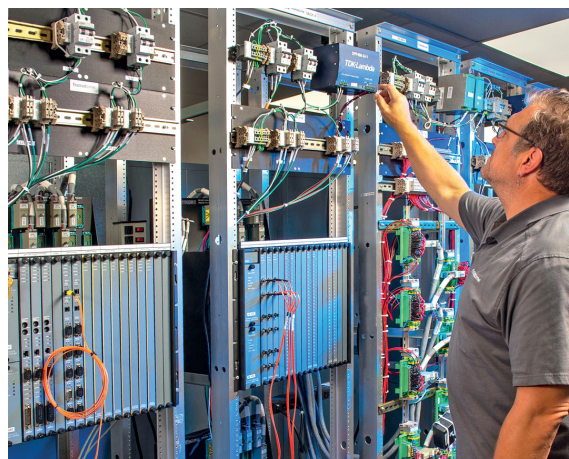
Technical information

The overall I&C architecture of a nuclear power plant is the organization of the complete set of I&C systems important to safety – from sensors up to the initiation of the actuators, including human machine interface.

This organization includes, but is not limited to, systems identification, classification and segmentation, function allocation, system and subsystem communication pathways, overall system and subsystem functions and signal handling.

Our global team of I&C architect engineers plays a leading role in the international standardization work by IAEA, IEC, IEEE or WNA to foster the international harmonization on generic topics for new build and modernization projects regarding:

- Defence in Depth and Diversity concept (Independence)
- Design solutions to deal with postulated common cause failures (CCF)
- Constraints on separation (structural separation, electrical isolation, functional independence)
- Cyber Security requirements
- Human Factors Engineering, Consulting, and Training Services



Key competencies and expertise

Framatome provides solutions, key competencies and expertise essential for a successful overall I&C design – making us your one-stop shop for all your needs:

- Project management
- I&C system engineering
- I&C development and platform licensing
- Supply chain
- Support functions (training / quality / etc.)
- Indirect I&C competencies (process & safety design / electrical systems & components)

Our competencies and expertise are your everyday benefit

Key figures

60 years of experience in designing, building and maintaining every type of nuclear power plant

300 I&C projects implemented worldwide

1,300 professionals in support as a global team including nominated I&C experts and advisors in the field of I&C design and architecture

17 sites in **9** countries

References

By working closely with our customers and partners worldwide, we complete projects reliably. Global technical expertise, cost-effective solutions and in-house engineering knowledge meeting the highest standards – all from one trusted source.

North America

- USA*

South America

- Brazil**

Western Europe

- Belgium*
- Finland* **
- France* **
- Slovakia**
- Sweden*
- Switzerland*

Asia

- China* **

*) I&C modernization projects (abstract)
**) New build projects (abstract)



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