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## Integration of control, investment protection and safety in the ITER Neutral Beam Test Facility

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The ITER Neutral Beam Test Facility (NBTF) is an extensive R&D programme currently under advanced construction at Consorzio RFX, Padova (Italy), with the aim of developing and testing the technology required by the ITER neutral beam injectors. The NBTF uses a two-step approach that involves the implementation of two experimental devices: the first, SPIDER, for the study of the ion source and the second, MITICA, for the development of the full-size HNB prototype. SPIDER is currently in operation, whereas MITICA is being constructed and most electrical and mechanical components have been already installed.

The operation of each experiment will be managed through three instrumentation and control (I&C) systems, independent of each other, referred to as the Control and Data Acquisition System (CODAS) to manage conventional control, the Central Interlocks System (CIS) to protect the investment, and the Central Safety System (CSS) responsible for occupational safety and environmental protection. Following a common principle in system engineering, it is required that system reliability increases significantly from CODAS to CIS to CSS, whereas complexity decreases drastically.

The paper will firstly discuss on the operation of the SPIDER I&C systems, discussing the advantages and disadvantages of the SPIDER realization. It will then describe the status of the MITICA I&C systems, with focus on the system evolution from SPIDER to MITICA, triggered by both additional requirements and technology evolution. Finally the paper will discuss the interaction of the MITICA I&C systems in the overall operation of the experiment.

### Minioral

Yes

### IEEE Member

No

### Are you a student?

No

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