

Machine Protection System (MPS) development lifecycle

A Machine Protection System (MPS) is a fundamental component of any fusion facility, serving as the first line of defence for safeguarding essential equipment and ensuring operational integrity under both normal and off-normal conditions. As fusion devices progress toward higher power, increased complexity, and extended operational regimes, the MPS assumes a central role within the overall plant safety and reliability. It protects critical subsystems from damage caused by faults, abnormal transients, or control malfunctions, thereby preserving asset longevity and minimising downtime.

This presentation showcases a comprehensive overview of the MPS, structured around its complete lifecycle from conceptualisation to operation. It examines the formulation of system specifications, the systematic identification and analysis of hazards, and the implementation of risk reduction strategies. Furthermore, it discusses the detailed design, integration, and operational considerations that underpin the realisation of a reliable protection system in a fusion environment. The presentation also outlines the standards that inform the whole process, ensuring alignment with functional safety requirements.

Technical Categories Addressed

Other Systems

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