The Software and Hardware Architecture of the Real-Time Protection of In-Vessel Components in JET-ILW

Imaging Protection System and Software relevant for ITER

- D-T operation at JET will cause failure of camera electronics within the Torus hall => new project was launched to provide new optical relay to take the cameras outside of the biological shield
- Long distance optical relay (≈40m long) to take imaging cameras outside of the biological shield
- Mirror based optical design
- Optimised wavelength for $T_{\text{surf}}$ measurements (NIR $\lambda$-range, $\lambda=1.25\mu\text{m}$):
  - Temperature independent spectral emissivity for W
  - Less sensitivity of the measurements to the surface roughness
  - Reduced max. relative error for the $T_{\text{surf}}$ measurements
  - Drawback: detection limit is $T_{\text{surf}} \approx 600^\circ\text{C}$
- Improved protection cameras
  - InGaAs sensor – more sensitive in the range from 0.9µm to 1.7µm
  - Logarithmic output- high dynamic range

- JUVIL graphical interface for analysis of imaging data
  - Powerful, user-friendly, robust platform independent modular object-oriented framework
  - Highly configurable and extensible environment that could be easily adapted to new cameras and data formats
- Hotspot Editor is a new tool developed on JET for the investigation of the formation and evolution of hot spots

- New mirror based optical relay to take the image and cameras outside of the biological shield
- Hotspot Editor is a new tool developed on JET for the investigation of the formation and evolution of hot spots