

Unattended measurement station (UMS) for fresh LEU assemblies

M. Boella², M. Franklin¹, J. Gonçalves¹, J. Löschner¹, P. Peerani¹, E. Oggioni³, V. Sequeira¹

1) European Commission, DG-JRC, IPSC, Ispra (Italy)

2) European Commission, DG-TREN, Luxembourg

3) SYREA Srl, Milano (Italy)

e-mail: jan.loeschner@jrc.it

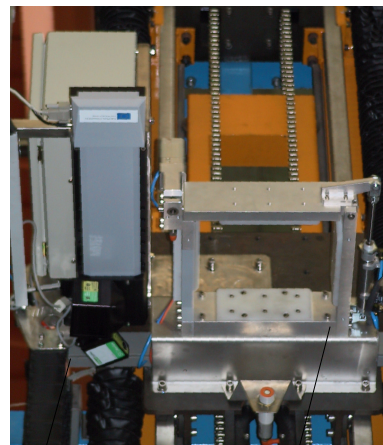
General Aspects

In collaboration with DG TREN the JRC, Institute for Protection and Security of Citizen has developed an unattended measurement station (UMS) for LEU fuel assemblies.

- The UMS provides a neutron measurement, which is based on coincidence counting using an AmLi interrogation source (neutron collar).
- The system was installed at the FBFC Framatome ANP fuel fabrication plant at Romans-sur-Isere in France where the assemblies will be verified for gross and/or partial defects by being placed in the measurement station by the facility operator in the absence of the inspector.
- The UMS has been designed for dual-operation (plant operator and inspector), breaks the paradigm of separating Safeguards from operation.
- The fuel assembly identification number is read by a 2D / 3D Laser system that is integrated into the measurement station. The identification incorporates optical character recognition (OCR) to interpret the 2D / 3D image but it also stores the image for inspector review.
- The system is designed to provide unattended service for 100 days without inspector intervention. The only intervention that is required by the facility operator is to insert and remove fuel assemblies.
- All activities of the measurement and identification system including loading and unloading of the AmLi source are preprogrammed for automatic operation.
- The inspector can program the UMS to measure in different positions of the assembly and to make a scan measurement of the whole assembly. The results are stored in a protected database to await the next visit of the inspector.

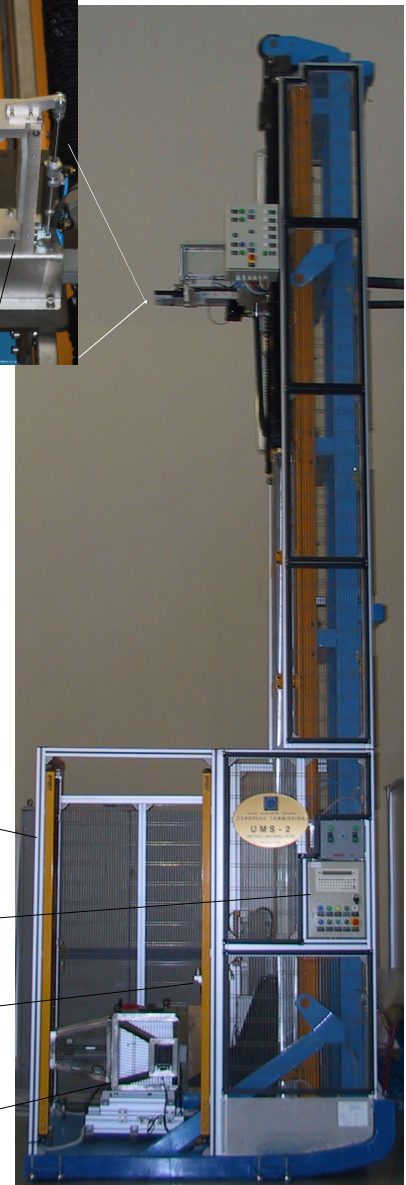
Technical Aspects

- Operating Systems: MS Windows 2000 – PC1 (Server); PC2 (WS)
- Data Integrity:
 - Two disks in PC1, one mirroring the other
 - PC2 backs up SQL server and all laser scanner raw data to PC1
- Communications between PCs: Named Pipes
- Access Control:
 - W2K security (Login + Password),
 - Inspector login for inspector mode on the application
- Start-up: Auto-login and application auto-start



Operator controled
pneumatic assembly
clamps

2D \ 3D LASER based
assembly identification



CE machine safety
protection

Operator panel

Support for fuel assemblies

AmLi source container
for automatic active
verification measurement

The permanent installation of the UMS at FBFC France is the successful implementation of a new unattended safeguards approach after some years of development and testing. **Milestones** in this process were:

- The Infield testing at the Fabbricazione Nucleare in Bosco Marengo, Italy between September 1996 and April 1997
- The modification and CE certification at Ispra in 1998
- The second Infield testing at ABB-Atom in Västerås, Sweden between September 1998 and May 2000
- The mechanical modification and shipment to FBFC, France in 2002