



**HEXAGON**  
PPM



## PARTICLE ACCELERATION CASE STUDY

# European Synchrotron Radiation Facility (ESRF)

### The Objectives

- An electronic logbook system which can be filtered and searched quickly
- Flexibility to add in-house developments and enhancements
- A sustainable Control Room software solution which constantly evolves
- A wide spectrum of potential applications
- Integration with Tango Control System

### The Benefits

- Automatic logging and the electronic central database saves a huge amount of time when recording / searching events
- Consistent web based user-interface reduces training requirements and human error
- Control Room procedures are consistent and on the same platform
- Consistent logbook data across ESRF for technical archiving and exchange processes

The European Synchrotron Radiation Facility (ESRF) is a 6 GeV X-ray source in Grenoble, France.

The accelerator complex comprises of a linear accelerator, a synchrotron and a storage ring that have been routinely operating for over 20 years in a 24h/24h mode.

This source delivers 5,600 hours of X-ray beam to 43 beam lines simultaneously.

### The Problem

The ESRF operation is managed from the Control Room by a two person crew rotating over 24 hours in 3 shifts of 8 hours. The crew must ensure that the beam meets the required operating specifications. To do this, the crew has many diagnostics tools at its disposal. Should a problem occur, the Operator must solve the issue or call and coordinate the experts for finding the fastest possible solution. Many technical and decision-assisting procedures have been set up and the crew is responsible for documenting all their observations, and for actions. Before ESRF implemented the j5 System in 2004, most of their procedures were written in a template format and classified in a file.

Another set of procedures were written on the Operators' intranet system and another set was available via the Intranet on the web pages of different groups of specialists. In the Control Room, all events on the accelerators were handwritten in paper logbooks (30 logbooks per year / 6,000 pages per year). The main limitation of the hand written logbooks was the difficulty of retrieving old information when needed. In 2004, ESRF drew the specifications for an ideal electronic logbook for their Control Room. Several institutes had developed their own e-logbook and offered the possibility of sharing it with ESRF. These e-logbooks fulfilled some of the ESRF specifications but none of them satisfied their requirements in term of flexibility. At that time, ESRF discovered the j5 Operations Logbook and a study of its capabilities confirmed that it met most of their requirements, either natively or with minor enhancements.

Another attraction of the j5 Operations Logbook was that it can use any standard database (Oracle, SQL Server and Postgres). The j5 software also only needed to be installed once onto a server PC while still allowing every user access via a standard web browser. ESRF wanted a solution that was customizable and flexible to change with their specific requirements. They found that the j5 software is extremely easy to customize to meet particular requirements and anyone who understands the fill-in-the-form procedure can do it without coding. ESRF discovered that virtually any kind of document / file can be attached to a log and these attachments can be displayed immediately from the log. The j5 software can also be used to create a whole spectrum of applications like logbooks, reports, document repositories, work permits and so on and the user-interface is so intuitive that there is no requirement for special training. Therefore ESRF decided to implement the j5 system.



## How j5 International Provided the Solution

The j5 Suite of applications matched the ESRF requirements closely, but a huge advantage to ESRF was the flexibility to easily add their own enhancements:

- The enhanced filtering and searching capability enables a user to locate a log quickly by selecting options from multiple fields and locate specific text within the attached pdf files, for example: a user may want to display all "failures" from the "klystron" of the "Radio-frequency" system in the last 7 days
- Special fields allow experts to add explanations or corrective actions to logs entered by operators
- A gallery for screenshots was added to the application and thumbnails of the screenshots were shown in each log
- An enhanced User Permission system was created, giving fine grain control of who can perform an operation
- Multi-key combo options were added so that a user can accurately describe situations that cover multiple overlapping areas
- Special procedural business rules were added, for example, the system forces selected users to read system status information at the start of the shift
- A powerful emailing system was added, therefore an email or an SMS can be sent out to a selected group of recipients (i) if the conditions in the log meet a configured requirement, (ii) if the crew wants a list of recipient to be informed of the log or (iii) at a scheduled time during the day

## Benefits of j5 to ESRF

The j5 application includes a real-time resource ideally suited to the connection with the ESRF Tango control system. When Tango sends events, j5 generates automatic logs. Thus, any power supply problem is now automatically logged. In addition to the real-time resource, j5 has steadily evolved to meet the special needs of ESRF:

- j5 system filtering has been substantially improved and integrated into the main ESRF page, additionally, custom filter buttons can be configured to meet the needs of frequently used filters
- j5 provides a Tab Based Framework for the hierarchical management of multiple logs and logbooks per individual beam lines can now be implemented and managed efficiently
- A new wizard based configuration system has been added, enabling fast creation of new logbooks
- New and more representative visualizing forms including charts, photographs and special scriptable buttons are configurable through a wizard
- LDAP authentication enables the centralized management of large numbers of users
- Provision of standard applications like Permit to Work, Inspection Rounds, Alarm Management and so on
- Logbooks can be accessed via PDA's like the iPod to allow remote access
- j5 has the ability to have logbooks within logbooks, these sub-logbooks are especially useful, for example, when a main event has several sub events
- Dashboard type logbooks and "ripple through reporting" allow the scheduling of daily, weekly and monthly PDF or spreadsheet reports
- Third party software can access the logbooks
- Logs of one logbook can hotkey to a specific log in another logbook



### Customer Quote

*"We have been EXTREMELY pleased with this product for more than 10 years. It offers the advantage of having a proven industrial solution whilst having the option to provide any complementary module that you would need for a specific requirement. The cross-filtering capacity is also very powerful. The advantage of this product is that you can also design an Operations Logbook to archive any document (control room procedure, commissioning documents, technical notes and so on). We also greatly appreciate the 'sub-logbook' feature, i.e., a record that can be composed of sub-records. Which is useful to follow the life of a individual pieces of equipment."*

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