

EVOLUTION AND STATUS OF THE E-LOGBOOKS AT ESRF

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Abstract

In 2004 ESRF moved to electronic logbooks which are now used for document management, the exchange of technical information and - in the Control Room - as a powerful tool for storing and retrieving information at a glance. ESRF has chosen a commercial product developed by St James Software (Pty) Ltd called jLogBook. jLogBook can be tailored by its users and evolve steadily with time. Thanks to the experience gained by several years of extensive use, a new version which offers extensive customization possibilities has been launched. This new version (j5) allows automatic access to control system parameters. It has been interfaced to the ESRF control system (Tango) through a Python binding. This feature allows automatic triggering of records on specific events and the generation of automatic reports from the historical database system. j5 can use an LDAP server for security management.

ESRF AND ITS CONTROL ROOM

ESRF: A brief description

The European Synchrotron Radiation Facility (ESRF) is a 6 GeV X-ray source. The accelerator complex comprises a Linear accelerator, a synchrotron and a Storage Ring that have been routinely operating for over 14 years in a 24h/24h mode. The source delivers 5,600 hours of X-ray beam to 43 beam lines simultaneously.

The Control Room

The operation is managed from the Control Room by a two person crew rotating over 24h 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 problem or call and coordinate the experts for finding the fastest possible solution. Many technical and decision-assisting procedures have been set up. The crew is responsible for documenting all their observations, and for actions.

INTRODUCTION TO E-LOGBOOKS

Before 2004

At that time, most of our procedures were written in a template format and classified in a file. Another set of procedures were written on the Operators' intranet system. Yet 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 hand-written in paper logbooks (30 logbooks per year, i.e.

6,000 pages / year!). The main limitation of the hand written logbooks was the difficulty of retrieving old information when needed. In 2004, we started the specifications for the ideal electronic logbook for the Control Room.

2004-2008: First Experience with Commercial e-Logbook Software.

Several institutes had developed their own e-logbook and offered the possibility of sharing it. These developments fulfilled some of our specifications but none of them satisfied our requirements in term of flexibility.

At that time, we discovered a product called jLogBook developed by St James Software [1] which had been developed for the industrial market. A study of its capabilities confirmed that it met most of our requirements, either natively or with minor enhancements.

jLogBook can use any standard database (Access, MySQL, SQLServer, PostGreSQL, SQLite or Oracle). The software need only be installed once on a server PC and every user can then access it via a standard web browser. The software is extremely easy to customize to meet particular requirement and anyone who understands the fill-in-the-form procedure can do it without coding. Virtually any kind of document can be attached to a log (e.g. pdf, graphic files like jpeg, png, bmp or videos, Word, Excel and PowerPoint files) and these attachments can be displayed immediately from the log. The same software can be used to create a whole spectrum of applications like logbooks, reports, document repositories, work permits etc.

The software layout is so intuitive that there is no requirement for special training.

ESRF SPECIFIED ENHANCEMENTS

Additional features were added to the application to meet ESRF's special requirements:

- The enhanced filtering and searching capability (Fig. 1) enables a user to quickly locate a log by selecting options from multiple fields and locate specific text within the attached pdf files. As an 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.

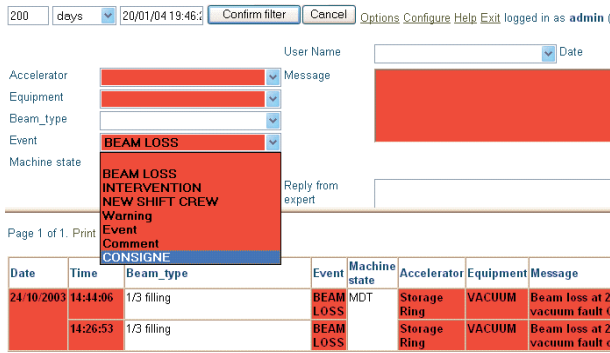


Figure 1: An example of a filter in action

- 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. 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.

Intermediate Projects

Moving definitively to a Control Room Electronic Logbook was not a task to be taken lightly and its potential irreversibility required thorough groundwork. We decided to move forward with intermediate projects.

Control Room Procedures

The first project was to create a database with all the Control Room procedures. This includes technical documentation linked to all types of equipment, minutes of technical meetings, safety procedures, etc. Each of these documents was classified into one or several subcategories.

E-LogBook in a Particular Group or Beam Line

The Power Supply Group of our Accelerator Division uses the jLogBook as an internal e-logbook. (Fig. 2) They classify their equipment into different classes. The event types are classified as ‘modification’, ‘intervention’, ‘failure’, ‘upgrade’ or ‘alarm’.

The filtering feature provides the history of the work carried out on a given piece of equipment. When the event option is a “failure”, an automatic email is immediately sent to the whole group.

Since then, several other groups and beamlines have now adopted the jLogBook for internal technical archiving and exchange purposes.

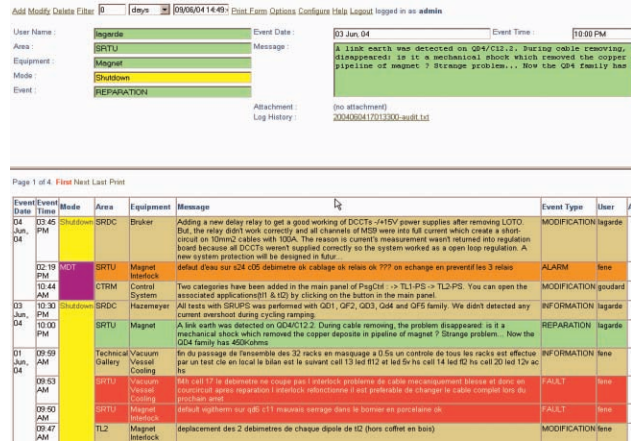


Figure 2: The Power Supply e-logbook

Control Room Electronic Logbook

Once we were satisfied that jlogBook met all the requirements, we built the structure of the Control Room e-logbook (Fig.3). This logbook was welcomed by the Operators. The emailing feature, thumbnail facilities and filtering capabilities were particularly appreciated.

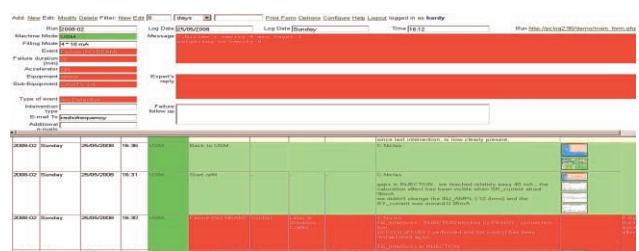


Figure 3: The Control Room e-logbook

E-LOGBOOKS EVOLUTION IN 2008

The next important step for ESRF was to connect the e-logbook with the Tango control system.

About Tango

Tango[2] is a Control system framework based on distributed objects using the CORBA[3] protocol. ESRF initially designed it in the year 2000 and since then, it has been adopted by several light sources in Europe under a collaborative development agreement. The collaborating institutes are SOLEIL, ELETTRA, ALBA and recently DESY for the control of PETRA 3 beamlines. Each collaborating institute engaged itself to use TANGO to control their accelerator and/or beamlines and agreed to participate in the development and maintenance of TANGO.

Tango’s key concept is the “device server”. Each device is “exported” over the network and offers an interface which can be used to read signals or perform actions on the device from any computer of the network.

About j5

J5 is the next generation logbook built using the jLogbook and the wealth of practical experience at ESRF.

The j5 application includes a real-time resource ideally suited to the connection with Tango

J5 / Tango : Interfacing and Results

Our first step was to get jlogBook to read the storage ring current and store it in the e-logbook. The goal was to generate automatic messages containing operation parameters read from the Tango history database (Fig.4). j5 is configured as a subscriber for Tango events. When Tango sends events, j5 generates automatic logs.

Event Date	Event	Priority	User Name
05-28-2008 11:47	Alarm	Emergency	admin
05-28-2008 11:47	ALARM	000	Item:FAULT POLAR PWON

Figure 4 : Example of an automatic log addition

In our next step, we linked in the former storage ring power supply's (SRPS) history loggers. The logbook subscribed to the "CHANGE" event of each SRPS TANGO device server. Thus, any power supply problem is now automatically logged.

ADDITIONAL J5 FACILITIES

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 page. Additionally, custom filter buttons can be configured to meet the needs of frequently used filters (Fig.5)

Actions	Log Time	Event	Mode	Area	Equipment	Message	Reference ID
	02-03-2008 14:25	ALARM	Shutdown	Modulator Hall	Darfsiek Power Supply	Modification du controle des Sables de TLI, le nouveau controle comprend un chassis PO avec son controleur RT et une carte PPOA. La carte PPOA comprend 8 DAC, 8 ADC et 88 entrées/sorties. Avec son programme elle assure les consignes et la lecture de courants des 7 canaux tandis que les 80 entrées assurent les commandes et les lectures. Le controleur assure notamment les échanges avec le resau TOPIP et la liaison RS232.	

Figure 5: A powerful and customised filtering system

- j5 provides a Tab Based Framework for the hierarchical management of multiple logs. 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 Work Permit, Inspection Rounds, Alarm Management etc
- Logbooks can be accessed via PDA's like the iPod to allow remote access. (Fig. 6)



Figure 6: Remote logbooks delivered via a PDA

- 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

Hardware, Operating System and Backups

- j5 connects to Tango via Python to access any Tango device attribute around the accelerator.
- It runs on Redhat Linux or Windows and MySQL.
- j5 is installed on a dedicated Linux machine. (DELL Poweredge®, with RAID1 controller and redundant « hotplug » power supply). Backup performed with Time Navigator®.

CONCLUSION

After 4 years experience of a commercial electronic logbook, we confirm that we are fully satisfied with the product we chose 4 years ago: all the functionalities which we required (and even more) have been implemented. Its modularity and the fact that it could be tailored to our needs was an asset. It is currently so flexible and powerful that it is easy to adapt the structure to most projects needing a database: it can be used not only in the Control Room but by any group or beamline to archive technical data or carry out troubleshooting procedures, work permits, follow-up of failures, etc. The e-logbook has been interfaced with our Tango control system which was a major step to generate filtered automatic logs. The interface can be adapted to any control system making this electronic logbook an added value not only for the Tango community but for any particle accelerator.

REFERENCES

- [1] JlogBook is a product of the St James Software Company: <http://www.sjsoft.com/>
- [2] TANGO website: <http://www.tango-controls.org>
- [3] Corba website: <http://www.omg.org>