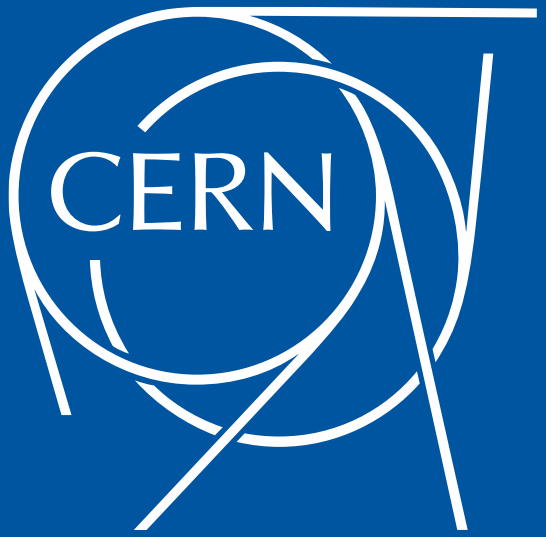

CERN

EAM New Logbook for Cryogenic Operation

Philippe Gayet – TE-CRG-ML

On behalf of the Cryogenics Group

philippe.gayet@cern.ch

Objectives of this talk

Not Repeat what has already been said by Goran but **Focus** on the Cryo logbook implementation.

- Brief History of the Cryo Logbooks from1990
- Current Organisation of the Cryo Operation and its Impact on Logbook.
- New Cryo Logbook Features

Brief History of Cryogenic Logbooks

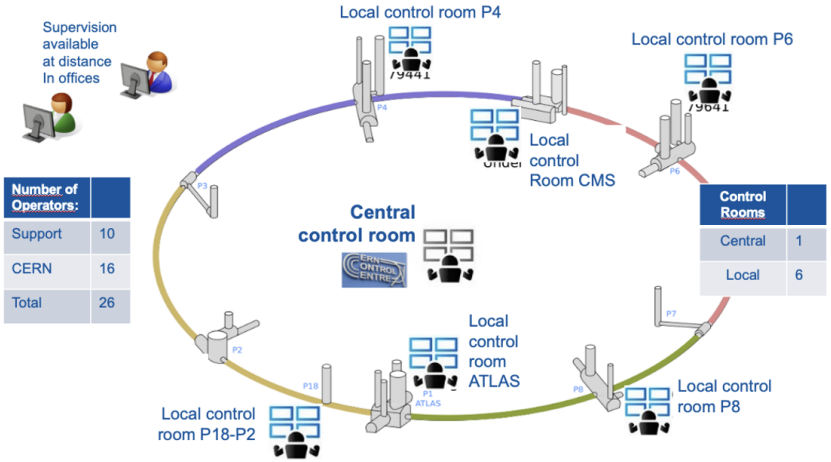
Long Term
No loss with Time

Link to Maintenance
Activities

Cryogenics Operation Today

LHC Installations

Task Oriented support



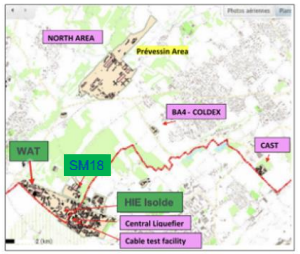
Number of Operators:	
Support	10
CERN	16
Total	26

Control Rooms	
Central	1
Local	6

Non LHC Installations

Result Oriented Support

Control Room North Area
Experiments & Helium Production



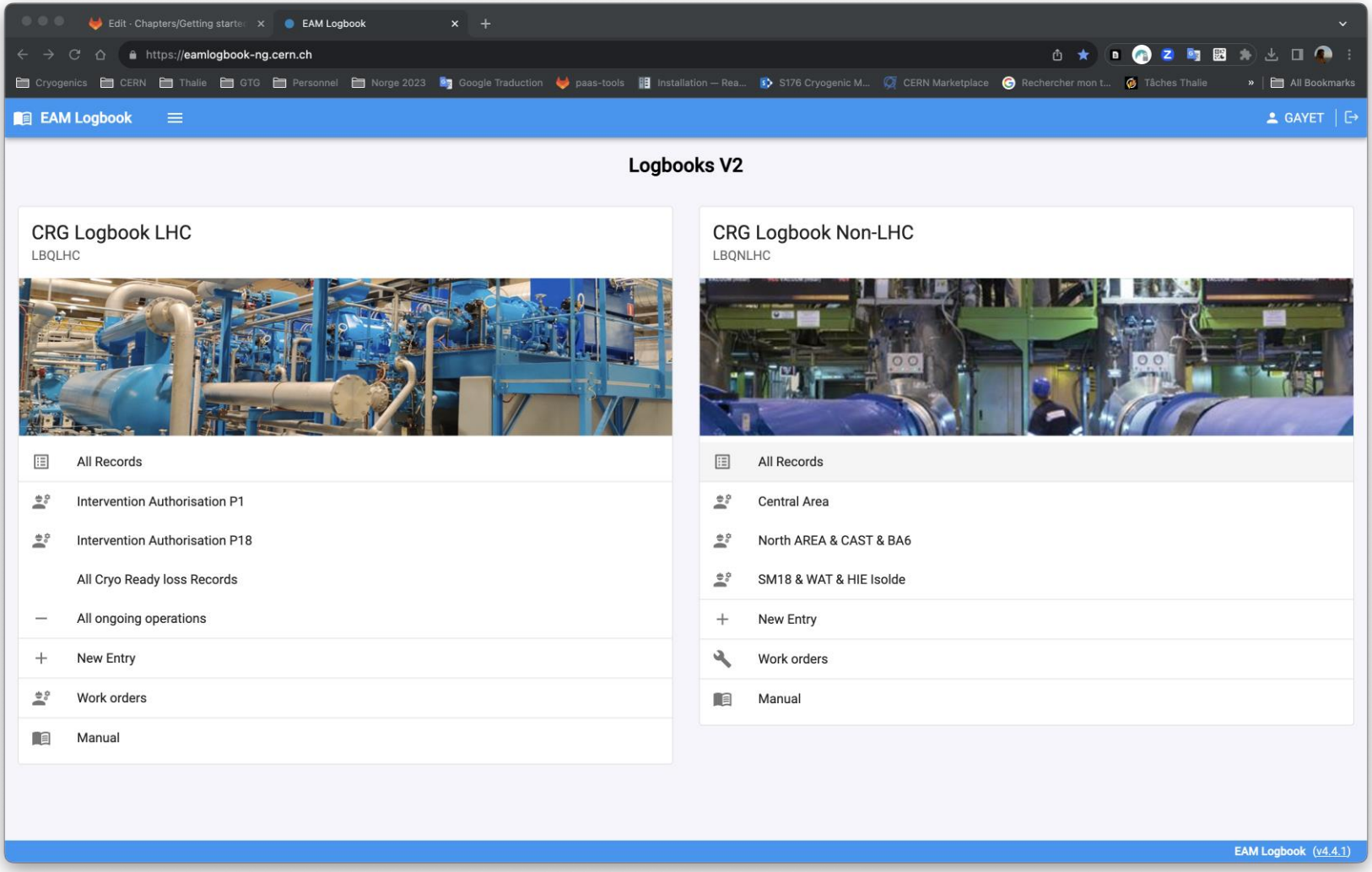
Supervision available remotely In offices

Control room SM18
Test Facilities & Small Accelerator

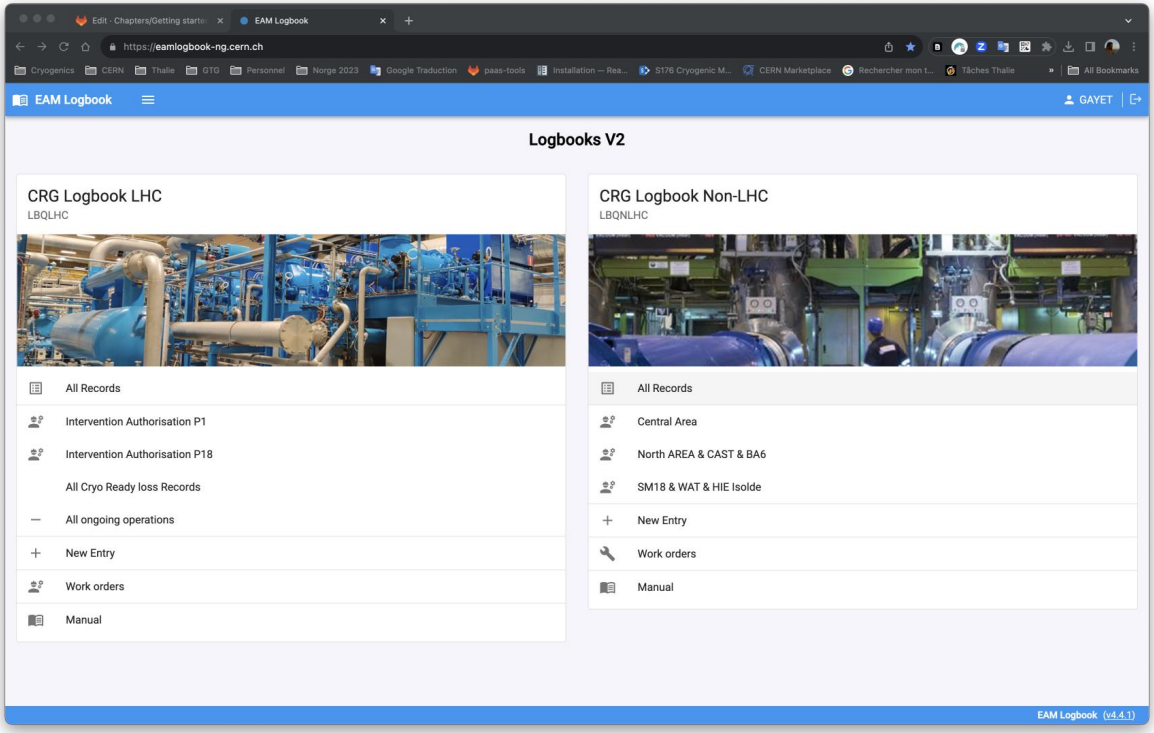
Operators	7
Cryo Facilities	17

Operators	7
Cryo Facilities	3

Cryogenic Logbook 2024



Cryogenic Logbook 2024



From here you can :

Access all Predefined List views

Create New Log Entry.

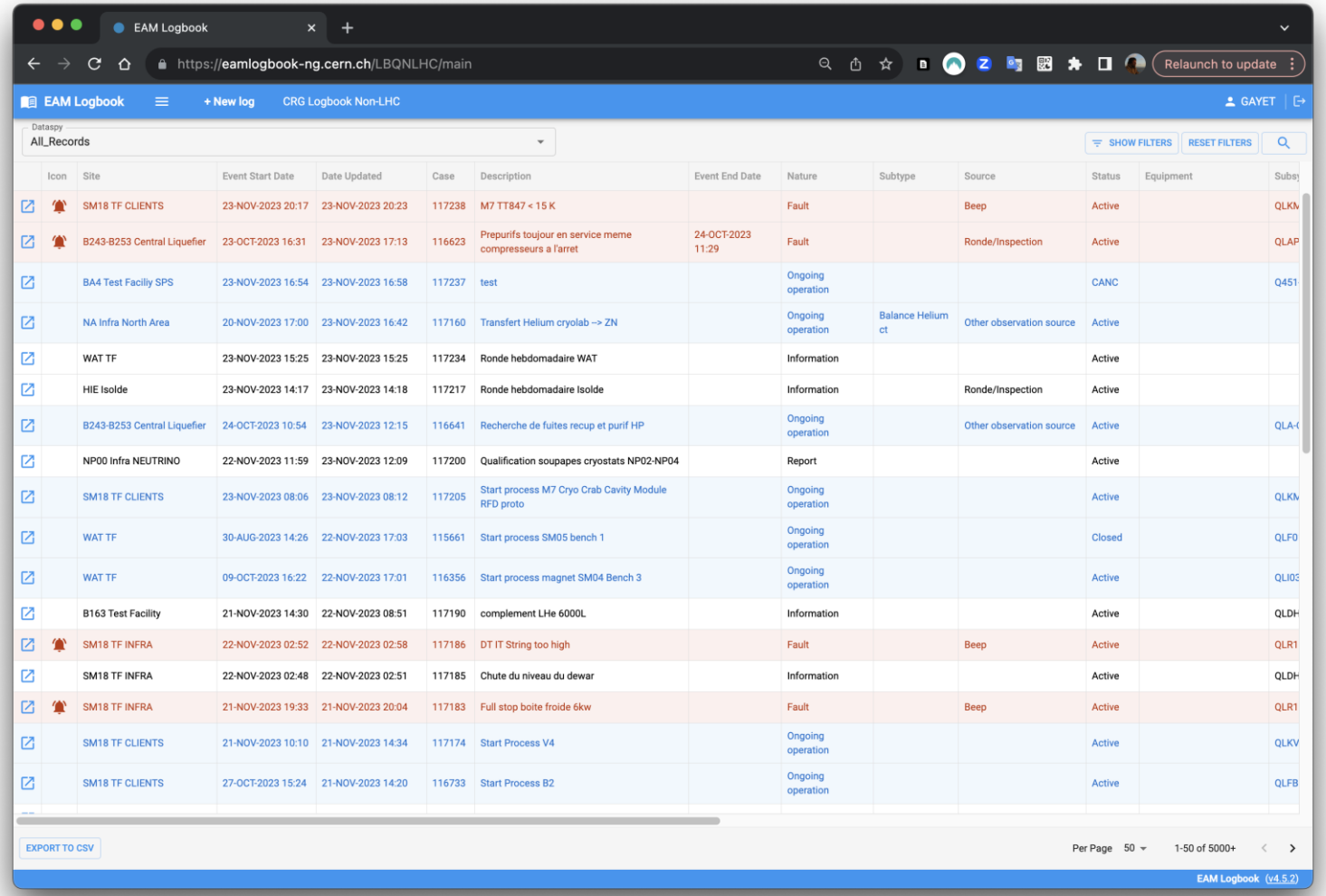
Open EAMlight

Open the Logbooks Guidelines

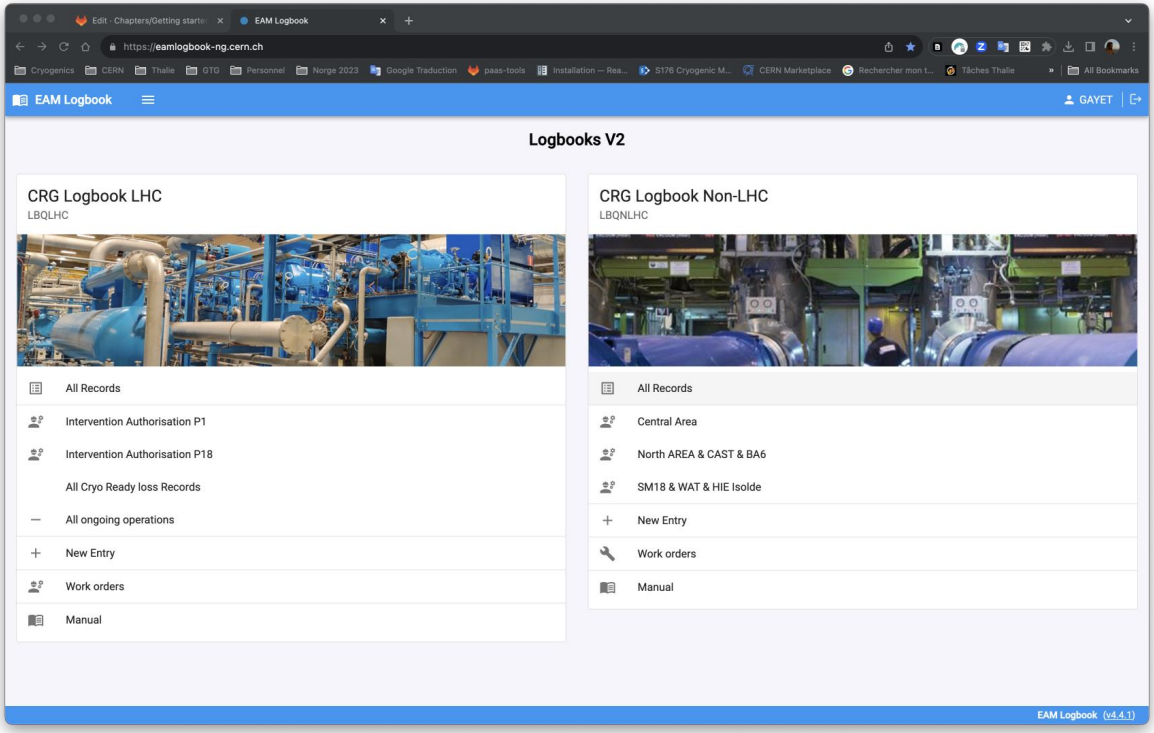
..

To be extended

Cryogenic Logbook 2024 : Predefined Lists



Cryogenic Logbook 2024



From here you can :

Access all Predefined List views

Create New Log Entry.

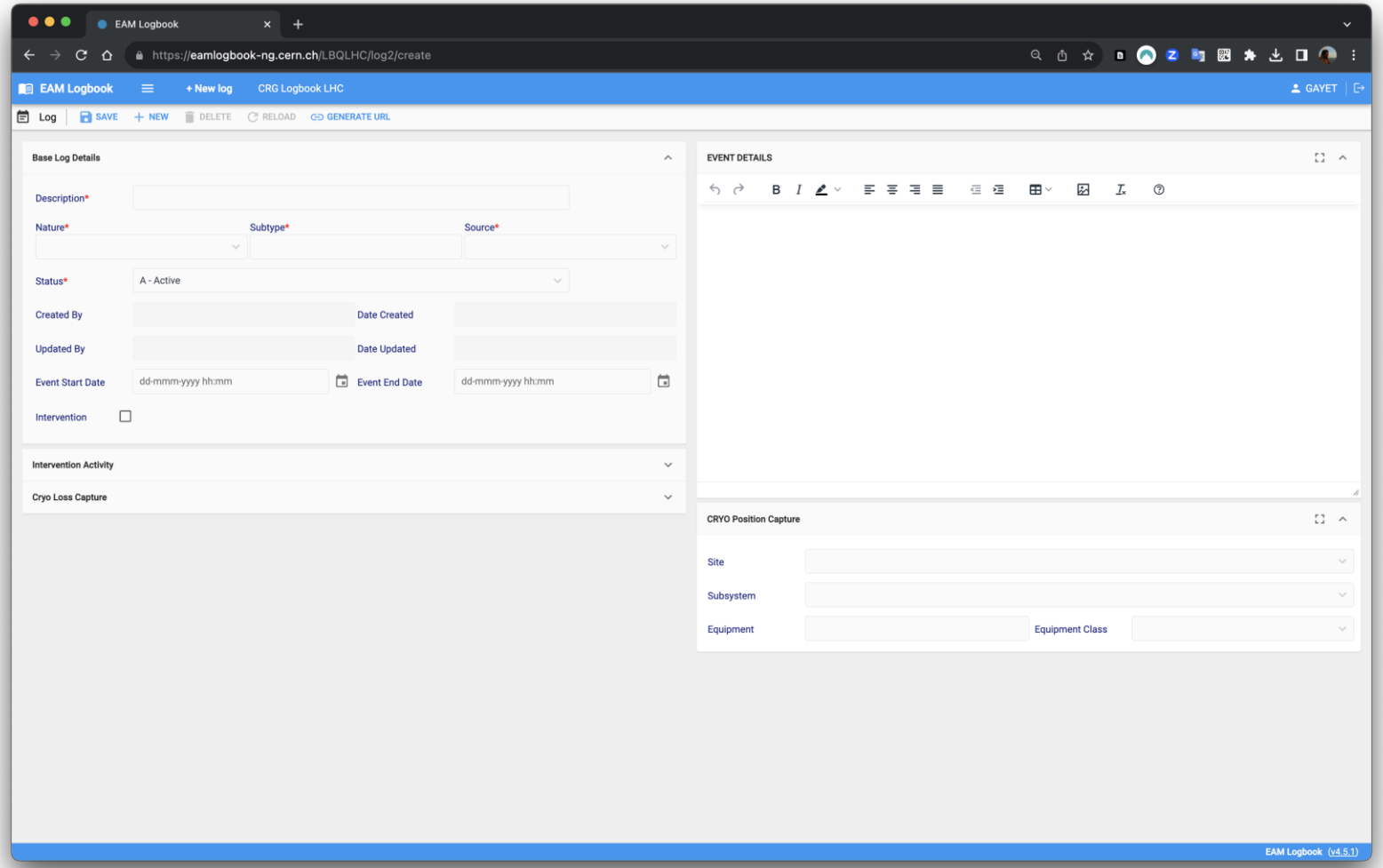
Open EAMlight

Open the Logbooks Guidelines

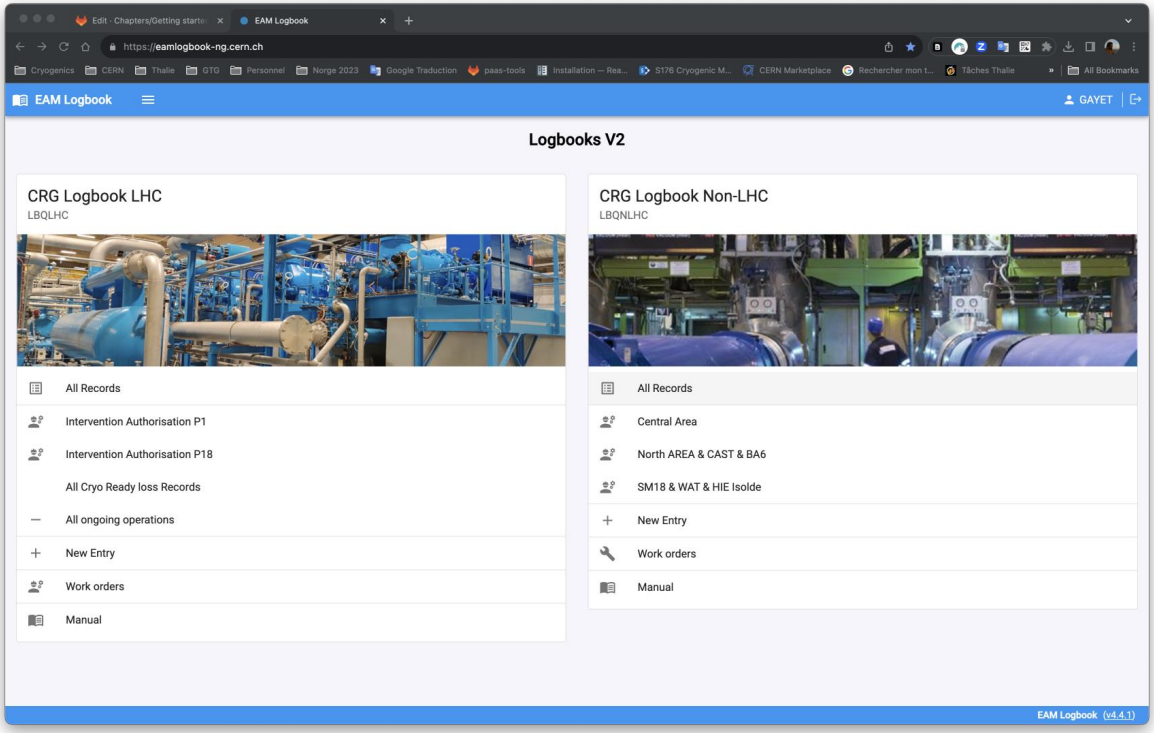
..

To be extended

Cryogenic Logbook 2024 : New Event



Cryogenic Logbook 2024



From here you can :

Access all Predefined List views

Create New Log Entry.

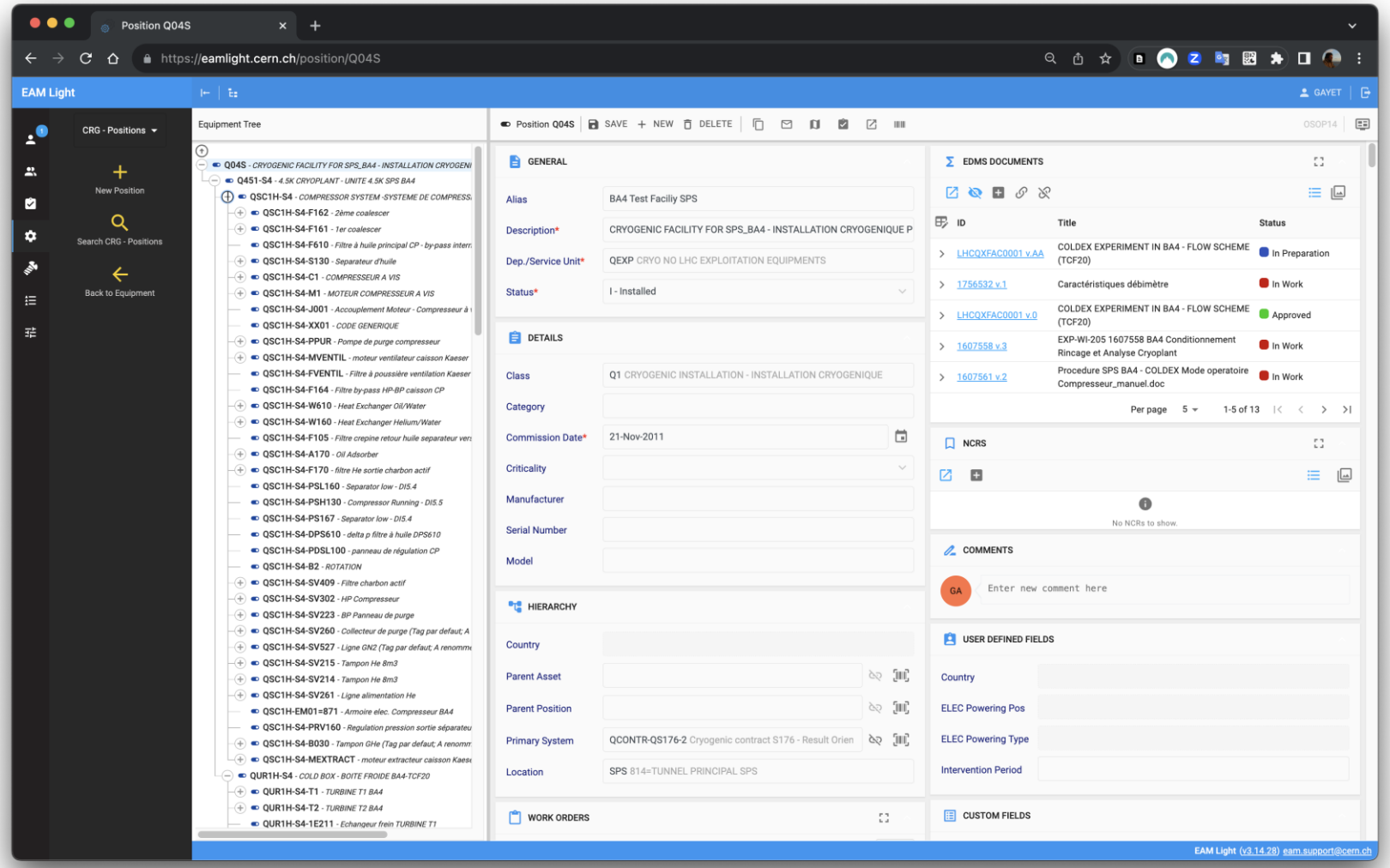
Open EAMlight

Open the Logbooks Guidelines

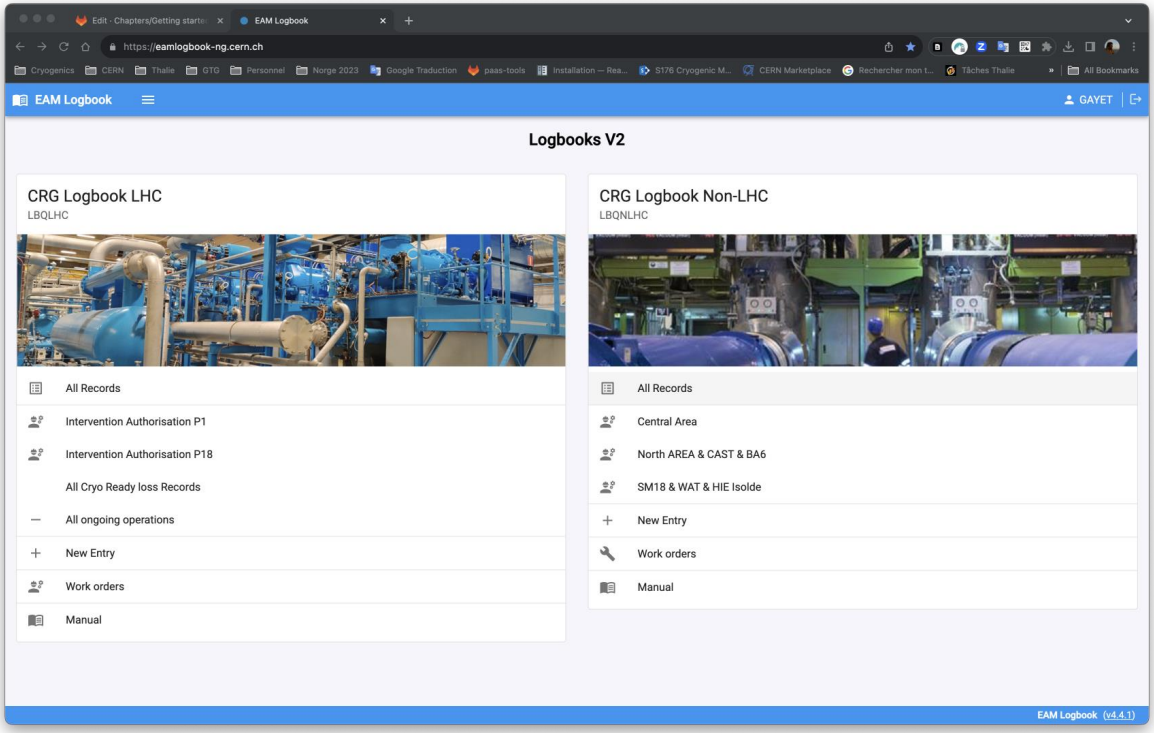
..

To be extended

Cryogenic Logbook 2024 : EAMLight



Cryogenic Logbook 2024



From here you can :

Access all Predefined List views

Create New Log Entry.

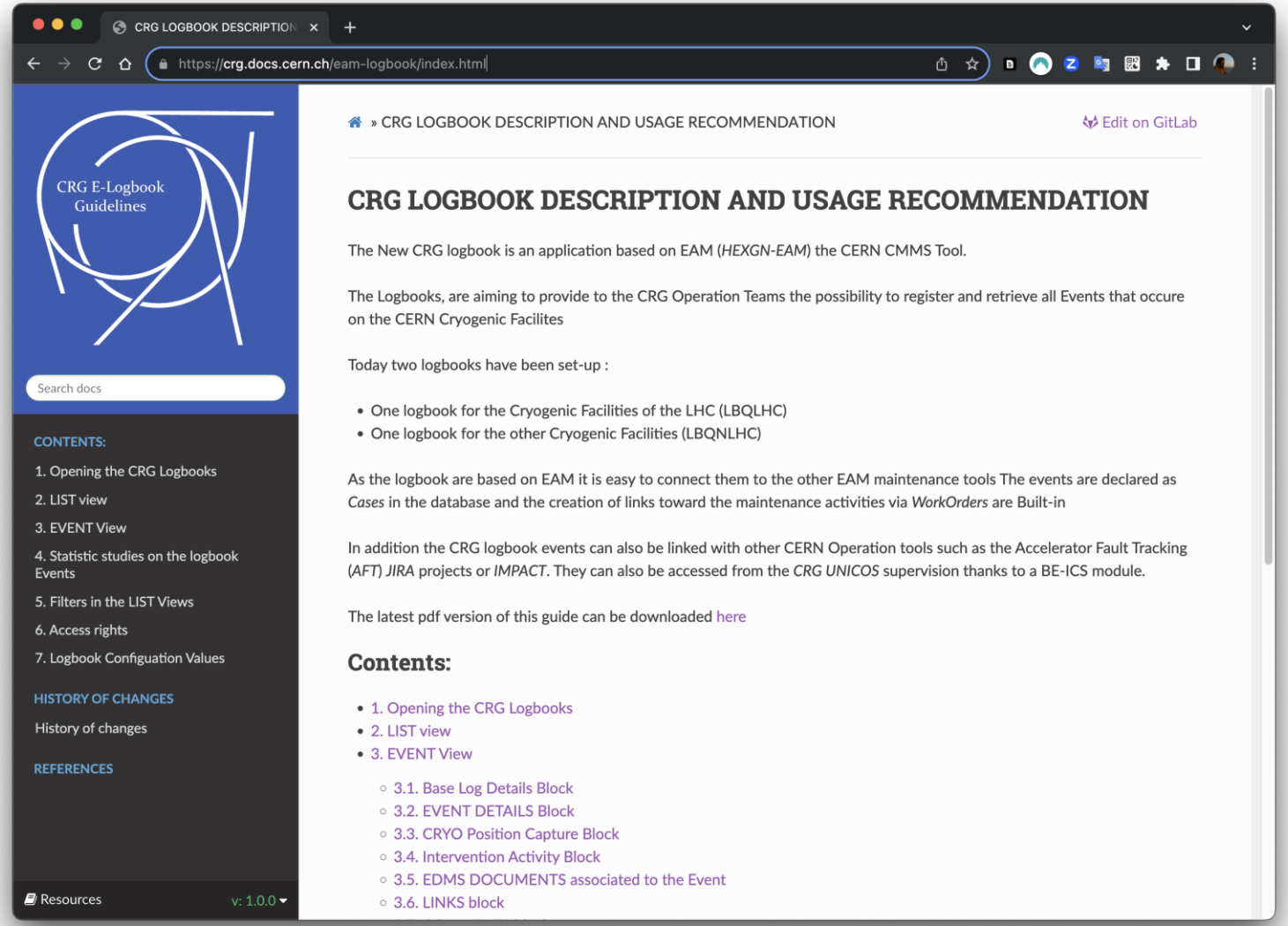
Open EAMlight

Open the Logbooks Guidelines

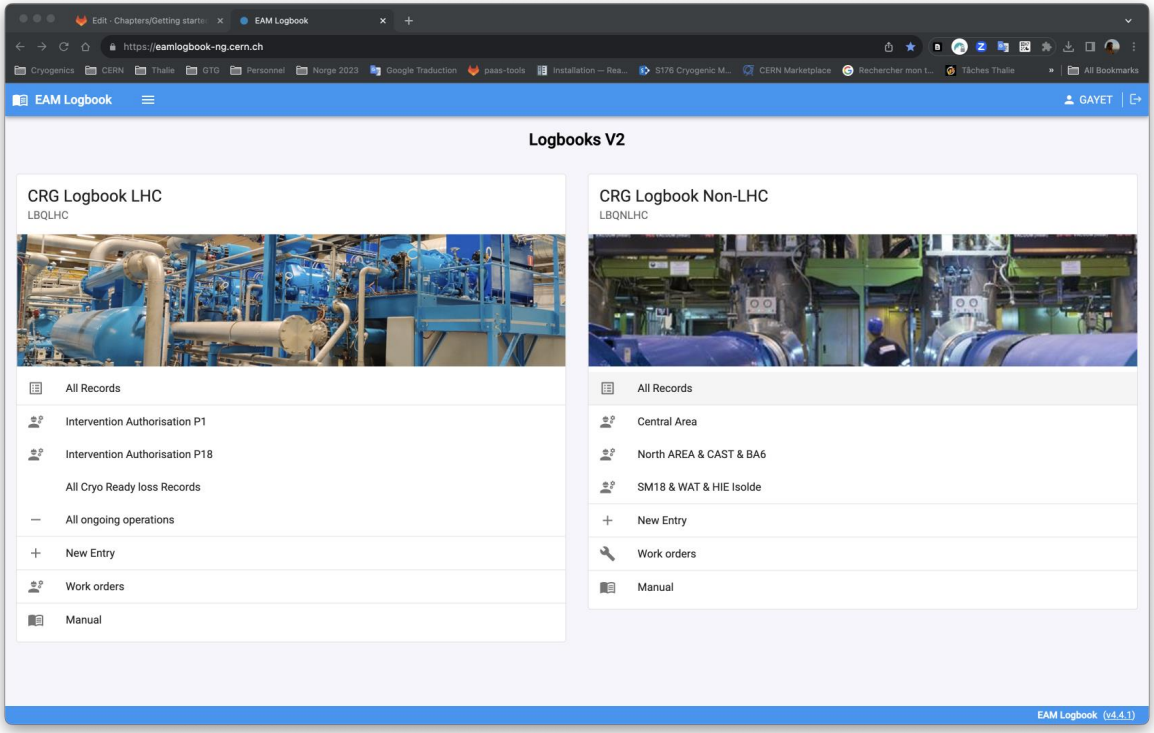
..

To be extended

Cryogenic Logbook 2024 : Guidelines



Cryogenic Logbook 2024



From here you can :

Access all Predefined List views

Create New Log Entry.

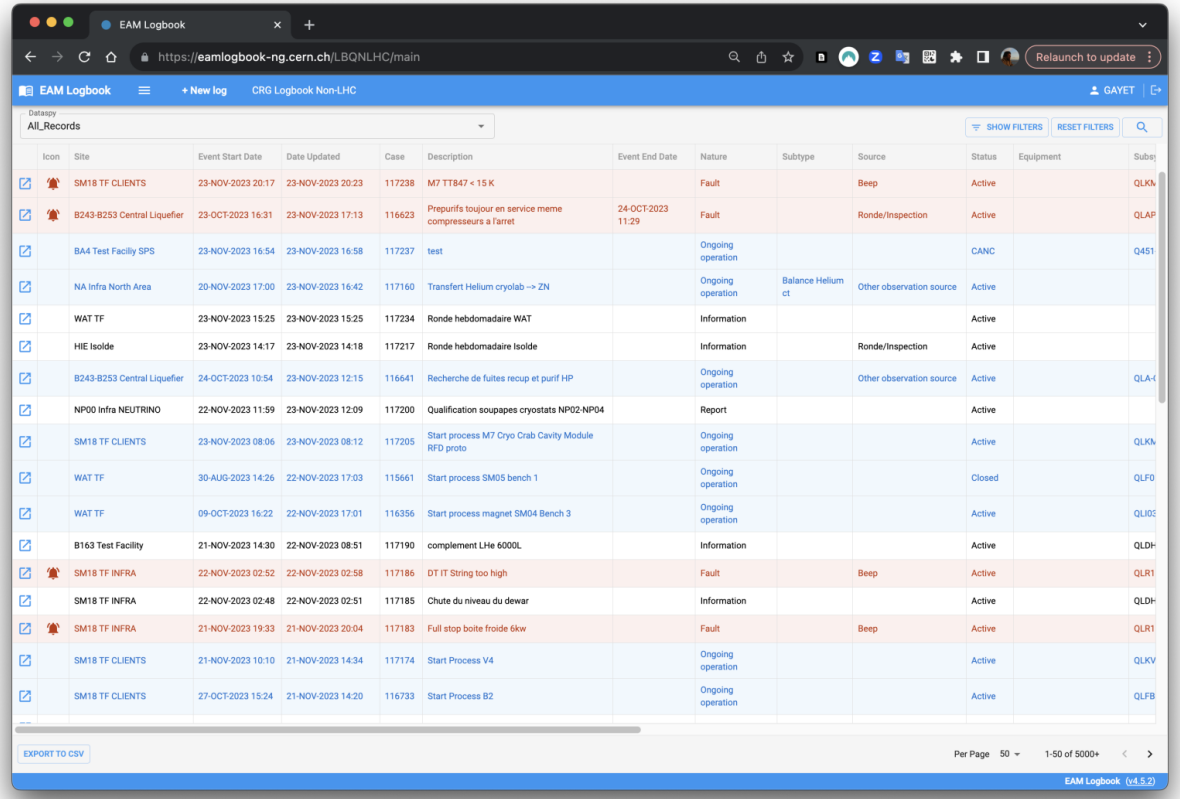
Open EAMlight

Open the Logbooks Guidelines

..

To be extended

Logbook ListView

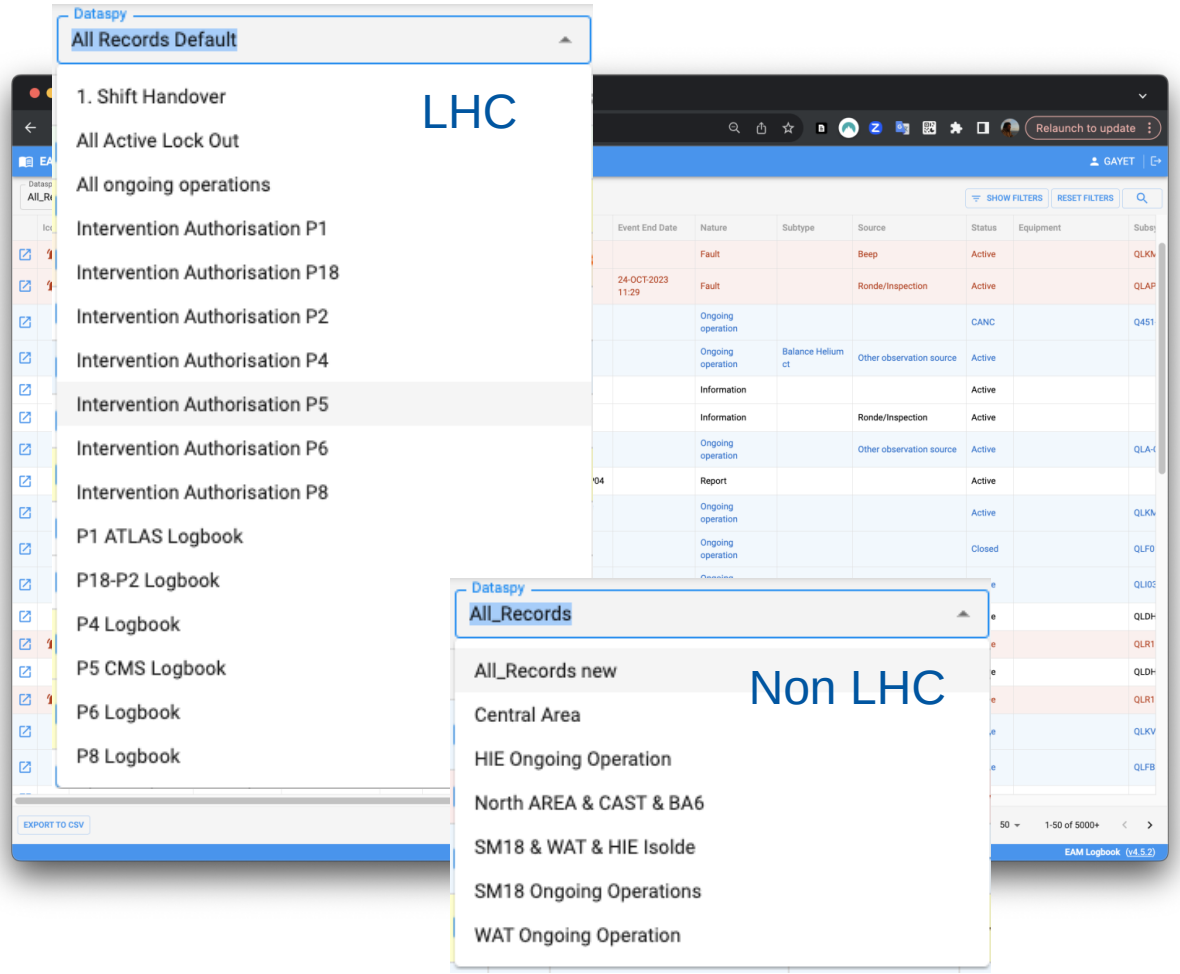


We have defined a set of :

- Font colour
- Background colour
- Icons

that are adapted to Cryo operation and common to the two logbooks

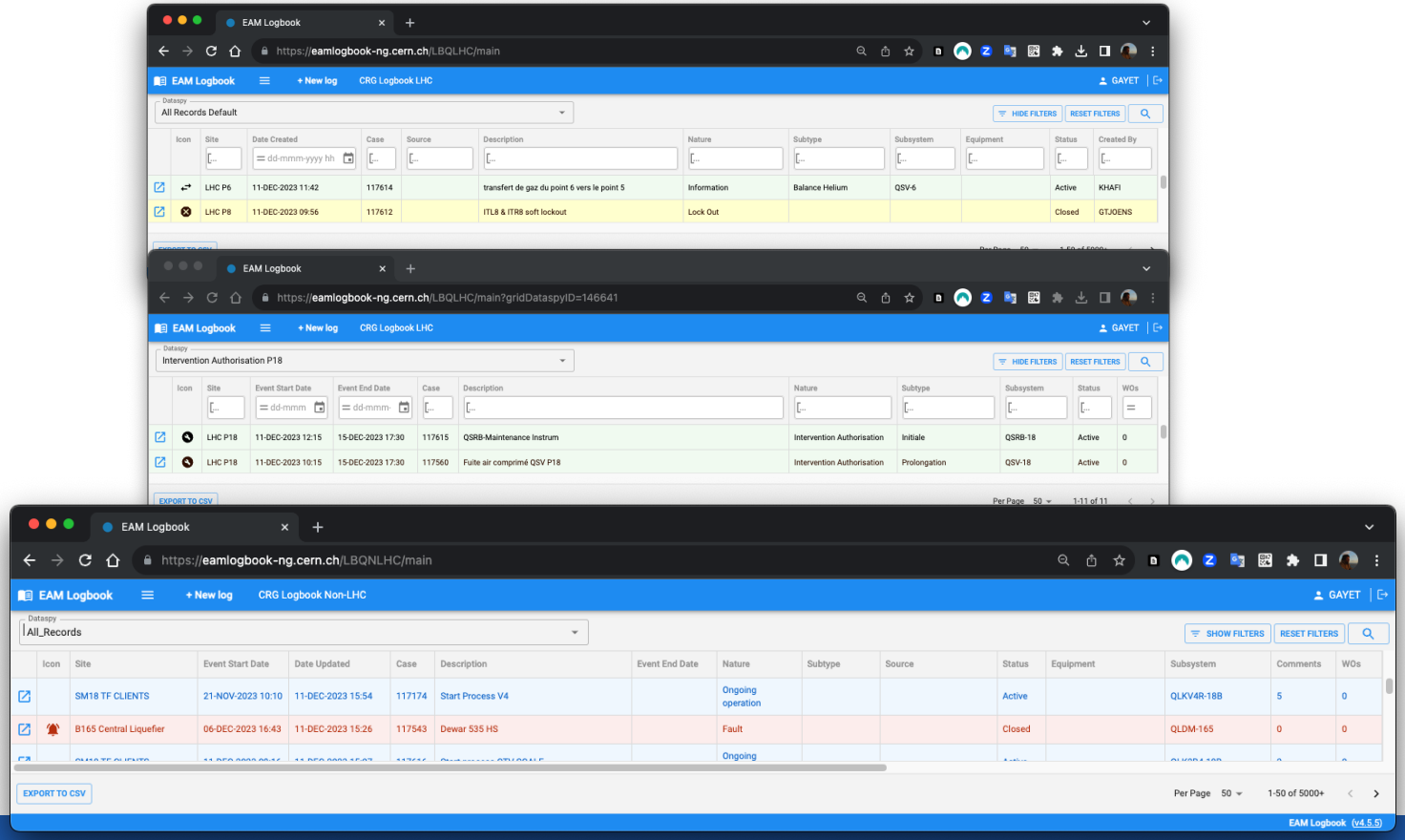
Logbook ListView



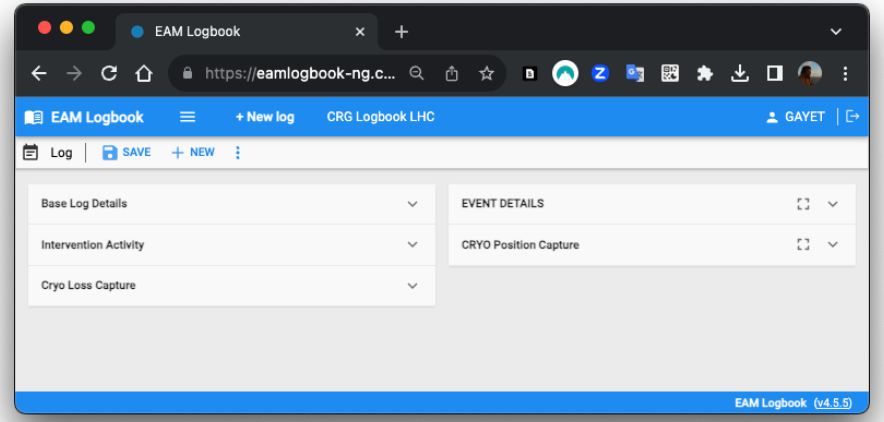
We have defined one sets of predefined ListView for each logbook.

Logbook ListView

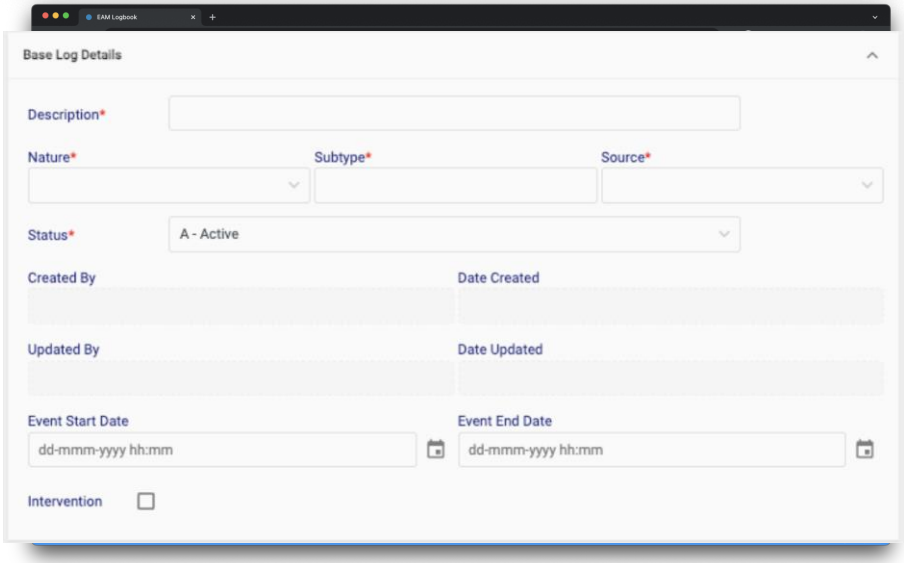
We have also defined different ListView layouts following the requests of the Operations Teams



Logbook LogView : Create a New Log



Five blocks presented



However, to create the Log we just need to fill four mandatory fields we have chosen.

- *Description*: shall be as precise as possible to ease the event identification.
- *Nature & Subtypes*: define precisely the nature of the Event
- *Source:* Origin of the information,
- *Status:* Actual state of the EVENT

Logbook LogView : Nature/Subtypes

Nature: is the Type of the event, it shall be selected in the following list:

Nature	Usage
Cryo Ok/Maintain loss	For a Fault with a loss of the Cryo OK or Cryo Maintain *(in LHC accelerator)*
Fault	For a Fault without a loss of the Cryo OK or Cryo Maintain
Ongoing operation	To inform that a specific operation is Ongoing
Report	To report from an activity
Instructions	To transmit instruction to other Operation team members
Modification request	To present modifications requested by the operation teams.
Information	To transmit Information or report a Beep without Fault
Lock Out	To Inform that a Lockout is Ongoing
Intervention Authorisation	To authorise an intervention on a facility and to inform the other people
Old Logbook	To present events from the APEX logbook *(2006-2018)*

Logbook LogView : Nature/Subtypes

Subtypes : to define precisely the nature of the Event.

Fault	**Failure without** the loss of Cryo Ok Conditions
Cryo OK/Maintain Loss	**Failure with** the loss of Cryo Ok Conditions
Subtype	Power failure
	Water & compressed air failure
	Communication failure
	Instrumentation failure
	Mechanical failure
	Control Software failure
	Control Hardware failure
	Vacuum failure
	User failure
	Process tuning failure
	General operation failure
	Human error failure

Ongoing operation	
Subtype	Production
	Users
	Maintenance
	GBalance Helium ct

Report	Activity Report
Subtype	Weekly Report
	Intervention

Instructions	Instruction for operators
Subtype	CCC consignes
	Shift Handover
	Liquid Transfer
	Gaz Transfer
	Safety

Modification request	Operation requests for Modification
Subtype	P&ID documentation
	Electrical documentation
	Control documentation
	Other documentation
	Control logic
	User interface
	Electrical cabling
	Mechanics
	GMAO-CMMS

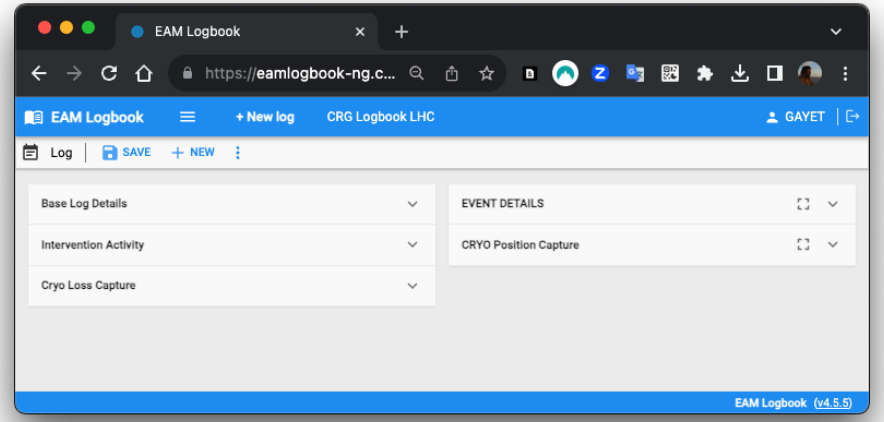
Information	Info for the operation team
Subtype	Call to CERN Best Effort
	Note Coupure Utility
	Information
	Beep Without failure

Lock Out	Lock-out
Subtype	Helium
	Electricity
	Water

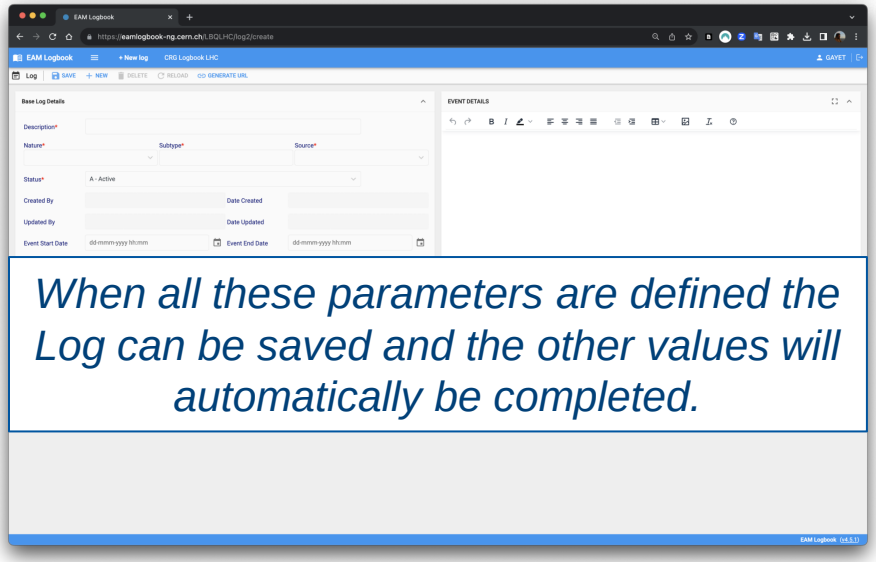
Intervention Authorisation	Work permit for intervention
Subtype	Initial
	On Hold
	Prolongated

Old Logbook	Event from the APEX logbook
Subtype	Old Event

Logbook LogView : Create New Event



Five blocks presented

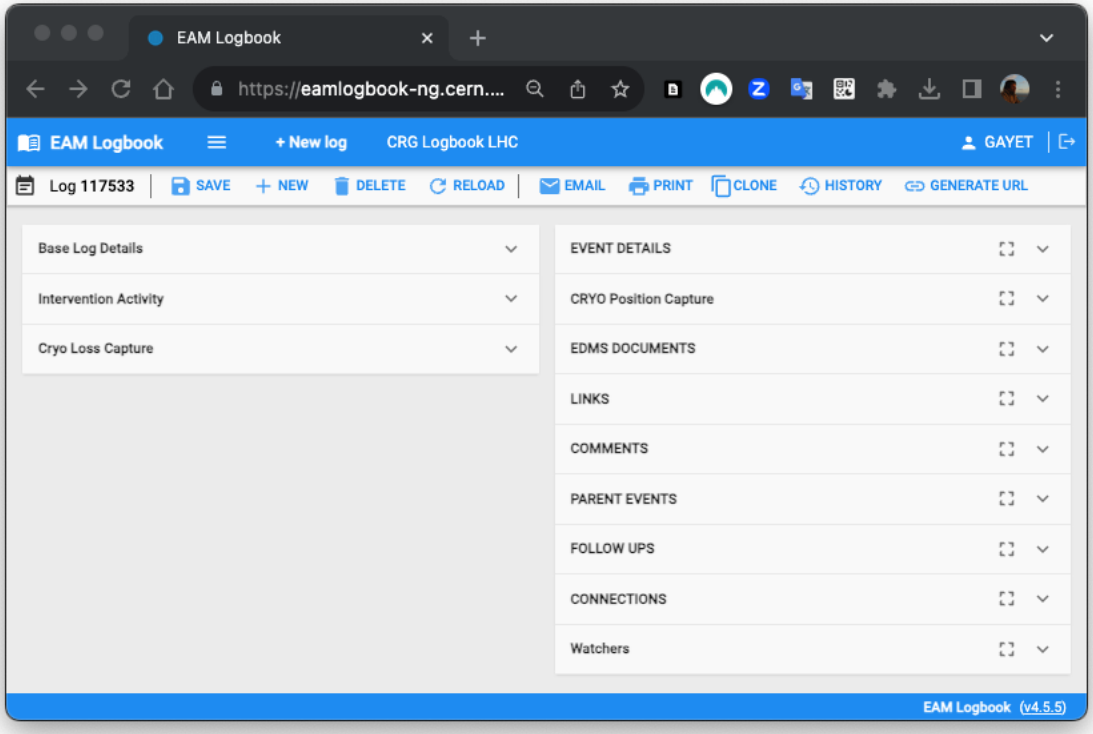


When all these parameters are defined the Log can be saved and the other values will automatically be completed.

However, to create the Log we just need to fill four mandatory fields we have chosen.

- *Description*: shall be as precise as possible to ease the event identification.
- *Nature & Subtypes*: define precisely the nature of the Event
- *Source:* Origin of the information,
- *Status:* Actual state of the EVENT

Logbook LogView : Full Event



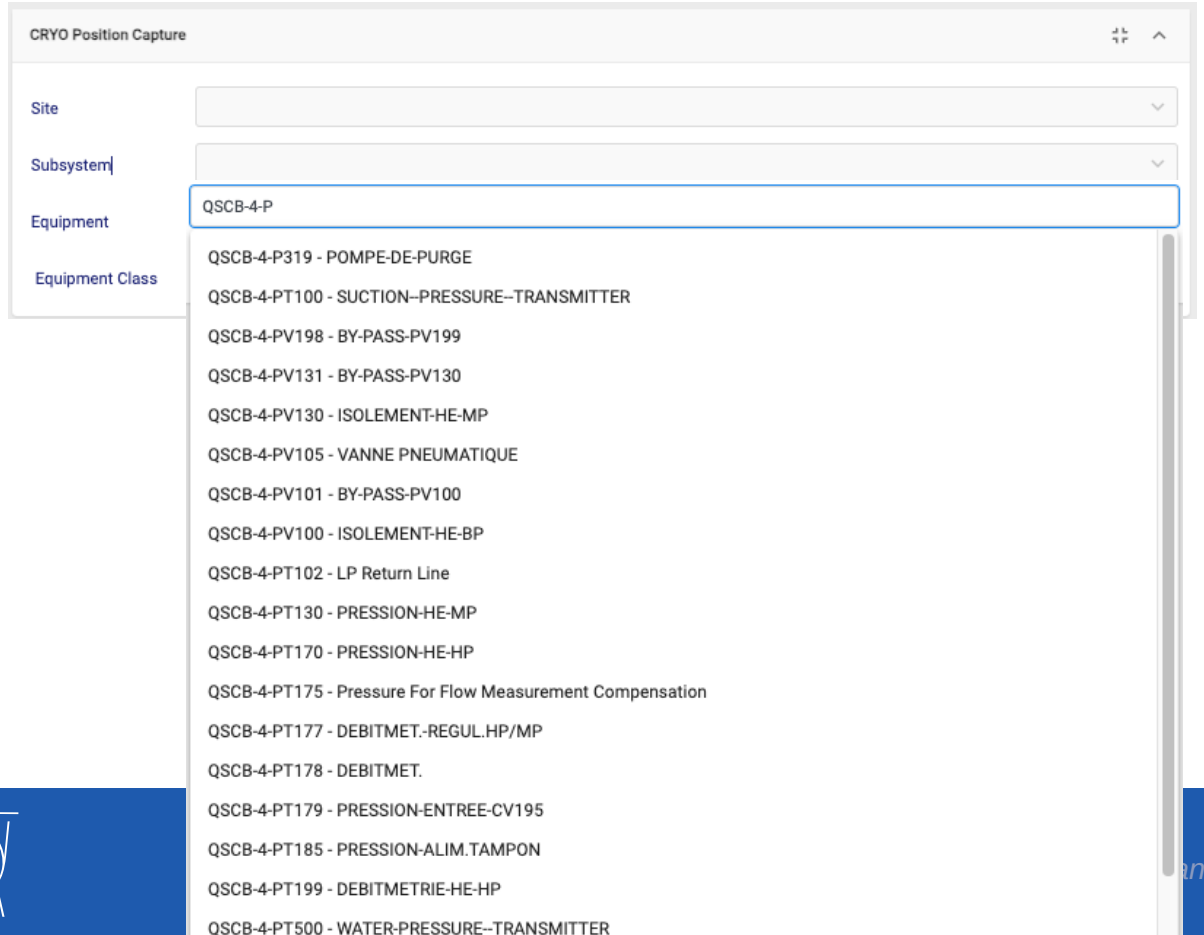
Nine blocks presented most of them equivalent to the standard block already presented.

However, we have defined specific blocks dedicated to cryogenic operation usage (Layout) .

Logbook LogView : Cryo Blocks

Cryo Position Capture, block developed by the EAM team to ease the capture of the equipment Position Name in EAM :

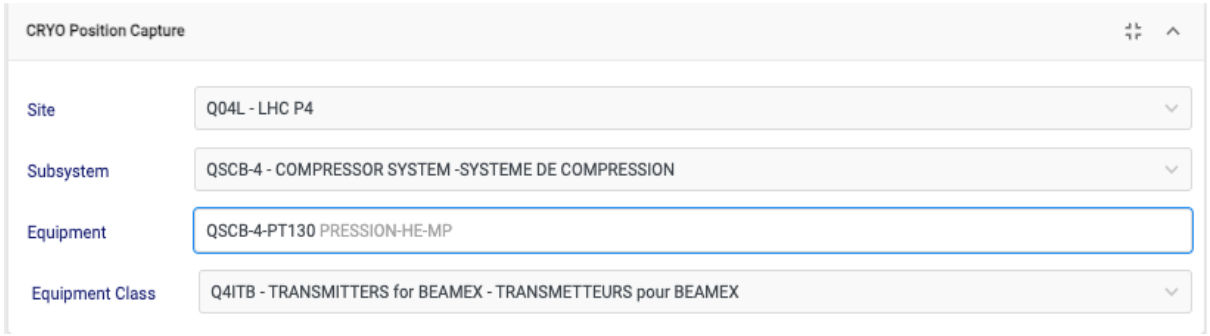
- either the specific structure of the Cryogenic position in EAM
- or in an autocompletion mechanism



Logbook LogView : Cryo Blocks

Cryo Position Capture, block developed by EN-AM for Cryo to ease the capture of the equipment Position Name in EAM based :

- either the specific structure of the Cryogenic position in EAM
- or thanks to an autocompletion mechanism



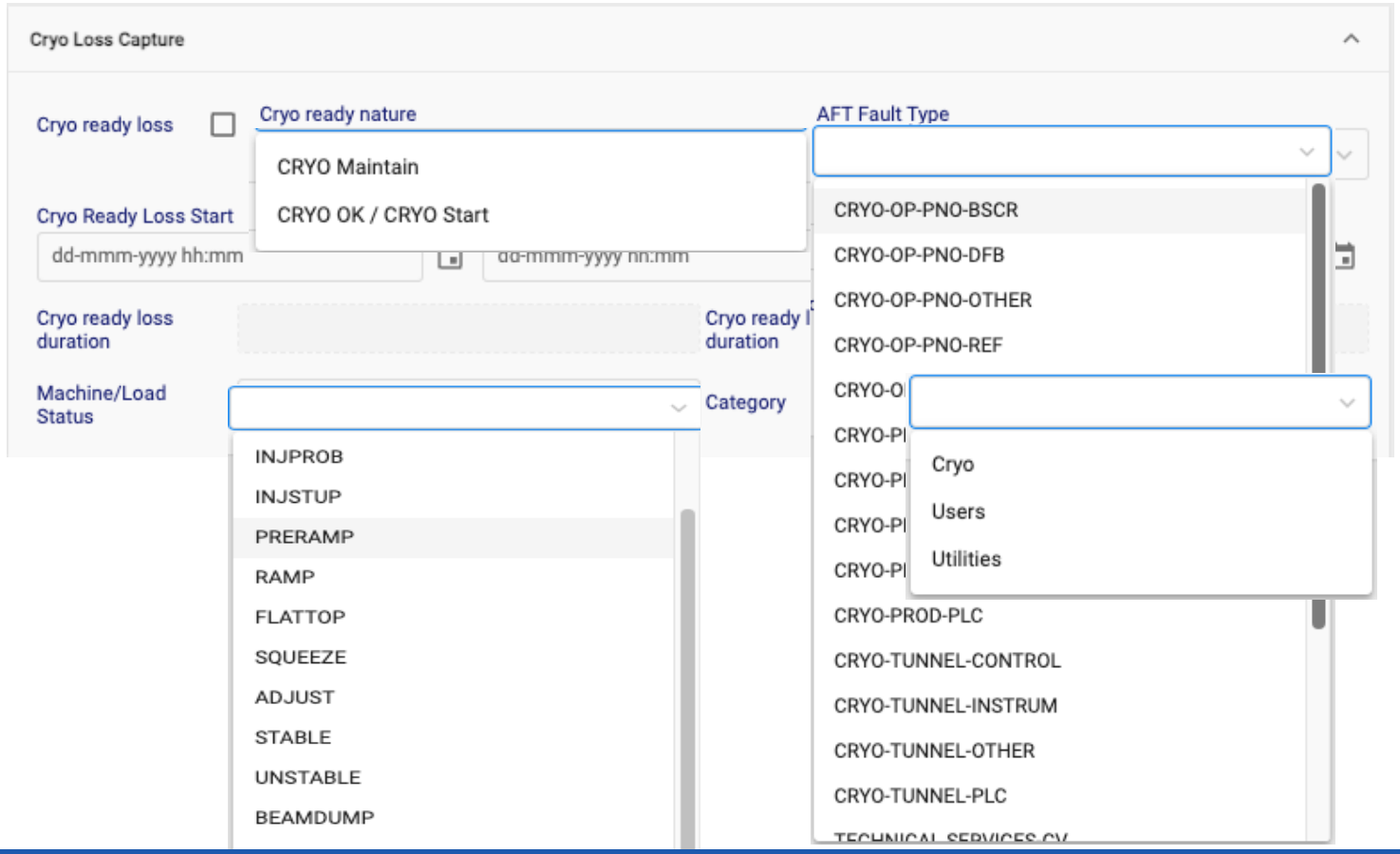
Logbook LogView : Cryo Blocks

Intervention Activities, used to capture information about :

- Intervention performed by the operation crew.
- Details for "*Interventions Authorisation*" Nature Events.

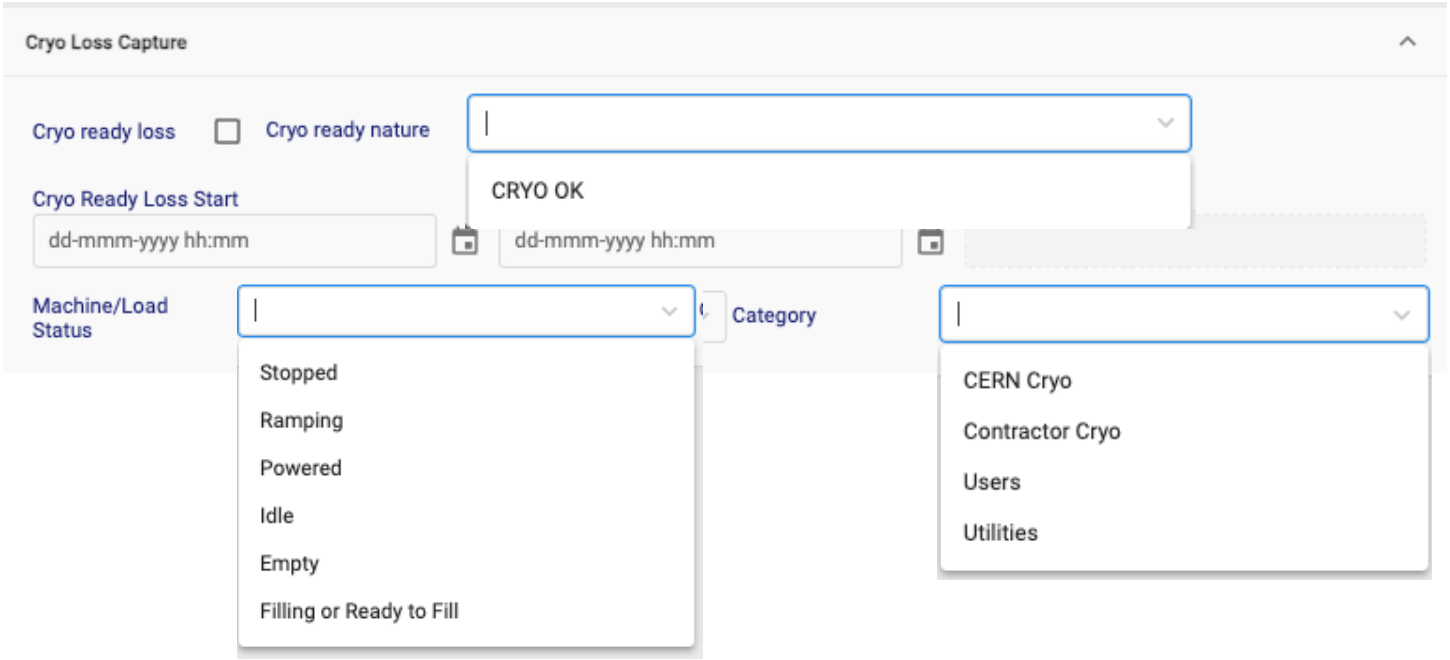
Logbook LogView : Cryo Blocks

Cryo Loss Capture, used when the Nature is "*Cryo OK/Maintain Loss*", layout developed by CRG and durations calculation implemented by EAM support.



Logbook LogView : Cryo Blocks

Cryo Loss Capture, used when the Nature is "*Cryo OK/Maintain Loss*" NON LHC



Logbook LogView : Cryo Usage

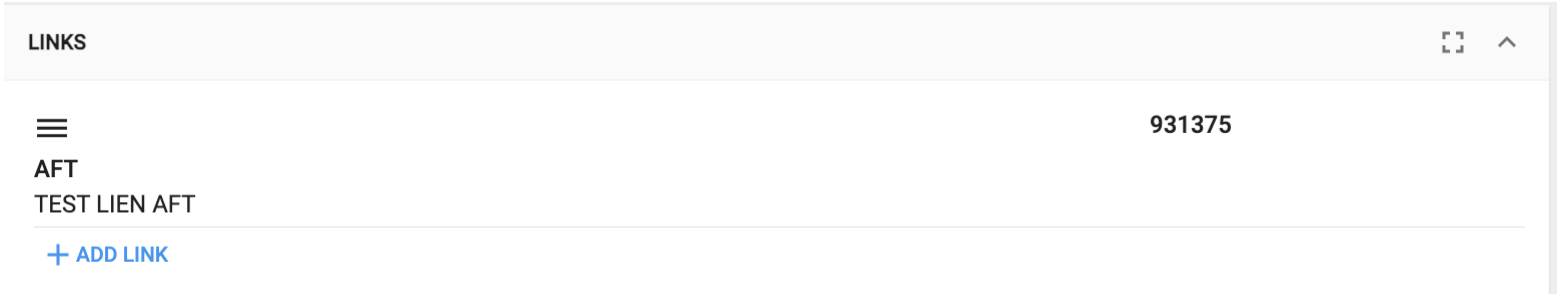
We use several standard blocks for specific action by the Cryo operation teams

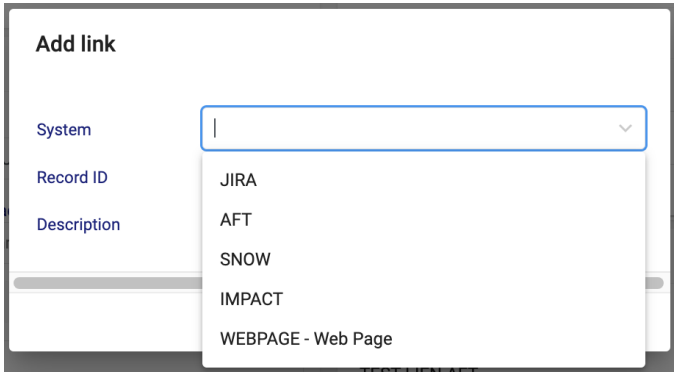
Comments : Used to update the logs with a date to follow the event history

Logbook LogView

We use several standard blocks for specific action by the Cryo operation teams

Links : Used to connect to other CERN Tools





- AFT For Cryo losses in LHC
- Impact for “Lockout” or “Intervention Authorisation”

Logbook LogView

We use several standard blocks for specific action by the Cryo operation teams

Follow Ups to connect to existing Workorders

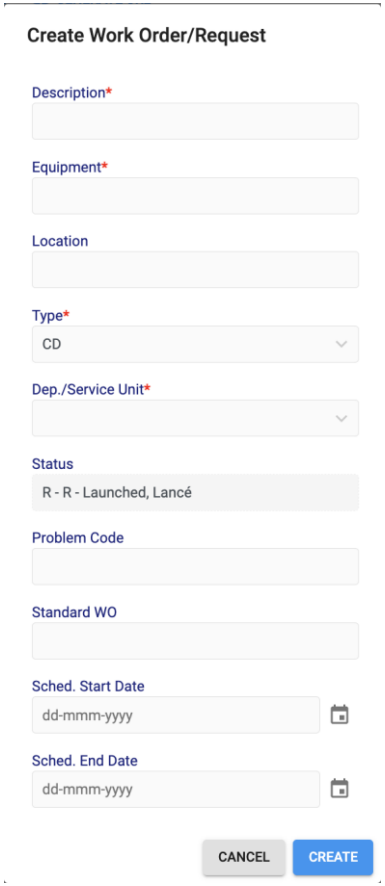
FOLLOW UPS

LINK WORK ORDER CREATE WORK O/R V2

Number	Description	Status	Delete
18901733	Bump test - Vibration shape	TX	

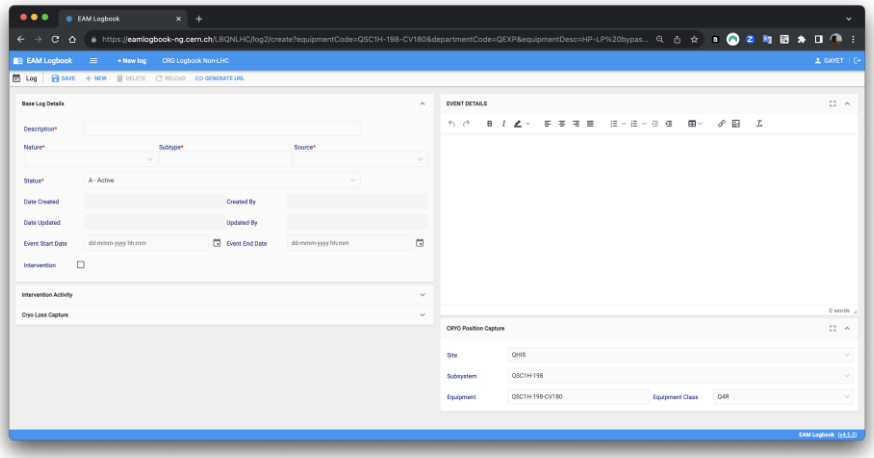
to create New Workorders

Soon a new one to connect to our Instrumentation Logbook.



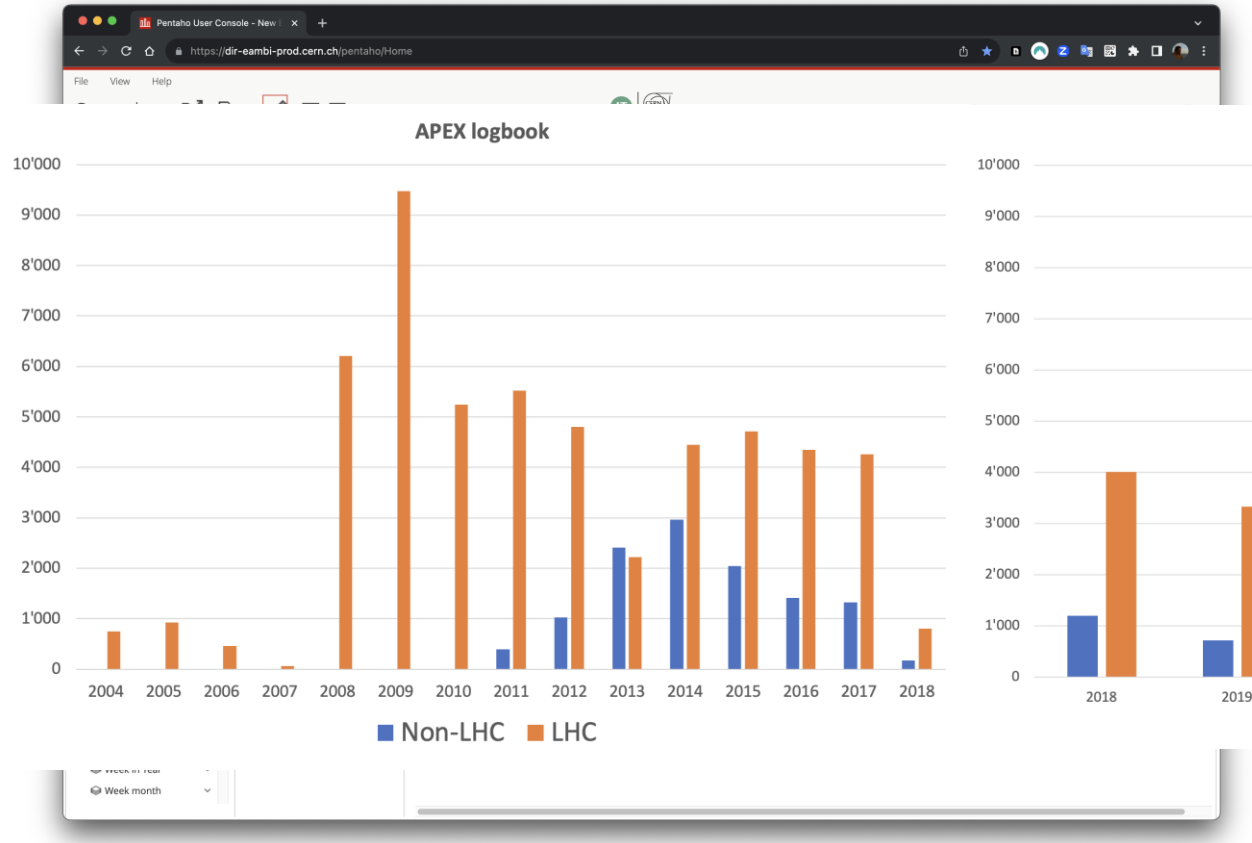
Logbook Integration with UNICOS

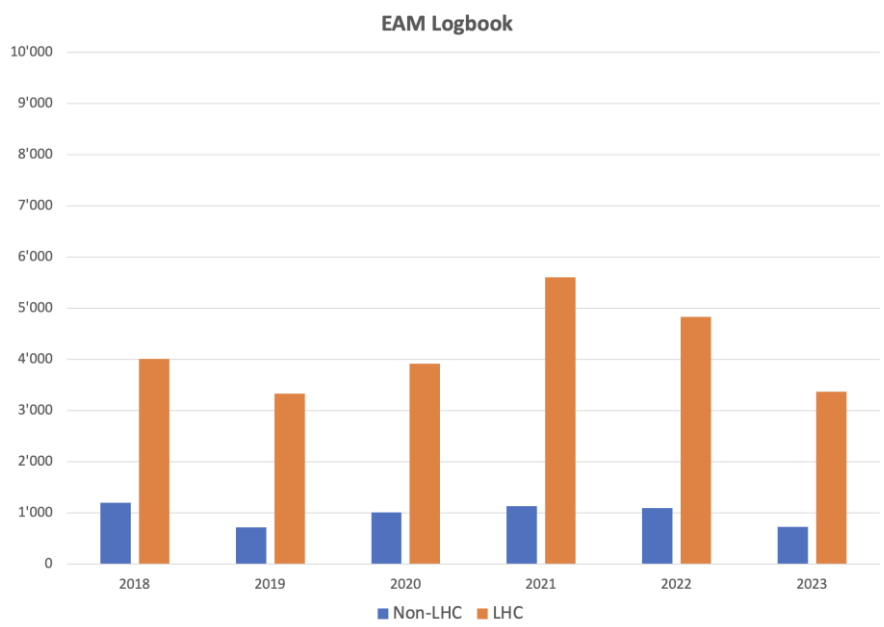
These logbooks are also accessible from the Supervision of the Cryogenic UNICOS Control system allowing the Operators to create a new log associated to a control device thanks to a generic module developed by BE-ISC.



Logbook Statistics

A new Pentaho cube has been developed by the EAM support to analyse the content of the logbooks. The results can be exported as Excel files, tables or graphs.





Conclusion

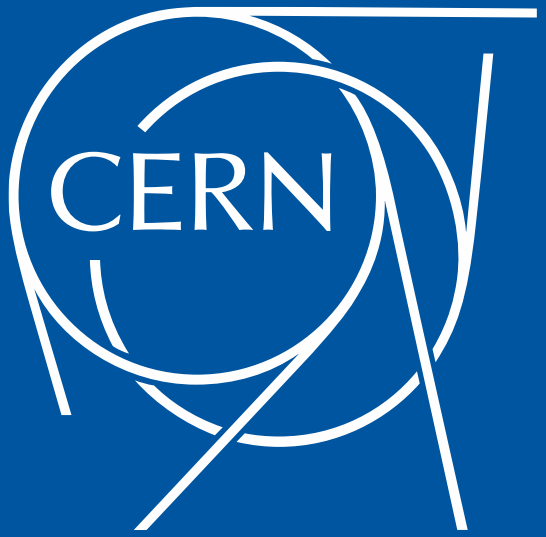
The New Cryogenic Operation EAM based logbooks are ready to be deployed.

They will allow to :

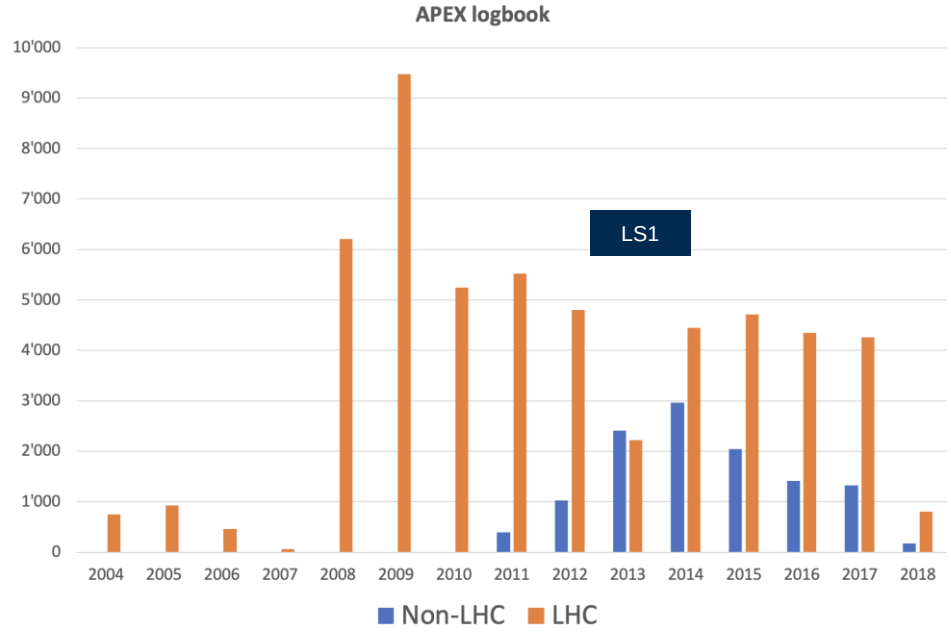
- Better describe and identify the operation events.
- Connect to EAM for follow up and access to more information about equipment.
- Connect to other CERN operation tools for a better integration.
- Create new events from the Control system with the right equipment name.
- Make statistics on their contents.

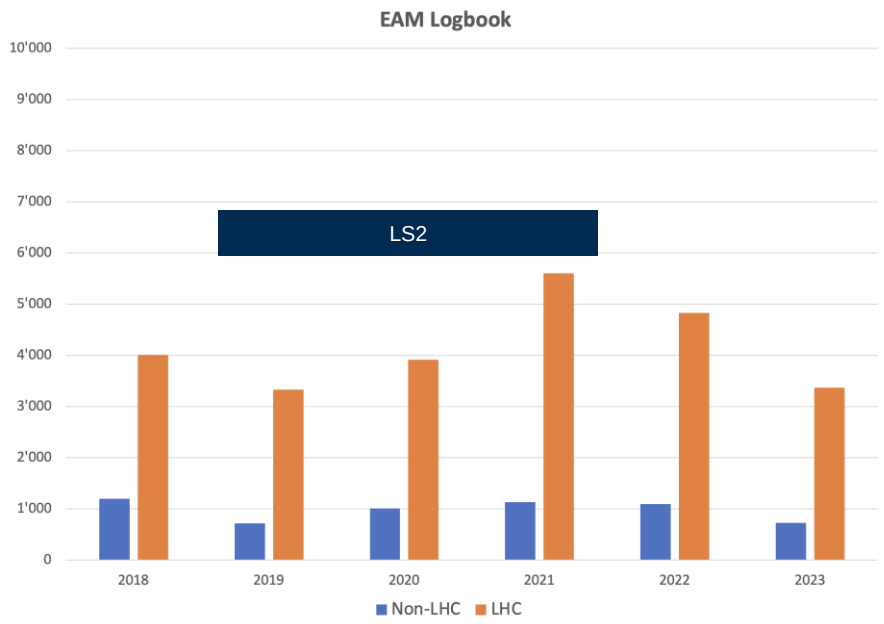
These logbooks will be improved with the feedback of users, our new configuration capability

Thanks to the EAM team for their support !


CERN

Number of Events Capture





LHC :

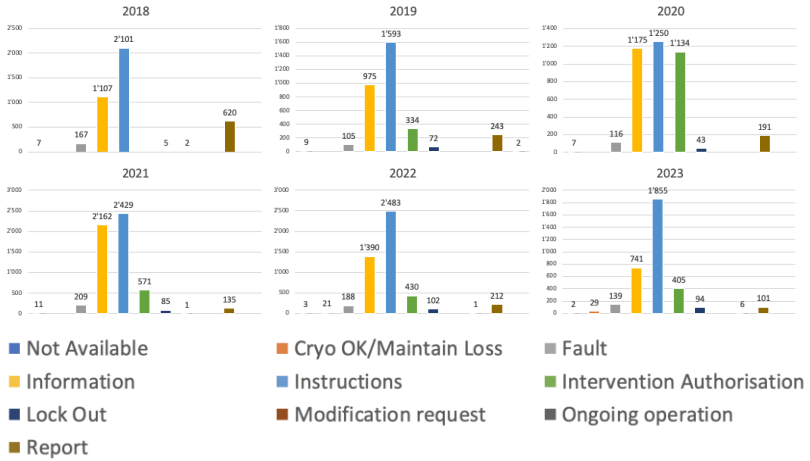
- Event Capture has **not been affected** by the current EAM logbook > **around 4 500 events/year**
- The Long Shutdown 1 (LS1) has affected the Event Capture **(↓)** but not the LS2

Non-LHC :

- **Small reduction** of the Event Capture by the current EAM logbook => **now around 1000/year**
- The Long Shutdown 1 (LS1) has affected the Event Capture **(↑)** but not the LS2

Event Nature Evolution for LHC

All Event Natures

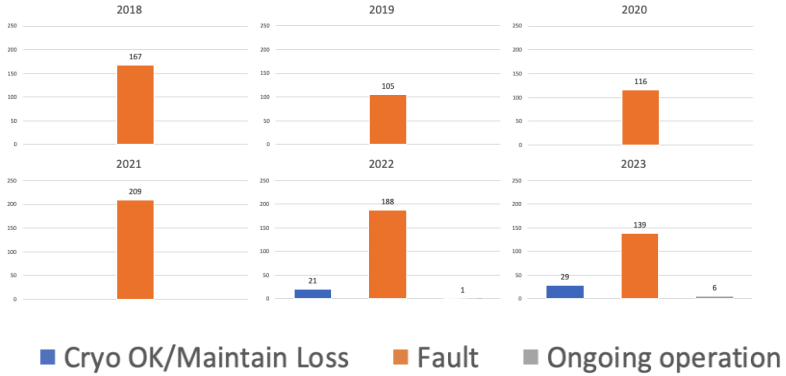


Clear instructions have been given to the Operation team to fill the Logbook.

From 2018 to 2023 the **Communication Events** dominates**.**

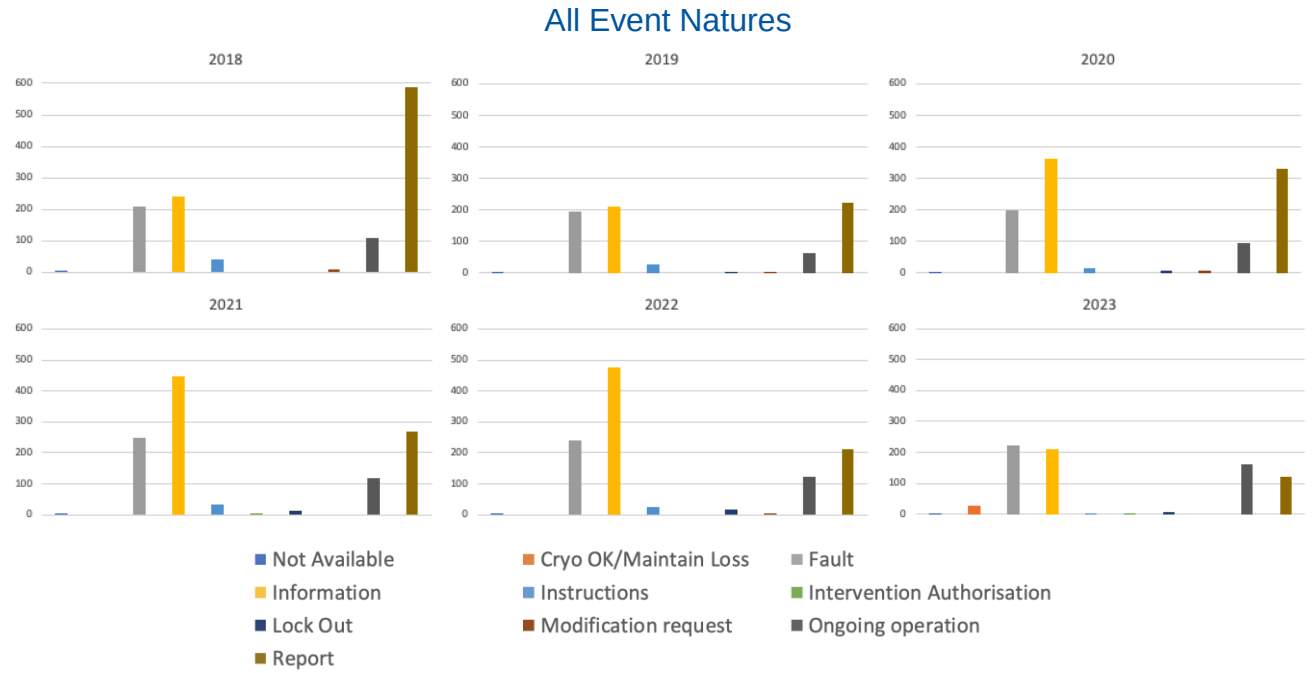
From 2019 the **Operation events** have increased to follow the support teams activities.

Fault & Operation Events



The Faults & Operation Events **are a small percentage** of the captures. The main part of the being the Failures.

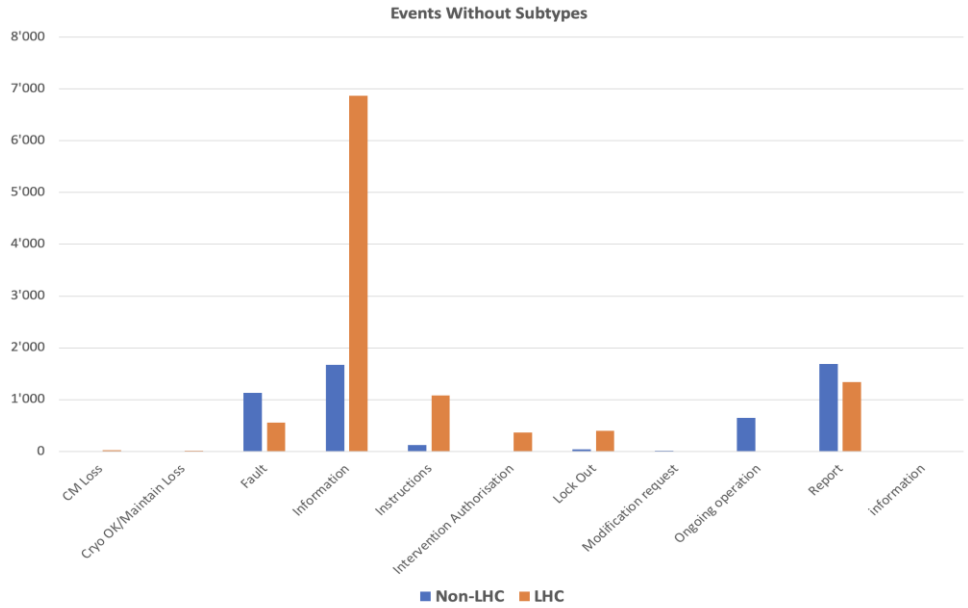
Event Nature Evolution for Non-LHC



None homogeneous and clear recommendations have been transmitted to the operation teams, making **this Logbook more difficult to analyse.**

- **Information and instructions are not as used** as for the LHC Logbook.
- However, it can be noted that the **number of Fault is almost constant and proportionally higher** than in LHC.
- **Very few Intervention** or Lock-out have been registered but the teams were **using a paper version to manage the authorisation**.
- The Ongoing operations are used at a higher level than in LHC probably related to the purpose of some facilities (Test installations).

Lack of Subtype and Source capture 2018-2023



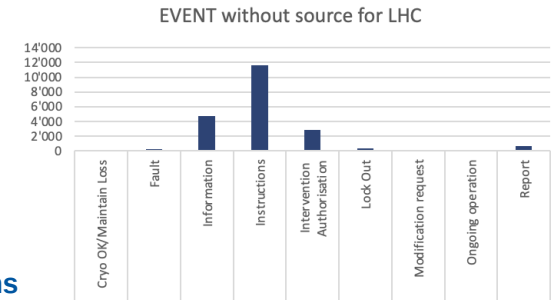
Subtypes : To refine the event "Nature" hence they are different for each "Nature": e.g., identify the origin of a fault, precise the lockout or the modification request type, etc

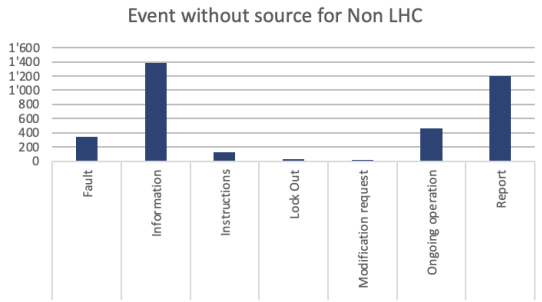
Source : To indicate from where the event was detected & generated.

- Beep
- SCADA Alarm
- CCC call
- Ronde/Inspection
- Other sources

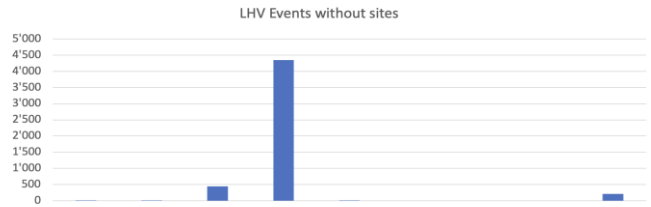
Many Events were **captured without** :
- the nature subtype
- the source that have originated them.

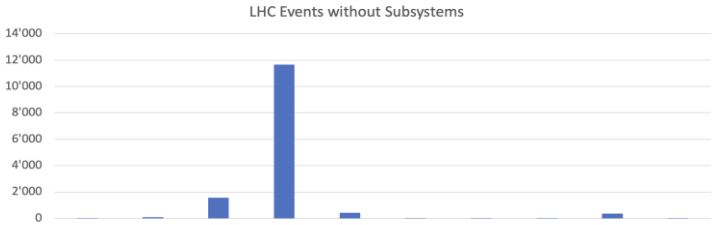
For these values:
- They were **no advice in the LHC recommendations**
- Their capture was **not mandatory**.

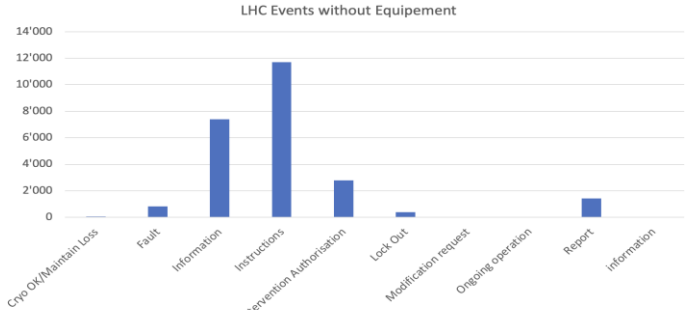


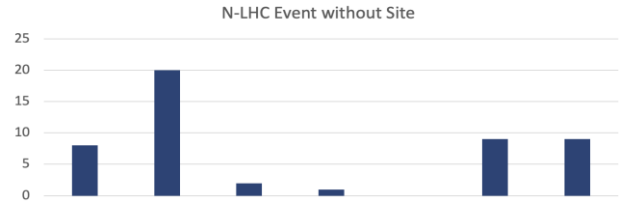


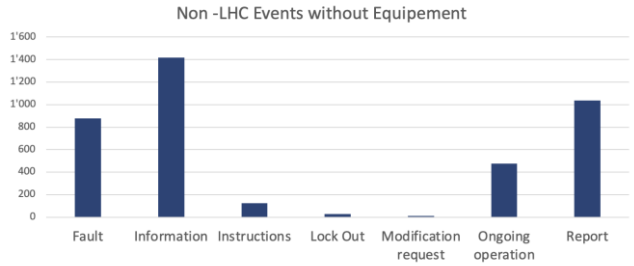
Lack of Position Capture 2018-2023











The Position Capture is not an easy issue as :

- **Equipment** captures are necessary to localise the origin of a **failure event**
- **Site or Subsystems** captures are sufficient for **communication purposes**

Recommendations to fill these fields **need to be provided** to the operation Teams

Feedback from the Operation Teams

The Operation Team value :

- ☑ The look & feel is nice, appreciated by all operators.
- ☑ The reaction time is generally appropriate.
- ☑ The predefined-filter of events (Dataspy) fits their needs.
- ☑ The filtering of events is efficient.
- ☑ The linking between events and EDMS/EAM Work worders works correctly and is appreciated (several past problems have been corrected).

To be Improved (Bugs remaining today) :

- ✕ **Filtering is not always adequate** in some columns (e.g., impossible to filter between 2 dates)
- ✕ **Automatic search of equipment** sometimes does not working properly
- ✕ When equipment are selected, the site and subsystem **auto-filling may not always be done** correctly.
- ✕ **Sometimes, the reaction time** can be to slow (e.g., Changing a colour, dropping menu choices,…).
- ✕ A **link** between the logbook and the CERN system to **manage co-activities** (IMPACT) for the cryo lockout or interventions would be welcomed.

Improvements since 2018

- ☑ Clone an event
- ☑ Possibility to create and save predefined filters (Dataspy) from the EAM application (2023)
- ☑ Reports (*Pentaho reporting*) : Statistics and save all information of an event in a pdf for printing or sharing
- ☑ Improved predefined lists for filtering use and statistics (nature field : Cryo loss)
- ✗ Open the logbook for read-access to non-EAM users and review write access.