

Accelerator Fault Tracking (AFT)

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Purpose

Complete and coherent fault capture for LHC (*initially*) from an operational perspective in order to identify problems as early as possible with the aim of increasing general availability.

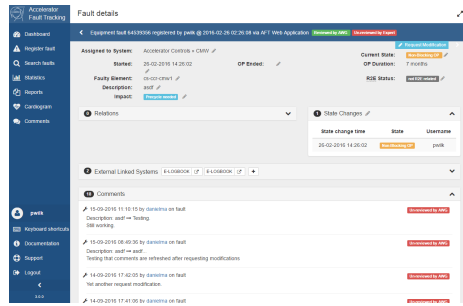
In other words, be able to:

- Analyse downtime
- Find a real root cause and relations between systems
- Look for patterns
- Limit downtime

Target audience is:

- **Operators** – to easily track faults, identify how operational procedures may be tuned.
- **Equipment Groups** – to follow their system failures, impact on operation, and identify areas for improvement.
- **Management** – to recognise progress, endorse consolidation strategies etc.
- **Working Groups** targeting availability and reliability improvements (AWG, R2E) – as a knowledge base for their studies and proposals for improvement strategies.

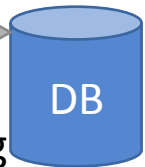
Place in the environment



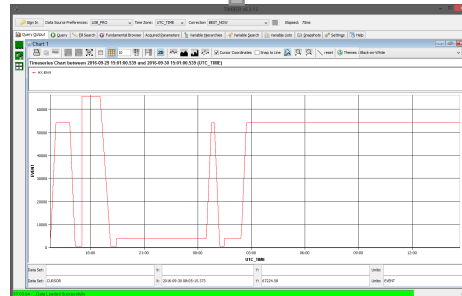
Web interface allowing to browse, edit and analyse fault data. Collaboration between operators, system experts and AWG members

AFT server

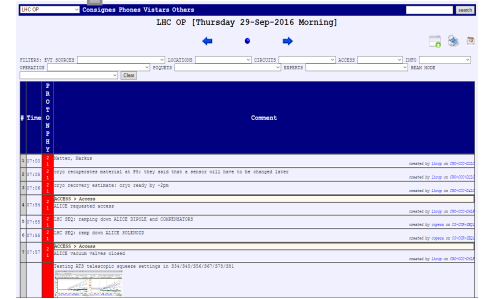
Storing filtered data coming from other systems correlated with faults details entered in AFT



Additional systems in future



Logging System – machine info



eLogbook – fault basic data

The system needs to be highly-available - as operators need to be able to register faults whenever they occur

History

AFT is the first Angular JS application in CO, dating back to early 2014.

During the years it has evolved a lot and continues to do so.

The screenshot displays the AFT web application interface. At the top, there is a navigation bar with links for Home, Create Fault, Search Faults, and Statistics, along with a user profile for 'pwilk' and a Logout option. The main content area is titled 'Edit fault' and shows details for a fault registered by 'pwilk' on 2016-02-26. The fault details include:

- Assigned to System:** Accelerator Controls » CMW
- Started:** 26-02-2016 14:26:02
- OP Ended:** (empty)
- Current State:** Non-Blocking OP
- Faulty Element:** cs-ccr-cmw1
- Description:** asdf
- OP Duration:** 7 months
- R2E Status:** not R2E related
- Impact:** Precycle needed

The interface also shows sections for Relations, State Changes (with a table of state changes), External Linked Systems, and Comments. The state changes table is as follows:

State change time	State	Username
26-02-2016 14:26:02	Non-Blocking OP	pwilk

The comments section shows three entries from 'danielma' on 15-09-2016, with descriptions like 'Testing' and 'Testing that comments are refreshed after requesting modifications'. Each comment has a status of 'Un-reviewed by AWG'.


Current state

Used in production since end of LS1 – contains fault data from LHC re-start in 2009.

In the process of completing migration to the latest ACW version, Angular 1.5 (components), and Typescript

Demo

Pre-release preview

 Accelerator Fault Tracking

Search faults


Interval: [dropdown] Start time: 24-09-2016 11:20:46 End time: 01-10-2016 11:20:46 System: -- Select value -- Clear filters Search [dropdown]






System	Start time	End time	Duration	State	Faulty ele.	Descriptio	AWG	Expert	R2E stati
Accelerator Controls » CMW	26-02-201...		7 months	Non-Blocking OP	cs-ccr-cmw1	asdf	Reviewed	Un-reviewed	not R2E related
Beam Injection	26-02-201...		7 months	Non-Blocking OP		sdfgsdfg	Reviewed	Reviewed	not R2E related
Operation » Operational error	26-02-201...		7 months	Non-Blocking OP		don't know ...	Reviewed	Reviewed	not R2E related
Access System	26-02-201...		7 months	Non-Blocking OP		2112	Reviewed	Reviewed	not R2E related
Power Converters	02-02-201...		8 months	Non-Blocking OP	QPS RQF.A...		Reviewed	Reviewed	R2E confirmed


5 item(s) shown


3.0.0

Pre-release preview

 Accelerator
Fault Tracking

-  Dashboard
-  Register fault
-  Search faults
-  Statistics
-  Reports
-  Cardiogram
-  Comments

 **pwilk**


-  Keyboard shortcuts
-  Documentation
-  Support
-  Logout



3.0.0

Fault details


Equipment fault 64539356 registered by pwilk @ 2016-02-26 02:26:08 via AFT Web Application Reviewed by AWG Un-reviewed by Expert Request Modification

Assigned to System: Accelerator Controls » CMW 
Started: 26-02-2016 14:26:02 
Faulty Element: cs-ccr-cmw1 
Description: asdf 
Impact: Recycle needed 



OP Ended: 


Current State: Non-Blocking OP 
OP Duration: 7 months
R2E Status: not R2E related 


0 Relations 

1 State Changes 


State change time	State	Username
26-02-2016 14:26:02	Non-Blocking OP	pwilk

2 External Linked Systems E-LOGBOOK  E-LOGBOOK  +


18 Comments 

 15-09-2016 11:10:15 by danielma on fault
Description: asdf → Testing.
Still working.


Un-reviewed by AWG

 15-09-2016 08:49:36 by danielma on fault
Description: asdf → asdf...
Testing that comments are refreshed after requesting modifications

Un-reviewed by AWG


 14-09-2016 17:42:05 by danielma on fault
Yet another request modification.

Un-reviewed by AWG


 14-09-2016 17:41:06 by danielma on fault
Description: asdf → This is a test description.
Add a more sensible description.

Un-reviewed by AWG

Pre-release preview

 Accelerator Fault Tracking

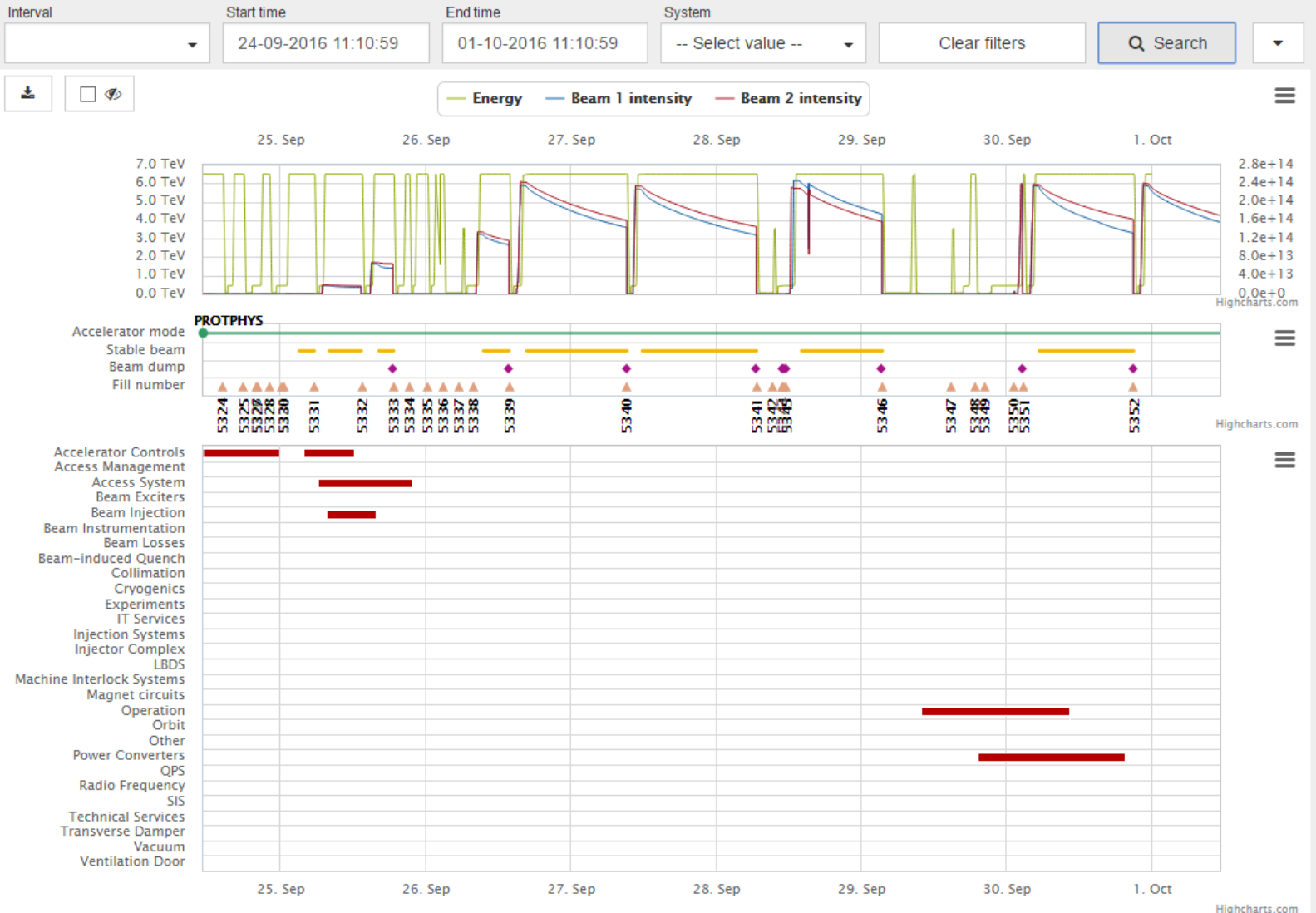
- Dashboard
- Register fault
- Search faults
- Statistics
- Reports
- Cardiogram
- Comments

 pwilk

- Keyboard shortcuts
- Documentation
- Support
- Logout

3.0.0

Cardiogram



Future Developments

- Integrating **equipment group specific properties** – suppressing the need for some existing expert tracking tools
- **Layout & CCDB integration** – to link faulty HW/SW elements
- **Expansion to cover all accelerators** – as mandated at Chamonix workshop in January 2016)
- Generally bringing **lots more functionality** e.g. search capabilities (using ACW search / reporting), basic analyses and reporting enhancements (based on ACW reporting), user specific customisations (based on ACW profiles)

Questions?

<https://wikis.cern.ch/display/aft>