

# FLD 2.2 – First Line Diagnosis The ISIS Neutron Source Fault Diagnosis Tool

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## 1. The need for FLD

The ISIS facility schedules a number of user cycles per year, each lasting 6-8 weeks during which time a pulsed proton beam is delivered to two target stations for neutron production. Any equipment fault that trips the beam reduces accelerator availability, often requiring specialist callouts that result in lengthy downtime.

FLD helps to reduce the response time to a fault by providing expert guidance on fault diagnosis and resolution. This standardised fault approach has improved the dissemination of knowledge from experts to operations; providing a platform for increasing overall accelerator availability.

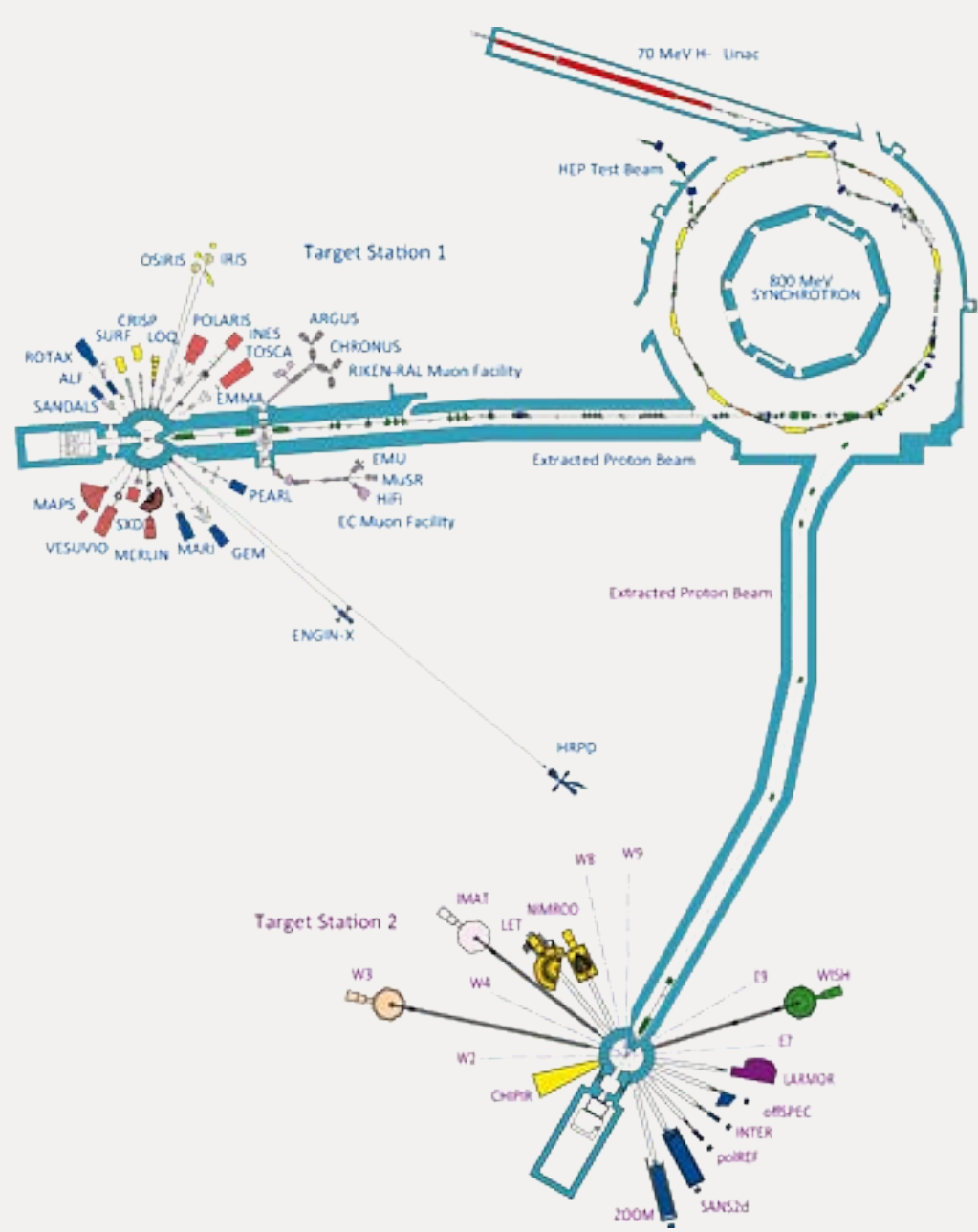


Figure 1 – ISIS facility schematic representation

## 2. Overview

FLD is a fully interactive, online platform containing a range of operational resources, ranging from fault analysis flowcharts and repair procedures to technical surveys and video tutorials. This information is carefully curated by equipment specialists spanning the ISIS facility, providing guidance on resolving machine faults.

The backbone of FLD is the “Fault Analysis Pathway”, termed FAP. Hundreds of FAP entities provide the structural links between ISIS subsystems, whilst also acting as the front-end navigational interface.

By following an FAP from a top level system through to its constituent sub-systems, users can instantly access “local” documentation pertaining to particular fault modes. This curated approach minimises file hunting, saving time and effort.

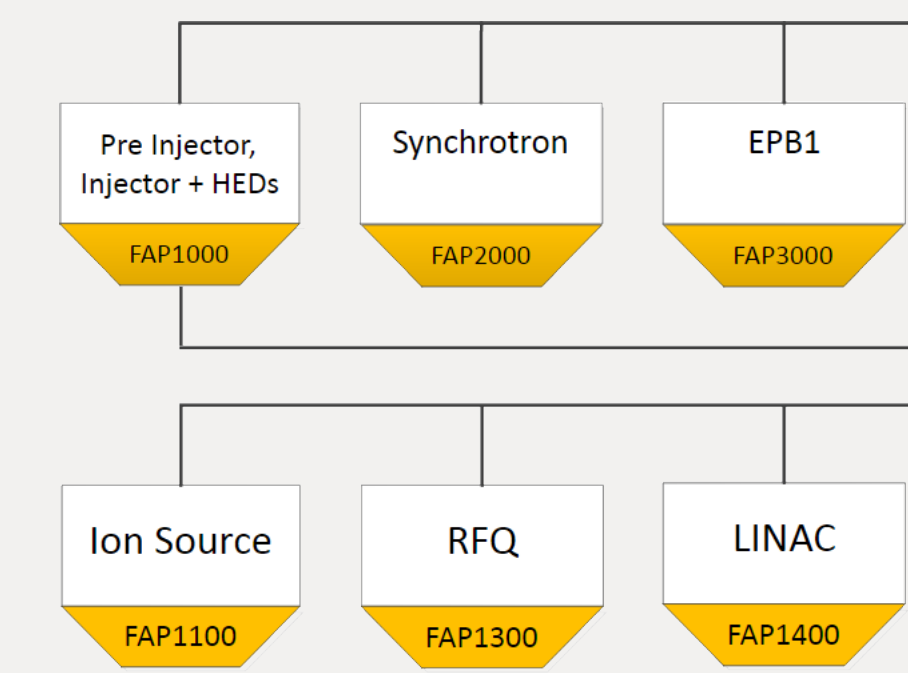
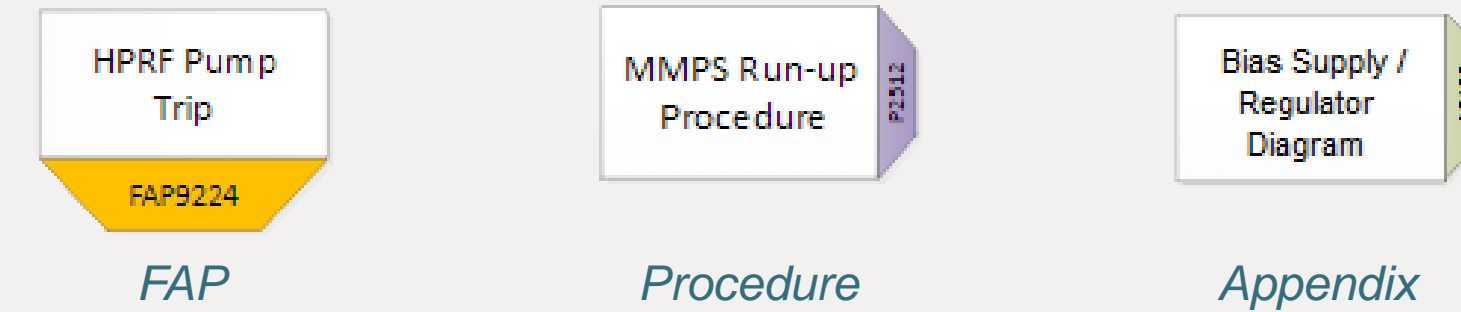


Figure 2 – Top Level FAPs with FAP1000 subsystems below

Content types are easily distinguished visually with coloured tabs.

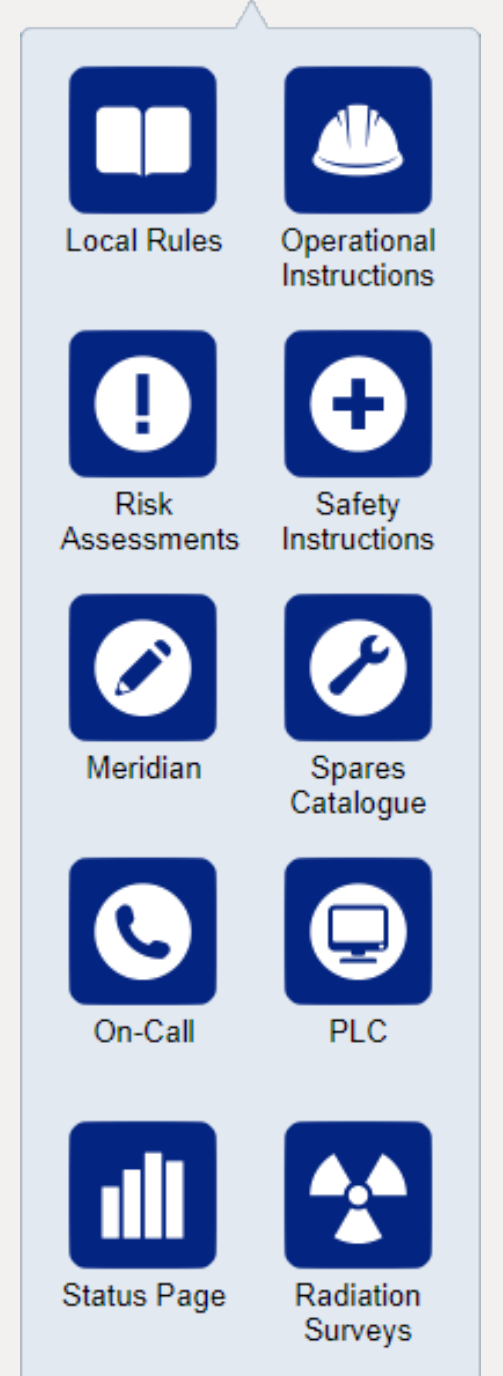


## 3. Update & New Features

With the release of FLD 2.0 and the subsequent 2.2 update, FLD has been transitioned from an SVG-based flat-file system to a client-side HTML5 website. Javascript technologies have been utilised including AJAX and JSON to deliver enhanced functionality and user interaction features.

### New Features:

- Global menu bar with content ID
- Dynamic user pathway tracking
- Global system-wide resources
- Locally curated resources
- Embedded content viewing
- Purpose-built content library
- Full search functionality
- Pushed news updates
- Go-To function for quick access
- Browser notifications



Global resources



Figure 3 – Global UI Menu Bar with content ID and pathway tracking

## 4. Software & Structure

FLD content is stored in Microsoft SharePoint CMS, with a host of client-side techniques used to deliver the site and UX.

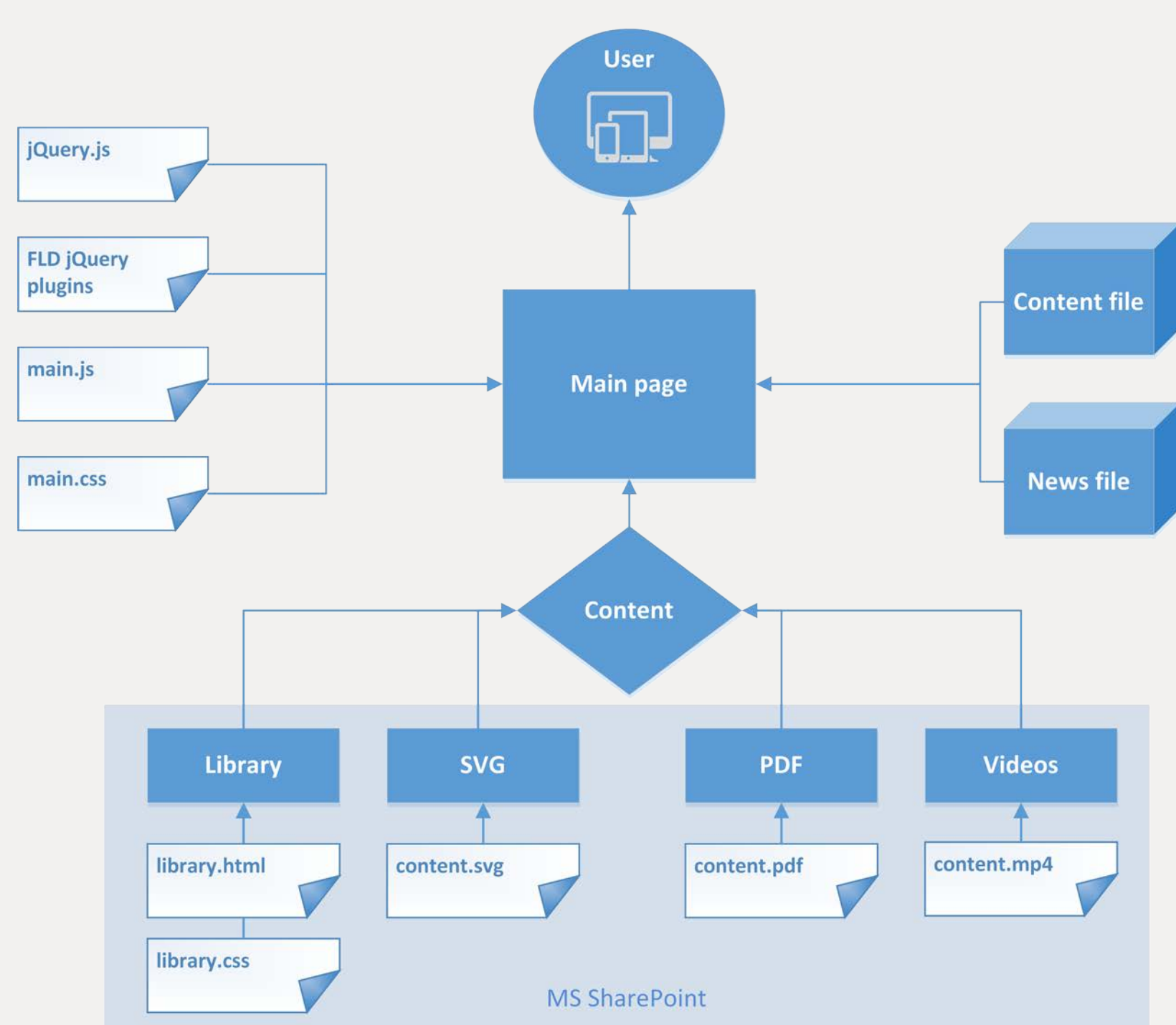


Figure 4 – Interaction diagram of FLD components

The system is designed to support a range of platforms, including a dedicated MCR (Master Control Room) touchscreen kiosk as well as portable Dell Latitude devices and iPad's. Site-wide network coverage ensures FLD can be accessed virtually anywhere on site.

## 5. Performance & Metrics

Three separate mechanisms generate user feedback for FLD:

- Lost Time Reports (LTR) – For faults exceeding 1 hour
- E-Log – Operational online logbook
- SharePoint CMS user metrics

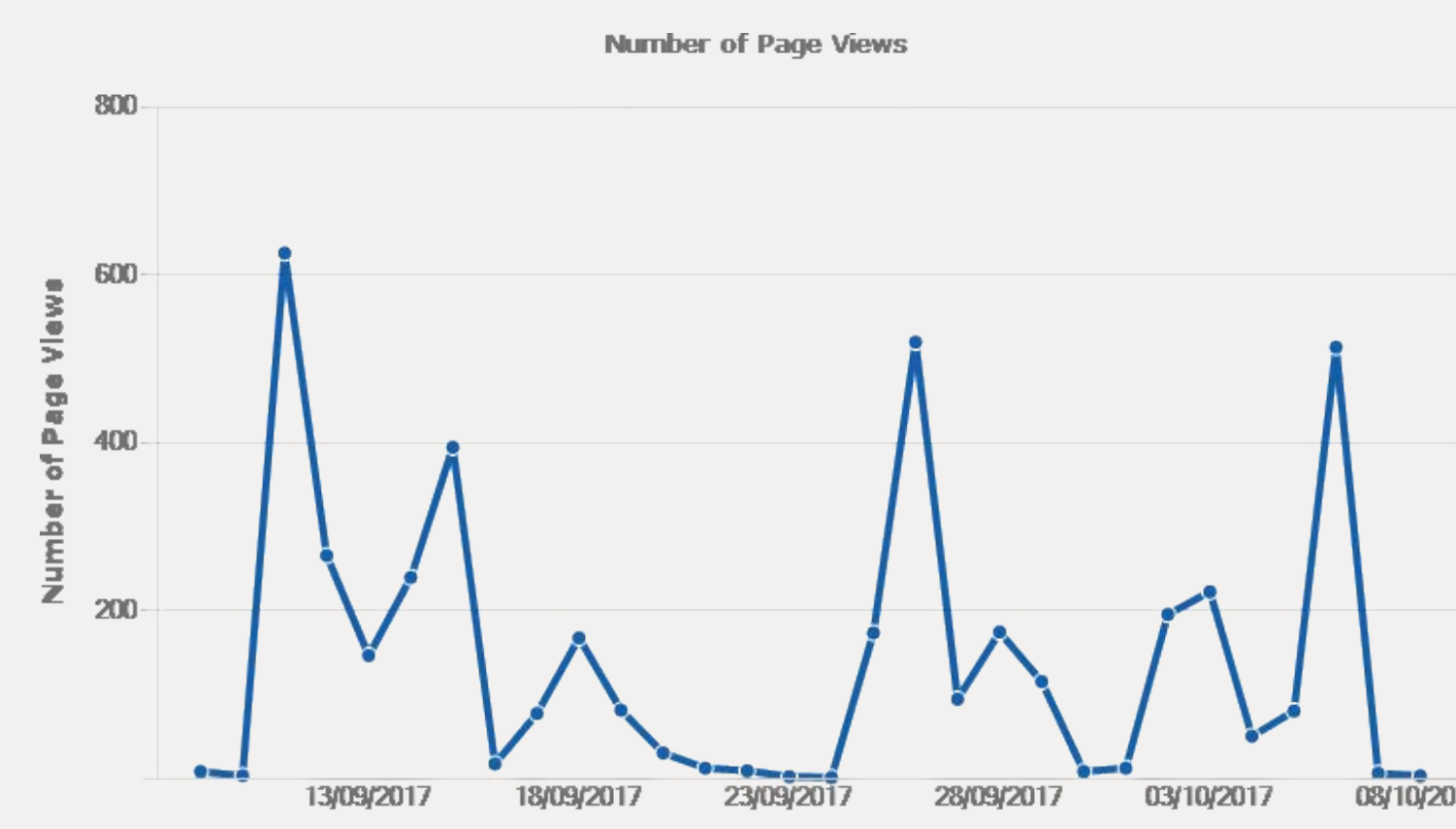
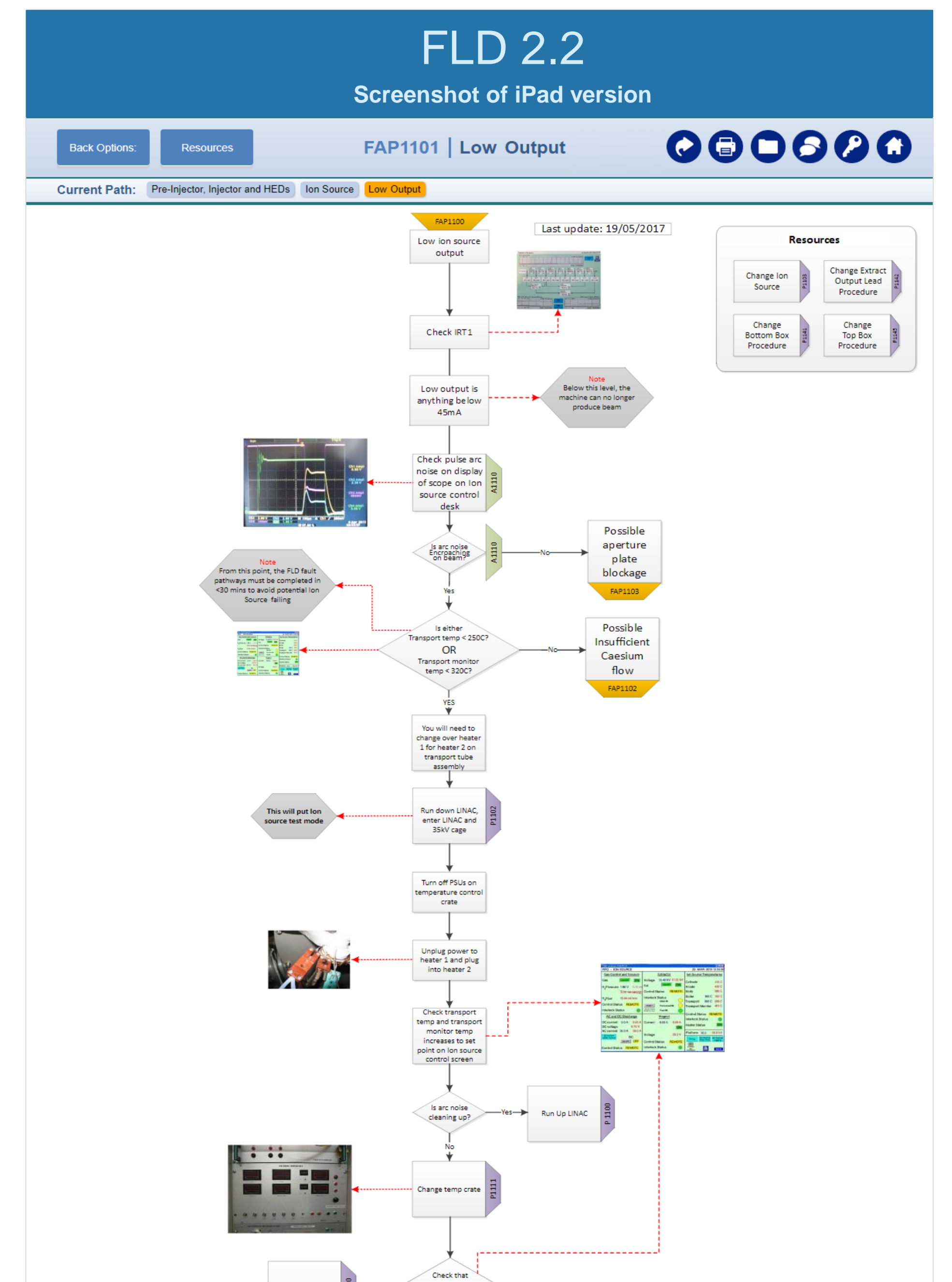


Figure 5 – Total FLD page views between Sept. to Oct. 2017

Both LTRs and E-Log have feedback sections for users to submit comments and content requests. Within the past year, FLD was able to assist in approx. 25% of a cycle's applicable LTR events, helping to reduce costly machine downtime.

*“On the whole I have found this system to be an excellent learning aid and believe it is an invaluable aid when resolving issues on the accelerator”*

- RF Group Linac Section Leader



## Contributions

Julian Brower, Greg Owen, Ross Titmarsh, Bob Mannix

FLD is developed and maintained by ISIS Performance Improvement. Future updates are currently undergoing design and testing.