

First Line Diagnosis FLD Update

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Section Leader

ISIS Accelerator Performance Improvement



Science & Technology Facilities Council

ISIS

Update since Melbourne ARW2103

- FLD being used
- Robust workflow systems
- More staff
- Equipment owners input
- SharePoint integration
- Population growing
- Feedback received
- Wi-Fi imminent
- Applications developer



FLD

Rutherford Appleton Laboratory, Oxfordshire

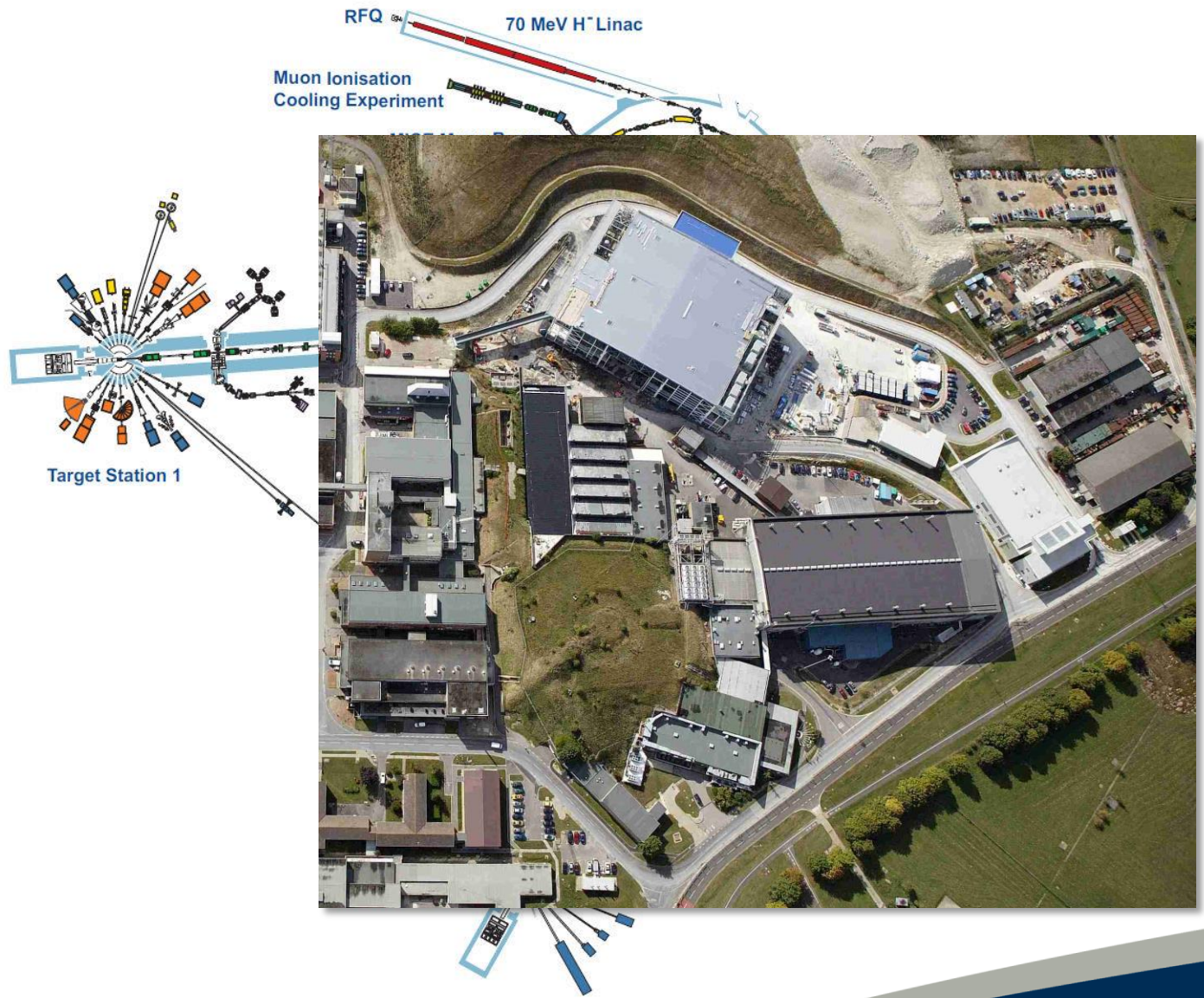


Science & Technology Facilities Council

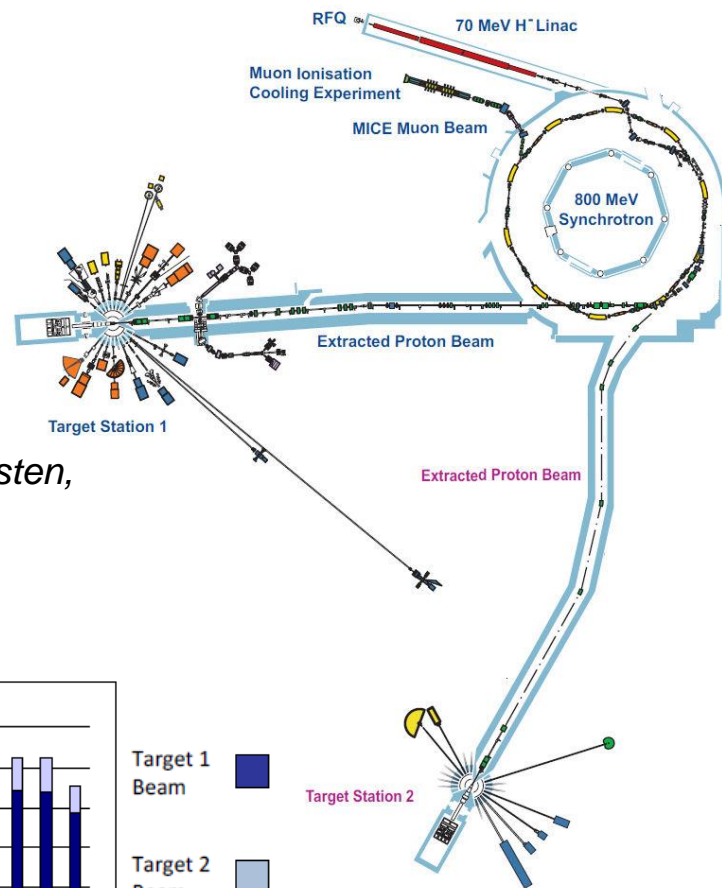
ISIS

- World's class Spallation Neutron Source since 1985
- Flagship STFC facility ~360 staff
- Up to 800 experiments/yr, 450 papers/yr
- Research fields
 - clean energy
 - environment
 - pharmaceuticals
 - health care
 - nanotechnology
 - materials
 - engineering
 - IT

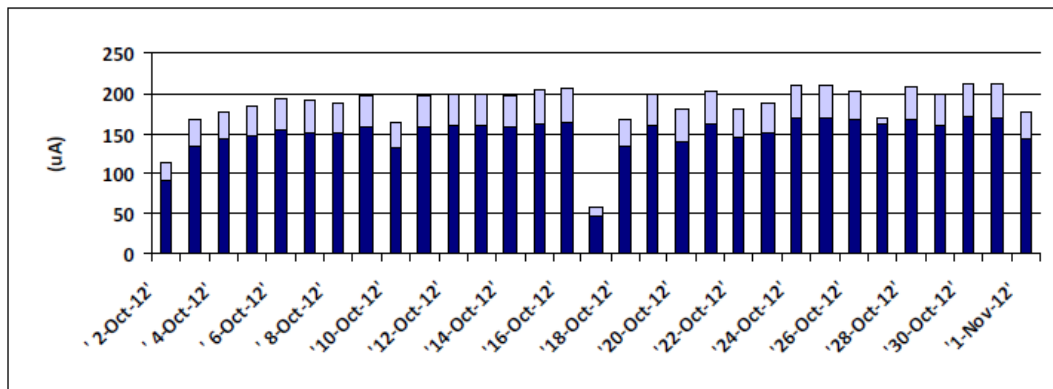




Ion Source: **35 keV H⁺**
 RFQ: **665 keV H⁺**
 LINAC: **70 MeV H⁺, 4 tank, 202.5 MHz**
 Synchrotron: **800 MeV protons,**
10 accelerating cavities, 50 Hz
 Targets: **200-215 uA, Tantalum coated Tungsten,**
TS1/160kW TS2/40kW



Daily Average Beam Current



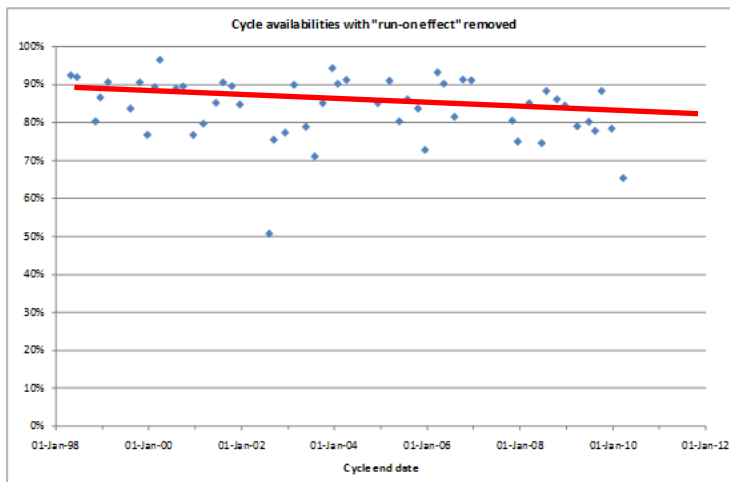
User Cycles

- 120 days/yr, 4 x 30 day cycles
- Experiment 1/2day – 2 weeks
- 1 day maintenance day mid cycle
- Overall availability 85% +

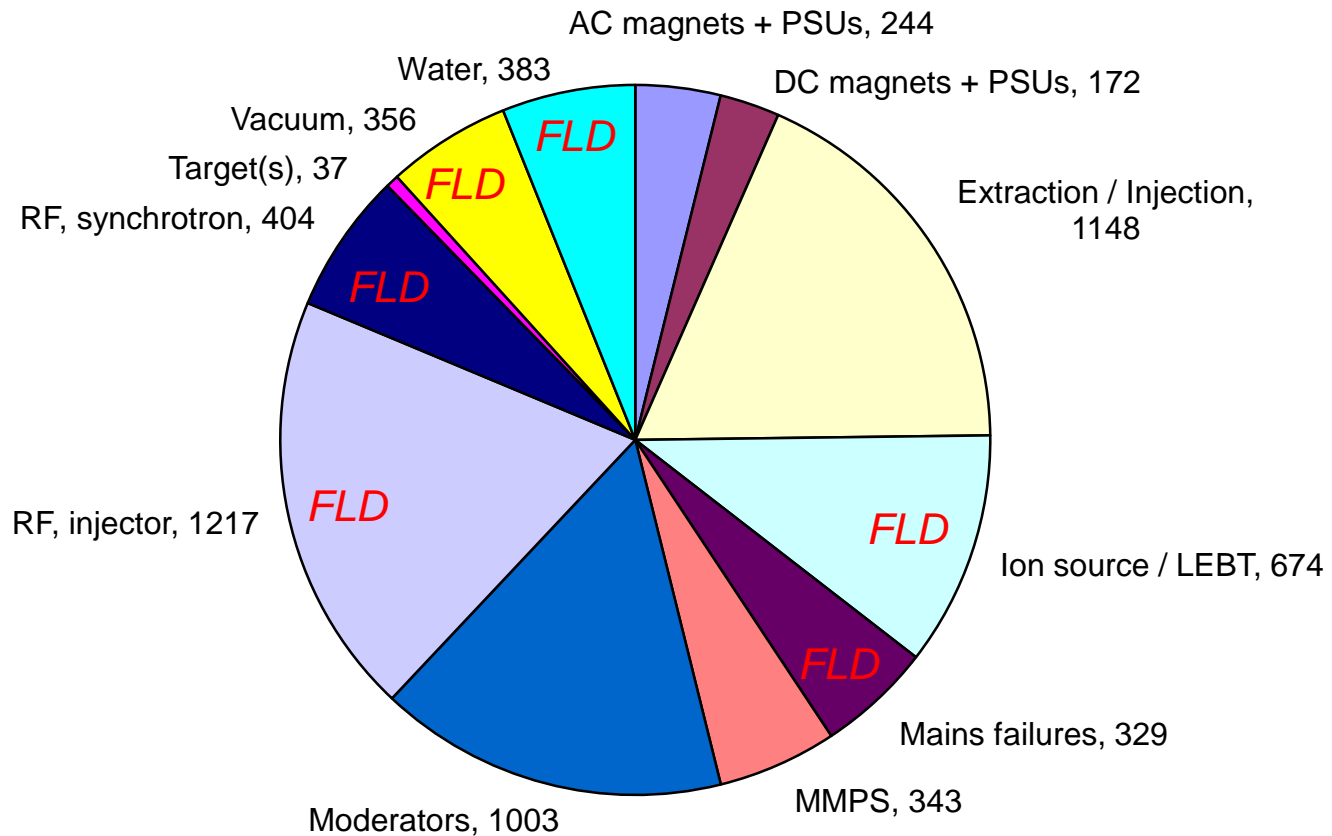


Reasons for non availability

- Running an accelerator
- Machine age
- Running harder
- Speed to faults (FLD)



ISIS unavailability, 1998-99 – 2011-12, with hours



Operating ISIS

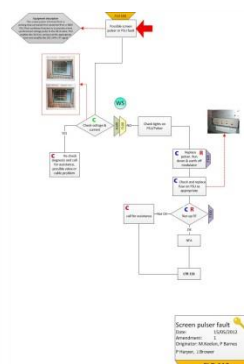
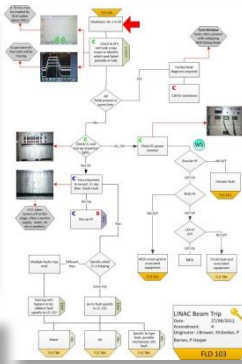
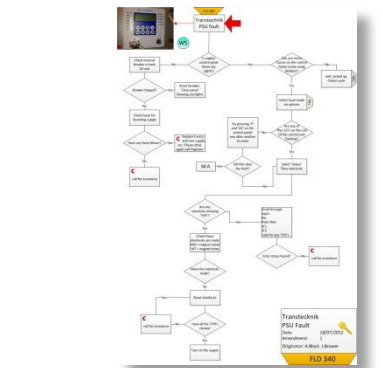
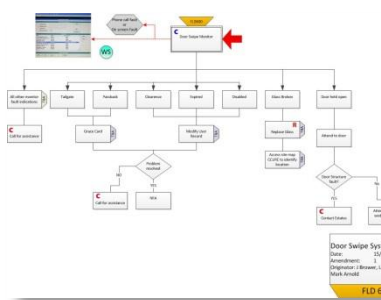
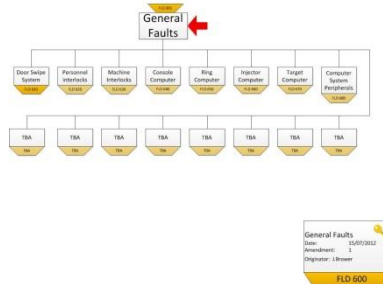
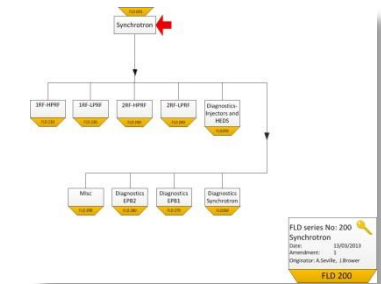
- 4 man crew, 8 hour shifts
- Duty Officer, 3 others, engineering backgrounds
- First line faults
- First line faults existing skills and knowledge
- On call specialists 24/7



FLD, improving availability by effective fault resolution

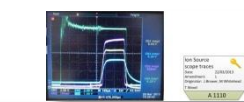
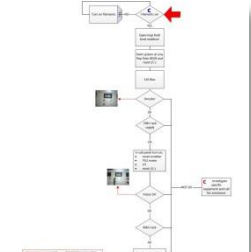
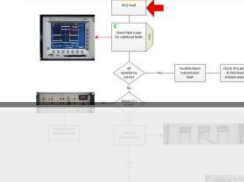
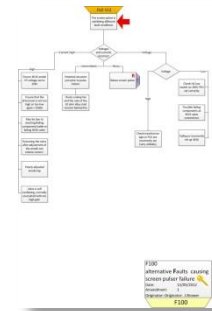
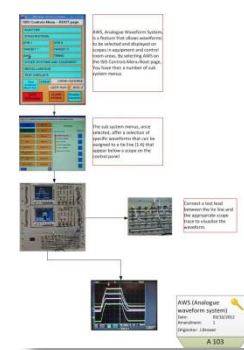
- FLD, First Line Diagnosis
- Interactive fault analysis tool
- Technical knowledge base
- Provides centralised resources
- Reduce beam downtime



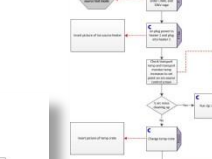
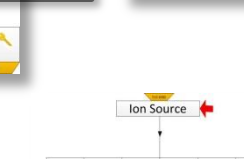
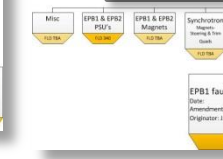
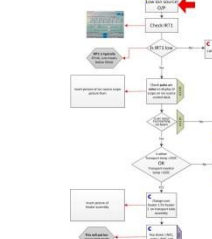
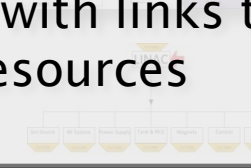
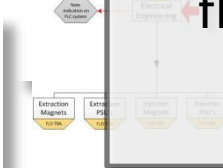


Example only

Item	Ref	Description	Unit	Value	Unit	Unit	Unit
1	1	...	...	...	...	...	...
2	2	...	...	...	...	...	...
3	3	...	...	...	...	...	...
4	4	...	...	...	...	...	...
5	5	...	...	...	...	...	...
6	6	...	...	...	...	...	...
7	7	...	...	...	...	...	...
8	8	...	...	...	...	...	...
9	9	...	...	...	...	...	...
10	10	...	...	...	...	...	...
11	11	...	...	...	...	...	...
12	12	...	...	...	...	...	...
13	13	...	...	...	...	...	...
14	14	...	...	...	...	...	...
15	15	...	...	...	...	...	...
16	16	...	...	...	...	...	...
17	17	...	...	...	...	...	...
18	18	...	...	...	...	...	...
19	19	...	...	...	...	...	...
20	20	...	...	...	...	...	...



FLD, a network of interconnected flow diagrams, with links to technical resources



Injector Efficiency

14-MAR-2013 09:24:55

Beam	Current (mA)	Power (kW)	Efficiency (%)
100	100	100	100
200	200	200	100
300	300	300	100
400	400	400	100
500	500	500	100
600	600	600	100
700	700	700	100
800	800	800	100
900	900	900	100
1000	1000	1000	100

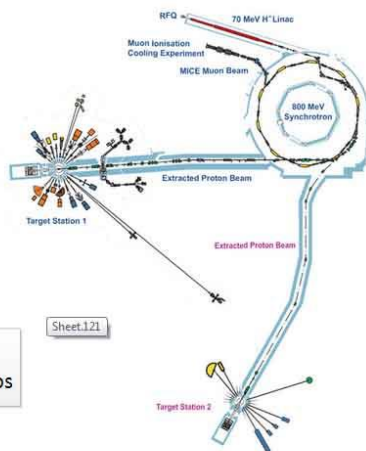
FLD

- Presents information in a Web Page Format
- Available On line and Off Line

ISIS FLD

Fault analysis tool
& technical knowledge base

Safety Notice
FLD is a tool. While using it, you are bound by the ISIS safety rules requiring appropriate electrical authorisation and safety training. Please contact the ISIS Duty Officer before using FLD in real life fault scenarios



Navigate via
Map or FAP tabs



FAP tabs
Click Key for more details

▶ Click to expand: Equipment or System orientated fault pathway
▶ Click to report: Fault Effect orientated fault pathway

ISIS FLD
Date: 09/10/2013
Amendment: 8

FAP0001

PC accessible

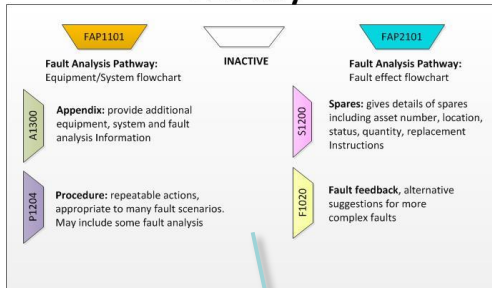


Wi-Fi accessible

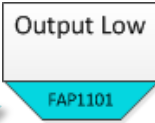
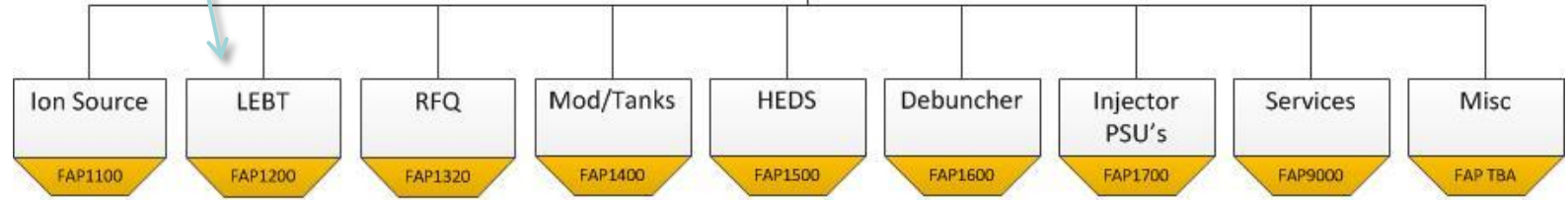
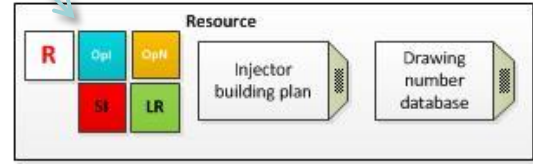


Standardised format

FLD Key

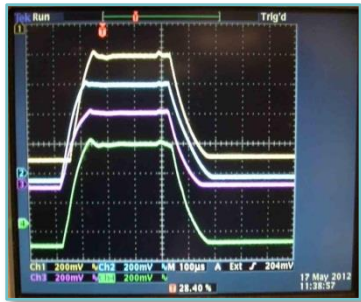


SharePoint 2013

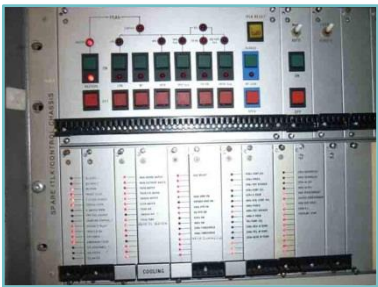



Numbered versioned

Interactive tabs



Live scopes

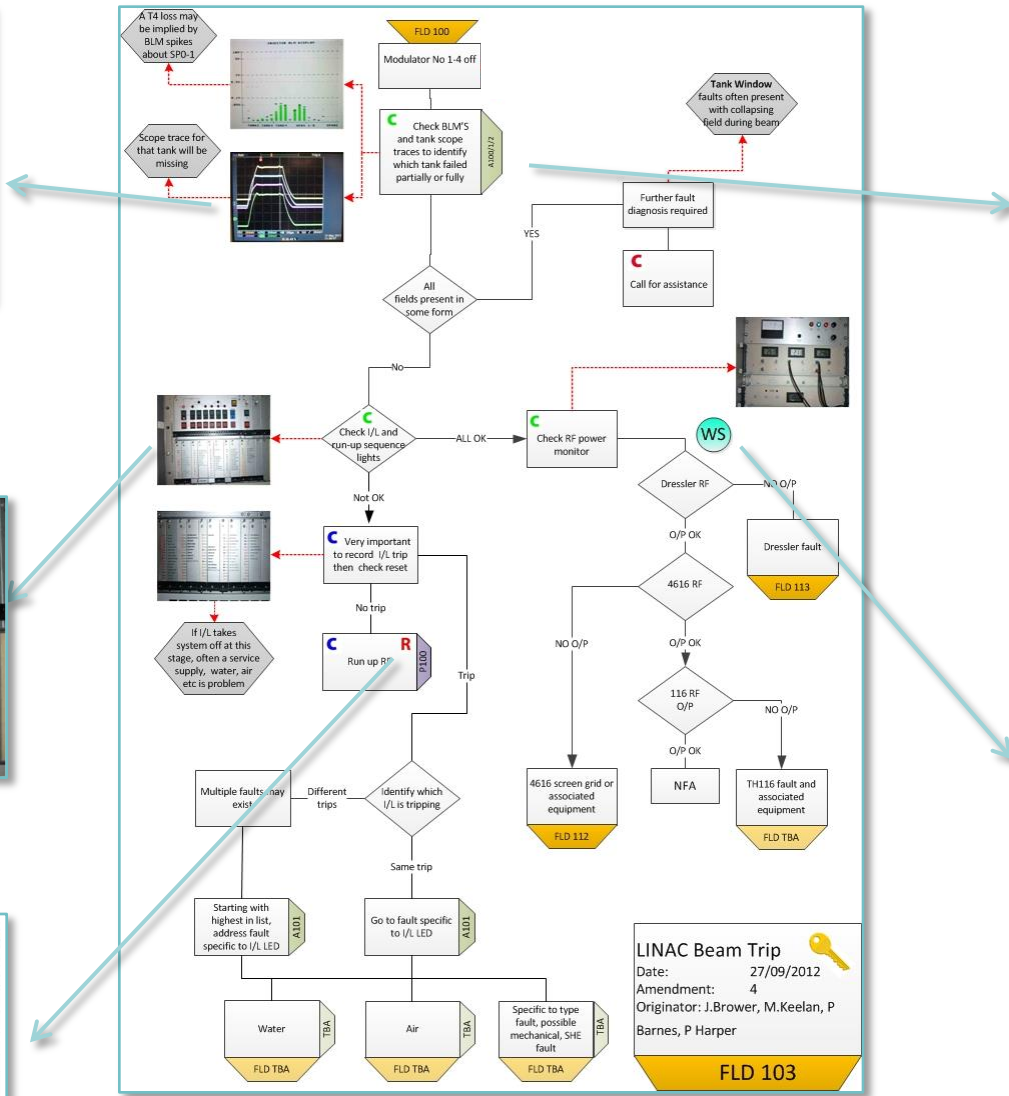


Equipment

Example only

SHEC QUANTITATIVE RISK ASSESSMENT PRO-FORMA											
Task	No. of workers	No. of days	Frequency	Severity	Control	Risk		Control		Residual	
						Before	After	Before	After		
...

Risk assessments



Appendices

WS Word search is an interactive technical word search function. It will search through any report you select.

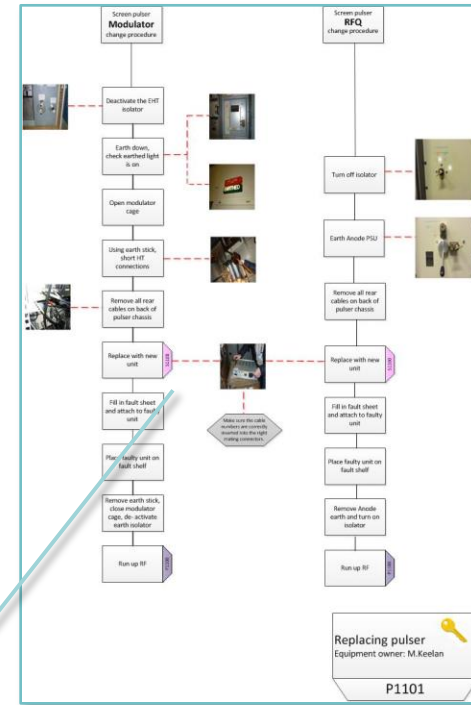
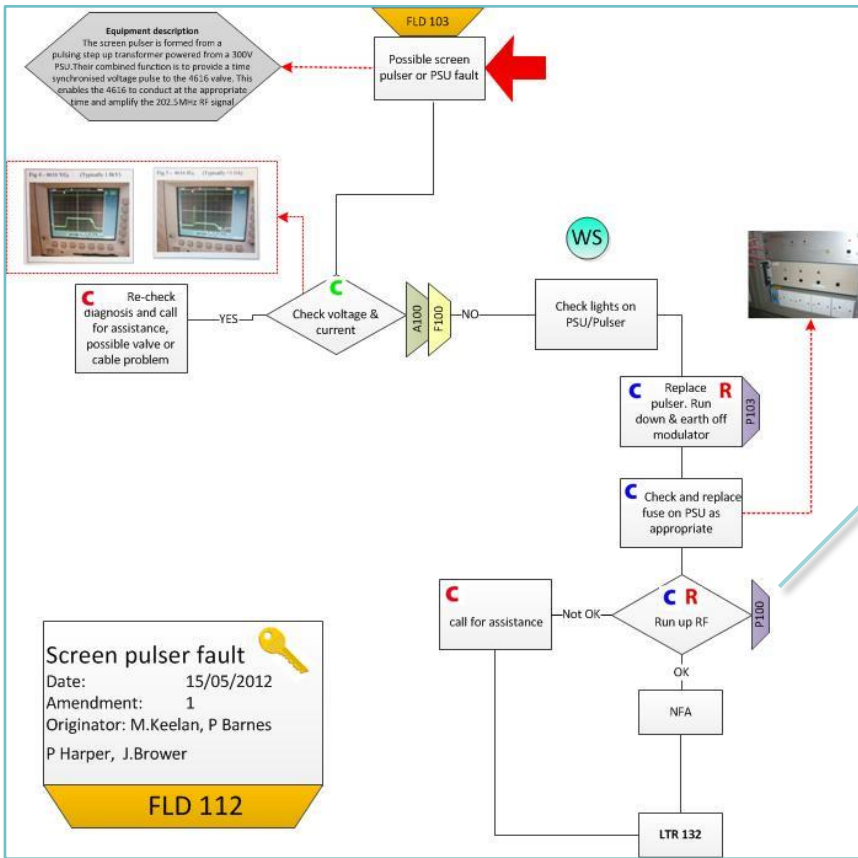
- Search lost time reports
- Search Fault Database
- Search Crew log book

Type the word or phrase you wish to search

Result

Word search





Procedures

Spares movement

It is the responsibility of individual's to complete this form and forward to the appropriate equipment owner.

Name: _____
 Job Title: _____
 Department: ISIS Operations
 Date: _____
 Asset number: 16678
 Screen Pulser

Additional information _____

ISIS
Ethical

Asset Number	ITEM	Condition	Location	Tick
15676	Screen-Pulser PSU	Ready for use	UNAC Hall Shelf3	
15679	Screen-Pulser PSU	Ready for use	UNAC Hall Shelf3	
15680	Screen-Pulser PSU	Ready for use	UNAC Hall Shelf3	
15681	Screen-Pulser PSU	Ready for use	UNAC Hall Shelf3	
15682	Screen-Pulser PSU	Ready for use	UNAC Hall Shelf3	
15683	Screen-Pulser PSU	Ready for use	UNAC Hall Shelf3	
15684	Screen-Pulser PSU	Ready for use	UNAC Hall Shelf3	
15685	Screen-Pulser PSU	Ready for use	UNAC Hall Shelf3	
15686	Screen-Pulser PSU	Ready for use	UNAC Hall Shelf3	
15687	Screen-Pulser PSU	Being repaired	Workshop	
15688	Screen-Pulser PSU	Ready for use	UNAC Hall Shelf3	
15689	Screen-Pulser PSU	Ready for use	UNAC Hall Shelf4	
15690	Screen-Pulser PSU	Ready for use	UNAC Hall Shelf5	
15691	Screen-Pulser PSU	Ready for use	UNAC Hall Shelf6	
15692	Screen-Pulser PSU	Ready for use	UNAC Hall Shelf7	
15693	Screen-Pulser PSU	Ready for use	UNAC Hall Shelf8	
15694	Screen-Pulser PSU	Ready for use	UNAC Hall Shelf9	
15695	Screen-Pulser PSU	Ready for use	UNAC Hall Shelf10	
15696	Screen-Pulser PSU	Ready for use	UNAC Hall Shelf11	
15698	Screen-Pulser PSU	Ready for use	UNAC Hall Shelf12	
15687	Screen-Pulser PSU	Ready for use	UNAC Hall Shelf13	
15688	Screen-Pulser PSU	Ready for use	UNAC Hall Shelf14	
15689	Screen-Pulser PSU	Ready for use	UNAC Hall Shelf15	
15690	Screen-Pulser PSU	Ready for use	UNAC Hall Shelf16	
15691	Screen-Pulser PSU	Ready for use	UNAC Hall Shelf17	
15692	Screen-Pulser PSU	Ready for use	UNAC Hall Shelf18	
15693	Screen-Pulser PSU	Ready for use	UNAC Hall Shelf19	

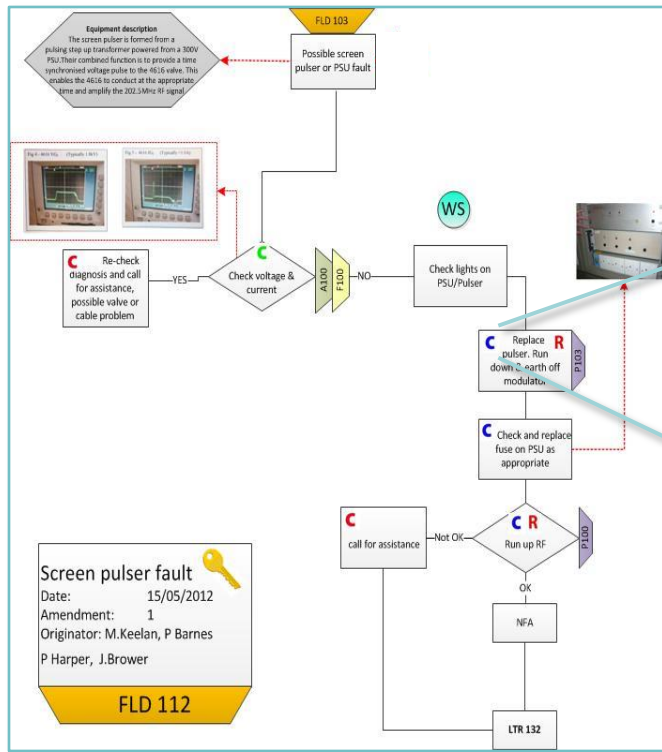


Movements

Spares



Ski Slope Competency/callout matrix



Competency colours

- C** Green slope entry level competency is the minimum level and relates to safe working and equipment or systems observations with no or minimal interaction.
- C** Blue slope competency requires a safe working knowledge of the equipment or system, experience and operational understanding to be able to investigate and isolate faults.
- C** Red slope competency requires that this action must be done by the appropriate competencies but **MUST** be preceded by a phone call to discuss the problem, not necessarily requiring a call out.
- C** Black slope competency requires that a call out is needed to continue with this fault issue.

Competency matrix

KEY	Accessed in software	Accessed in software (understand)	Accessed in software (understand)	Accessed in software (understand)	Accessed in software (understand)	Accessed in software (understand)	Accessed in software (understand)	Accessed in software (understand)	Accessed in software (understand)	Accessed in software (understand)	Accessed in software (understand)	Accessed in software (understand)	Accessed in software (understand)	Accessed in software (understand)	Accessed in software (understand)	Accessed in software (understand)	Accessed in software (understand)	Accessed in software (understand)	Accessed in software (understand)
	Injector	Injector	Injector	Injector	Injector	Injector	Injector	Injector	Injector	Injector	Injector	Injector	Injector	Injector	Injector	Injector	Injector	Injector	Injector
Center 1 DD																			
ADO																			
Tech																			
Dps Assist																			
Center 2 DD																			
ADO																			
Tech																			
Dps Assist																			
Center 3 DD																			
ADO																			
Tech																			
Dps Assist																			
Center 4 DD																			
ADO																			
Tech																			
Dps Assist																			
Center 5 DD																			
ADO																			
Tech																			
Dps Assist																			

Workflow

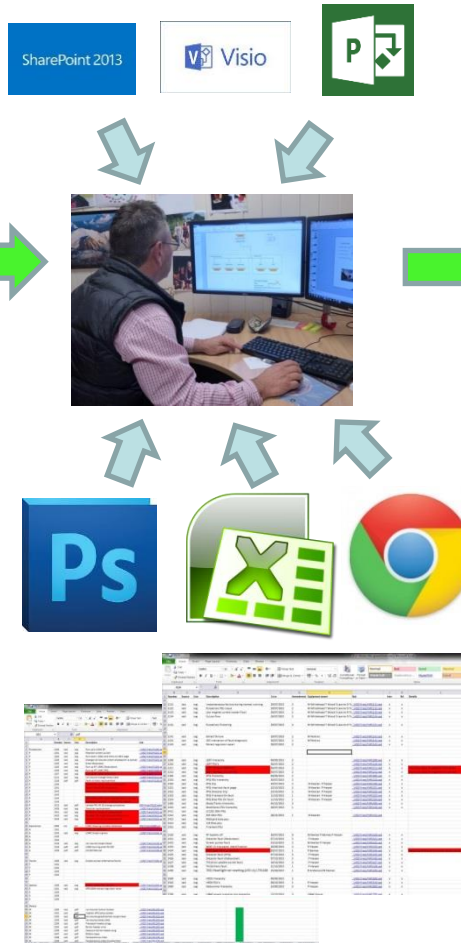
Stage 1 Identify

Stage 2 population

Stage 3 verification

Stage 4 delivery

- Meeting with EO's
- Crew fault scenarios
- LTR's and MCR Log (operational issue)
- EO's self develop

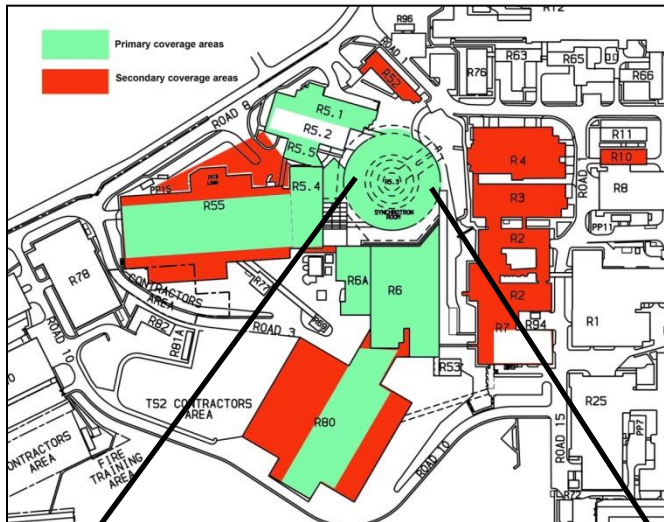


Tracking and revisions

Feedback Updates

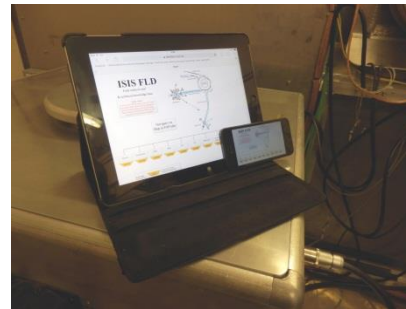


FLD Wi-Fi upgrade



Specifications

- 20 AP's
- IEEE 802-11n
- Principle areas



- Windows tablet
- IPAD
- Mobile



JUNIPER WLA532E-WW
2.4Ghz, 23dBm



2.4Ghz aerial



HP J9778A
POE



Catacombs



Project deliverables/timescales

- Roll out 6 high consequence pathways (within 3 months) ✓ ✓
- Roll out much of FLD to ISIS (2 years) **On target**
- Implement SSC/Spares/Document/Word search (1 year) **On target**
- Employ 2 additional staff to facilitate growth (2 years) ✓
- Metrics and feedback ✓
- 12 ½ % lost time/yr, return on investment (within 5 years)



Demonstration



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ISIS