



QA/QC/ Safety/ Documentaion / progres tracking

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Agenda

- RFPI QA/QC scope – as a part of LLRF system
- Project management and progress monitoring tool
- [Hardware] design workflow
- Data management
- [Hardware] Design documentation
- Safety
- Summary

WJ

WC





QA/QC Scope

- The LLRF System Quality Control Plan adheres to the Accelerator Systems (L2) and the PIP-II Quality Assurance Plans (DocDB#4805 and DocDB#142 respectively).
- It aligns with the Project Management Plan for the PIP-II Project.
- The LLRF systems required for the PIP-II Project is comprised of both hardware and software deliverables all residing within WBS.121.03.04.
- The LLRF System QA Plan reflects the systems, controls, and measures incorporated by the PIP-II Project to manage, plan, assess, and improve processes to deliver operational and scientific excellence in a consistent environment with minimal risk.
- This LLRF Systems QC Plan (QCP) covers the various acceptance and testing steps required to ensure these deliverables are provided to the project while meeting the required specifications.

Courtesy: S. Raman, PIP-II, LLRF, Quality Control and HW & SW Documentation





Integration Requirements (Non- Nationally Recognized Testing Laboratory)

Non-NRTL Requirements for Electrical Equipment

- NRTL seal & certification are required for many different kinds of Electrical Products.
- The process of getting a NRTL listing for accelerator components such as magnet or radio-frequency power supplies and specialized experimental equipment could add complexities to procuring these unique or limited-production items.
- All electrical products must be approved by : NRTL Seal Certification, NRTL field evaluation, or a field evaluation performed by Fermilab's Authority Having Jurisdiction (AHJ).

Non-NRTL Requirements for Electrical Equipment

- All technical teams **MUST** plan for procuring products/equipment with NRTL certification or procure and fabricate equipment with a successful field evaluation.
- Key systems with risk for acceptance includes:
 - Instrumentation Deliverables (CM systems)
 - Power Supplies (HPRF systems constructed by DAE)
 - LLRF/RFPI equipment (design & constructed by WUST)
- SPMs & L3M's to coordinate meetings with SPCs and technical teams to identify critical equipment and begin preparations for appropriate approvals.
 - High risk equipment for PIP-II needs to be highlighted and addressed

Courtesy: Lidija Kokoska,

Technical Integration Updates P2PEB#13



Partners and Technical Teams to have detailed discussions with Fermilab's AHJ for Electrical Systems (Dave Mertz) for seamless approval and acceptance of deliverables.



Project management and progress monitoring tool

• REDMINE

- Used for many project @ DMCS
- Open-Source + Community
- We manage our own installation (versions, plugins, configurations)

RFPI

Home My page Projects DMS Administration Help

Search: [] RF

Overview Activity Issues Spent time Calendar DMS Wiki Tools Trello Board Files Repository Settings

Open Tasks [Q] New Issue ... Custom queries

Filters Open Tasks [Q]
Options Recursive Tasks [R]
To Be Closed [C]

Spent time: 101:00

#	Parent task	Priority	Status	Subject	% Done	Assignee	Updated	Due date
195		Normal	In Progress	RFPI Box Design			10/14/2022 12:23 AM	...
159	POC #195	Normal	In Progress	MCU Based Management Unit		Rafal Kotas	10/14/2022 12:23 AM	...
305	POC #159	Normal	Planned	Test Watchdog and JTAG Interface			10/26/2022 11:45 AM	...
324	POC #305	Normal	Planned	Modify STM32 Firmware to Support Watchdog connections		Rafal Kotas	10/26/2022 11:45 AM	...
325	POC #305	Normal	Planned	Modify RPI library to support Watchdog and JTAG		Wojciech Tyman	10/26/2022 11:46 AM	...
189	POC #195	Normal	In Progress	General Mechanical/Layout Planning			11/28/2022 11:48 AM	...
299	POC #189	Normal	In Progress	Box assembly			10/22/2022 08:56 AM	...
308	POC #299	Normal	In Progress	Prepare Cabling for Management		Rafal Kotas	11/14/2022 11:04 PM	...
318	POC #299	Normal	In Progress	Prepare connections for Watchdog and JTAG Interface		Rafal Kotas	11/16/2022 02:29 PM	...
261		Normal	In Progress	PoC project time planning for PDR scheduling		Wojciech Cichalewski	10/13/2022 11:12 AM	...
310		Normal	In Progress	Placeholder for Software Tasks			10/22/2022 09:06 AM	...
158	POC #310	Normal	In Progress	LLRF/MP5/Timing Link Implementation			11/28/2022 11:48 AM	...
221	POC #310	Normal	In Progress	Prepare Wiki page about Ubuntu on Xilinx		Rafal Kielbik	10/22/2022 09:06 AM	...
312	POC #310	Normal	In Progress	Prepare ADC Readout App		Rafal Kielbik	11/20/2022 07:40 PM	...
316	POC #310	Normal	Planned	Prepare Test Pattern Tester for GPIO interface		Rafal Kielbik	10/25/2022 09:58 AM	...
338	POC #310	Normal	In Progress	Conditioning boards tester		Piotr Amrozik	12/05/2022 05:48 AM	...
313		Normal	Planned	Placeholder for Performance Measurements			11/14/2022 11:00 AM	...
314	POC #313	Normal	Planned	Measure exact characteristics of ADC input stage			11/14/2022 11:00 AM	...
339	POC #313	Normal	Planned	Measurements of NIRP characteristics		Grzegorz Jablonski	12/02/2022 09:51 AM	...
337		Normal	Planned	Corrections needed after initial prototype tests			11/29/2022 03:32 PM	...

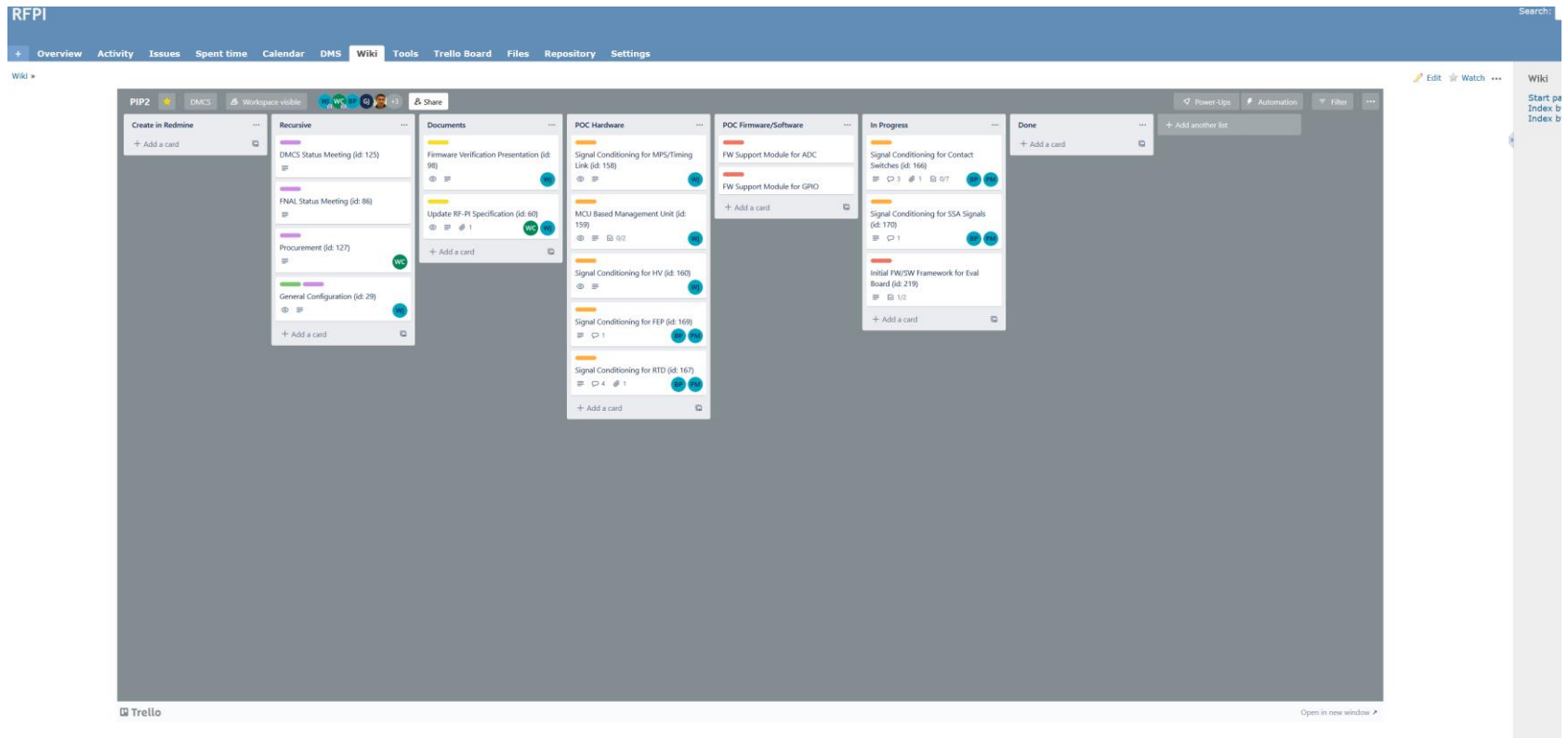
(1-20/20)





Project management and progress monitoring tool

- REDMINE
 - Additional Extensions: Trello



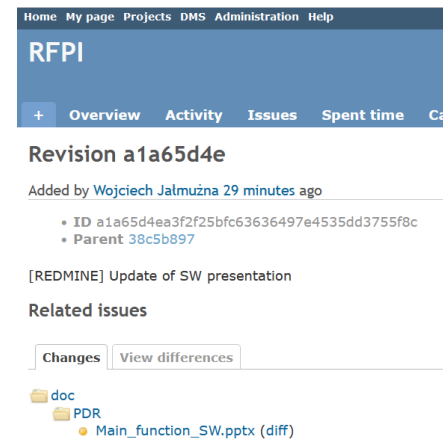
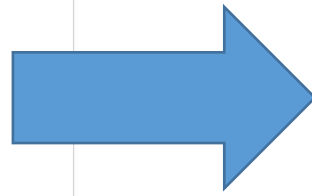
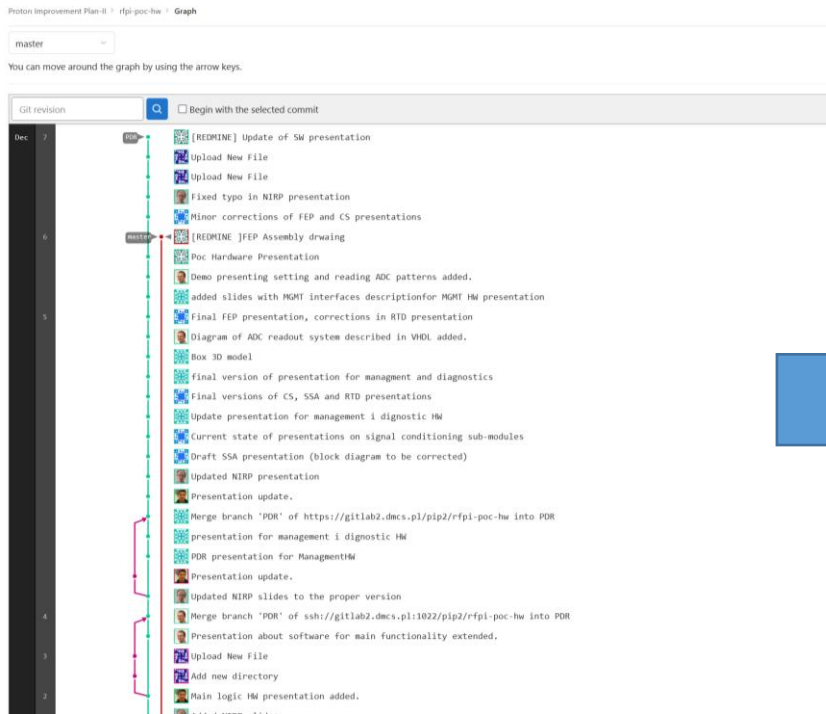
- GIT Integration





Project management and progress monitoring tool

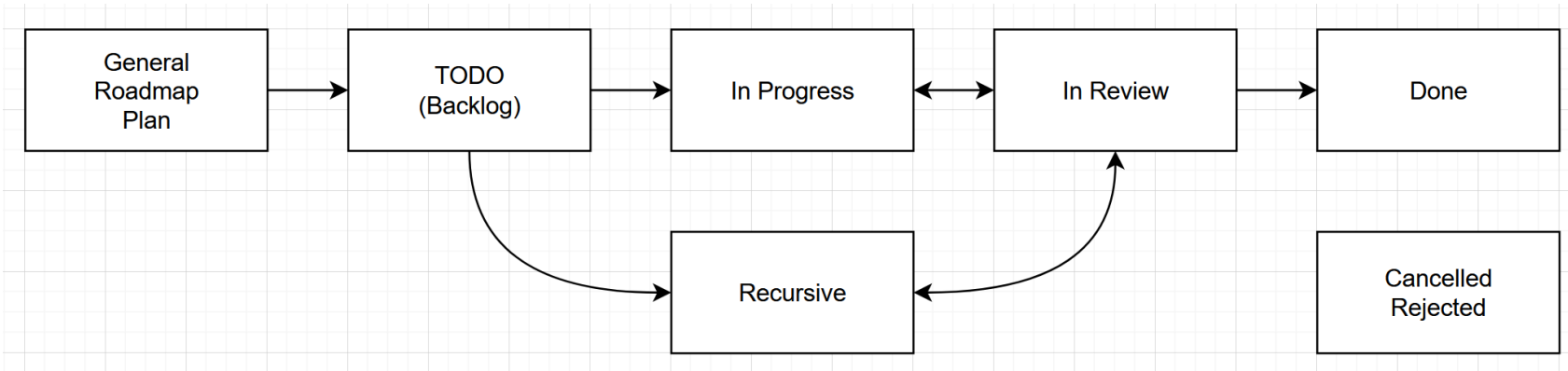
- REDMINE
 - Additional Extensions: Trello
 - GIT Integration





[Hardware] design workflow

- In fact not only HW workflow, but general one

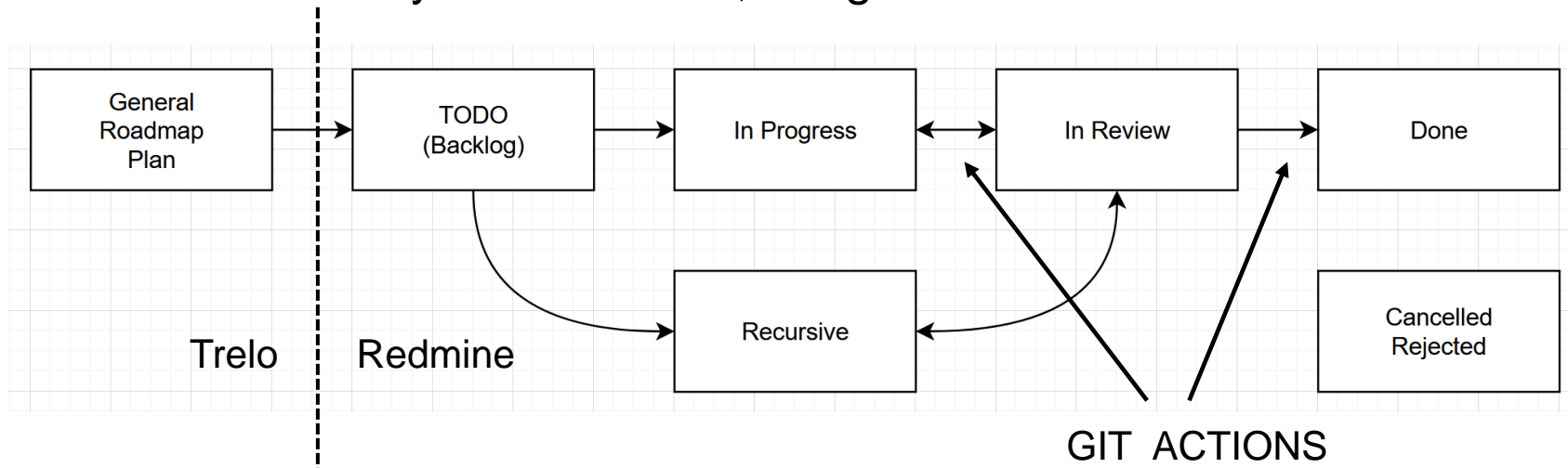


- one person to ensure workflow is kept
- configured on Redmine level
- permissions for different transitions



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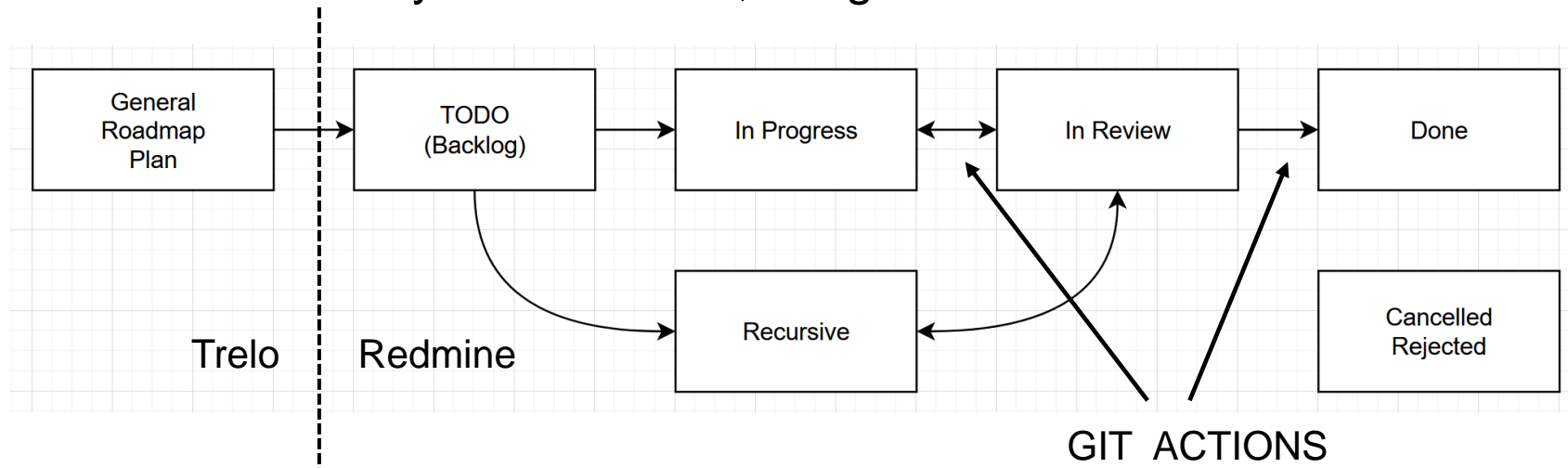


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BAD THINGS HAPPEN
when stuff is done outside of this diagram



Data Management

- GIT as main data repository and data exchange medium
 - if something is not on GIT, it does not exist
 - Exception: some temporary docs exist in form of Redmine Wiki pages with intention to submit them to repository when they are complete
- GITLAB used as web interface, but issue tracking and feedback features are not used there
- One repository manager responsible for merges and data/history consistency



[Hardware] Design Documentation

- Hardware documentation exists in distributed form:
 - Block Diagrams
 - Electrical Schematic and PCB drawings
 - Production and Test Reports
- Code is intended to be self documenting



RFPI safety

As the RFPI system is a part of the LLRF system it should implement same safety rules:

- The system shall abide by all Fermilab ES&H (FESHM) and all Fermilab Radiological Control Manual (FRCM) requirements including but not limited to:
 - Electrical Safety
 - FESHM Chapter 9110 Electrical Utilization Equipment Safety
 - FESHM Chapter 9160 Low Voltage, High Current Power Distribution Systems
 - FESHM Chapter 9190 Grounding Requirements for Electrical Distribution and Utilization Equipment
 - Radiation Safety
 - FRCM Chapter 8 ALARA Management of Accelerator Radiation Shielding
 - FRCM Chapter 10 Radiation Safety Interlock Systems
 - FRCM Chapter 11 Environmental Radiation Monitoring and Control
 - General Safety
 - FESHM Chapter 2000 Planning for Safe Operations
 - Follow LOTO Procedures

Courtesy: S. Raman, PIP-II, LLRF, Quality Control and HW & SW Documentation

