QA/QC/ Safety/ Documentaion / progres tracking

Wojciech Jałmużna & Wojciech Cichalewski

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).

Courtesy: Lidija Kokoska, Technical Integration Updates P2PEB#13

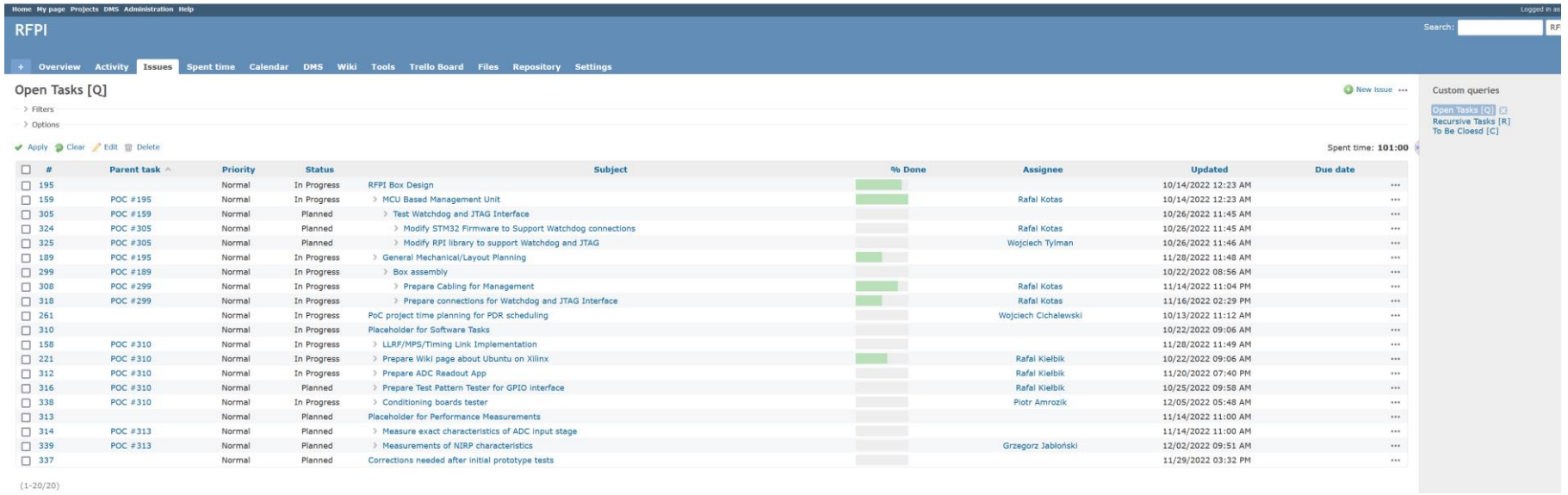
Non-NRTL Requirements for Electrical Equipment

- 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

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

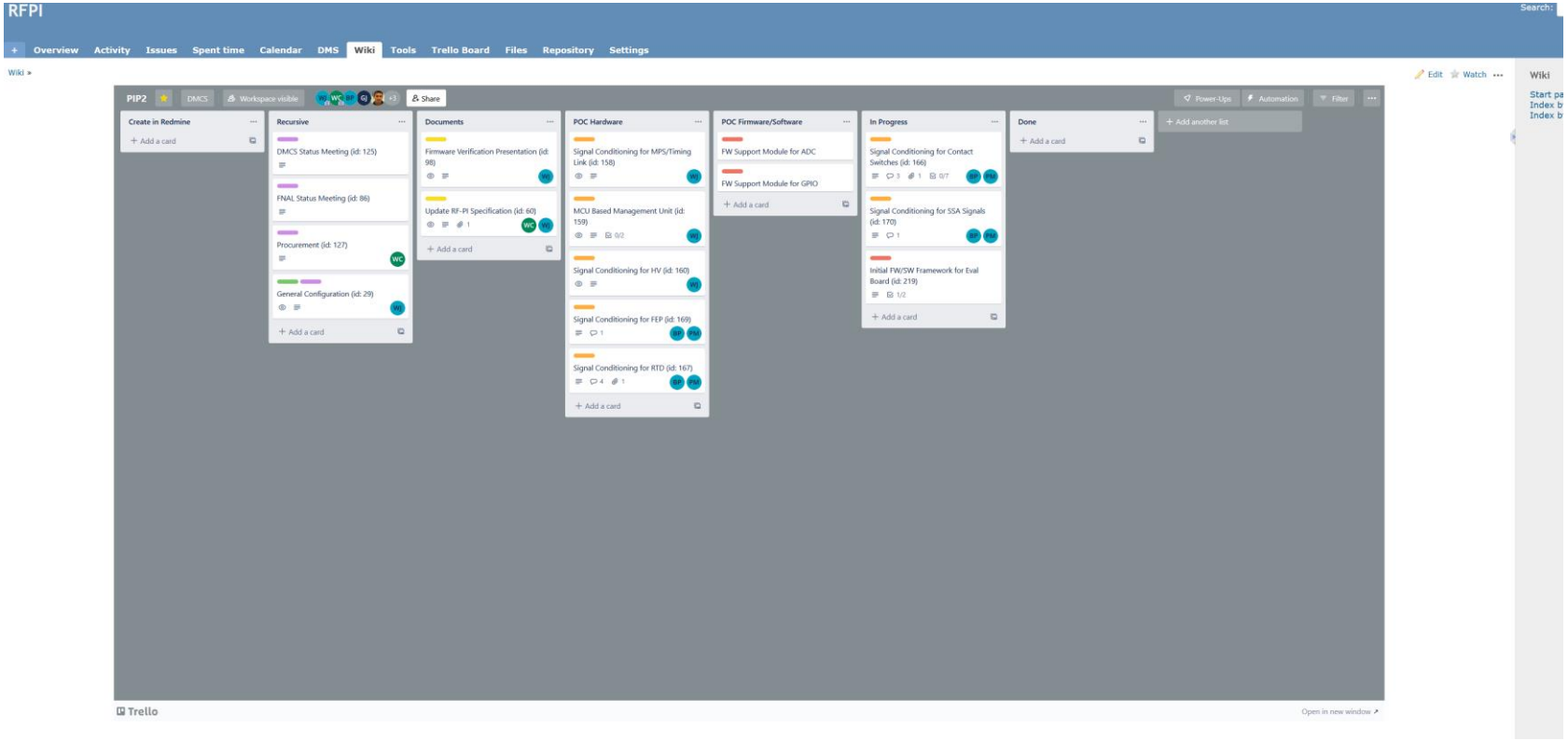
Project management and progress monitoring tool

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



Project management and progress monitoring tool

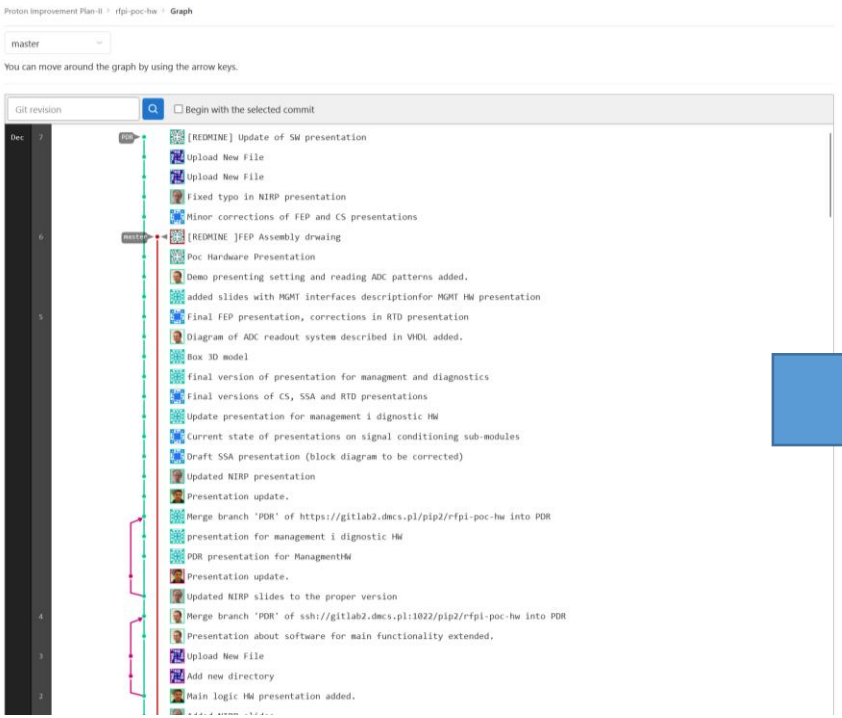
- REDMINE
  - Additional Extensions: Trello

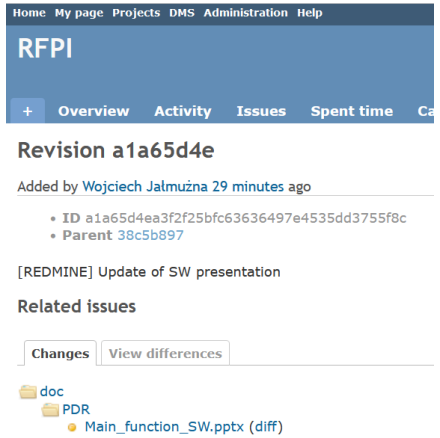


  - GIT Integration

Project management and progress monitoring tool

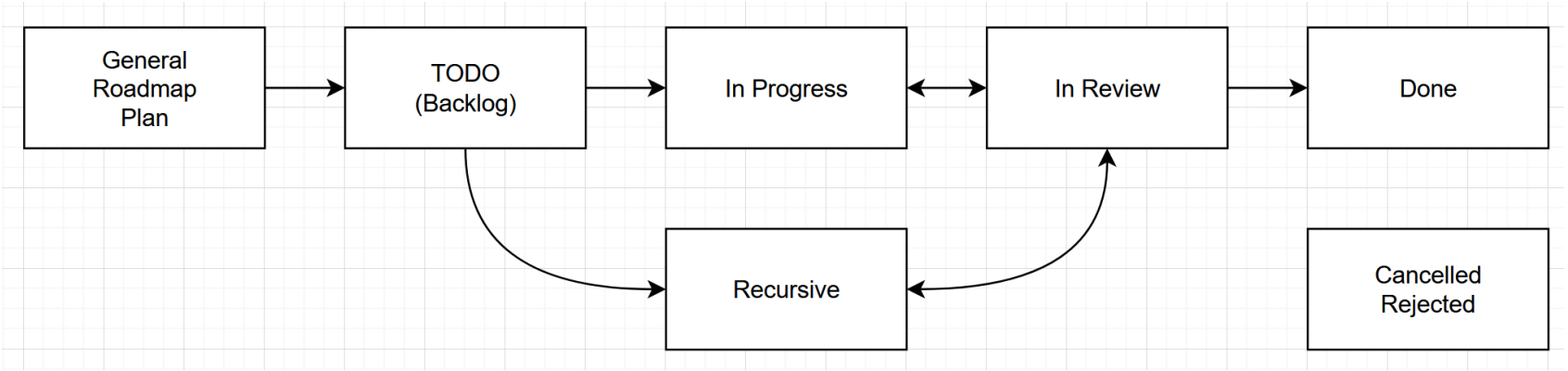
- REDMINE
  - Additional Extensions: Trello
  - GIT Integration





[Hardware] design workflow

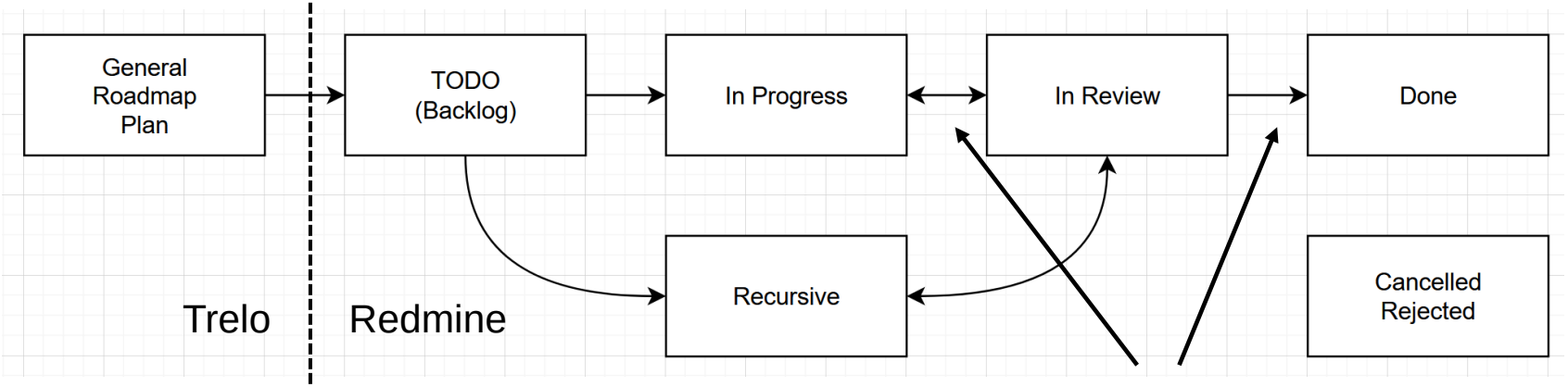
- In fact not only HW workflow, but general one



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

Hardware design workflow

- In fact not only HW workflow, but general one



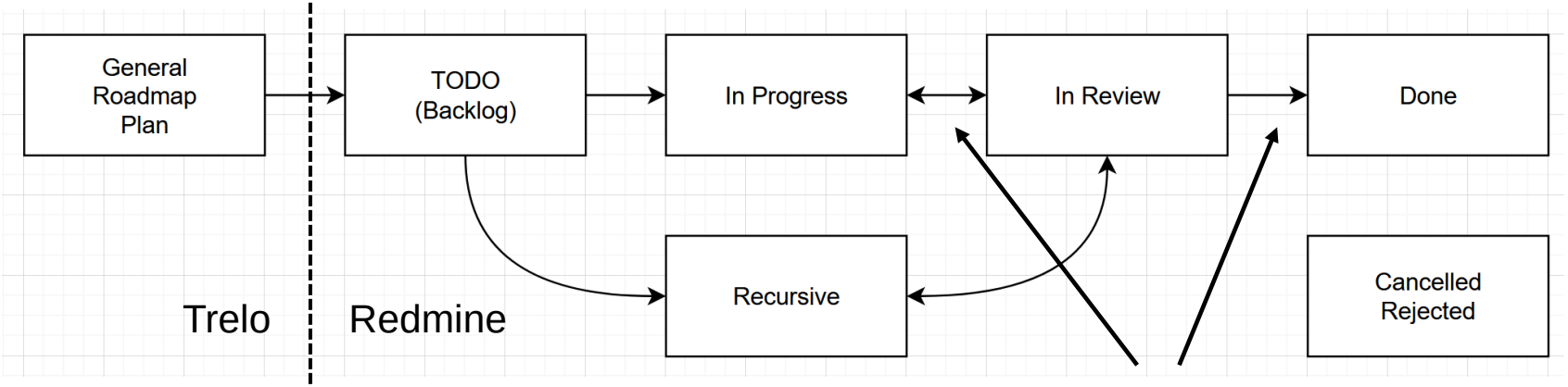
- one person to ensure workflow is kept
- configured on Redmine level
- permissions for different transitions

GIT ACTIONS

- Feature branches
- Review on redmine level
- Merge to master

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

GIT ACTIONS
- Feature branches
- Review on redmine level
- Merge to master

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