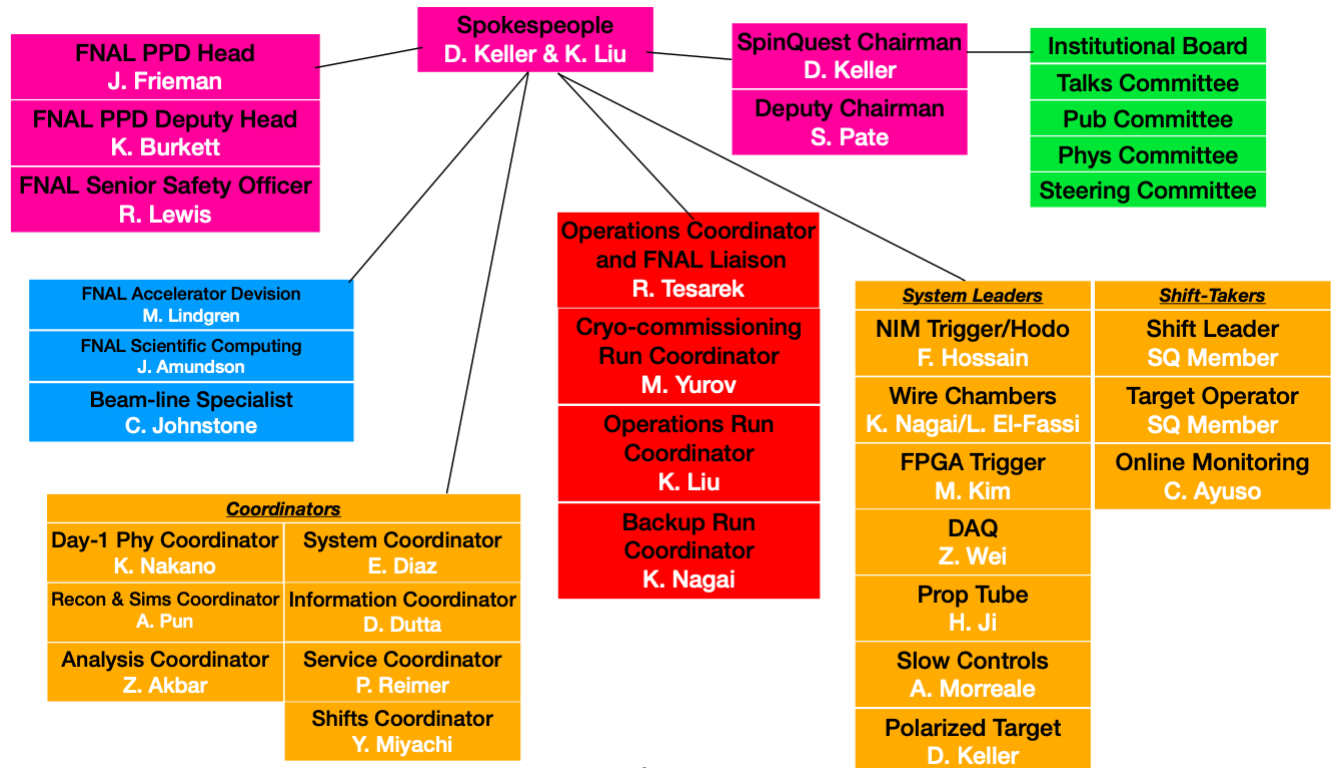
SpinQuest Experimental Operations Plans

In this document we describe the roles and responsibilities pertaining to the safe and optimized maintenance, operation (and upgrades) of the SpinQuest experiment.

The relevant sections of the Org Chart are below. In the SpinQuest Org Chart SpinQuest leadership is indicated in magenta while the roles associated with operations and safety in the NM4 facility are indicated in red. The chart lists the leaders for the sub-systems and coordinator roles lead by the collaboration in brown. The green block indicates the various committees used to govern and direct the experiment. The roles and responsibilities of the laboratory management, spokespersons, SpinQuest managers and coordinators, as far as they pertain to operations are below.



Laboratory Management

Fermilab is the host laboratory for SpinQuest and has line-management responsibility for the safety and operation of activities in the NM3/NM4 building. The safety oversight is provided by the Fermilab Environment, Safety, Health & Quality (ESHQ) Section via Division Safety Officers and operations coordinators. The budget required to provide the M&S (e.g. for repairs, spares, upgrades, and consumables) and to provide the Fermilab personnel resources (e.g. technician, engineer, and physicist labor) is developed and approved by the Fermilab Directorate in consultation with the relevant Division and experiment leadership and submitted as an annual funding request to the Department of Energy Office of High Energy Physics (OHEP). Fermilab then administers the budget allocated by OHEP.

SpinQuest Spokespersons

The spokespersons are the primary link between the laboratory and the experiment. They are the principal source of liaison with PPD, AD, TD and SCD. They are responsible for establishing work priorities, from which the Operations Coordinator and Run Coordinators produce work plans, and for developing work procedures that satisfy lab-specified ESHQ criteria. Work priorities comprise the high-level Run-Plan and potential upgrades. The priorities are defined in consultation with the SpinQuest Institutional Board, the governing body of SpinQuest responsible for developing the SpinQuest Collaboration Bylaws. The Spokespersons are directly responsible for working together with the laboratory ESHQ personnel and the PPD SpinQuest Operations Coordinator to ensure that collaborators are appropriately trained and execute their work in accordance with established work procedures and hazard mitigation protocols.

PPD SpinQuest Operations Coordinator

The PPD SpinQuest Operations Coordinator is a position in the PPD Division office. The position is appointed by the PPD Division Head. The PPD SpinQuest Operations Coordinator is responsible for managing PPD resources for the SpinQuest experiment. The PPD SpinQuest Operations Coordinator will accept requests for labor and materials from the experiment's Spokespeople and allocate them within budgetary constraints based on priorities provided by the experiment's Spokespersons. The PPD SpinQuest Operations Coordinator, along with the Division Safety Officer, will ensure that all SpinQuest technical work performed in PPD buildings by employees, users, and contractors is conducted in a safe manner and follows the existing work planning and supervision protocols outlined by the experiment and FESHM. The PPD SpinQuest Operations Coordinator, the experiment's Chair, Deputy Chair, lead engineers and the Spokespeople will meet regularly to discuss safety, work planning and execution, resource allocation, project budget and schedule. In SpinQuest the Operations Coordinator also serves as the FNAL liaison and help to provide the necessary resources and services to the project and collaboration.

SpinQuest Run Coordinators (RCs)

For all work in the NM3/NM4 building, the RC plays the role of the Supervisor in FESHM 2060 and will be part of the job site walk-through and will conduct pre-job briefings. The RC ensures that people are working safely and that JHAs have been completed and that LOTO practices are followed when required. During data-taking, the RC oversees the work done by shifters and defines a daily Run-Plan informed from the list of systematics/special runs maintained by the Spokespeople. The RC attends the AD meetings and ensures the appropriate run status reports are prepared for AD/Program Planning. The RC is the primary liaison with AD's Machine Coordinator. The RC is responsible for communicating significant schedule delays or problems to the Operations Coordinator and Spokespeople. They determine when the hall shall be secured for beam and when the experiment has controlled and open accesses and in consultation with the OM when the experiment enters the MR-CLOSED and MR-OPEN states. In switching between the MR-CLOSED and MR-OPEN

states, the RC must be present to lock and unlock the magnet power supply. The RC is responsible for approving all controlled accesses and for maintaining a daily list of who is allowed to be issued a key to access the high-bay (HB) and/or magnetic-region (MR). The RC is the point of contact by the shifters if operational problems arise that cannot be solved by the (sub-) system leaders.

There is also a specialize cryo-commissioing Run Coordinator for SpinQuest who is versed in the polarized target technology and supporting cryogenic infrastructure as well as slow controls monitoring of these systems.

In addition to the Run Coordinator is a Backup Run Coordinator who helps the Run Coordinator as needed and prepares for the Run Coordinator role to pass to them at the appropriate time.

The specific day to day duties of the run coordinators and operations coordinator are outlined in the appendix.

System Leaders

Each of the major systems has an associated working group who are responsible bringing and maintaining the system online and coordinating and prioritizing the activities of the sub-systems, in line with the collaboration-defined priorities, and that the sub-systems are following the appropriate ESHQ best practices. The System Leader is the system expert on call and the working group leader. The System Leaders will report at the weekly operations meeting and outline the work-plans of the sub-systems. They, with the System Coordinator, are responsible for maintaining a list of experts who are the first point of contact by the shifters if operational problems arise. They will also coordinate shutdown and upgrade work across their sub-systems.

The roles and responsibilities of these sub-system managers are:

- Primary responsibility for developing the work-plan and execution of tasks for the sub-system and in appointing a task manager, which may be themself, for a given task.
- Maintain a list of experts who can be contacted to solve problems under direction from the Systems Coordinator.
- Ensure that the appointed task manager for a given task attends scheduled toolbox meetings and that the task manager presents the work-plans for the task.
- Ensure the safe and reliable operation of their subsystems.
- Ensure that appropriate monitoring plots are available to shifters so that problems with a system can be quickly identified and diagnosed.
- Identify potential upgrades and work with the Operations Coordinator to define a potential schedule and resources necessary to achieve them.
- Ensure the “What To Do When” sections of the shifter wiki are up to date for their subsystem

In the above sections the general roles and responsibilities have been defined. For the Operations Coordinator and Run Coordinators we have outlined a more detailed list of the duties they are expected to be perform particularly the Run Coordinators and this was used in their training. This material is also included as an appendix after the Signatures page. Clearly some of these duties will change and evolve with experience but are included here as a snapshot of their common tasks.

Polarized Target Leader

The polarized target system has many subsystems and the Polarized Target Leader shall break these subsystems into parts and designate responsibilities to various polarized target team members. Each of the subsystem experts shall be on call for that subsystem and are responsible for following the appropriate ESHQ best practices. The Polarized Target Leader is the system expert on call and the working group leader. The System Leaders will report at the weekly operations meeting and outline the work-plans of the sub-systems. The Polarized Target Leader also maintains the requirements for the Target Operators who are the shift takers for monitoring and controlling the polarized target system. Each Target Operator is responsible for understanding the hazards involved with the polarized target system and how to monitor that system and to reach out for assistance as needed during operations.

Appendix: Run Coordinator, Operations Manager(s) Specific Responsibilities

The general ethos is that the run coordinators (RCs) are responsible for all the day-to-day aspects of running the experiment efficiently and safely, that a daily Run-Plan is defined and executed and AD are kept aware of our status. The Operations Manager (OM) has the longer term responsibility of forward planning of resources, executing the long-term run-schedule, deciding when a problem should be escalated and maintaining continuity in the communication with AD and PPD.

Operations Coordinator Responsibilities

- When alerted by the RC of a problem that could lead to a significant downtime decide, in consultation with the Spokes, whether this should trigger an email report to PPD/DOE.
- Define whether it is necessary to have a dedicated 8:00 meeting to discuss a specific problem and plan the activities in the Hall for that day.
- Monitor the instances of safety violations and define with the SpinQuest safety liaison and DSO (Raymond Lewis) actions to reduce these and deal with any specific instances.
- The OC and/or RC should try to attend the long AD-meeting each Friday.
- Attend the weekly collaboration phone meetings and SpinQuest management meetings.
- With the Analysis and beam dynamics coordinators ensure that an up to date list of “systematic/special runs” is maintained and schedule these in consultation with the RC.
- Monitor experiment resources and identify if there is a shortage in a particular subsystem or operational task.
- Manage FNAL recources and plan construction and activities with guidance from the Spokespeople of SpinQuest
- Follow the lead of the Spokespeople in prioritizing activities and allocating HEP funds for such activities
- Collect the requests for shutdown work and the resources required ahead of the shutdown.

RC Responsibilities

For all work in the NM3/NM4 building, the RC plays the role of the Supervisor in FESHM 2060 and will be part of the job site walk-through and will conduct pre-job briefings. For on-site work outside of MC1, a task manager must be appointed who will also take part in the job site walk-through and the pre-job briefing. The RC can also be the task manager for such tasks but this could also be the Operations Coordinator, Fermilab line managers, or building managers.

These cover several categories that are listed below.

Safety

- Ensure that people are working safely and JHAs, if appropriate, have been completed.
- Ensure that work and study requests are written (preferably in elog), and require people to document the planned

job before doing them.

- If things are not safe, STOP THE WORK. If in doubt about anything safety related, discuss and get help from the

ESHQ safety liaison, the DSO (presently Raymond Lewis) or the PPD SpinQuest Operations

Coordinator

- When things happen incorrectly, communicate the issues to the safety team and the Ops Manager. It is better to address the problems as they occur rather than try to avoid conflict and letting bad practices escalate to the point that someone gets hurt.

- Ensure LOTO practices are followed when required:

1. Access to the SRV MAY require LOTO of quads, kickers or BOTH. Access to individual ports must come with an understanding of the associated hazards.
2. Work on kickers or quad systems may require LOTO -- make sure that you understand the scope of the work to determine if LOTO is required, and if there is confusion, ask safety experts and experienced people.

- Understand the safe operation of the laser interlock system.

Access Control / Key Issue

- The Operations Coordinator will check training and OK the issue of Keys for Controlled Access Area if their issue is also approved by the Run-Coordinator. The Run-Coordinator must ensure that the requested access to the facility has the appropriate planning for the job: JHA, procedures, checklists and the work-request approved in the elog.

Oversight of shifts and the daily Run-Plan

- Operations Coordinator sends a message 4 weeks prior to people's shifts and verifies that the shifters training is up to date.

- Try and find cover for a shift if alerted that a shifter cannot make a shift during your RC period or if a shifter fails to show up.

- Call/talk to shifters at the beginning of the shift to ensure a good shift handover.

- For phone number purposes, translate shift signup / on-call experts to ECL (BK can help with this)

- Check that on-call experts have signed up. Know who you will call if the shifters have unsolvable problems. Encourage subsystem leaders to manage this effort. The aim is that in the event of a problem the shifters should first call the DAQ-on-call, Field on-call, Detector on-call, Ring on-call (or Quad/Kicker on-call if the problem is well defined). The on-calls should then escalate to the RC if they cannot quickly solve the problem or alert the RC if the fix requires a significant time.

- Make sure shifters understand the daily Run-Plan

- By the end of each day generate an overnight run plan + a default start plan for the following day ○ Post to elog with Run Plan type and Run Plan tag

- In this context identify the shifts where the shift pair is missing expertise, especially owl shifts and manage the Run Plan accordingly.

- The Run-Plan should be informed from the list of systematics/special runs maintained by the Ops Managers. If special runs are taken ensure that the analyzers are informed of the run numbers and conditions so that they can rapidly process the data.

Communication

- Ensure the target operators know who is the primary/secondary RC and the RC phone numbers.
- Make sure the phone number for the Primary RC is on the display board (operator sets this) and what the backup phone number is if the RC cannot be reached.
- Attend the 9:00 AM AD Meetings held on Mon,Wed,Fri
    - At these meetings be able to provide short reports of the experiment's status (e.g. production running, planned magnet off, planned open access, etc.)
- Touch base with the "Machine Coordinator" (MC) on a daily basis so they and we are aware of each others schedules and priorities.
- Note any important issues that are happening with the accelerator (what is broken, when do they anticipate down time, how long will it ask, POWER OUTAGES, etc) , and communicate these important issues back to the OM/Spokes and adjust run schedule accordingly.
- Operations Updates to Experiment
    - Run 8:00 AM meeting if such a meeting is deemed appropriate by OC.
    - Report the weekly activities on the Thursday Meetings (also attended by the OC) and ensure updates are received from the subsystems.
    - Based on this define a general plan for the following week.
    - Give a State of Experiment Update (5-10 minutes) at the Thursday meeting.
- Communicate significant schedule delays or problems to OC and Spokespeople. This may trigger a report to PPD/DOE.
- Generate weekly stats for PPD. What these are is yet to be defined but will likely be integrated CTAG, POT, efficiency, down-time etc. This will replace the weekly (Monday) All-Experimenters-Meeting talk.

Maintain Shifter Wiki

- Keep up to date the list of Shift Responsibilities
- Ensure "What To Do When" sections for each subsystem are up to date.

Elogs

- Read all elogs, every day.
- Add to the elog if you see something that hasn't been reported but which is important to be documented/communicated.
- Ensure shifters perform adequate shift summaries

Hall Access

- Decides when the hall shall be secured and when we have controlled and open accesses and in consultation with the OC when the experiment enters the MR-CLOSED and MR-OPEN states,
- In switching between Mr-CLOSED and MR-OPEN the RC must be present to lock and unlock the magnet power supply.
- Decide (approve) on *all* controlled accesses. Usually system experts will advise if an access is needed.
- Communicate open access with AD, give them an estimate of when we can secure
    - Shift changes are at 4pm, so it is often useful to secure early afternoon
    - Verify personnel available to do secure if we have to go open
    - Let NoVA run at full rate when SpinQuest cannot use beam efficiently
    - Polarized target team may advise that a ramp down target magnet is needed. Understand if there is time target swap or material change or other related details is important.