8 Project Management

This chapter describes the mission, scope, participation, and personnel of the MINERvA Project Office, which appears as a level 2 project in the MINERvA Work Breakdown Structure (WBS). At Level 2, the MINERvA Project has nine major technical subprojects:

- Scintillator Extrusions: WBS 1.0
- Wavelength Shifting Fibers: WBS 2.0
- Scintillator Plane Assembly: WBS 3.0
- Clear Fiber Cables: WBS 4.0
- Photomultiplier Boxes WBS 5.0
- Photomultiplier Procurement and Testing: WBS 6.0
- Electronics and DAQ WBS 7.0
- Frames, Absorbers, and Detector Stand WBS 8.0
- Module and Veto Wall Assembly WBS 9.0

The project office is WBS 10.0 and provides management and oversight for the other subprojects. This chapter defines the WBS of the detector through level two and describes some of the key procedures and practices that will be followed throughout the course of the project.

8.1 MINERvA Management Task

The basic functions of the Project Office fall into four general categories:

- oversight/reporting
- technical assistance, problem resolution;
- management/leadership; and
- administrative support.

Oversight/reporting includes, but is not limited to:

1. developing and maintaining the Work Breakdown Structure and baseline resource loaded cost and schedule
2. tracking the status of the project relative to the baseline using formal project management tools such as Earned Value and Schedule Variance;
3. providing regular (periodic) and ad hoc reports on the status of the project to Fermilab management and the funding agencies;
4. reporting on the status of the project to the MINERvA experimemntal collaboration;

5. developing and maintaining a Project Management Plan and working with the DOE MINREvA Program Director to develop and maintain the Project Execution Plan, Acquisition Execution plan, and other formal plans;
6. developing and maintaining a Quality Assurance Program;
7. preparing annual budget requests and establishing work plans;
8. negotiating Memoranda of Understanding (MOU's) and Statements of Work (SOW's) with participating institutions;
9. reporting schedlue and cost variances and developing mitigation plans;
10. developing, maintaining and updating the Risk Analysis/Mitigation plan; and
11. managing the change control process .

Technical Assistance and Management/Leadership includes, but is not limited to:

1. developing, selecting, or organizing the development of standards and procedures, captured in documents, for the use in the MINERvA project and enforcing adherence to them;
2. ensuring that all work done by the subprojects meets the technical requirements, conforms to safety requirements, and satisfies the quality assurance criteria of DOE, Fermilab, and MINERvA. This includes visiting production sites at universites, vendors, and other labs;
3. approving, after evaluation and review, all major procurements and contracts;
4. identifying possible conflicts between projects and resolving them;
5. evaluating or arranging to have evaluations made of proposed changes to the technical baseline, costor schedule, and providing the technical input to the change control process;
6. identifying resource shortfalls and reallocating human resources or funds in a manner required to maintain the schedule and budget;
7. appointing the level 2 subproject leaders and ensuring that the leadership of the subprojects is functioning at an acceptable level;
8. organizing "internal" reviews and responding to their findings; and
9. participating in and responding to the findings of external reviews

Administrative Functions of the Project Office include but are not limited to:

1. preparing and distributing reports;
2. arranging and accounting for travel;
3. maintaining key schedules and scheduling key meetings;
4. providing support for meetings;

5. maintaining general office supplies and equipment
6. procuring computers, PC software, and general software;
7. evaluating, selecting, acquiring and supporting special project management and report preparation software;
8. supporting guests and visitors, including helping them with travel, housing, support, and workspace;
9. organizing training; and
10. providing administrative support for internal and external reviews.

The MINERvA Project Office will reside in the Particle Physics Division (PPD). The relationship between the PPD and the MINERvA project is descfribed int he PMP. Other Fermilab divisions and sections, including Computing Division, Accelerator Division, Technical Division, Facility Engineering Systems Section (FESS) and Business Systems Section (BSS) are involved in MINERvA. The interactions of those divisions with the project is described in the PMP.

8.2 Key Roles in the Project Managmenet/Project Office

The key management roles are described here. It should be noted that a single person may hold more than one of the roles described below, or for example there may be more than one person selected to fill a specific role. For example, several of the level two subtasks are co-managed by two people.

- Project Manager

  The Project Manager is appointed by the Fermilab Director, and is responsible for the execution of the MINERvA Project. Therefore, the MINERvA PM must develop and maintain the Project Management Plan; negotiate and update the Memoranda of Understanding (MOU) between Fermilab and the collaborating institutions; and direct the activities of subsystem managers. These MOUs determine the resources which are available to the project from the collaborating institutions. Implicit in these responsibilities is the requirement that the PM administer both human and financial resources available to the project through these MOUs.

  The MINERvA PM works with representatives of the divisions and sections at Fermilab to obtain Laboratory resources for the project as approved by the Fermilab Directorate. This may include the development of additional MOU between the Project and specific Fermilab divisions or sections.

  The PM assigns responsibilities and resources to the Subsystem Managers. The progress of these assignments is monitored through monthly status reports generated by the Subsystem Managers, by means of regular Subsystem Managers meetings, and through daily communications. The MINERvA PM is responsible for developing, maintaining, and tracking the schedule for the project, which will include a complete list of milestones to facilitate monitoring the progress of the project. The MINERvA PM provides monthly reports summarizing the progress of the Project to the Fermilab Director and the Federal Project Director.

  The PM may delegate responsibilities to the Deputy Project Manager to optimize the efficiency of the project.

- Deputy Project Manager

  The Deputy Project Manager assists the MINERvA PM in all matters relating to the MINERvA Project, including the planning, procurement, disposition and accounting of resources, progress reports on project activities, ES& H issues, and Risk Management. In the absence of the Project Manager, the DPM assumes the project management responsibilities.

- University Project Manager Representative

  The University Project Manager Representative (PMR) assists the MINERvA PM in all matters relating to activities and resources at collaborating universities, including the planning, procurement, disposition and accounting for resources allocated to the universities, progress reports on activities carried out off-site, off-site ES&H issues, liaison with university Institutional Representatives, fabrication of detector components off-site, and their timely delivery at Fermilab. The PMR coordinates activities between universities which work on closely-related WBS elements occurs.

- Project Mechanical Engineer

  The MINERvA Project Mechanical Engineer is responsible for coordination of mechanical aspects of the design and fabrication phases of the project. The Project Mechanical Engineer is directly responsible to the MINERvA Project Manager and receives input from the DPM, PMR and Level 2 Subsystem Managers. In cooperation with them the Project Engineer works with the MINERvA ES&H Coordinator to implement Fermilab's policy of Integrated Safety Management (ISM) in the project and resolve any ES&H issues that may arise.

- Project Electrical Engineer

  The MINERvA Project Electrical Engineer is responsible for coordination of electrical aspects of the design and fabrication phases of the project. The Project Electrical Engineer is directly responsible to the MINERvA Project Manager and receives input from the DPM, PMR and Level 2 Subsystem Managers. In cooperation with them the Project Engineer works with the MINERvA ES& H Coordinator to implement Fermilab's policy of Integrated Safety Management (ISM) in the project and resolve any ES& H issues that may arise.

- Document Coordinator

  The MINERvA Documentation Coordinator supports the Project Manager in the preparation and revision of the PMP and other project documentation. The Documentation Coordinator also assists in the preparation of MOU and SOW with the collaborating institutions and with the organization of materials for internal and external reviews of the project. The Documentation Coordinator supports the ES& H Coordinator in the compilation of relevant safety documentation for the project.

  MINERvA documentation is maintained within a document database, the DocDB document management system. The Documentation Coordinator is the administrator for the database.

  The MINERvA Documentation Coordinator also coordinates Quality Assurance issues and maintains the MINERvA Quality Assurance Plan, as discussed in Section 7.1. The Documentation Coordinator also maintains and tracks documentation of internal QA reviews, reviews Memoranda of Understanding and other documentation, and advises the Project Manager on QA issues.

- Safety Officer

  The ES& H Coordinator addresses the administrative aspects of all ES& H work associated with the MINERvA Project and reports to the MINERvA Project Manager. The ES& H Coordinator compiles and maintains the MINERvA Hazard Assessment Document, Preliminary Safety Assessment Document (PSAD), and the MINERvA Safety Assessment Document (SAD). The ES& H Coordinator plans and coordinates ES& H reviews of the project and assembles the associated documentation.

- Scheduler

  The MINERvA Scheduler maintains and updates the MINERvA Project cost and schedule plan and prepares the schedule information for monthly reports and scheduled reviews, submitting them to the MINERvA PM for approval and transmission. The Scheduler also works with PM in identifying schedule issues in a proactive manner in order to track and report deviations from baseline schedules and costs.

- Budget Officer

  The Budget Officer has the responsibility for preparing cost information for the monthly reports, submitting them to the PM for approval and transmission. The Budget Officer monitors expenditures of US and non-US funds, tracks and reports deviations from baseline schedules and costs as specified in Section 5, and prepares the Project Accounting Task Structure. The Budget Officer verifies costs in MOUs/SOWs, using COBRA for tracking earned value on a monthly basis and as needed for reports/reviews. The Budget Officer tracks requisitions as needed and tracking monthly costs and obligations versus Cost & Schedule Plan (CSP).

  The Budget Officer also assists collaborating researchers in preparing initial budget estimates and collaborates with the Fermilab Office of Project Management Oversight to develop project controls.

  The Financial Management System (FMS) in use by Fermilab allows individual cost codes to be established, where necessary. The Budget Officer has the responsibility for establishing the proper cost codes. The FMS is also used to track and monitor such expenses as charge-backs from other Divisions/Sections, and other Fermilab related costs. At the successful completion of each project phase or WBS task, the Project Manager or designated representative is required to verify that work was performed and completed in accordance with acceptable standards before final payment is authorized by the Business Services Section.

8.3 MINERvA Detector Work Breakdown Structure

The MINERvA Work Breakdown Structure is defined in table 8.3 to Level 2.

8.4 MINERvA Management Procedures

- Internal Reviews

  Each Level 2 subsystem will undergo technical reviews to help optimize the design and cost of the subsystem, as well as to coordinate its schedule with those of the other subsystems. A committee appointed by the Project Manager, comprising members of the MINERvA Collaboration and

Table 1: Work Breakdown Structure for the MINERvA Detector Project.

WBS	Title	Description
0	MINERvA	Design and construct the MINER A Detector
1	Scintillator Extrusion	Prototype and fabricate the triangular (inner detector) and rectangular (outer detector) plastic scintillating strips which comprise the sensitive elements of the detector
2	WLS Fibers	Fabricate and test wavelength-shifting fibers for insertion in scintillator bars.
3	Scintillator Plane Assembly	Assemble scintillator bars and WLS fibers into detector planes.
4	Clear Fiber Cables	Fabricate and test clear fiber bundles, connectors and Optical Detector Units to carry light from the WLS fibers to the MAPMTS.
5	Photomultiplier Tube Boxes	Fabricate housings, install internal optical cables, mount MAPMTS and test output. Develop, test and integrate light-injection calibration system into PMT boxes.
6	Photomultiplier Tubes	Procure and test MAPMTs
7	Electronics and DAQ	Fabricate and test front-end digitizer/HV boards, VME chain controllers, computer readout system and associated power and monitoring infrastructure.
8	Frames, Absorbers and Stand	Fabricate graphite, iron and lead absorbers and nuclear target planes, steel outer frames for detector modules and detector support stand.
9	Module and Veto Wall Assembly	Assemble scintillator planes, frames, absorbers, and target planes into detector modules; scan response; fabricate associated power, cooling and monitoring systems. Refurbish and test the upstream veto planes. Fabricate PMT box support framework.
10	Project Management	Manage the construction process

experts from Fermilab and other institutions, review each subsystem at least once, with additional reviews at the discretion of the Project Manager. The review committee submits a written report to the Project Manager, who acts upon the committee's findings as necessary.

Each Level 2 Subsystem will also undergo a review to ensure compliance with applicable Fermilab ES& H requirements. Additional ES& H reviews may be scheduled at the Project Manager's discretion. The MINERvA ES& H Review Committee is discussed in detail in Section 6.1.1. The Committee will submit a written report of its findings to the Project Manager and the Particle Physics Division Head. The Project Manager will address any findings of noncompliance with ES& H requirements and inform the Division Head in writing of the resolution of those findings.

- External Reviews

  The Fermilab Director will appoint a committee to conduct periodic reviews of the MINERvA Project to monitor its progress. Director's Reviews are held at the Director's discretion, typically on an annual basis.

  In addition to external reviews organized by MINERvA, there will be reviews organized by and reporting to external funding agencies and Fermilab. The MINErvA Project Manager or the MINERvA spokespersons, as appropriate to the particular review, will organize MINERvA presentations at these reviews. It will be the role of the MINERvA Project Manager to provide the required support for the preparation for the review through the Project Office, to participate as required in the review, and help resolve any issues emerging from the review.

8.5 Reporting

The MINERvA Project Manager will provide the MINERvA spokespersons with contributions for reports which they require or which are required by them for Fermilab or funding agencies. The MINERvA Project Manager will develop, in conjunction with her or his team, a reporting procedure for the whole project as well as for the Project Office subproject. Such reporting should guarantee good information flow within the project but should require no more effort than is needed to meet this objective.

8.6 Assignment of Responsibility for Work

At some point a subgroup or collaborating institution may want (or be required) to formalize its activity and assume responsibility for work on a MINErvA subsystem. The work may be an individual subtask or subtask component. Assumption of responsibility for an activity will be done by submitting a proposal to the relevant Level 2 Manager. The Manager will work with the proponents to develop the final proposal and after the Level 2 manager approves it, she or he will submit it to the MINERvA Project Manager, and the Spokespersons for concurrence.

After a positive decision, the task manager will negotiate an "assignment of responsibility" for the project or subtask. This agreement with the group will be written and will specify all requirements (performance, interfacing, etc.) all deliverables, schedule, costs, and manpower requirements. Deliverables will normally include technical components (with interconnections, power, etc) quality assurance data (results of acceptance tests) test and debugging procedures, supporting computer programs (simulations, readout, diagnostic, monitoring) complete documentation (schematics, trouble-shooting), safety information and procedures, and a maintenance and repair plan. The agreement will also specify commitnments to debugk, integrate, and maintain all devices.

The MINERvA Project Manager and spokespersons will approve the agreement, and if required, the agreement will then be submitted to Fermilab and the funding agencies for approval. The agreement must be reflected in the group's formal MOU and funding and manpower plan. The group will then undertake the subtask. Reports and cost and schedule data will be provided for the regular reports and upon special request. Reviews will be conducted as needed.

The level 2 manager must ensure that all work assigned under the task is being carried out on schedule, within budget, is technically sound and meets the requirments of hte project for quality and ES& H. If work is not being done or is not meeting the requirements, action must be taken to correct the situation. If the corrective action requires changes in MOU's or SOW'sl, the problem must be brought to the MINERvA Project Manager for resolution.

8.7 Value Management

The MINERvA Project has implemented a design review system, in which each major subsystem is closely examined to obtain optimal value for the system, given the technical requirements and schedule constraints imposed on it. These reviews are documented in the project's document database, which uses the DocDB document management system. Documentation and updates are thus available to the project management staff, subsystem managers and other project personnel.

Specific project notes on design modifications are maintained in an assigned Value Engineering category in the document database. The database allows for easy access, review and updating by participants in the MINERvA Project.

8.8 Risk Management

The MINERvA Project has adopted a standard risk management process . The MINERvA Project employs several tools to implement the risk management process. These include, but are not limited to, project reviews, monthly reports and the Level 2 Managers meeting. This meeting is held weekly and provides a forum for identification of risks and discussion of risk handling strategies. Risk management documentation is maintained in the MINERvA document database, from which it is available to all of the affected project members and stakeholders.