Management Plan for the HPS Experiment

The HPS Executive Committee

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The document describes the management plan for the work of the HPS Collaboration during the current period, including the maintenance and operation of the apparatus to collect data and the processing and analysis of the data to produce physics results. This document is an adjunct to the bylaws and will be revised as suits the goals and composition of the collaboration.

Contents

1 Overview and Guiding Principles **2**
1.1 Definition of Roles and Responsibilities 2
1.1.1 Working Group Coordinator 2
1.1.2 Executive Committee Liaison 3

2 Management of Detector Systems and Operations **3**
2.0.1 Beamline 3
2.0.2 SVT 4
2.0.3 ECal and Hodoscope 4
2.0.4 Slow Controls 4
2.0.5 Data Acquisition Systems 4
2.0.6 Trigger 5
2.0.7 Data Quality Monitoring 5

3 Management of Data Processing and Analysis **5**
3.0.1 Analysis 5
3.0.2 Calibration and Reconstruction 5
3.0.3 Monte Carlo Simulation 6
3.0.4 Software and Computing 6

1 Overview and Guiding Principles

The HPS experiment, being a small collaboration of colleagues, has simple governance consisting of Spokespeople, an Executive Committee (EC), and a set of Working Groups (WG). The ex officio membership of the spokespeople in the Executive Committee provides cohesion in the process of executive decision-making. However, there has been no formal structure connecting the activities of the Working Groups with the EC. In the past, this has been handled in an ad hoc way by selective inclusion of key Working Group members in the discussions of the EC as needed. One intention of the Management Plan presented here is to provide a formal structure connecting the strategic direction and decision-making of the Executive Committee to the activities of the Working Groups to foster communication critical to clearly defining priorities and tracking progress, as well as providing information to the EC required for the coordination of priorities among groups that have overlapping memberships.

A second purpose of this Management Plan is to define the mandates of the individual working groups during the current phase of the experiment and provide guidance on the roles and responsibilities of those who organize the activities of these groups. The leadership of these groups was defined in an ad hoc way at the inception of the collaboration, largely according to the composition of the collaboration and its needs at that time. As the composition of the collaboration has evolved, new appointments have been made, but there has been little change to the group structure itself according to the changing needs of the collaboration and the individuals available to fill these roles. This Management Plan attempts to define a set of working groups around the current needs of the collaboration and the individuals who are now available to fill these roles. Finally, this Management Plan lays out some guiding principles for the task of organizing these groups, in accordance with our ideals as a collaboration.

1.1 Definition of Roles and Responsibilities

1.1.1 Working Group Coordinator

The working groups of the collaboration shall have a Coordinator or Coordinators responsible for organizing their activities. Depending on the needs of the group, there may be a single Coordinator, a pair of Co-Coordinators, or a Coordinator and a Deputy Coordinator. The term "coordinator" is chosen with intent: the task is one of organizing efforts, where the ideal that befits a small collaboration is the development of consensus among the group on how best to achieve the high-level goals defined by the EC. While the Working Group Coordinators, being knowledgeable and experienced individuals, provide essential guidance to their groups, the EC is vested with the authority to make decisions in cases where a consensus cannot be reached.

The Working Group Coordinators are responsible for maintaining a prioritized task list in accordance with goals and milestones agreed upon by the EC and for working with the group members to develop and implement plans to

achieve them. Additionally, the Coordinators are the point of contact for the Working Groups on issues requiring collaboration between Working Groups. The coordinators should report regularly to the EC on progress as well as to the collaboration at meetings. Coordinators should alert the Executive Committee when problems arise with achieving important milestones and enlist their help to resolve the underlying issues. Where necessary to resolve issues, the Coordinators will be included in discussions of the full EC. However, in general, the primary EC contact for the Coordinators will be an EC member designated as the EC Liaison for that Working Group.

1.1.2 Executive Committee Liaison

The Executive Committee shall appoint individual members to act as liaisons to the Working Groups. The EC Liaisons for the Working Groups provide a formal and essential connection between the Working Groups and the Executive Committee, communicating the priorities decided by the EC to the Working Groups and communicating the status and progress of the activities in each Working Group to the EC. Most importantly, the EC Liaisons assist the Coordinators by alerting the EC to issues arising in the Working Groups, such as shortages of effort and resources required to meet milestones, and working with the EC to help address these issues.

2 Management of Detector Systems and Operations

The following Working Groups comprise the organization of effort required to maintain and operate the experiment, along with their mission statements and mandates. For all groups, regular reporting of progress to the EC and documentation describing these subsystems and their operation are essential tasks. During operations, each of these groups is responsible for regular participation and reporting at daily Run Coordination meetings.

2.0.1 Beamline

The Beamline Working Group is responsible for ensuring the maintenance and operation of the Hall B beamline necessary to the deliver the CEBAF beam required for the HPS experiment. This includes instrumentation required for the control, monitoring, and diagnostics of beam currents, trajectories, profiles, and vacuum; protections against errant beam and resulting radiation during tuning and operation; and setup, control, and monitoring of the HPS chicane magnets. Planning and coordination with CEBAF accelerator personnel, as well as with the SVT and ECal/Hodoscope groups is essential to this task.

2.0.2 SVT

The SVT Working Group is responsible for ensuring the maintenance and operation of the SVT necessary for the tracking and vertexing performance required for the HPS experiment. This includes the the maintenance and operation of the sensor modules, the external and internal connectivity of power and DAQ, mechanics, motion control, and cooling systems, as well as ensuring the survey and alignment setup of the detector for operations. The maintenance and operation of the target system, being tightly integrated with the SVT vacuum box, is also part of this task. Planning and coordination with the DAQ and Slow Controls groups are particularly essential to this task.

2.0.3 ECal and Hodoscope

The ECal and Hodoscope Working Group is responsible for ensuring the maintenance and operation of the ECal and Hodoscope necessary for the trigger, particle identification, and energy resolution required for the HPS experiment. This includes the maintenance and operation of the ECal and Hodoscope electronics and mechanics, connectivity to power and DAQ, the cooling systems, as well as ensuring the survey and alignment setup of the detectors. Planning and coordination with the DAQ, Trigger, and Slow Controls groups are particularly essential to this task.

2.0.4 Slow Controls

The Slow Controls Working Group is responsible for ensuring the maintenance and operation of the detector monitoring and slow controls for the beamline and detector systems of the HPS experiment. This includes the monitoring and control of the Hall B environment, beamline components, target system, SVT, ECal, Hodoscope, DAQ and Trigger: everything that defines the environment and operating point of the experiment. Monitoring includes monitoring of low-level rates and data flow: all metrics that do not require the use of offline analysis code. Planning and coordination with all of the operations working groups are essential to this task.

2.0.5 Data Acquisition Systems

The Data Acquisition Systems Working Group is responsible for ensuring the maintenance and operation of the DAQ necessary for the SVT, ECal, Hodoscope, and Trigger systems of the experiment required to collect the data. This includes the SVT DAQ, the ECal/Hodoscope DAQ and Trigger, event building and recording, and data flow to persistent storage. Planning and coordination with the SVT, ECal and Hodoscope, Slow Controls, and Monitoring, and Software and Computing groups are essential to this task.

2.0.6 Trigger

The Trigger Working Group is responsible for ensuring the development and testing of the Trigger algorithms necessary to ensure the high-efficiency collection of signal events at acceptable data rates. This includes the development of trigger tables for the key physics goals of HPS and the real-time testing and validation during operations. Planning and coordination with the Analysis, Monte Carlo, DAQ, ECal and SVT groups are essential to this task.

2.0.7 Data Quality Monitoring

The Data Quality Monitoring Working Group is responsible for ensuring that the quality of the data being collected during operations meets the requirements for physics analysis. This includes the development of tools that can be run online, or offline in near real-time, to identify any problems in the detector systems, DAQ or trigger algorithms, the ensure that the operating point of the apparatus and the data it is producing is sufficient to meet the physics goals of the experiment. Planning and coordination with the rest of the operations groups, as well as the Software and Computing group, are essential to this task.

3 Management of Data Processing and Analysis

The following groups comprise the organization of effort required to convert raw data collected by the experiment into physics results. For all groups, regular reporting of progress to the EC, and documentation describing tools, techniques, data formats and samples, and important procedures are essential tasks.

3.0.1 Analysis

The Analysis Working Group is responsible for developing the tools and analysis techniques for the HPS experiment, and employing them to produce published physics results. This includes the development of software tools, data formats, and datasets for data analysis; the development of the required analysis techniques; the process of producing results and documenting them in internal notes; and the preparation and submission of publications on the results of the experiment. Planning and coordination with the other offline working groups is essential to this task.

3.0.2 Calibration and Reconstruction

The Calibration and Reconstruction Working Group is responsible for developing the tools and techniques required to reconstruct the raw data into physics objects for analysis and performing analysis of the data to derive calibrations for the detector required for optimizing efficiencies and resolutions that are essential to the physics sensitivity of the experiment. Planning and coordination with the Analysis WG and the Software and Computing WG are especially important to this task.

3.0.3 Monte Carlo Simulation

The Monte Carlo Working Group is responsible for developing the tools and techniques required for producing samples of simulated data and the production of those samples. This includes samples required for the analysis of the data for physics, as well as for developing the calibration and reconstruction techniques for the data. Planning and coordination with the Analysis WG and the Software and Computing WG are especially important to this task.

3.0.4 Software and Computing

The Software and Computing Working Group is responsible for developing and maintaining the common software frameworks used for online operations and offline analysis of data for the experiment, managing the computing resources required for simulation and data reconstruction, and managing large scale production and processing of Monte Carlo and data. This includes the management of software releases, development of the event data model, ensuring the compatibility of software with the computing resources of the experiment, exploring performance issues, and managing large scale Monte Carlo production and reconstruction of official data sets for the experiment as required to support data analysis.