Overview of Instrumentation Captured in Run II Upgrade Plan

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Run II Luminosity Upgrade Review

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Plan Organization by Objectives and WBS

- 1.1 Operations and Operational Maintenance and Upgrades
- 1.3.1 Protons on Pbar Target
- 1.3.2 Pbar Acceptance
- 1.3.3 Pbar Stacking and Cooling
- 1.3.4 Tevatron High Luminosity

- Instrumentation tasks are included in each area
- Manpower includes specification, software, engineering, implementation, and commissioning

1.3.1 Protons on Pbar Target

- 1.3.1 Projects
  - 1.3.1.3.1 Main Injector Dampers in support of longitudinal emittance control
  - 1.3.1.3.2 Main Injector BPM System upgrade in support of all Main Injector operations
- 1.3.1 Costs
  - Labor $678K + ~55% contingency
  - M&S $900K + ~60% contingency
- 1.3.1 Schedules and Priorities
  - Dampers are high priority, now being actively pursued
  - MI BPM system is third in priority relative to Tev BPM and Beamline BPMs needed for rapid transfers from Accumulator to Recycler

1.3.2 Pbar Acceptance

- 1.3.2 Projects
  - 1.3.2.2.3.1.1 AP2 BPM data acquisition and software upgrade in support of beamline acceptance diagnosis
  - 1.3.2.2.3.1.2 Reinstall Debuncher horizontal collimator in support of acceptance limitation diagnosis
  - 1.3.2.2.3.1.3 AP2 Large Aperture Toroid to open aperture
  - 1.3.2.2.3.2.1 Debuncher Ring BPM electronics and software upgrade
  - 1.3.2.2.3.3 Development of unspecified new instrumentation in support of Antiproton production improvements

1.3.2 Pbar Acceptance

- 1.3.2 Costs
  - Labor $272K + ~80% contingency
  - M&S $213K + ~80% contingency
- 1.3.2 Schedules and Priorities
  - Instrumentation is high priority for this multi-phase Upgrade project due to it's need for understanding and planning to remove Pbar acceptance limitations
  - All instrumentation systems now identified are scheduled for completion within first year of Upgrade Project

1.3.3 Pbar Stacking and Cooling

- 1.3.3 Projects
  - 1.3.3.4.9.1 Recycler Ring Injection Dampers
  - 1.3.3.6.3 Rapid Transfer Software in support of reliable and automated Accumulator to Recycler Antiproton transfers
  - 1.3.3.6.4.1 Main Injector injection dampers in support of Accumulator to Recycler Antiproton transfers
  - 1.3.3.6.4.2 Accumulator Quad pickup in support of Accumulator to transfer line matching improvements and monitoring
  - 1.3.3.6.5.1 P1, P2, AP1, and AP3 BPM upgrade in support of reliable and automated Accumulator to Recycler Antiproton transfers

1.3.3 Pbar Stacking and Cooling

- 1.3.3 Costs
  - Labor $745K + ~60% contingency
  - M&S $284K + ~60% contingency
- 1.3.3 Schedules and Priorities
  - Operational Instrumentation and associated software are required to support early Recycler integration efforts
  - Rapid Transfer beamline BPMs are nestled in the schedule and in priority between Tevatron and Main Injector BPM systems

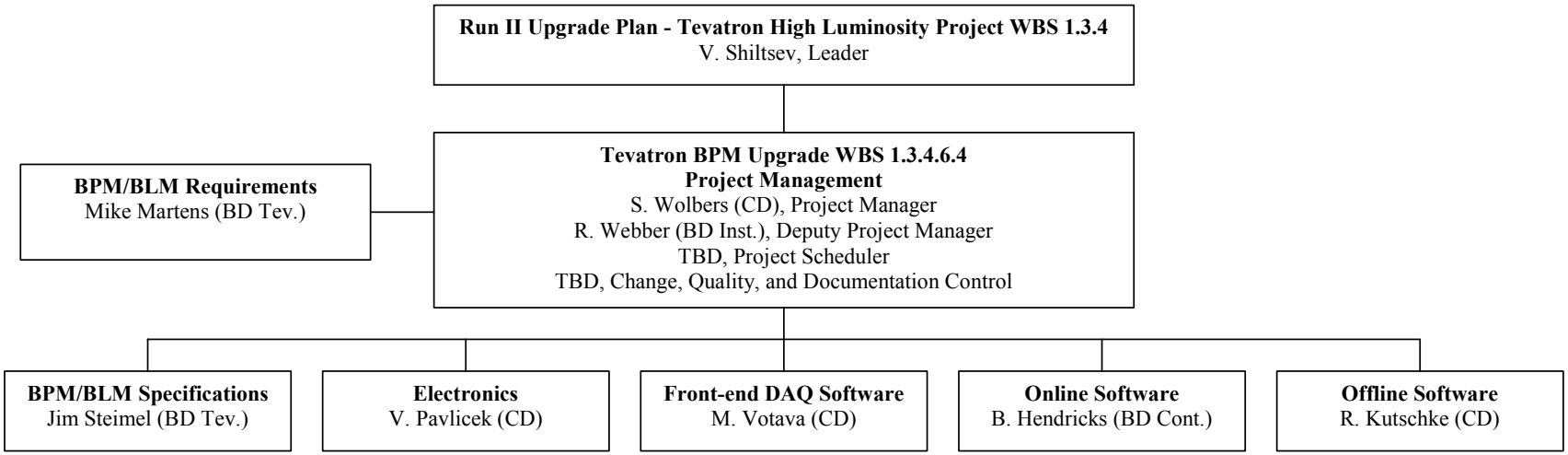
1.3.4 Tevatron High Luminosity

- 1.3.4 Projects
  - 1.3.4.6.1 Abort gap monitor to diagnose and monitor un-bunched beam in the abort gap
  - 1.3.4.6.2 Longitudinal Dampers for longitudinal emittance maintenance of Collider beams
  - 1.3.4.6.3 Proton/Antiproton Tune Meter/Tracker for tune measurement and control at injection and thru ramp
  - 1.3.4.6.4 BPM upgrade in support of orbit stabilization
  - 1.3.4.6.5 Ionization Profile Monitor for diagnosing transverse matching and monitoring emittance thru ramp
  - 1.3.4.6.7 1.7 GHz Schottky Detector electronics and software for integrated measurement and monitoring of transverse and longitudinal beam parameters (even bunch-by-bunch) throughout a Collider cycle
  - 1.3.4.6.8 Pingers for chromaticity measurements and for head-tail motion and bunch instability investigations

1.3.4 Tevatron High Luminosity

- 1.3.4 Costs
  - Labor $896K + ~57% contingency
  - M&S $1340K + ~60% contingency
- 1.3.4 Schedules and Priorities
  - Tevatron BPM system now has highest priority
  - Organizational plan for execution of this task is now in place [next slide] and requirements documentation is being prepared [Beams-doc-554-v2, TeV BPM Upgrade Requirements]
  - Present schedule calls for completion of the Tevatron BPM upgrade in late Spring 2004
  - Mike Martens Tevatron BPM talk in this breakout
  - Proton/Antiproton Tune Meter/Tracker scheduled for completion early Spring 2004

Tevatron BPM Upgrade Project Organization



1.1 Operational Maintenance and Upgrades

- 1.1 Example Projects Not Itemized in Plan
  - Includes commissioning and optimizing utilization of recently installed instrumentation systems as well as ongoing improvements to better integrate existing systems into daily operations.
    - Recycler BPM system installation and commissioning
    - Global intensity monitoring improvements
    - Tevatron synchrotron light monitor system improvements (other than abort gap monitor)
    - Tevatron BPM application and automation software enhancements
    - Signal processing electronics and software for Recycler 1.7 GHz Schottky monitor
    - Booster beam loss monitoring improvements
    - Commissioning of Booster hardware performance monitoring software
    - Better integrated Linac beam energy and momentum spread monitoring and feedback control