SDSS-II Work Breakdown Structure (WBS)

as of 02/09/05

WBS	Task Name
1	**Survey Management**
1.1	ARC Administration
1.2	Office of the Director
1.3	Office of the Project Scientist
1.4	Office of the Project Manager
1.5	Office of the Scientific Spokesperson
2	**Survey Operations**
2.1	**Observing Systems**
2.1.1	Technical Support at APO
2.1.2	Off-mountain Technical Support
2.1.3	Plug Plate Production
2.1.4	ARC Support for Observing Systems
2.2	**Observatory Operations**
2.3	**Data Processing**
2.3.1	**Data Processing Operations**
2.3.1.1	Legacy Data Processing
2.3.1.2	SEGUE Data Processing
2.3.1.3	Supernova Data Processing
2.3.2	**Software and Data Processing Support**
2.4	**Data Distribution**
2.4.1	**Data Distribution Operations**
2.4.1.1	Legacy Data Distribution
2.4.1.2	SEGUE Data Distribution
2.4.1.3	Supernova Data Distribution
2.4.2	**Data Archive Development and Support**
2.5	**Survey Coordination**
2.5.1	Legacy Survey Coordination
2.5.2	**SEGUE Survey Coordination**
2.5.2.1	Monitor new imaging and spectra as they arrive and adjust observing plan as necessary
2.5.2.2	Develop monthly SEGUE observing plans
2.5.3	Supernova Survey Coordination
2.6	**ARC Support for Survey Operations**
3	**New Development**
3.1	**SEGUE Project Development**
3.1.1	**Segue Science Requirements**
3.1.1.1	Develop SEGUE Science Requirements Document
3.1.1.2	Review and revision of SEGUE Science Requirements Document
3.1.1.3	SEGUE Science Requirements Document approved by MC
3.1.2	**SEGUE Survey Stategy**
3.1.2.1	Develop the baseline 3-year SEGUE observing plan, in prioritized order
3.1.2.2	Baseline SEGUE observing plan reviewed by MC, Head of Survey Coordination
3.1.2.3	Baseline SEGUE observing plan approved
3.1.3	**SEGUE Target Selection**
3.1.3.1	Formalize SEGUE target selection web page
3.1.3.2	**SEGUE Target Selection Code Changes**
3.1.3.2.1	Cool white dwarf numbers allowed to exceed (on rare occassions) 10/plate pair.
3.1.3.2.2	Incorporate proper motion catalog from AMNH/Shara et al.
3.1.3.2.3	SEGUE target selection code finished
3.1.3.3	**SEGUE Target Selection Technical Paper**
3.1.3.3.1	Write and publish SEGUE target selection paper
3.1.3.3.2	SEGUE target selection paper published
3.1.3.4	**SEGUE Qualilty Assurance Program**
3.1.3.4.1	**SEGUE Imaging Quality Assurance**
3.1.3.4.1.1	Develop process for inspecting new SEGUE imaging data at APO
3.1.3.4.1.2	Develop process for inspecting new SEGUE imaging data in DP Factory
3.1.3.4.1.3	SEGUE imaging QA processes defined
3.1.3.4.2	**SEGUE Spectra Quality Assurance**
3.1.3.4.2.1	Develop process for inspecting new spectra in each of the 11 target selection categories
3.1.3.4.2.2	Develop process for monitoring overall SEGUE plate qualilty on "next-day" basis during operations

SDSS-II Work Breakdown Structure (WBS)

as of 02/09/05

WBS	Task Name
3.1.3.4.2.3	SEGUE specta QA processes defined
3.1.4	**Refined Derived-Parameters Determinations**
3.1.4.1	Compute and verify photometric parallax info
3.1.4.2	Determine effects of zero-point errors in photometry and variations across the sky
3.1.4.3	Determine errors in Teff, log, g, etc, with respect to F subdwarf model atmospheres
3.1.4.4	Quantify how the determinations of velocity and log(g) scale with S/N
3.1.4.5	Determine the S/N for a star of fiducial flux and exposure time
3.1.4.6	Define the set of model atmospheres, known star templates and isochrones that will be used and verify their self-consistency.
3.1.4.7	Determine the appropriate number of sky fibers per faint plate.
3.1.5	**Calibrations/Catalogs of Spectroscopy of Star of Known Metalicity**
3.1.5.1	Design globular cluster and open cluster plates at high S/N to assist with star catalog assembly
3.1.5.2	Observe SEGUE globular and open cluster plates
3.1.5.3	Assemble catalog of stars of known metalicity, gravity, Teff for use in refining atmosperic parameter measuring code.
3.1.5.4	SEGUE star catalog assembled
3.1.5.5	Incorporate data from SEGUE globular and open cluster plates into processing algorithms.
3.1.6	**SEGUE Spectroscopic Data Processing Pipelines**
3.1.6.1	**SEGUE specBS Pipeline**
3.1.6.1.1	Incorporate most recent ELODIE catalog of known star templates into SEGUE specBS
3.1.6.1.2	Prune ELODIE templates to clean zero-pointed list
3.1.6.1.3	Generate list of new data model outputs from ELODIE matches and diagnose quality of fit
3.1.6.1.4	Perform regression tests on modified SEGUE specBS pipeline and verify production-readiness
3.1.6.1.5	SEGUE specBS pipeline development complete
3.1.6.2	**SEGUE Spectro-2D Pipeline**
3.1.6.2.1	Generate Spectro-2D outputs that are co-added and wavelength calibrated
3.1.6.2.2	Modify Spectro-2D to output non-sky subtracted spectra.
3.1.6.2.3	Make modifications to Lick indices and documentation for them
3.1.6.2.4	SEGUE Spectro-2D pipeline development complete
3.1.6.3	**Incorporate Proper Motions into Stellar Parameters**
3.1.6.3.1	Incorporate proper motions (USNO-B2.0) into included stellar parameters and derived distance, space velocities, with errors
3.1.6.3.2	Proper motions incorporated into stellar parameters
3.1.6.3.3	Develop methodology and process
3.1.6.4	**SEGUE Spectro Parameter Flat File Format**
3.1.6.4.1	Develop process for packaging new spectro parameters into uniform flat file format for collaboration (Year 1)
3.1.6.4.2	Process developed for packaging new spectro parameters into flat files
3.1.6.5	**SEGUE Stellar Parameter Pipeline**
3.1.6.5.1	Determine Teff, RV, chi-sq, log(g), etc. for each star, with errors on quantities
3.1.6.5.2	Develop pipeline for computing stellar atmosphere parameters, incorporating proper motions and generating flat files
3.1.6.5.3	Test Stellar Parameter Pipeline and verify production-readiness
3.1.6.5.4	Incorporate Stellar Parameter Pipeline into SEGUE data processing production operation
3.1.6.5.5	SEGUE Stellar Parameter Pipeline development complete
3.1.6.6	**SEGUE Database Development**
3.1.6.6.1	Produce DAS-style flat-fields for SEGUE outputs (imaging and spectra)
3.1.6.6.2	Produce CAS-style indexed look-up with new SEGUE parameters included.
3.1.6.6.3	Incorporate other Spectro-2D v5 data model changes into CAS data releases
3.1.6.7	**SEGUE Stellar Parameter Technical Paper**
3.1.6.7.1	Write and publish paper on SEGUE stellar parameter techniques
3.1.6.7.2	SEGUE stellar parameter technical paper published
3.1.7	**Additional Services for SEGUE Survey**
3.1.7.1	**SEGUE Theory/Simulation Work**
3.1.7.1.1	Define a method to quantify how well SEGUE will test the distribution of dark matter
3.1.7.1.2	Develop new models of the galaxy with kinematics in order to compare SEGUE scan data and radial velocities.
3.1.7.2	**Photo Pipeline Modifications for Crowded Field Data**
3.1.7.2.1	Explore photometry error systematics in crowded field data
3.1.7.2.2	DAOPHOT/DoPhot-style PSF only (no galaxies) fitting with PHOTO, to reduce load on photo deblender in crowded fields.
3.1.7.2.3	Perform regression tests on modified Photo and verify production-readiness
3.1.7.2.4	Photo pipeline modifications done
3.1.7.3	**Very-Low-Latitude Target Selection and Data Processing Analysis**
3.1.7.3.1	Generate list of suggested cross-scans that could be provided to Survey Coordinator when asked.
3.1.7.3.2	Develop and implement target selection algorithm for open cluster plates

WBS	Task Name
3.1.7.3.3	Develop and implement target selection algorithm for Sagitarrius stream plates
3.1.7.3.4	Very-low-latitude target selection algorithms and analysis complete
3.2	**Supernova Project Development**
3.2.1	**SN Survey Planning and Coordination**
3.2.1.1	**SN Science Requirements Document**
3.2.1.1.1	Develop SN Science Requirements Document
3.2.1.1.2	Develop requirements on accuracy of stripe 82 template photometry
3.2.1.1.3	Review of SN Science Requirements Document
3.2.1.1.4	SN Science Requirements Document approved by MC
3.2.1.2	**SN Quality Assurance Plan**
3.2.1.2.1	Develop QA plan for on-mountain reductions
3.2.1.2.2	Develop QA plan for off-mountain reductions
3.2.1.2.3	Develop QA plan for data loaded into SN Public Archive
3.2.1.2.4	Assemble QA sub-plans into single QA document for SN Project
3.2.1.2.5	Review of SN Quality Assurance plan by affected parties
3.2.1.2.6	SN Quality Assurance plan approved by MC
3.2.1.3	**SN Software Requirements Document**
3.2.1.3.1	Develop PHOTO software requirements (SN)
3.2.1.3.2	Develop Frame Subtraction pipeline requirements (SN)
3.2.1.3.3	Develop doObjects software requirements (SN)
3.2.1.3.4	Develop hand-scan software requirements (SN)
3.2.1.3.5	Develop requirements for candidate webserver, including color selection (SN)
3.2.1.3.6	Develop requirements for follow-up obervations software and selection criteria (SN)
3.2.1.3.7	Develop requirements for public web server
3.2.1.3.8	Review of software requirements document
3.2.1.3.9	Software requirements document approved by MC
3.2.1.4	**SN Proposal for Bright-time Operations in 2005-07**
3.2.1.4.1	Evaluate bright-time data from Fall 2004 and earlier
3.2.1.4.2	Review 2.5m schedule w/ Legacy and SEGUE Teams, Observers, and MC
3.2.1.4.3	Develop proposal for bright-time operations in 2005-07
3.2.1.4.4	Review of SN bright-time operations proposal by observers, Survey Coordinator, MC
3.2.1.4.5	SN bright-time operations proposal approved by MC
3.2.1.5	**2.5m SN Observing Plans**
3.2.1.5.1	Develop SN observing plans/protocols in coord with survey mgmt
3.2.1.5.2	Review of SN observing plan by MC
3.2.1.5.3	SN Observing Plan approved by MC
3.2.1.6	**SN Project Operations Plan**
3.2.1.6.1	Develop SN operations plan with data flow diagrams
3.2.1.6.2	Review of SN Operations Plan by observers, Survey Coordinator, MC
3.2.1.6.3	SN Operations Plan approved by MC
3.2.1.7	**SN Software Development Plan**
3.2.1.7.1	Develop software development plan
3.2.1.7.2	Review of SN software development plan by MC
3.2.1.7.3	Initial software development plan approved by MC
3.2.1.8	**SN On-mountain Computer Hardware Plan**
3.2.1.8.1	Determine computing requirements for on-mountain SN data reduction system
3.2.1.8.2	Benchmark machines for APO cluster
3.2.1.8.3	Assess impact of SN computing requirements on APO infrastructure
3.2.1.8.4	Develop computer hardware plan and cost est for SN on-mountain data reduction ops
3.2.1.8.5	Review of SN on-mountain computer hardware plan by APO & FNAL staff, MC
3.2.1.8.6	SN On-mountain Computer Hardware Plan approved by MC
3.2.1.9	**APO Computer Room Cooling Upgrade Plan**
3.2.1.9.1	Develop APO computer room cooling upgrade requirements
3.2.1.9.2	Develop APO computer room cooling upgrade plan with cost estimate
3.2.1.9.3	Review of APO computer room cooling upgrade plan
3.2.1.9.4	APO computer room cooling upgrade plan approved
3.2.1.10	**SN Off-mountain Computer Hardware Plan**
3.2.1.10.1	Determine computing requirements for off-mountain SN data reduction system
3.2.1.10.2	Assess impact of SN computing requirements on FNAL/FCC infrastructure

WBS	Task Name
3.2.1.10.3	Develop computer hardware plan for SN off-mountain data reduction operations
3.2.1.10.4	Review of SN off-mountain computer hardware plan by FNAL staff, MC
3.2.1.10.5	SN Off-mountain Computer Hardware Plan approved by MC
3.2.1.11	**SN Database Development Plan**
3.2.1.11.1	Develop requirements for SN databases (loading, hosting, maintaining, etc.)
3.2.1.11.2	Determine compute resources at Fermilab to host SN databases
3.2.1.11.3	Develop plan for hosting SN databases at Fermilab
3.2.1.11.4	Review of SN database plan by Fermilab, MC
3.2.1.11.5	SN database plan approved.
3.2.1.12	**SN Candidate Rapid Dissemination Plan**
3.2.1.12.1	Develop plan for rapid dissemination of SN candidates to the community
3.2.1.12.2	Rapid dissemination plan approved by SN Project Team Leaders
3.2.1.13	**Coordination of Follow-up Observations**
3.2.1.13.1	Compose and submit observing proposals
3.2.1.13.2	Develop collaboration to carry out follow-up on ARC and non-ARC telescopes
3.2.1.13.3	Coordinate with collaborators submitting observer proposals
3.2.1.13.4	Develop priorities for different follow-up telescopes
3.2.1.13.5	Develop dissemination procedures for candidates for follow-up observers/teams
3.2.1.13.6	Develop plan for coordinating follow-up information received from collaborators
3.2.1.14	**SN Public Dissemination Plan**
3.2.1.14.1	Develop plan for timely public dissemination of SN data (corrected frames and catalogs)
3.2.1.14.2	Develop computer hardware plan and cost estimate for SN public data archive
3.2.1.14.3	Review of SN public dissemination plan by affected parties
3.2.1.14.4	SN Public Dissemination Plan approved by MC
3.2.2	**SN Project Computing Hardware Implementation**
3.2.2.1	**APO Computer Room Cooling Upgrade**
3.2.2.1.1	Prepare RFQ for APO computer room upgrade based on approved upgrade plan
3.2.2.1.2	RFQ for APO computer room upgrade out for bids
3.2.2.1.3	Bids due for APO computer room upgrade
3.2.2.1.4	Review bids and award contract for APO computer room upgrade
3.2.2.1.5	APO computer room upgrade work by contractor
3.2.2.1.6	APO computer room cooling upgrade finished
3.2.2.1.7	APO computer room cooling upgrade punchlist work by contractor
3.2.2.1.8	APO computer room cooling upgrade punchlist work complete
3.2.2.2	**SN On-mountain Computer Hardware Implementation**
3.2.2.2.1	Purchase computer hardware for on-mountain system
3.2.2.2.2	Assemble, configure and test on-mountain compute system at Fermilab
3.2.2.2.3	Pack on-mountain compute cluster and ship from Fermilab to APO
3.2.2.2.4	On-mountain compute cluster delivered to APO
3.2.2.2.5	Re-configure and re-test on-mountain compute cluster at APO
3.2.2.2.6	On-mountain compute cluster ready for SN operations at APO
3.2.2.3	**SN Off-mountain Computer Hardware Implementation**
3.2.2.3.1	Purchase computer hardware for off-mountain data analysis system
3.2.2.3.2	Assemble, configure and test off-mountain compute system at Fermilab
3.2.2.3.3	Off-mountain compute cluster verified as ready for use
3.2.2.4	**Supernova Database Computer Hardware Implementation**
3.2.2.4.1	Purchase computer hardware for supernova database at (host institution name)
3.2.2.4.2	Assemble, configure and verify supernova database cluster setup
3.2.2.4.3	Supernova database cluster ready for software loading
3.2.2.5	**SN Public Archive Computer Hardware Implementation**
3.2.2.5.1	Purchase computer hardware for SN Public Archive
3.2.2.5.2	Assemble, configure and verify SN Public Archive hardware setup
3.2.2.5.3	SN public archive database cluster ready for software loading
3.2.3	**SN Software Development for 2.5m Survey Operations**
3.2.3.1	**SN Software Script Development**
3.2.3.1.1	Port scripts to scientific Linux
3.2.3.1.2	Develop scripts to automate tape spooling
3.2.3.1.3	Develop script to automate pipeline running at APO
3.2.3.1.4	Develop script to monitor progress of pipelines during data processing

SDSS-II Work Breakdown Structure (WBS)

as of 02/09/05

WBS	Task Name
3.2.3.2	**Improved Stripe 82 Photo-Z Implementation**
3.2.3.2.1	Implement improved stripe 82 photo-z's from other SDSS collaborators into database, for improved targ selection
3.2.3.3	**PHOTO Module Improvements (only if necessary to meet processing-time req.)**
3.2.3.3.1	Develop list of PHOTO modules to be modifed to run in parallel fashion
3.2.3.3.2	Develop plan for modifying PHOTO modules based on processing requirements
3.2.3.3.3	Implement plan as necessary (placeholder)
3.2.3.4	**SN Software Tools**
3.2.3.4.1	Develop software tools to monitor SN detection efficiency
3.2.3.4.2	Develop software tools to test accuracy of SN photometry
3.2.3.4.3	Test and validate SN software tool by putting artificial Sne into the data-stream
3.2.3.4.4	Development of SN software tools finished
3.2.3.5	**Frame Subtraction Pipeline Development**
3.2.3.5.1	Develop improved re-mapping algorithm between search and template frames
3.2.3.5.2	Develop improved characterization of noise properties of the subtracted image
3.2.3.5.3	Implement screening/flagging and improved masking within the frame subtraction pipeline of artifacts
3.2.3.5.4	Implement better resampling methods
3.2.3.5.5	Implement masked pixels
3.2.3.5.6	Include PHOTO Info on astrometry, PSF, masks
3.2.3.5.7	Frame subtraction pipeline development work complete
3.2.3.6	**Co-Added Template Frames (enhanced goal)**
3.2.3.6.1	Develop/test co-added template frames for stripe 82 to reach required depth of SN search
3.2.3.6.2	Co-added template frame development complete
3.2.3.7	**Production and preparation of Templates**
3.2.3.7.1	Choose, Process, Zero-point templates for 82S and 82N
3.2.3.7.2	template development complete
3.2.3.8	**I-Band Frame Subtraction**
3.2.3.8.1	Implement I-band frame subtraction for all processed frames as part of normal operations
3.2.3.8.2	I-band frame subtraction code complete
3.2.3.9	**Forced Object Measurement**
3.2.3.9.1	Implement frame subration and forced object detection for candidates in u and z and for earlier/later exposure in g,r,i if not found
3.2.3.9.2	Forced object measurement code complete
3.2.3.10	**Veto Catalogs and Objects Database**
3.2.3.10.1	Construct/test bright star masks for both strips of stripe 82
3.2.3.10.2	Cross-correlate stellar and QSO veto catalogs with other catalogs
3.2.3.10.3	Conduct further tests on input variability catalogs
3.2.3.10.4	Star list for frame subtraction fitting
3.2.3.10.5	List of galaxy photo-z's in database
3.2.3.10.6	Veto catalogs and database work complete
3.2.3.11	**SN Candidates Database**
3.2.3.11.1	Define scope of work for further development work on SN Candidates Database
3.2.3.11.2	Further development work on SN Candidates Database
3.2.3.11.3	First round of development work on SN Candidates Database complete
3.2.3.12	**doObjects Pipeline**
3.2.3.12.1	Define scope of work for additional development work on doObjects pipeline
3.2.3.12.2	Further development on doObjects pipeline
3.2.3.12.3	First round of development work on doObjects pipeline complete
3.2.3.13	**HandScan Tool Development**
3.2.3.13.1	Make framesub diagnostics available for field around each object being scanned
3.2.3.13.2	Develop web-based HandScan tool
3.2.3.13.3	HandScan tool development complete
3.2.3.14	**Target Selection Development**
3.2.3.14.1	Develop color-color and color-mag pre-selection using models and color/mags of nearby SN
3.2.3.14.2	Develop real-time light-curve fitting and estimated current mag.
3.2.3.14.3	Test color-color and multi-night vs. single-epoch selection using Fall 2004 data and artificial Sne
3.2.3.14.4	Refine selection criteria for SN brightness relative to host, separation from host, etc.
3.2.3.14.5	SN target selection development complete
3.2.3.15	**Selection Criteria**
3.2.3.15.1	Develop selection criteria for subsample of multii-epoch spectrophotometry
3.2.3.15.2	Develop selection criteria for optical and NIR imaging follow-up

WBS	Task Name
3.2.3.15.3	Selection criteria developed
3.2.3.16	**Target Selection Web Interface**
3.2.3.16.1	Develop web interface for target selection
3.2.3.16.2	Implement improved finding charts on target selection web interface
3.2.3.16.3	Implement improved consolidation of information on target selection web interface
3.2.3.16.4	Target selection web interface finished
3.2.3.17	**Public SN Candidate Web Server**
3.2.3.17.1	Develop public version of SN candidate web server
3.2.3.17.2	Link Public SN Candidate Web Server to www.sdss.org
3.2.3.17.3	Public SN candidate web server ready for use
3.2.4	**Software Development for Follow-up Observations**
3.2.4.1	**Follow-up Candidates and Observed Objects Database**
3.2.4.1.1	Develop database for follow-up candidates and observed objects
3.2.4.1.2	Develop web interface for Follow-up Candidates database
3.2.4.1.3	Link Follow-up Candidates database web interface to candidate pages
3.2.4.1.4	Follow-up Candidates DB development complete
3.2.4.2	**SN Observing Tools**
3.2.4.2.1	Develop tools to determine if sufficient spectro S/N achieved after given exposure time
3.2.4.2.2	Develop tool to do "on-the-fly" SN typing and redshift determination
3.2.4.2.3	SN Observing Tools developed
3.2.4.3	**SN Typing Tools**
3.2.4.3.1	Develop tools for galaxy spectroscopic subtraction for improved SN typing
3.2.4.3.2	SN Typing tools developed
3.2.4.4	**Auxiliary Imaging Data Reduction Tools**
3.2.4.4.1	Further develop tools for reducing aux imaging data from NMSU 1m, 3.5m SPIcam, etc.
3.2.4.4.2	Tools for reducing auxiliary imaging data developed
3.2.4.5	**SN Intercalibration Framework**
3.2.4.5.1	Determine level of framework required for intercalibration between 2.5m, NMSU 1m, and 3.5m imaging
3.2.4.5.2	Develop required framework for intercalibration between 2.5m, NMSU 1m, and 3.5m imaging
3.2.4.5.3	SN intercalibration framework developed
3.2.5	**Software Development for SN Off-mountain Analysis**
3.2.5.1	**SN Photometry Pipeline**
3.2.5.1.1	Develop initial precision SN photometry pipeline (aperture and PSF photometry)
3.2.5.1.2	Develop final precision SN photometry pipeline (aperture and PSF photometry)
3.2.5.1.3	Test/characterize SN Photometry Pipeline with artificial supernovae
3.2.5.1.4	SN Photometry Pipeline development complete
3.2.5.2	**Improved Stripe 82 Object/Image Calibrations**
3.2.5.2.1	Implement improved calibrations of stripe 82 objects/images based on multiple observations
3.2.5.2.2	Improved stripe 82 calibrations implemented
3.2.6	**SN Database Development**
3.2.6.1	**Collaboration Archive of Repeat Imaging Data and/or Catalogs**
3.2.6.1.1	Create framework for collaboration archive of repeat imaging data and/or catalogs
3.2.6.1.2	Framework in place for collaboration archive of repeat imaging data and/or catalogs
3.2.6.2	**Public Archive of Repeat Imaging Data and/or Catalogs**
3.2.6.2.1	Create framework for public archive of repeat imaging data and/or catalogs
3.2.6.2.2	Framework in place for public archive of repeat imaging data and/or catalogs
3.2.6.3	**SN Database Development**
3.2.6.3.1	Develop database for collaboration and public dissemination of SN data
3.2.6.3.2	Test and verify SN database ready for production use
3.2.6.3.3	SN database development complete; database ready for use
3.3	**Photometric Calibration Development**
3.4	**Data Acquisition Upgrade**
3.4.1	**Remote Milestones**
3.4.1.1	SDSS-II Approved
3.4.1.2	New computer professional start date
3.4.2	**Functional Specifications**
3.4.2.1	Update functional specifications with new requirements and goals
3.4.2.2	Vet updated specs with relevant parties (MC, developers, APO staff)
3.4.2.3	Functional specs approved (milestone)

SDSS-II Work Breakdown Structure (WBS)

as of 02/09/05

WBS	Task Name
3.4.3	**Hardware Procurements**
3.4.3.1	Procure (2) Motorola MVE5500 PowerPC cards and transition modules for prototyping
3.4.3.2	Procure (17) Motorola MVE5500 PowerPC cards and transition modules for new DA system
3.4.3.3	Specify hardware requirements for sdsshost replacement
3.4.3.4	Procure (2) dual-processor PCs for sdsshost replacement
3.4.3.5	New "lhost" machine installed at APO
3.4.3.6	Set up lhost at APO
3.4.3.7	Procure VxWorks license for PowerPC platform
3.4.3.8	Procure (5) 250GB IDE disks for prototyping
3.4.3.9	Procure (2) 8-bay drive chassis'
3.4.3.10	Procure (18) DLT tape drives to replace current drives? (placeholder)
3.4.3.11	Procure new networking gear (Gb switch)
3.4.4	**Software Development**
3.4.4.1	**VxWorks Environment**
3.4.4.1.1	Get VxWorks test environment set up at FNAL
3.4.4.1.2	Get VME board booting in VxWorks environment
3.4.4.1.3	Build existing DA code in VxWorks environment to verify and as necessary modify work scope
3.4.4.2	**VxTools Mods**
3.4.4.2.1	Map registers and rest of VxTools (other than DMA)
3.4.4.2.2	Write new DMA driver for VCI+ and scrolling display
3.4.4.3	**Emulation Code Development**
3.4.4.3.1	Develop design document for PTVME emulation scheme
3.4.4.3.2	Review and sign-off of proposed PTVME emulation scheme
3.4.4.3.3	Develop code to emulate PTVME functionality
3.4.4.3.4	Emulation code mods complete
3.4.4.4	**Archiver Mods**
3.4.4.4.1	Modify both sides of archiver to write to remote side disk
3.4.4.5	**Murmur Portability Check**
3.4.4.5.1	Port murmur to Linux box at FNAL and compile
3.4.4.5.2	Murmur ported to Linux successfully, or additional scope of work defined
3.4.4.6	**Network Time Protocol (NTP)**
3.4.4.6.1	Port NTP to VxWorks, if necessary
3.4.4.6.2	**ftelnet Tests**
3.4.4.6.2.1	Port ftelnet to Linux at APO and test
3.4.4.7	**Host Code Modifications**
3.4.4.7.1	Specify software environment (compiler/distribution) for lhost.
3.4.4.7.2	Vet software specs for lhost machine
3.4.4.7.3	Port current development environment (support) for MCP and TPM to lhost
3.4.4.7.4	Port current set of host code to lhost (e.g., tccmon, watcher, webserver, etc.)
3.4.4.7.5	Install murmur on lhost at FNAL
3.4.4.7.6	Install ftelnet on lhost at FNAL
3.4.4.7.7	Endian conversion on lhost
3.4.4.7.8	lhost ready for testing at FNAL
3.4.4.8	**TPM Modifications**
3.4.4.8.1	Move TPM display monitor to commish (TPM dm) (real-time TPM display)
3.4.4.8.2	TPM move to commish complete
3.4.4.9	**IOP code modifications**
3.4.4.9.1	**Critical IOP Changes**
3.4.4.9.1.1	**endNight Rewrite**
3.4.4.9.1.1.1	Develop functional requirements for endNight rewrite
3.4.4.9.1.1.2	Develop design proposal for endNight rewrite
3.4.4.9.1.1.3	Vet design proposal for endNight rewrite
3.4.4.9.1.1.4	Rewrite endNight.
3.4.4.9.2	**Potential IOP Changes**
3.4.4.9.2.1	**Teamster**
3.4.4.9.2.1.1	Write gangs directly on Unix side ()
3.4.4.10	**Potential Astroline Mods**
3.4.4.10.1	Improve stretch on scrolling displays (requires code mods on VME side).
3.4.5	**DA Prototype Development and Testing at APO**

SDSS-II Work Breakdown Structure (WBS)

as of 02/09/05

WBS	Task Name
3.4.5.1	Ship MVE5500 board to APO and install in crate
3.4.5.2	Test NTP and TCC broadcast functionality
3.4.6	**Test Stand Development**
3.4.6.1	Verify that FNAL simulation environment is functional
3.4.6.2	Modify existing test stand to incorporate hot-swap drives
3.4.6.3	FNAL test stand work complete
3.4.7	**DA System Testing at FNAL**
3.4.7.1	Full system commisioning tests at FNAL to verify operational readiness of new DA
3.4.7.2	New DA system testing at FNAL complete
3.4.8	**DA Shipment to APO**
3.4.8.1	Prep and pack DA system hardware for shipment to APO
3.4.8.2	Ship DA hardware to APO
3.4.8.3	New DA hardware arrives at APO
3.4.9	**APO Site Preparations**
3.4.9.1	Assess impact of new DA system on APO infrastructure (power, cabling, etc.)
3.4.9.2	Impact of new DA on APO infrastructure deemed acceptable
3.4.10	**Final APO Installation**
3.4.10.1	Reconfigure 2.5m networking at APO
3.4.10.2	Install new DA hardware and code at APO
3.4.11	**DA Commissioning Plan**
3.4.11.1	Develop commissioning plan for DA installation at APO
3.4.11.2	Review and approve DA commissioning plan
3.4.11.3	DA commisioning plan complete
3.4.12	**APO Commissioning**
3.4.12.1	Start DA commissioning at APO
3.4.12.2	Commissioning tests at APO
3.4.12.3	System handoff to APO staff
3.4.12.4	New DA ready for routine operations
3.4.13	**Final As-built Documentation**
3.4.13.1	Finish as-built DA system documentation
3.4.13.2	Update observing procedures
3.4.13.3	Update operating procedures
3.4.14	**FNAL Infrastructure Upgrade**
3.4.14.1	Meet with FCC personnel to define work scope for incorporating hot-swap drives
3.4.14.2	Procure hot-swap chassis for testing at Fermilab
3.4.14.3	Develop prototype hot-swap disk system and test at FCC
3.4.15	**sdssmth Upgrade**
3.4.15.1	Merge MOP and IOP back together
3.4.15.2	Port MOP onto new "host"
3.4.16	**FNAL Tape Drive Replacement**
3.4.16.1	Modify FNAL system to read data from DLT tape drives or hot-swappable drives (placeholder)
3.4.16.2	Adapt FNAL inventory system to accommodate disk drives and DLT tapes (placeholder)
4	**ARC Corporate Support**
5	Public Outreach
6	Management Reserve