Appendix A

Sloan Digital Sky Survey-II
Schedule for the Three-Year Baseline Plan

Introduction

SDSS-II proposes to create three surveys of the sky: complete the spectroscopic footprint of SDSS-I ("Legacy"); Galactic structure in both photometry and in spectroscopy ("SEGUE"); and an imaging survey for Type Ia supernovae ("SN"). This document shows how these surveys fit together, how time is apportioned, and provides benchmarks against which progress can be reckoned. In more detail:

Legacy intends to complete the coverage of the sky in the area defined by stripes 10 through 37, inclusive, in both imaging and spectroscopy. (The system of stripes is defined at http://www.sdss.org/dr4/coverage/atStripeDef.par.) The spectroscopic targets (galaxies and quasars) will be selected in the same way as for SDSS-I. The data quality criteria will be the same as for SDSS-I.

SEGUE intends to scan approximately 3500 square degrees of sky outside of the North Galactic Cap in a pattern such that no part of the sky with declination greater than –20 degrees is more than 20 degrees away from a stripe. The pattern includes scans that pass through the Galactic plane, but there is no requirement for the quality of data in fields where the SDSS photometric pipeline fails because of varying background or excessive image crowding. Approximately 200 spectroscopic tiles will be observed spectroscopically. Within each tile, approximately 1200 stars will be selected with a uniform algorithm to achieve specific goals, e.g. measuring the velocity and metallicity distributions in the Galactic halo, sampling the thick disk - spheroid interface at higher Galactic latitudes, and measuring the initial mass function and age distribution for stars in diverse regions. One hundred and thirty-five of the tiles will uniformly probe the Milky Way at all accessible longitudes and latitudes, and 65 will sample specific directions, such as well-calibrated open clusters. The plan, for the SEGUE stripes and tiles, is available at: http://home.fnal.gov/~yanny/fut/layout.html.

SN intends to scan repeatedly the celestial equator from RA = 20h to RA = 4h in September, October, and November in each of the three years, with a time-sampling that is as dense as possible, where an increasing fraction of the time is yielded to the other surveys in November. These observations will yield light curves for numerous variables, including about 60 Type Ia supernovae per season. These events will be announced as quickly as possible to enable spectroscopic follow-up with other telescopes.

Overview of the Integrated Baseline Plan

In the three years of SDSS-II operations, the goal is to complete the science outlined above for all three surveys. Two of the surveys are in opposite regions of the sky (Legacy and SN), and the third (SEGUE) requires imaging and spectroscopy at all seasons.

The SDSS-I experience allows us to compute average weather conditions and average observing efficiency. For time that is astronomically useful, it also allows us to compute the average of that time that can be used for imaging (photometric skies and good seeing). These average values are adopted to scale the available time into expected values for survey progress in units that can be compared against the survey goals, e.g. square degrees of sky and number of spectra.

For SEGUE, each of the 200 tiles on the sky is observed with two plates, one with a relatively short exposure for the brighter stars, and one with a relatively longer exposure for the fainter stars. We have determined that the net observing time (including overhead for swapping plates, etc.) required for one SEGUE plate pair is about 4.8 hours. (Note that the tables below refer to tiles, as opposed to plates.)

For imaging, we adopt the metric of "unique" square degrees. These are square degrees that have been corrected for overlaps of the scan lines in each of the two strips of a stripe, as well as for the end-to-end overlap where different runs of the same strip have been spliced together. "Unique" square degrees does not account for the "barrel-stave" overlap of the system of stripes for Legacy - that is accounted for in the "footprint" category. For SEGUE, the stripes are distinct and "unique" and “footprint” are equivalent.

A model observing plan has been devised that apportions time to the three surveys as a function of month of year, for each of the three years. The available time is dark time corrected for weather, minus one dark run in July/August for mirror re-aluminization and other maintenance. The demands by each of the three surveys in each month are defined by the following protocols:

1) If an unobserved Legacy stripe or spectroscopic plate is available in a part of the North Galactic Cap between stripes 10 and 37 that is currently accessible, observe that stripe or plate.

2) September, October, and most of November are allocated to the Supernova survey, where imaging is attempted even in spectroscopic conditions. The right ascension range of the Supernova survey is from 20 h to 4 h; whenever this area is not accessible for at least 1.5 hours at an hour angle of less than 3.25 h, the time is given to SEGUE (e.g., the ends of the nights later in the Fall). Some smaller amount of time may be given to SEGUE in September and October so that SEGUE can obtain stripes and tiles at lower declination that can best be obtained in those months.

3) All other time is given to SEGUE. The choice between imaging and spectroscopy depends on atmospheric conditions (imaging if photometric, good seeing, and dark) and availability of sky. The imaging for a region of sky must precede the spectroscopy, which is why there is no SEGUE imaging in 2008. In any month, the fraction of the astronomically useful time allocated for imaging never exceeds 23%, based on experience with SDSS-I.

As the Legacy footprint is filled in, the demands for time by Legacy as a function of month will change, and this development of the footprint is not predictable. The present unobserved area between stripes 10 and 37 can be seen at http://www.sdss.org/status/imagingStatus.gif
and http://www.sdss.org/status/survey_area_covered_23.gif.

The model assumes something definite for filling in the Legacy footprint in order to create a definite baseline plan. In detail, the 2005 and 2006 profile for Legacy assumes a distribution of time by month based roughly on the distribution of Right Ascension for the remaining area. In 2007 and 2008, the 2005 and 2006 time for Legacy is reduced by a factor of 1.23. Thus the baseline plan calls for faster completion of Legacy in the North Galactic Cap than for the completion of SEGUE tiles in the same region of sky, but this balancing can be adjusted each year. The important part of the baseline is what each survey eventually yields by July 2008.

The model observing plan is a table of available hours per month, from 1 January 2005 to 30 June 2008, for each of the three surveys. To compute how many square degrees per hour are to be expected, we multiply the hours by 12.5 (as opposed to 18.75, which is the scan rate). The more conservative number corrects for inefficiencies and data that are collected but which do not pass the quality criteria. For Legacy, to compute the number of plates per hour, we adopt 1.8 hours per plate. Again, this is a conservative number based on SDSS-I experience that includes a correction for time spent obtaining plates in poor conditions with resulting longer exposures. As mentioned earlier, the number of SEGUE tiles is computed by assuming that each plate pair (SEGUE tile) requires 4.8 hours.

Legacy Survey Baseline

The baseline schedule for the Legacy survey is presented in Table 1 for imaging and for spectroscopy. Figures 1 and 2 present the same information in graphical form. As of 1 July 2005, approximately 200 square degrees remain to be completed for Legacy, and approximately 500 spectroscopic tiles.

Table 1. SDSS-II Baseline Projection – Legacy Survey

Period	Unique Imaging Area (sq. deg.)	Number of Spectroscopic Tiles
2005		
Q3	41	6.1
Q4	125	18.7
2006		
Q1	0	105.5
Q2	0	80.6
Q3	0	6.1
Q4	0	18.7
2007		
Q1	0	85.7
Q2	0	65.4
Q3	0	4.9
Q4	0	15.2
2008		
Q1	0	85.7
Q2	0	65.4
Total	166	558

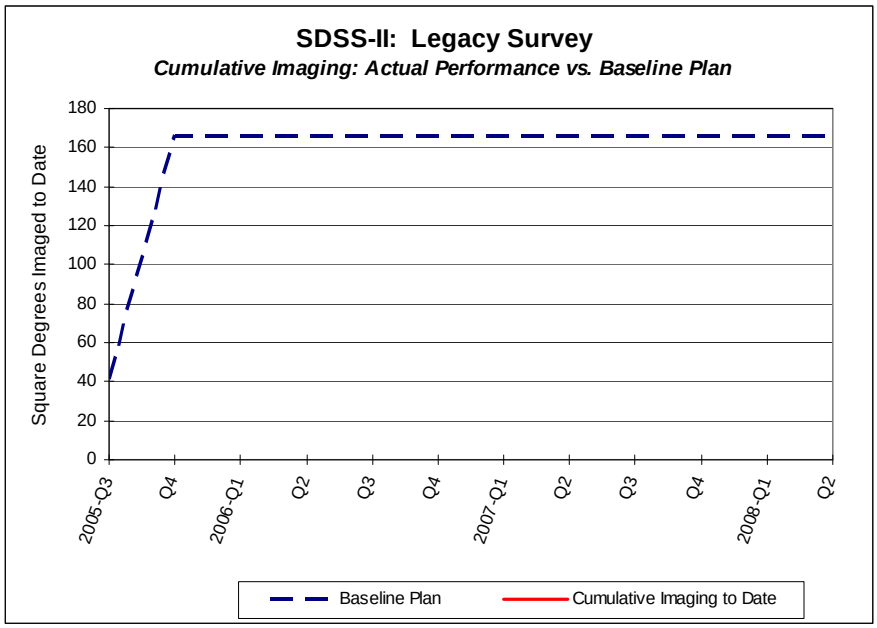

Figure 1. Baseline Imaging Schedule for the SDSS-II Legacy Survey

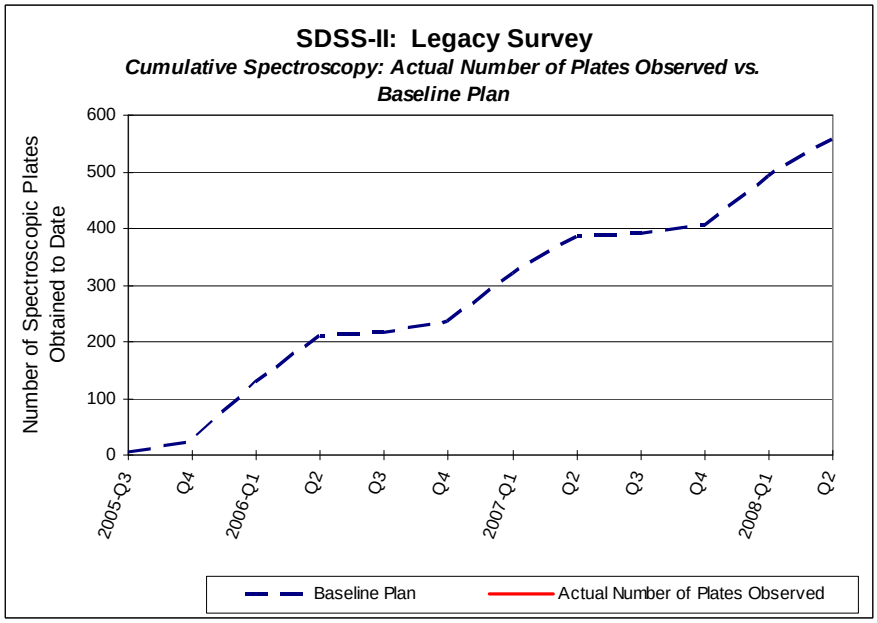

Figure 2. Baseline Spectroscopy Schedule for the SDSS-II Legacy Survey

SEGUE Survey Baseline

The baseline schedule for the SEGUE survey is presented in Table 2 for imaging and for spectroscopy. Figures 3 and 4 present the same information in graphical form. Although the SEGUE Survey goals are 3500 square degrees and 200 tiles, the projection in Table 2 shows a slightly smaller number for the imaging area. This is because the table covers the period from July 2005 through June 2008 and does not include SEGUE imaging data acquired prior to this period.

Table 2. SDSS-II Baseline Projection – SEGUE Survey

Period	Unique Imaging Area (sq. deg.)	Number of Spectroscopic Tiles
2005		
Q3	201	11.2
Q4	306	17.1
2006		
Q1	460	15.2
Q2	225	12.5
Q3	210	11.8
Q4	430	17.1
2007		
Q1	535	21.4
Q2	303	16.9
Q3	215	12.1
Q4	435	18.3
2008		
Q1	0	30.3
Q2	0	21.9
Total	3320	205.8

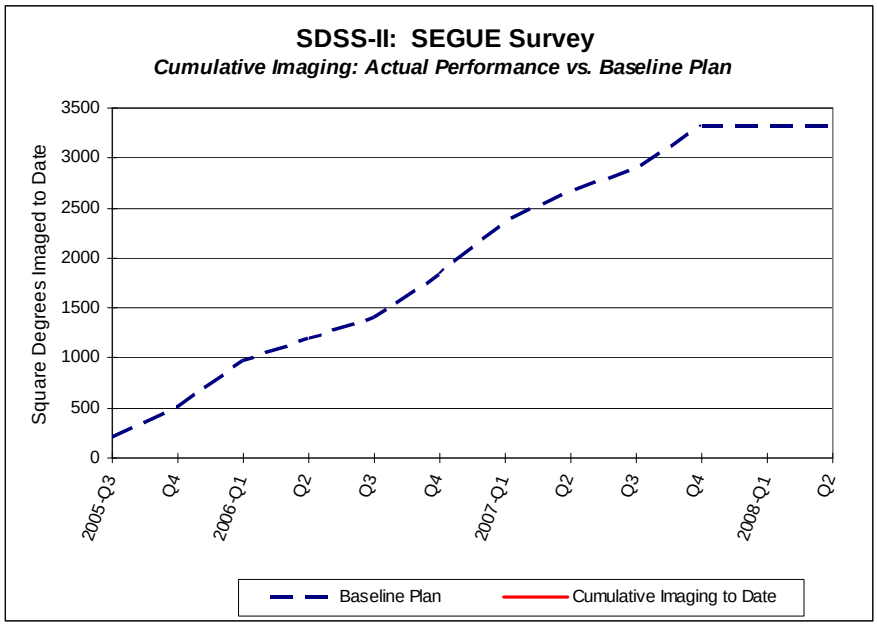

Figure 3. Baseline Imaging Schedule for the SDSS-II Legacy Survey

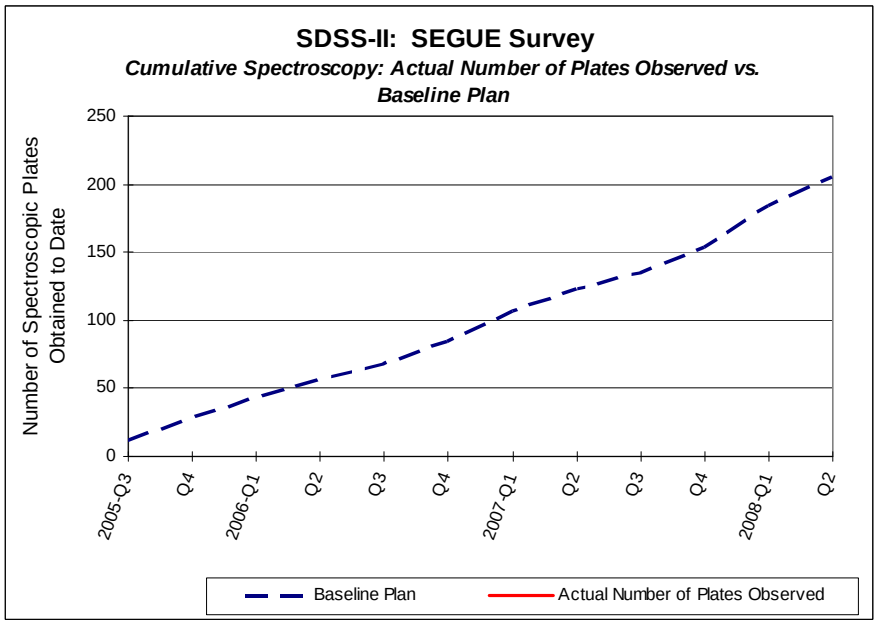

Figure 4. Baseline Spectroscopy Schedule for the SDSS-II Legacy Survey

SN Survey Baseline

For the SN survey, the model baseline observing plan allocates a certain number of hours useful for observing in the months September, October, and November, the same for 2005, 2006, and 2007 (ignoring details related to the lunations). The model assumes that time normally used for

spectroscopy is useful for SN imaging. For September, 10% of the available time is allocated for SEGUE, and this time is included in the Q3 baseline projection for SEGUE in Table 2. Similarly, for October 15% and for November 25% of the time is so allocated; this time for SEGUE is included in the Q4 baseline projection for SEGUE in Table 2.

The specific time for SEGUE in September and October in practice will be scheduled by the Head of Survey Coordination, taking into account the needs of both SEGUE and SN. The values of 10% and 15% for September and October, respectively, are estimates of the average amounts of time needed by SEGUE in those months. For November, the value of 25% reflects both the time not useable by SN because of airmass constraints, plus a lowered need for dense sampling at the end of the season.

After these allocations of time for SEGUE in the months of September, October, and November, the baseline model provides for 80 hours for SN in September, 83 hours in October, and 79 hours in November. These times are already corrected for inefficiencies, and so can be converted to square degrees by multiply by 18.75 square degrees per hour. In addition to this time, SN will observe during bright time, which will increase the hours quoted above by a factor of 1.25. In total, the model provides, on average, complete coverage of the 300 square degree area 19 times per season. In practice, some parts of the footprint will be covered more often and some less often, of course.

Appendix B

Level-4 Work Breakdown Structure (WBS)

WBS	Activity	Responsible
1	**Survey Management**	**Rich Kron**
1.1	ARC Administration	Mike Evans
1.2	Office of the Director	Rich Kron
1.3	Office of the Project Scientist	Jim Gunn
1.4	**Office of the Project Manager**	**Bill Boroski**
1.4.1	Project Management Office	Bill Boroski
1.4.2	**Project Milestones**	**Bill Boroski**
1.4.3	**Data Release Milestones**	**Bill Boroski**
1.4.4	**Summer Shutdown Periods**	**Bill Boroski**
1.5	Office of the Scientific Spokesperson	Michael Strauss
2	**Survey Operations**	Jim Gunn,Bill Boroski,Steve Kent
2.1	**Observing Systems**	Jim Gunn,Bill Boroski
2.1.1	Technical Support at APO	Bill Boroski
2.1.2	Off-mountain Technical Support	Bill Boroski
2.1.3	Plug Plate Production	Mike Evans
2.1.4	ARC Support for Observing Systems	Mike Evans
2.2	**Observatory Operations**	Bruce Gillespie
2.3	**Data Processing**	Chris Stoughton
2.3.1	**Data Processing Operations**	Chris Stoughton
2.3.1.1	Legacy Data Processing	Brian Yanny
2.3.1.2	SEGUE Data Processing	Brian Yanny,Jill Knapp
2.3.1.3	Supernova Data Processing	Josh Frieman
2.3.2	**Software and Data Processing Support**	Michael Strauss
2.4	**Data Distribution**	Bill Boroski
2.4.1	**Data Distribution Operations**	Brian Yanny
2.4.1.1	Legacy Data Distribution	Brian Yanny
2.4.1.2	SEGUE Data Distribution	Brian Yanny
2.4.1.3	Supernova Data Distribution	Josh Frieman
2.4.2	**Data Archive Development and Support**	Alex Szalay
2.5	**Survey Coordination**	**Steve Kent**
2.5.1	Legacy Survey Coordination	Steve Kent,Michael Strauss
2.5.2	**SEGUE Survey Coordination**	**Connie Rockosi,Brian Yanny**
2.5.3	Supernova Survey Coordination	Josh Frieman,Craig Hogan
2.6	**ARC Support for Survey Operations**	Mike Evans
3	**New Development**	Rich Kron
3.1	**SEGUE Project Development**	**Connie Rockosi,Brian Yanny**
3.1.1	**SEGUE Survey Planning and Coordination**	**Connie Rockosi,Brian Yanny**
3.1.1.1	**Segue Science Requirements**	**Connie Rockosi,Brian Yanny**
3.1.1.2	**SEGUE Survey Stategy**	**Connie Rockosi,Brian Yanny**
3.1.1.3	**SEGUE Qualilty Assurance Program**	**Connie Rockosi,Brian Yanny**
3.1.2	**SEGUE Target Selection**	**Connie Rockosi,Brian Yanny**
3.1.2.1	**SEGUE Target Selection Web Page**	**Connie Rockosi,Brian Yanny**
3.1.2.2	**SEGUE Target Selection Code Changes**	**Connie Rockosi,Brian Yanny**
3.1.3	**Very-Low-Latitude Target Selection and Data Processing Analysis**	**Connie Rockosi,Brian Yanny**
3.1.4	**Refined Derived-Parameters Determinations and Theory/Simulations**	**Connie Rockosi,Brian Yanny**
3.1.5	**Calibrations/Catalogs of Spectroscopy of Stars of Known Metalicity**	**Connie Rockosi,Brian Yanny**
3.1.6	**SEGUE Data Processing Software Development**	**Connie Rockosi,Brian Yanny**
3.1.6.1	**SEGUE Spectro-1D Pipeline**	**Mark SubbaRao**
3.1.6.2	**SEGUE Spectro-2D Pipeline**	**Craig Loomis**
3.1.6.3	**SEGUE Stellar Atmosphere Parameter Code**	**Tim Beers**
3.1.6.4	**Incorporate Proper Motions into Stellar Parameters**	**Jeff Munn,Sebastian Lepine**
3.1.6.5	**SEGUE Spectro Parameter Flat File Format**	**Brian Yanny**
3.1.6.6	**SEGUE Stellar Atmosphere Parameter Pipeline**	**Sivarani Thirupathi**
3.1.6.7	**Photo Pipeline Modifications for Crowded Field Data**	**Robert Lupton**
3.1.7	**SEGUE Database Development**	**Ani Thakar**
3.1.8	**SEGUE Technical Papers**	**Connie Rockosi,Brian Yanny**
3.1.8.1	**SEGUE Target Selection Technical Paper**	**Connie Rockosi,Brian Yanny**
3.1.8.2	**SEGUE Stellar Parameter Technical Paper**	**Tim Beers**

Level-4 WBS (continued)

WBS	Activity	Responsible
3.2	**Supernova Project Development**	Josh Frieman
3.2.1	**SN Survey Planning and Coordination**	Josh Frieman
3.2.1.1	**SN Science Requirements Document**	**Josh Frieman**
3.2.1.2	**SN Quality Assurance Plan**	**Rick Kessler**
3.2.1.3	**SN Software Requirements Document**	**Josh Frieman**
3.2.1.4	**SN Proposal for Bright-time Operations in 2005-07**	**John Marriner**
3.2.1.5	**2.5m SN Observing Plans**	**Steve Kent**
3.2.1.6	**SN Project Operations Plan**	**Fritz DeJongh**
3.2.1.7	**SN Software Development Plan**	**Fritz DeJongh**
3.2.1.8	**SN On-mountain Computer Hardware Plan**	**Fritz DeJongh**
3.2.1.9	**APO Computer Room Cooling Upgrade Plan**	**Bruce Gillespie**
3.2.1.10	**SN Off-mountain Computer Hardware Plan**	**Hubert Lampeitl**
3.2.1.11	**SN Database Development Plan**	**Hubert Lampeitl**
3.2.1.12	**SN Candidate Rapid Dissemination Plan**	**John Marriner**
3.2.1.13	**Coordination of Follow-up Observations**	**Josh Frieman**
3.2.1.14	**SN Public Dissemination Plan**	**Chris Stoughton**
3.2.2	**SN Project Computing Hardware Implementation**	Josh Frieman
3.2.2.1	**APO Computer Room Cooling Upgrade**	**Bruce Gillespie**
3.2.2.2	**SN On-mountain Computer Hardware Implementation**	**Fritz DeJongh**
3.2.2.3	**SN Off-mountain Computer Hardware Implementation**	**Hubert Lampeitl**
3.2.2.4	**Supernova Database Computer Hardware Implementation**	**Chris Stoughton**
3.2.2.5	**SN Public Archive Computer Hardware Implementation**	**Chris Stoughton**
3.2.3	**SN Software Development for 2.5m Survey Operations**	Josh Frieman
3.2.3.1	**SN Software Script Development**	**Rick Kessler**
3.2.3.2	**Improved Stripe 82 Photo-Z Implementation**	**Erin Sheldon**
3.2.3.3	**PHOTO Module Improvements (only if necessary to meet processing-time req.)**	**Rick Kessler**
3.2.3.4	**SN Software Tools**	**Ben Dilday**
3.2.3.5	**Frame Subtraction Pipeline Development**	**Fritz DeJongh**
3.2.3.6	**Co-Added Template Frames (enhanced goal)**	**Josh Frieman**
3.2.3.7	**Production and preparation of Templates**	**Josh Frieman**
3.2.3.8	**I-Band Frame Subtraction**	**Fritz DeJongh**
3.2.3.9	**Forced Object Measurement**	**Fritz DeJongh,Andy Becker**
3.2.3.10	**Veto Catalogs and Objects Database**	**Hubert Lampeitl**
3.2.3.11	**SN Candidates Database**	**Hubert Lampeitl**
3.2.3.12	**doObjects Pipeline**	**Hubert Lampeitl**
3.2.3.13	**HandScan Tool Development**	**Hubert Lampeitl**
3.2.3.14	**Target Selection Development**	**Josh Frieman**
3.2.3.15	**Selection Criteria**	**John Marriner**
3.2.3.16	**Target Selection Web Interface**	**John Marriner**
3.2.3.17	**Public SN Candidate Web Server**	**John Marriner**
3.2.4	**Software Development for Follow-up Observations**	Josh Frieman
3.2.4.1	**Follow-up Candidates and Observed Objects Database**	**John Marriner**
3.2.4.2	**SN Observing Tools**	**John Marriner**
3.2.4.3	**SN Typing Tools**	**Juan Estrada**
3.2.4.4	**Auxiliary Imaging Data Reduction Tools**	**Hubert Lampeitl**
3.2.4.5	**SN Intercalibration Framework**	**Hubert Lampeitl**
3.2.5	**Software Development for SN Off-mountain Analysis**	Josh Frieman
3.2.5.1	**SN Photometry Pipeline**	**Hubert Lampeitl**
3.2.5.2	**Improved Stripe 82 Object/Image Calibrations**	**Juan Estrada**
3.2.6	**SN Database Development**	Josh Frieman
3.2.6.1	**Collaboration Archive of Repeat Imaging Data and/or Catalogs**	**Chris Stoughton**
3.2.6.2	**Public Archive of Repeat Imaging Data and/or Catalogs**	**Chris Stoughton**
3.2.6.3	**SN Database Development**	**Hubert Lampeitl**
3.3	**Photometric Calibration Development**	Jill Knapp

Level-4 WBS (continued)

WBS	Activity	Responsible
3.4	**Data Acquisition Upgrade**	Kurt Biery
3.4.1	**DA Upgrade Planning**	**Bill Boroski**
3.4.1.1	**DA Upgrade Functional Specification**	**Don Holmgren**
3.4.1.2	**DA Upgrade Test Plan**	**Kurt Biery**
3.4.1.3	**DA Upgrade Commissioning Plan**	**Don Holmgren**
3.4.2	**DA Hardware Procurements**	**Bill Boroski**
3.4.3	**DA Software Development**	**Margaret Votava**
3.4.3.1	**VxWorks Environment**	**David Slimmer**
3.4.3.2	**VxTools Mods**	**David Slimmer**
3.4.3.3	**Emulation Code Development**	**Kurt Biery**
3.4.3.4	**Archiver Mods**	**Fritz Stauffer**
3.4.3.5	**Murmur Portability Check**	**Margaret Votava**
3.4.3.6	**Network Time Protocol (NTP)**	**Fritz Stauffer**
3.4.3.7	**ftelnet Tests**	**Craig Loomis**
3.4.3.8	**Port Infrastructure Code to "host2"**	**Margaret Votava**
3.4.3.9	**Port Observing Tools to "host2"**	**Eric Neilsen**
3.4.3.10	**IOP code modifications**	**Eric Neilsen**
3.4.3.11	**Potential Astroline Modifications**	**Kurt Biery**
3.4.3.12	**sdssmth Upgrade**	**Eric Neilsen**
3.4.3.13	**TPM Modifications**	**Peregrine Mc Gehee**
3.4.4	**DA Upgrade Testing at Fermilab**	**Kurt Biery**
3.4.4.1	**FNAL Test Stand Verification**	**Kurt Biery**
3.4.4.2	**DA System Testing at FNAL**	**Kurt Biery**
3.4.5	**DA Upgrade Preps at APO**	**Fritz Stauffer**
3.4.5.1	**DA Preliminary Development and Testing at APO**	**Fritz Stauffer**
3.4.5.2	**APO Site Preparations**	**Craig Loomis**
3.4.5.3	**DA Upgrade Hardware/Software Installation at APO**	**Fritz Stauffer**
3.4.6	**DA Upgrade Commissioning**	**Bill Boroski**
3.4.7	**Final As-built Documentation**	**Margaret Votava**
3.4.8	**DA Upgrade Tape Drive Replacement**	**Bill Boroski**
4	**ARC Corporate Support**	Mike Evans
5	Education and Public Outreach	Julie Lutz
6	Management Reserve	Rich Kron

Appendix C

ARC Work Agreements by Institution

Institution	Agreement	Description	Manager
ARC	SSP-221	ARC Secretary and Treasurer	M. Evans
	SSP-234	ARC Business Manager	M. Evans
	SSP-291	ARC Corporate Accounts	M. Evans
Fermilab	SSP-140	SEGUE and Supernova Survey Development	S. Kent
	SSP-161	Data Acquisition Upgrade	D. Petravick
	SSP-240	Software and Data Processing	S. Kent
	SSP-242	Observing Systems Support	W. Boroski
	SSP-248	Survey Management Support (Proj. Manager)	W. Boroski
	SSP-261	Observing Programs and DA Support	K. Biery
	SSP-268	Data Distribution Operations	M. Kaletka
Japan Participation Group	SSP-256	Observing Systems Support	S. Okamura
Johns Hopkins University	SSP-237	Data Archive Development and Support	A. Szalay
	SSP-272	APO Site Management Support	B. Gillespie
New Mexico State	SSP-235	NMSU Site Support	M. Klaene
Princeton University	SSP-138	SEGUE Survey Development	M. Strauss
	SSP-232	Observing Systems Support	J. Gunn
	SSP-238	Software and Data Processing Support	M. Strauss
	SSP-246	Survey Management Support (Proj. Scientist)	J. Gunn
Univ. of Chicago	SSP-139	Supernova Survey Development	J. Frieman
	SSP-239	Software and Data Processing Support	J. Frieman
	SSP-267	Survey Management Support (Director)	R. Kron
Univ. of Washington	SSP-231	Observing Systems Support	M. Evans
	SSP-270	EPO Coordinator	J. Lutz
	SSP-302	Systems Engineering Manager	F. Leger
Los Alamos National Laboratory	SSP-258	Observing Systems Support	S. Habib
Michigan State University	SSP-269	SEGUE Survey Development	T. Beers
United States Naval Observatory	SSP-257	Software and Data Processing Support	J. Pier
Ohio State University	SSP-271	Crowded Field Photometry Scientific Support	J. Johnson
Univ. of California Santa Cruz	SSP-273	SEGUE Radio Velocity Accuracy Scientific Support	C. Rockosi

Appendix D

SDSS-II Cost Control Structure (CCS)

1. Survey Management

1.1. ARC Administration
- SSP-221 - ARC Secretary Treasurer
- SSP-234 - ARC Business Manager

1.2. Office of the Director
- SSP-267 - UC Support for Survey Management

1.3 Office of the Project Scientist
- SSP-246 - Princeton Support for Survey Management

1.4 Office of the Project Manager
- SSP-248 - Fermilab Support for Survey Management

1.5 Scientific Spokesperson
- SSP-291a - Support for Public Affairs
- SSP-291b - ARC Support for the Spokesperson
- SSP-291c - ARC Support for Collaboration Affairs

2. Survey Operations

2.1 Observing Systems

2.1.1. Technical Support at APO
- SSP-242 - FNAL Observing Systems Support
- SSP-302 - UW Systems Engineering Support

2.1.2. Off-mountain Technical Support
- SSP-261 - FNAL Observing Programs and DA Support
- SSP-231 - UW Observing Systems Support
- SSP-232 - PU Observing Systems Support
- SSP-257 - USNO Observing Systems Support
- SSP-258 - LANL Observing Systems Support
- SSP-256 - JPG Observing Systems Support

2.1.3. Plug-plate Production
- SSP-231 – UW Observing Systems Support

2.1.4. ARC Support for Observing Systems
- SSP291d – ARC Observing Systems Support

2.2. Observatory Operations
- SSP-235 – APO Site Support
- SSP-272 – APO Site Management Support

2.3. Data Processing

2.3.1. Data Processing Operations
- SSP-240 – FNAL Software and Data Processing Support

2.3.2. Software and Data Processing Support
- SSP-238 – PU Software and Data Processing Support
- SSP-239 – UC Software and Data Processing Support
- SSP-269 – MSU Software and Data Processing Support
- SSP-257 – USNO Software and Data Processing Support

2.4. Data Distribution

2.4.1. Data Distribution Operations
- SSP-240 – FNAL Software and Data Distribution Support
- SSP-268 – FNAL Data Distribution Operations

2.4.2. Data Archive Development and Support
- SSP-237 – JHU Data Archive Development and Support

2.5. Survey Coordination
- SSP-240 – FNAL Software and Data Processing Support

2.6. ARC Support for Survey Operations
- SSP-291f – Additional Scientific Support
- SSP-291h – Observers' Research Fund

3. New Development

3.1. SEGUE Survey Development

SSP-138 – PU SEGUE Software Development
SSP-140 – FNAL SEGUE Development
SSP-237 – JHU Data Archive Development and Support
SSP-268 – FNAL Data Distribution Support
SSP-269 – MSU SEGUE Software Development
SSP-271 – OSU Scientific Support
SSP-273 – UCSC Scientific Support

3.2. Supernova Survey Development

SSP-139 – UC Supernova Survey Development
SSP-140 – FNAL Supernova Development
SSP-231 – UW Supernova Survey Development
SSP-235 – APO Computer Room Upgrade

3.3. Photometric Calibration

SSP-138 – PU Software Development

3.4. Data Acquisition Upgrade

SSP-161 – FNAL DA Upgrade Support

4. ARC Corporate Support

SSP291e - Corporate Support
SSP291g – Capital Improvements

5. Education and Public Outreach

SSP-270 – ARC Support for EPO Coordinator
SSP-291i – ARC Support for Public Information Officer
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6. Management Reserve

SSP-291 - Management Reserve

Appendix E

SDSS-II Closeout Plan

Table of Contents

1. Introduction

This document describes the closeout plan for the Sloan Digital Sky Survey II (SDSS-II) under two scenarios. Scenario 1 assumes there will be a follow-on SDSS-III project; Scenario 2 assumes there is no follow-on project. As activities associated with the final data release, and project closeout activities such as settling project accounts and preparing final reports, are the same in both scenarios, the only difference is the manner in which observatory operations at APO are handled.

Observing operations for the SDSS-II project are scheduled to end on July 14, 2008. If there is a follow-on project, then all aspects of observatory operations and observing systems, including budgetary responsibility, will be handed over to the SDSS-III project on July 15, 2008. In parallel, the final set of data will be processed, calibrated, and loaded into databases in preparation for the final data release. The final data release will be made available to the collaboration by October 1 and released to the public on October 31, 2008. The public release will mark the end of all SDSS-II infrastructure work. During the month between the final collaboration and public releases, responsibility for the long-term stewardship of the SDSS Archive will be transferred from the SDSS-II project to the long-term steward. Work following the final data release will consist of settling final invoices, closing financial accounts, and writing final project reports. This work will be performed by the Director, Project Manager, and ARC Business Manager and will be completed by December 31, 2008. At the completion of closeout activities, the Director and Project Manager will present a final project closeout report to the SDSS Advisory Council II and ARC Board of Governors.

If there is no follow-on project (Scenario 2), then after the completion of observing operations on July 14, equipment and systems at APO will be prepared for long-term storage. The 2.5m telescope, 0.4m Photometric Telescope, imaging camera, spectrographs, data acquisition system, and all supporting sub-systems will be prepared for long-term storage at APO. Long-term loan agreements or property

transfers will be executed between ARC and the participating institutions for equipment or systems that will remain in long-term storage at APO.

The following assumptions have been made in preparing this closeout plan:

1. Data processing and distribution operations will be automated to the point that all new data collected during the last month of operations will be processed, calibrated, and loaded into the databases within 4 weeks of its acquisition.
2. The final data release will be referred to as Data Release 7 (DR7). There will be two versions of DR7 released to the collaboration, with only the latter released to the public. Thus, there will be two collaboration data releases and one final public data release.
    a. The first collaboration release (DR7_1) will contain all survey quality Legacy and SEGUE data collected through October 1, 2007. The data will be processed and calibrated using the same pipelines and methods used for DR6. The data will be loaded into databases using the same data model, schema, and database loading tools used for DR6. The first collaboration release will occur by February 14, 2008.
    b. The second collaboration release (DR7_2) will contain all survey quality Legacy and SEGUE data collected through July 15, 2008. All data will be processed using new versions of the photometric pipelines, photo and psPhot; and the spectroscopic pipeline, idlspec2d. All imaging data will be calibrated using the ubercal pipeline. This requires the delivery of production-ready pipelines in late 2007. It also requires a complete reprocessing and recalibration of all data collected prior to January 1, 2008; the reprocessing is scheduled to occur in spring 2008. In parallel with the reprocessing activity, all new data collected between January 1 and July 14, 2008 will be processed using the new pipelines. The re-processing of the data set requires a complete reload of the Catalog Archive Server "best" database and a modification of all Data Archive Server (DAS) links to point to the newly-processed data. The data model and database schema changes associated with the pipeline upgrades, and other improvements, require a new version of the software used to load the CAS databases. The second collaboration release is scheduled to occur by October 1, 2008.
    c. The final public release (DR7) is scheduled to occur on October 31, 2008. The public will be given full access to the DAS and CAS versions released to the collaboration as DR7_2. Given the shortness of time between the final collaboration and public releases, no changes will be made to the final data set. Rather, problems will be documented in the final release documentation.
3. It is anticipated that all work associated with preparing data from the Supernova Survey for the final public release will occur prior to July 15, 2008. As such, the closeout plan does not include support for any work associated with the Supernova Survey.
4. Fermilab will serve as the initial primary steward of the SDSS and SDSS-II data archives. The formal transfer of stewardship responsibilities from the SDSS-II project to Fermilab will occur in October 2008, with the transfer complete in time for the final public data release. It is anticipated, however, that preparations for the transfer will begin much earlier in the year. An MOU will be established between Fermilab and ARC defining roles, responsibilities, and financial support arrangements; a draft version of this MOU is currently under preparation. Costs associated with data stewardship activities beyond 2008 are not included in this closeout plan; they are included in the SDSS-II Archive Stewardship Plan (to be developed).
5. It is anticipated that two university science libraries will serve as mirror sites to the archive at Fermilab. Details are defined in the SDSS-II Archive Stewardship Plan (to be developed).

6. Princeton will serve as the interim steward of the SDSS and SDSS-II mail archives and problem-reporting database until the archives can be successfully transferred into a form suitable for long-term curation. The intent is to take a "snapshot" of the mail archive, problem-reporting database, and other similar systems on October 31, 2008, and that the snapshot version will be archived. It is anticipated that planning for this effort will occur in 2008, with completion of the transfer occurring in late 2008, shortly after the final public data release. Costs associated with transfer activities beyond October 31, 2008 are not included in this closeout plan; as appropriate, they are included in the SDSS-II Archive Stewardship Plan (to be developed).
7. All ARC SSP accounts will be closed to new charges on or before October 31, 2008. This will help ensure that final costs will be known and final invoices will be received in a timely manner to support the closeout schedule.
8. A decision on whether to begin planning for closeout activities at APO will be made no later than May 15, 2008. This will allow for sufficient time to plan for APO closeout activities to begin on July 15, 2008, should the status of the follow-on project still be uncertain by the May decision date.

2. Closeout Plan Timeline

The period of performance for this closeout plan is July 15, 2008 through December 31, 2008. Figure 1 presents a summary view of the timeline for the project closeout and includes the incremental activities necessary to close down SDSS operations at APO if there is no follow-on project.

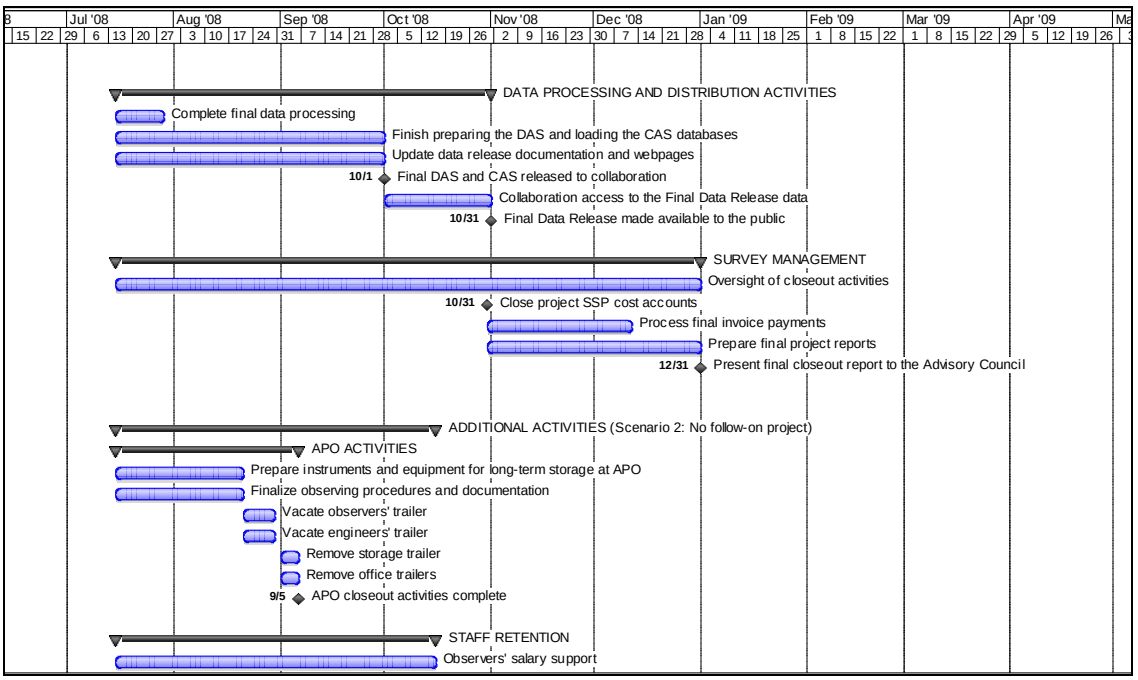

Figure 1. Closeout Plan Timeline

Subsequent sections of this document describe the scope of work and budget in greater detail. The scope of work is fully captured in a detailed Work Breakdown Structure (WBS) and resource-loaded schedule, which has been prepared and will be maintained by the SDSS-II project office.

3. Closeout Budget

Table 1 presents the current forecast for the closeout budget, organized by scenario and WBS category.

- If there is a follow-on project, then the estimated cost to complete the remaining data processing and distribution activities, and terminate the project, is $505K, including $50K in anticipated in-kind contributions of and $455K of ARC-funded expenses.
- If there is no follow-on project, then additional costs will be incurred to close down activities at APO. The incremental cost for these activities is estimated to be $400K. Since there are no in-kind costs associated with these activities, the full cost will be ARC-funded.

Until it is known with certainty that a follow-on project will occur, and that the follow-on project will be in a position to accept full financial responsibility for SDSS-II observing systems and observatory operations at APO beginning on July 15, 2008, it is most prudent to consider a closeout budget that provides for the second scenario. In this case, the total cost forecast to close out the SDSS-II project is $905K, including $50K in anticipated in-kind contributions and $855K of ARC-funded expenses.

Table 1. SDSS-II Closeout Budget ($K)

	ARC-Funded Budget	*In-Kind Contribution*	*Total*
Scenario 1: *Closeout Activities with a Follow-on Project*			
Survey Management	165	22	187
Collaboration Affairs	10	0	10
Data Processing and Distribution	230	28	258
ARC Corporate Support	15	0	15
Sub-total	420	50	470
Management Reserve	35	0	35
Scenario 1 Sub-total:	455	50	505
Scenario 2: *Incremental Activities if No Follow-on Project*			
Observing Systems	80	0	80
Observatory Operations	290	0	290
Sub-total	370	0	370
Management Reserve	30	0	30
Scenario 2 Sub-total	400	0	400
Total Closeout Budget ($K)	855	50	905

4. Scenario 1: Closeout Activities with a Follow-on Project

4.1. Survey Management

Survey management activities will be performed by the Director, Project Scientist, Project Manager, Associate Project Manager, and ARC Business Manager, with support from their administrative staff. The Director and Project Manager will oversee final data processing and distribution activities; and the transfer of responsibility for APO activities to the follow-on project. They will be responsible for

preparing quarterly and final project reports. The Project Scientist will provide support for survey management activities as necessary. The Business Manager will be responsible for managing ARC corporate affairs, negotiating long-term property loans or transfers, processing final invoice payments, closing ARC SSP accounts, disposing of ARC-purchased equipment (e.g., computers), and satisfying final funding agency reporting requirements.

In addition to these management and administrative activities, a number of other management activities associated with the project closeout will begin before the closeout period.

1. The Business Manager will assemble a list of all computers purchased with ARC funds and will coordinate the disposition of these assets in accordance with ARC policy. In some cases, it may be most appropriate to transfer ownership of a specific computer from ARC to a participating institution. In other cases, it may be most appropriate to reassign the computer within the ARC consortium. In all cases, the Business Manager will be responsible for documenting the final disposition of each computer in preparation for the final closeout audit.
2. The Project Manager will assemble a list of all non-computer assets (hardware and software) that are located at the various institutions that have participated in the construction, commissioning, and operation of the survey. The goals of this activity will be to assemble a comprehensive list of ARC-funded assets that will be of value to future possible observing operations and gather value assets together in a single location. An example of such assets is the plug plate drilling fixture and the plug plate QA measuring fixture. If there is not a follow-on project, then at the end of the survey it will be advantageous to have this tooling shipped to APO as opposed to leaving the responsibility for long-term storage with the UW machine shop.
3. The Project Manager will be responsible for organizing a documentation archive containing all documentation relevant to future continued operations of the SDSS equipment and systems at APO.

It is anticipated that these activities will be completed and documents and other property turned over to ARC as part of the final project closeout.

The ARC-funded budget will cover the following expenses:

- 50% of the salary cost for the Business Manager and 25% of the salary cost for administrative support staff for the period July 15 through October 31, 2008.
- One trip to APO by the Business Manager.
- Modest office supply costs for the Business Manager.
- Two months of summer salary support for the Director and Project Scientist
- 50% of the salary cost for the Associate Project Manager for the period July 15 through October 31, 2008.
- Travel by the Director, Project Manager, Associate Project Manager and Spokesperson associated with final data release and closeout activities, through October 31, 2008.

With the exception of summer salary support provided to the Director and Project Scientist, it is anticipated that salary costs for the Director, Project Scientist, Project Spokesperson, and Project Manager will be provided by their respective institutions as an in-kind contribution.

4.2. Collaboration Affairs

During the closeout period, the Spokesperson will work with the Management Committee, Collaboration Council and Working Group chairs to finalize collaboration-related activities. A modest amount of travel support will be required to support this effort.

A technical paper describing the final data release will be prepared and submitted for publication. Page charges will be covered by ARC funds, which will be set aside in an ARC account for this purpose.

It is possible that a final collaboration meeting will be organized after July 15, 2008. ARC funds will not be used to cover meeting expenses. If a collaboration meeting is held, it should sustain itself with a registration fee. If a collaboration meeting is held in conjunction with an AAS meeting, individuals will be responsible for paying their own expenses.

In summary, the ARC-funded budget will cover the following expenses:

- Travel expenses for the Spokesperson through October 31, 2008.
- Final data release page charges

4.3. Observing Systems

Observing Systems includes all equipment and systems used to support SDSS-II observing operations. With a follow-on project, the intent is to keep all of these systems in place and functional at APO. A list of this equipment will be assembled prior to the end of SDSS-II observing operations. The list will provide an inventory of ARC assets and will show current institutional ownership for those items associated with observing operations that were not purchased with ARC funds. The ARC Business Manager will work with each institutional owner to negotiate long-term loan arrangements or permanent property transfers to ARC.

During SDSS-II operations, machine tools were provided to APO by Fermilab to support observing operations. Prior to the end of observing operations, an MOU will be established between Fermilab and ARC that will allow these machine tools to remain at APO under a long-term loan agreement. Responsibility for on-going maintenance and repair of these machines will reside with APO.

4.4. Data Processing and Distribution

Fermilab will provide scientific and technical staff to finish data processing and calibration activities, configure the final DAS and load the final CAS, and perform other activities as necessary to prepare for the final data release.

Princeton, Johns Hopkins, and the Adler Planetarium will provide scientific and technical staff to support final data processing and distribution activities leading up to the final data release. Princeton activities will include testing and scientific evaluation of the final data set, and participation in the development of final survey documentation. JHU activities will include support for the final CAS load and preparing documentation for the final release. Adler Planetarium support will include quality inspections of the spectroscopic data.

The final release of SDSS data will mark the end of all infrastructure work associated with data processing and distribution. Subsequent activities will be related to maintaining the project website (www.sdss.org), serving up the data archive, and providing helpdesk support. Activities associated with maintaining the SDSS website and serving up the data archive will be transferred to Fermilab. The primary responsibility for helpdesk support will reside with the University of Chicago Crerar Library, with subject matter support provided by various members of the SDSS collaboration on a best-effort basis.

Fermilab will create and maintain a permanent archive copy of the CVS repository used to store software used in SDSS/SDSS-II observing, data processing, and data distribution operations. During

the course of the SDSS/SDSS-II survey, Princeton maintained the project mail archives, the problem-reporting database GNATS, and a CVS repository containing some of the software used in production operations. It is anticipated that Princeton will continue to maintain the mail archive and problem-reporting database during the closeout period. In mid-November, Princeton will make a final archive copy of all mail archives, the problem-reporting database, and the Princeton CVS repository and will provide the archive copy to Fermilab for long-term curation.

In summary, the ARC-funded budget for data processing and distribution provides salary and benefits support for the following:

- Fermilab: The budget will support 0.5 FTEs of post-doc support and 5.25 FTEs of computer professional support to support final data processing and distribution activities.
- Princeton: The budget will support two members of the scientific/technical staff at 25% each through October 31, and two post-docs at 100% each through September 30, to support final data release preparations, mail archives, and the problem-reporting database.
- Johns Hopkins: The budget will support 0.5 FTEs of database developer support through October 31 and 0.25 FTEs of system admin support through September 30, to support final data release preparations.
- Adler Planetarium: The budget will support 0.1 FTE of scientific staff effort through September 30 to perform quality inspections on the final spectra data set.

It is anticipated that Fermilab will provide the salary costs for one FTE of scientist support during the closeout period as an in-kind contribution to ARC.

Not included in the closeout budget is the value of in-kind salary support for senior scientists at participating institutions (e.g., Princeton, Johns Hopkins, and the University of Chicago) who will be providing support for the final data release. This is in consistent with past policy and practice.

4.5. ARC Corporate Support

Corporate support affairs will be handled and managed by the ARC Business Manager. We do not anticipate incurring any legal expenses as part of the SDSS-II closeout. Anticipated corporate expenses included in the ARC-funded budget include the following:

- Six months of insurance
- CPA audit and closeout fees

ARC financial records are audited on an annual basis by an external audit firm. Given the plan to close out the SDSS project in December 2008, we will arrange for an external audit of SDSS-II financial records in January 2009, once most invoices have been received and processed. Estimated audit fees are included in the closeout budget and will be set aside in an ARC account to cover final audit expenses.

4.6. Management Reserve

The management reserve budget for Scenario 1 is set at approximately 7% of the ARC-funded closeout budget. Management reserve will be controlled by the SDSS Director.

5. Scenario 2: Incremental Closeout Activities without a Follow-on Project

5.1. Observing Systems

If there is no follow-on project, then in consultation with the Project Scientist and Project Manager, the SDSS-II Telescope Engineer will be responsible for preparing equipment and systems at APO for

long-term storage. A careful assessment of each system will be performed and the appropriate means of storage will be determined and implemented. As a starting point, it is anticipated that the SDSS imaging camera will be prepped and moved into the clean room of the APO operations building. The spectrographs will remain mounted to the 2.5m telescope; however, it may be appropriate to remove spectrograph optics and cameras and store them in the APO instrument lab. Data acquisition system computers, disk drives, and other components will be powered down and left in place. The outside manipulator and its rails will be removed and placed inside the SDSS support building. Existing spare parts will be inventoried, removed from the Spare Parts Storage Trailer and placed into storage in the building currently housing plug plate operations. Systems documentation will be organized and finalized during the last six months of observing operations and will be handed over to the APO Site Operations Manager for long-term archival storage. The Engineering Office Trailer will be emptied of all tools, documentation, office equipment and personal items in preparation for trailer removal.

Machine tools provided to APO by Fermilab to support observing operations will be returned to Fermilab. On-site engineering staff will remove these tools and prepare them for shipment back to Fermilab. Shipping costs for these machines are included in the closeout budget.

The ARC-funded budget will cover the following expenses:

- Salary support through August 30, 2008 for the SDSS-II Telescope Engineer and two technicians at APO involved in closeout activities;
- Materials and supplies to prepare SDSS-II equipment and systems for long-term storage at APO.
- Travel and shipping costs related to the removal of Fermilab machine tools from the APO machine shop and their shipment back to Fermilab.
- Relocation costs for permanent full-time Fermilab members of the engineering staff in residence near APO. Relocation costs will cover moving expenses from New Mexico to the Fermilab area, in accordance with the approved Fermilab relocation policy.

5.2. Observatory Operations

Observatory Operations includes APO infrastructure support and observer activities. During normal operations, the SDSS operating budget covers a significant fraction of infrastructure costs for services (e.g., cleaning, trash removal, maintenance); utilities (e.g., water, electricity, telecommunications); and supplies (e.g., cryogens, other miscellaneous). The closeout budget for Observatory Support will provide for 67% of site infrastructure costs for the period July 1 through August 30, 2008. The closeout budget does not provide funds for cryogens, as it is anticipated that the instruments will not be kept cold after July 14.

The closeout budget provides fully-loaded salary support for nine observers through October 15, 2008. The observers will be responsible for finalizing operating procedures, documenting final software versions, and other related tasks that will allow startup of operations at some point in the future. The observers will assist the project scientist with activities related to instrument storage preparation, and the engineering crew with closeout activities. The observers will be responsible for emptying the observers' office trailer of all personal items in preparation for trailer removal by August 30. Office furniture and computing equipment will be removed and disposed of by APO site staff.

The closeout budget provides partial salary support for specific members of the APO operations staff. The Site Operations Manager will be responsible for overseeing site infrastructure support, including the removal of the engineers' and observers' office trailers. The Computer Systems Manager will support the decommissioning of all computer systems and networks associated with SDSS operations.

The SDSS-II Operations Engineer, one technical writer, and one maintenance technician will assist the SDSS-II Telescope Engineer with closeout activities.

ARC has a standing agreement with the U.S. Forest Service regarding the use of land for observatory operations. Under the existing agreement, ARC must maintain the exterior appearance of all observatory buildings. With the closeout of the SDSS project, it is understood that APO site staff will be responsible for the ongoing maintenance of the exterior of all SDSS facilities, with long-term funding provided by ARC. Funding for this on-going maintenance is not included in the SDSS closeout budget.

In summary, the ARC-funded budget will cover the following expenses:

- Salary support for nine observers through October 15.
- Salary support for the SDSS-II Operations Engineer and administrative assistant through August 30.
- Salary support for the APO Site Operations Manager, computer systems manager, computer systems administrator, technical writer, and maintenance technician, at the 50% level through August 30.
- Salary support for the ARC Program Administrator at the 25% level, through August 30.
- Benefits and overhead for the aforementioned staff.
- Two months of rental on the spare parts storage trailer.
- Three months of rental for the observers' office trailer and engineer's office trailer.
- 67% of site service, utility, and supply costs through August 30.

5.3. ARC Corporate Support

Corporate support affairs will be handled and managed by the ARC Business Manager. If there is no follow-on project, the Business Manager will administer the contract for removing the engineers' and observers' office trailers from APO. It is anticipated that the observers will complete their work and vacate their office trailer by August 30 and that the engineering staff will complete their work and vacate their office trailer by August 30. Office equipment in the trailers will be removed and/or disposed of by the APO site staff. The trailers will be prepped for removal by the APO site staff such that the trailers will be removed from the site by October 15. In consultation with the ARC Business Manager, the APO Site Operations Manager will be responsible for securing the contracts to remove the trailers and perform site restoration. The area occupied by the Observers' Trailer will be restored to its original condition, with all utilities properly removed and/or terminated. The area occupied by the Engineers' Trailer will be left as a gravel pad with all utilities left intact in a secure and safe manner.

Anticipated corporate expenses included in the ARC-funded budget include the following:

- Removal costs for the engineers' and observers' office trailers

5.4. Management Reserve

The management reserve budget associated with Scenario 2 is set at approximately 7% of the ARC-funded budget. Management reserve will be controlled by the SDSS Director.

Appendix F

Updated Total Project Budget

The original project scope of work was budgeted at $14.9M (total cash + in-kind) and appears as Table 2.1 in the SDSS-II Project Execution Plan (PEP). This was the budget presented to the Alfred P. Sloan Foundation and the National Science Foundation.

After the proposals were submitted, we succeeded in raising cash beyond our funding-raising goal by adding new partners to the project. The extra cash allows us to address some areas of the project that we had under scoped, most especially the contingency (Management Reserve), which was only $305K out of the $14.9M (Table 2.1).

The amount of additional cash resources not only provides for an adequate level of contingency, but it also allows us to expand the scope of work of the project by adding what we call "New Projects." Recognizing this potential, the NSF requested us to devise a plan to address it; our response to that is Section 11 of the PEP. The increase in the scope of work of the SDSS-II, and correspondingly in the budget, was approved by the Advisory Council-II at its meeting in October 2005.

This Appendix documents the new budget and describes in more detail the mechanism for establishing the balance between the Management Reserve and the New Projects for each annual budget request.

Table F.1 shows the cost forecast for the three-year survey including the total resources raised. The total is $16.54M, which includes $0.61M for the Management Reserve in 2008.

Table F.1 SDSS-II 3-Year Cost Forecast (in $000s)

	Original Budget	Current Forecast*	% Change
Survey Management	1,629	1,685	3%
Observing Systems	2,552	2,337	(8%)
Observatory Operations	5,174	5,412	5%
Data Processing	2,390	3,010	26%
Data Distribution	1,451	2,125	46%
ARC Support for Observing Systems	207	42	(80%)
ARC Corporate Support	179	172	(4%)
Education & Public Outreach	0	132	100%
Operations Sub-total	13,582	14,915	10%
New Development	1,013	1,016	0.3%
Sub-total	14,595	15,931	9%
Management Reserve	305	606	99%
Total Cost Forecast	14,900	16,538	11%
Cash Portion	*13,212*	*14,156*	
In-kind Portion	*1,688*	*2,382*	

** as of 30-Apr-2008*

Each year the need to hold resources in the contingency will decrease, and unspent cash in the Management Reserve account from the previous year can be re-allocated to the New Projects account. That is, as long as there are no calls on the Management Reserve, the actual resources expected to be available to the New Projects will exceed $0.51M. Table F.2 shows a set of New Projects with their projected funding profiles that totals $0.93M, as an example. In practice, additional New Projects may be identified and other changes to this scheme may be made. As of this writing, only the CY2006 budget for New Projects has been approved.

Table F.2. Cost Forecast for the New Projects (in $000s)

New Projects	2006	2007	2008	Total
Education and Public Outreach	82	85	47	215
Additional Software Development	38	40	23	100
Data Distribution Operations	60	62	48	170
Add'l Scientific and Engineering Support	80	83	42	205
Support for Collaboration Activities	40	42	33	115
Observer Retention Plan	0	0	125	125
Total	300	312	318	930