

ASTROPHYSICAL RESEARCH CONSORTIUM
Principles of Operation
for the Sloan Digital Sky Survey II (PoO-II)

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Introduction

The Sloan Digital Sky Survey II (SDSS-II) is a continuation of operations of the Sloan Digital Sky Survey (SDSS-I) to further the objectives of SDSS-I (Legacy) and to undertake two new surveys, one for Galactic structure (SEGUE) and the other to identify Type Ia supernovae (SN). The interval for observations is 1 July 2005 through 30 June 2008. This document defines the scientific objectives of the new survey, and it describes the management structure for the project, including the nature of institutional participation.

These Principles of Operation (PoO-II) of the Sloan Digital Sky Survey-II are based on the PoO-I for the SDSS-I. The Principles expressed here have been agreed upon by the Participating Institutions. They may be revised as needed by future agreements. Changes to the PoO must be approved by the Board and will generally be based on recommendations from the Advisory Council, acting either at its own initiative or in response to a request from the Board.

Scope

This document provides the basis for the governance of the SDSS-II. The Director of the SDSS-II will develop and put in place the specific procedures and rules to run the SDSS-II smoothly in a manner consistent with the PoO. The Director will keep the Advisory Council informed about such procedures and rules.

Key Terms

Certain key terms, when capitalized, will have the following meanings throughout this document:

SDSS-I The SDSS-I, originally the SDSS, is defined to consist of all operations and data obtained prior to 1 July 2005.

SDSS-II

the Sloan Digital Sky Survey II, consisting of observations obtained after 1 July 2005.

ARC

Astrophysical Research Consortium, a nonprofit Washington corporation for research and education in astronomy with seven member organizations.

Board

the ARC Board of Governors.

NSF Project Execution Plan

a document prepared for the NSF that serves as the Management Plan for the SDSS-II.

PoO-II

Principles of Operation, the document setting forth the operating principles for the SDSS-II.

Participating Institutions

the institutions participating in the SDSS-II, each with representation on the Advisory Council-II. The Appendix provides a current list of these partners in each category of scientific participation.

Advisory Council-II (AC-II)

the body which represents the Participating Institutions and advises the Board on matters relating to the SDSS-II.

Director

the Director of the SDSS-II.

Participants

persons having access to the SDSS-II Science Archive and rights for scientific exploitation prior to public release as specified in Section 4. The extent of Participant status within each Participating Institution is described in the respective Memorandum of Understanding (MOU).

Collaboration

collectively, all Participating Institutions and Participants.

Ombudsperson

The Ombudsperson is the last resort for the resolution of disputes related to publications.

Project Teams

Project Teams have specific charges and are part of the operations of the SDSS-II.

Working Groups

groups of SDSS-II scientists who focus on particular fields of astronomy as they pertain to the SDSS-II.

Core Programs

The Legacy, SEGUE, and SN surveys, collectively.

Science Archive

the reduced survey data, data products, software interfaces, and supporting scientific and technical information created by the SDSS-II to enable scientific analyses of the survey data.

Proposal

a formal proposal in the name of ARC or a Participating Institution to an external funding source requesting financial support for the SDSS-II or its scientific exploitation.

Initiative

an activity to extend the SDSS-II beyond the Core Programs; an activity proposed by a non-Participant or non-Participating Institution involving access to the SDSS-II data, hardware, or software.

1. Preamble

1.1 The goal of the SDSS-II is to conduct wide-angle imaging and spectroscopic surveys of the sky to address critical issues in astronomy. The three Core Programs are "Legacy," the continuation of the SDSS-I for obtaining complete samples of galaxy and quasar photometry and spectroscopy over a well defined area; "SEGUE," a new imaging and spectroscopic survey for stars and Galactic structure; and "Supernova," a new time-domain survey for discovery of Type Ia supernovae and precise characterization of their light curves. The separate scientific cases for the three Core Programs each lead to a set of requests for observing time. These requests will be balanced so that the scientific goals of all of the surveys are optimized together within the three-year interval of the SDSS-II, and so that the observing systems are always used with high efficiency, adapting to weather.

1.2 The top priority will be to ensure the highest possible scientific integrity of the Core Programs. Calibrations must be extensive and trustworthy. Moreover, the intent is that the survey be well enough designed and the data of sufficient quality that the survey will have a long and productive lifetime.

1.3 The main product of the SDSS-II is the Science Archive, consisting of reliable and easily utilized data sets, data products, and software interfaces. The Science Archive is designed to support scientific analyses that will provide insight into fundamental topics.

1.4 Participants may carry out whatever scientific projects they choose using SDSS-II data, subject to the policy guidelines discussed in Section 4. Participants are encouraged to support the overall quality control effort and must provide their own resources as needed, above and beyond the data and the software tools provided by the project.

1.5 Consistent with plans to maintain the integrity and usability of the Science Archive, and as mandated by the funding agencies, the SDSS-II will construct periodic public releases of its contents. Details of the data and publication policies are presented in Section 4. The public data distribution products and schedule are described in Section 4.1.5 of the NSF Project Execution Plan.

1.6 In addition to the Core Programs, Initiatives for other separately funded projects to use available telescope time or data in new ways will be entertained provided they do not interfere with or delay the Core Programs, and do not require those Participating Institutions that are not direct beneficiaries of the Initiative to increase their financial contributions.

2. Management

This section is an abstracted version of Section 1 of the NSF Project Execution Plan.

2.1 ARC Board

The ultimate responsibility for all aspects of the SDSS-II rests with the ARC Board, including approval of annual budgets and requests for outside funding. The Board is assisted by the AC-II on matters concerning the SDSS-II. The Board must approve entry of all Participating Institutions into the SDSS-II. One criterion for entry will be the written acceptance of these PoO-II.

2.2 Advisory Council-II (AC-II)

The AC-II advises the Board on matters relating to the SDSS-II project. AC-II members represent the Participating Institutions and are therefore the primary channel through which information flows between the Board and Participating Institutions. A majority consensus of the AC-II is required before a recommendation to admit a new Participating Institution is made to the Board.

The Board will request nominations by the Participating Institutions for their representatives on the AC-II. Each Participating Institution will be represented by one member. The Chair of the Board will be an ex officio member of the AC-II. The Chair of the AC-II will be appointed by the Board for a specified term.

The AC-II will meet as deemed necessary, but generally twice per year. Meetings may be conducted in-person or via teleconferencing. Meeting dates will be set and announced well in advance to assure good attendance. The agenda will be distributed

at least five working days in advance of the meeting to AC-II members, the ARC Chair, ARC Secretary, ARC Treasurer and the SDSS-II Director. The AC-II Chair is responsible for timely filing of approved meeting minutes with the ARC Secretary, and is responsible for informing the Collaboration of any decisions by the AC-II. The ARC Business Manager will ensure that a public version of the minutes is posted to the Collaboration in a timely manner.

Decisions are made through a simple majority of voting members for a quorum and a simple majority method of decision-making both in the AC-II as-a-whole and in its Executive Committee. All Participating Institutions have one vote in matters related to their contributions. All matters shall be decided by the affirmative vote of a majority of the votes eligible to be cast by AC-II members present at the time of the vote, provided a quorum is present. If an AC-II member is unable to attend a meeting, he or she may appoint an alternate to attend and vote in his or her place, or give his or her proxy to another AC-II member. The Chair is not compelled to break a tie vote.

Any action of the AC-II may be taken by electronic ballot if a simple majority of the members of the AC-II consent in writing to adoption of a resolution authorizing the action. The electronic ballot period shall be no less than seven calendar days. The ballots or the resolution and the written consents thereto shall be filed with the minutes of the preceding AC-II meeting.

It is the responsibility of AC-II members to ensure that their Participants and relevant institutional officers (e.g. Departmental Chair, Director of Sponsored Programs, etc.) are informed of the SDSS-II data access, publication, and proposal policies as is implied by that institution's acceptance of these PoO-II.

The Board has approved the establishment of an AC-II Executive Committee (AC-II EC). It is chaired by the Chair of the AC-II and includes the Chair of the ARC Board (ex officio). In addition to these two individuals, the AC-II EC includes three at-large members appointed by the AC-II. Its purpose is to provide advice and guidance through communications with the SDSS-II Director that are more expedient than is practical with the entire AC-II. The AC-II EC has the authority to act for the AC-II when deemed appropriate by the Chairs of the AC-II and the Board. The AC-II EC will act as a readily available sounding board for the Chair of the AC-II and the SDSS-II Director, thereby helping to frame significant management decisions and policy issues for eventual action by the AC-II as a whole. In the case of a tie vote (AC-II EC Chair and the three at-large members), the Chair of the ARC Board may, but is not obliged to, break the tie. The AC-II Chair keeps the rest of the AC-II informed of the activities of the AC-II EC. Where the AC-II EC acts for the AC-II, ratification of the action will be sought at the next meeting of the AC-II.

2.3 SDSS-II Director

The Board has delegated to the SDSS-II Director the executive authority for construction of any necessary hardware and software, and for operation of the survey. To those ends, the SDSS-II Director is responsible for:

- * defining and appointing key personnel;
- * keeping the AC-II informed on the status of the project, including any major problems and plans for resolving them;
- * working with ARC officers in conducting the project so as to comply with the terms of funding awards received by ARC from federal agencies and private entities;
- * drafting for concurrence by the AC-II and approval by the Board the Memorandum of Understanding with any new Participating Institution.

The SDSS-II Director leads the preparation of Proposals to fund the operations of the SDSS-II (Section 5.1), and assists the Board and AC-II in other relevant fund-raising activities as requested.

The SDSS-II Director will be appointed for a fixed term by the Board taking into consideration the recommendation of the AC-II. The AC-II will identify and evaluate candidates for the position of SDSS-II Director when the incumbent's term is coming to an end, or when the position is vacated unexpectedly.

The SDSS-II Director will be assisted by the ARC corporate office under the general supervision of the ARC Treasurer in preparing annual budgets and financial summaries. The SDSS-II Director will submit annual budgets to the AC-II. These budgets will include funds and in-kind services needed for maintenance and use of the SDSS-II telescope and instruments, and for the acquisition, processing, archiving, and distribution of the data. The AC-II will transmit the SDSS-II Director's budget along with its recommendations to the Board for approval. Periodic financial summaries will be provided to the AC-II to show expenditures and obligations compared to the major line item budget.

2.4 SDSS-II Project Scientist

The SDSS-II Director has delegated to the SDSS-II Project Scientist the responsibility for providing the overall quality assurance for the project and ensuring its scientific integrity. From this perspective, he/she monitors the systems aspect of the project in all its phases and evaluates the scientific impact of changes or compromises made in the course of constructing the hardware, preparing the software, and developing the plans for commissioning and operations. The SDSS-II Project Scientist plays a leadership role in organizing and overseeing the scientific effort of the Collaboration.

2.5 SDSS-II Management Committee

The SDSS-II Director has defined a SDSS-II Management Committee (MC-II) and serves as its Chair. The SDSS-II Director may delegate specific areas of

responsibility to the SDSS-II MC members. The MC-II presently consists of the SDSS-II Director, SDSS-II Project Scientist, SDSS-II Project Manager, and the SDSS-II Spokesperson, the responsibilities of whom are described below. This may be changed as deemed necessary by the SDSS-II Director.

Informal communication between the MC-II and members of the Board and AC-II is encouraged. These communications will include regularly inviting the MC-II members to AC-II meetings. Formal communications of the MC-II with the Board or AC-II is through the SDSS-II Director.

2.6 SDSS-II Project Manager

The SDSS-II Project Manager assists the Director in the performance of his or her responsibilities. The Project Manager, with the support of the Project Office, is responsible for developing and maintaining project schedules. He or she (hereafter “he”) is responsible for preparing annual and cost-to-complete budgets for consideration by the SDSS-II Director and the SDSS-II Project Scientist prior to their submission by the SDSS-II Director to the AC-II. He is responsible for tracking project expenditures and reporting them, together with any deviations from the approved budgets, to the SDSS-II Director on a timely basis. He is responsible for preparing the quarterly reports that are distributed to the AC-II and for tracking expenditures against the approved budget.

The Project Manager coordinates the engineering effort at Apache Point Observatory with the efforts of the engineering groups at the Participating Institutions and the requirements of the observing program. He identifies resources at the Participating Institutions when additional resources are needed to meet schedules.

The Project Manager is responsible for informing the SDSS-II Director and the SDSS-II Project Scientist of the state of compliance of Survey Operations with survey metrics. He is also responsible for keeping the SDSS-II Director and the SDSS-II Project Scientist informed on the cost and schedule performance of Survey Operations.

2.7 SDSS-II Spokesperson

The SDSS-II Director has delegated to the SDSS-II Spokesperson the primary responsibility for fostering the scientific productivity of the Participants, representing the SDSS-II to the outside world, raising the visibility of the SDSS-II within the astronomy and physics communities, and maintaining good morale in the Collaboration. He/she is charged with formulating and implementing guidelines for project publications and for coordinating public presentations. The SDSS-II Spokesperson is elected by the Collaboration from a slate of candidates nominated by the Collaboration and approved by the MC-II.

2.8 Collaboration Council

The Collaboration Council (CoCo) advises and supports the Spokesperson, who chairs the CoCo. It consists of one member from each Participating Institution (appointed by that Institution) plus one member who represents, and is elected by, the External Participants (namely those individuals with status defined by Section 4.1.5 or 4.1.6).

2.9 Project Teams

The Core Programs define the scientific objectives of the SDSS-II. For each Core Program (Legacy, SEGUE, and Supernova), there is an associated Team that undertakes efforts that affect survey operations. These efforts include the design of target-selection algorithms and undertaking work related to calibrations. A fourth Team oversees calibrations and interacts with all of the others. The Teams also serve as centers of expertise to advise on matters of the optimal observing strategy, necessary systems or software development, and data release content. A Project Team may propose improvements to the Project Scientist for calibration, analysis software, data processing software, and data distribution to the Collaboration.

The SDSS-II Management Committee will prepare a charge for each Team and will review their activities from time to time. The SDSS-II Director will appoint the chairs of the Teams for a fixed term.

2.10 Working Groups

The Working Groups (WG) facilitate the work on the science goals of the Survey. The Collaboration and the WG's are organized to allow individual scientists a great deal of freedom in pursuing their scientific projects. For example, any participant may join in any project to which they have subscribed (see Section 3.3). A WG may advise the SDSS-II Spokesperson on matters related to Collaboration affairs. Each WG Chair is appointed by the Director for a fixed term.

2.11 Education and Public Outreach Coordinator

A scientist will serve as the SDSS-II Education and Public Outreach (EPO) Coordinator. The EPO Coordinator will promote inter-institutional contacts and information sharing concerning the respective ongoing EPO efforts at the Institutions. The EPO Coordinator will also serve as the point of contact between the SDSS-II and science museums or other entities that may undertake projects related to using SDSS-II data, with a view to enhancing the net impact of SDSS-II data for educational purposes.

3. Scientific Goals

3.1 SDSS-II

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](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 the SDSS-I. If time is available once this contiguous area is completed, it will be used to extend the contiguous area further north or south. The details of doing so will be determined by the SDSS-II Director.

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. Exact specifications of these directions and the corresponding target-selection algorithms will be made by the SEGUE Project Team and approved by the MC-II. The quality standards for acceptance of imaging and spectroscopic data will be determined by the SEGUE Project Team and approved by the MC-II.

Supernova intends to scan repeatedly the celestial equator in the Fall observing season (1 September through 30 November) to cover approximately 300 square degrees, with a time-sampling that is as dense as possible. Campaigns to measure supernova light curves are conducted in 2005, 2006, and 2007, where an increasing fraction of the time is yielded to the other surveys in the last month of each season. 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 the ARC 3.5-m telescope, the MDM Hiltner Telescope, the Hobby-Eberly Telescope, and others. The combination of photometric and spectroscopic data for these objects will significantly advance the study of the expansion rate of the Universe, as the redshift range (roughly 0.1 to 0.3) bridges between local surveys and ongoing surveys for more distant supernovae.

3.2 Monitoring Survey Progress and Setting Priorities

The SDSS-II Director will report actual progress with respect to the adopted 3-Year Baseline Plan (Appendix A of the NSF Project Execution Plan) on a quarterly basis. These written reports, together with regular reports presented by the Director at AC-II and EC-II meetings, will ensure that the Participating Institutions are informed and

have an opportunity to advise the Director with respect to the general plan for subsequent observations and the prioritization amongst the three surveys in this plan.

Survey progress (for each dark run and cumulative-to-date) will be reviewed cooperatively by the Project Team leaders, the SDSS-II Spokesperson, the SDSS-II Project Scientist, and the Head of Survey Coordination (see Section 1.4 of the NSF Project Execution Plan). Based on this discussion, guidance will be given to the Head of Survey Coordination concerning the design of the observing plan for the following dark run.

3.3 SDSS-II Data Products by Scientific Category

Depending on the governing MOU or other agreements, Participants in SDSS-II may publish papers within the fields of some combination of the three Core Programs: Legacy, SEGUE, and Supernova. This section describes what is intended by the scientific fields of each.

Subscribing to Legacy means the scientific exploitation of all SDSS-II data that underpin an eventual publication relating to extragalactic astronomy (i.e. galaxies not resolved into individual stars and AGN), irrespective of the Core Program within which the actual data have been taken. For Stripe 82 data, special rules apply (see below) Moreover, subscribing to Legacy is equivalent to having joined the SDSS-I. Therefore, all data obtained prior to 1 July 2005 is accessible to Legacy subscribers, and can be used for publications in any field.

Subscribing to SEGUE means the scientific exploitation of all data, including data obtained prior to 1 July 2005, that underpin an eventual publication relating to Galactic astronomy (i.e. stars and resolved stellar systems such as nearby dwarf galaxies) or stellar astrophysics, irrespective of the core program within which the actual data have been taken. For Stripe 82 data, special rules apply (see below).

The Supernova survey is defined by the repeat scans of Stripe 82, which extends from RA = 20 hr to RA 4 hr on the celestial equator, and extends from dec = -1.25 deg to dec = +1.25 deg. “Supernova science” in the sense of this PoO therefore refers to science performed by coadding or differentiating data from repeat scans of Stripe 82. Subscribers to Supernova have access to all such scans, including those obtained prior to 1 July 2005. Non-subscribers to Supernova may utilize only public data for Stripe 82. Since the intent of the Supernova survey is to identify transients in the time series, subscribers to Supernova have full access to the intermediate data products that allow fast detection and classification of the transients. (There are currently no plans to make these intermediate data products available publicly.) In practice the Supernova effort includes also a wide range of spectroscopic and photometric follow-up activities. Subscribers to Supernova may elect to participate and benefit from these follow-up observations.

A co-added deep image of the Stripe 82 scans was a goal of SDSS-I and thus any

subscriber to SDSS-I/Legacy may participate and benefit from efforts to co-add scans obtained prior to 1 July 2005. These scans will be made public in June 2006. Co-adds from non-public data obtained after 1 July 2005 is restricted to subscribers to the Supernova Core Program.

Concerning scientific fields not described above (“Others”), any SDSS-II Participant may publish papers in any such field, using data collected either before or after 1 July 2005.

Questions concerning the nature and extent of an institution’s scientific participation should be addressed to the Chair of the AC-II. Questions from an individual Participant concerning whether a specific publication is allowed should be addressed in the first instance to the Spokesperson, who may consult with the MC-II.

4. Participants and Publication Policies

Participants have access to the Science Archive and may publish papers as defined by their respective institutional subscription as described in Section 3.3, subject to the policies and procedures specified below. Participants must read and abide by the PoO-II, and are responsible for protecting the scientific integrity of the SDSS-II and the data rights of other Participants.

4.1.2 At ARC Participating Institutions

At ARC Participating Institutions, Participants are generally full-time PhD-level scientific staff. Exceptions to this guideline may be requested of the AC-II Chair and brought to the attention of the Director.

4.1.3 At non-ARC Participating Institutions

At non-ARC Participating Institutions, Participants are defined via the individual MOU's.

4.1.4 Participant Portability

Persons whose Participant status is by virtue of their affiliation with a Participating Institution who leave that Participating Institution, or otherwise lose their Participant qualifying status, may retain their Participant status only with designation by the SDSS-II Director as an External Participant on a case-by-case basis. In the unlikely event of protest of such rulings, the issue may be appealed to the AC-II which will have jurisdiction on the basis of a majority vote.

4.1.5 External Participants

The SDSS-II Director may designate other scientists at Participating and non-Participating Institutions as Participants ("External Participants"), based upon designated future contributions to the infrastructure of the SDSS-II. This status may be restricted to individual Core Programs. The Project Team Leaders will be consulted in this process; they may propose candidate External Participants who will contribute special expertise not otherwise available. The scope of access to data, the involvement of students in the work, and the nature of the infrastructure tasks will be spelled out in a letter of agreement from the Director to the External Participant. External Participants in SDSS-I are not automatically External Participants in SDSS-II.

At non-Participating Institutions where External Participants may be designated, an institutional officer (e.g. Departmental Chair, Director of Sponsored Programs, Site Operations Manager, etc.) must be named as a contact person. The SDSS-II Director will inform the institutional contact person of the designation of the External Participant(s) at the respective institution, will provide a summary of the rights and responsibilities of External Participants (data access, publication, and proposal policies), and provide access to a copy of these PoO-II. The status of External Participant will come into effect only after the contact person has acknowledged that these conditions are acceptable to and will be honored by the institution.

4.1.6 Legacy, SEGUE, and Supernova Participants

Individuals who have made significant contributions to the SDSS-I and who are not accommodated in other ways can be designated as "Legacy Participants" or as "SEGUE Participants" or as "Supernova Participants," according to their choice. This category enables the participation in the science exploitation within the respective Core Program of SDSS-II, equivalent to a Participant at an institution that has subscribed to the corresponding Core Program. The status is granted on the understanding that continuing scientific participation of these individuals will be beneficial to the SDSS-II as a whole. Candidates for such Participants may be nominated from any quarter. The MC-II will review the nominations based on the above criteria, and will consult with the Chairs of the relevant Working Groups and others concerning the merits of each case before making the appointment. The appointment will be via a letter from the Director that will define the scope of access to the data and the involvement of students in the work. The MC may defer decisions in specific cases to the AC-II. These appointments will be reviewed annually by the MC-II to affirm that the SDSS-II continues to benefit from the science enabled by this mechanism, again with input from the relevant Working Group Chairs and others.

4.2 Non-Participants Early Collaborative Data Access

Prior to public release, non-Participants may be granted access to limited portions of SDSS data to conduct specific research projects in collaboration with a Participant who acts as their sponsor. The sponsoring Participant will be responsible for protecting the scientific integrity of the SDSS-II and the data rights of other

Participants, and for ensuring that the non-Participant uses the data responsibly and abides by the Collaboration rules. The sponsoring Participant may terminate the sponsorship at any time by informing the SDSS-II Spokesperson. The SDSS-II Director may terminate access to SDSS-II data by a non-Participant at any time for cause.

4.2.1 A full-time student at a Participating Institution

A full-time student at a Participating Institution will be granted early access to SDSS-II data if a Participant at that institution agrees to sponsor such access and ensure that SDSS-II policies are followed.

4.2.2 External Collaborators

A non-Participant at a non-Participating Institution may be granted early access to limited portions of SDSS-II data, and/or given the right of co-authorship on an SDSS paper as an External Collaborator in order to work on a specific project, if a Participant will agree to sponsor such access. The sponsoring Participant describes the nature of the proposed research, and the case is reviewed by the Collaboration. If no conflicts are discovered and the proposed collaboration brings value to the SDSS-II in the form of support, resources, observational or computational facilities, or special expertise, as considered by the Collaboration Council, the SDSS-II Spokesperson will make a recommendation to the MC-II which will make the final decision. The SDSS-II Spokesperson will communicate this decision to the prospective External Collaborator and his or her Participant sponsor. If granted, data access and/or co-authorship rights shall be restricted to the specific person for the specific project. All such projects will be reviewed annually by the Spokesperson to determine if continuation is warranted.

4.3 Projects and Publications

Any Participant may use the Science Archive to undertake any scientific project, subject to the subscription to the corresponding Core Program and subject to the rules and procedures described in this document. New projects must be announced to the collaboration, specifying the subject matter, the associated core program (Legacy, SEGUE, Supernova or Others) known collaborators, a contact person (with address), and the anticipated duration of the project. These policies and procedures apply only to data that have not been released to the public at the time the analysis was started.

4.3.1 Projects List

4.3.1.1 A Projects List shall be maintained by the SDSS-II Spokesperson in an easily accessible format which lists, for each project, the subject matter, the associated Core Program (Legacy, SEGUE, Supernova or Others) known collaborators, a contact person (with address), and the anticipated duration of the project.

4.3.1.2 Participants must notify the SDSS-II Spokesperson -- for inclusion on the Projects List -- on initiation of any scientific project utilizing SDSS-II data that is expected ultimately to result in publication. Participants must regularly inform the Spokesperson about the progress of the project. These policies apply to Participants both for their own projects and for projects they sponsor.

4.3.2 Publications List

4.3.2.1 A Publications List shall be maintained by the SDSS-II Spokesperson in an easily accessible format which lists for each paper, the title, authors, and journal of submission.

4.3.2.2 Participants must post to the Collaboration Publications web site at least three weeks before submission for publication any manuscript which utilizes SDSS-II data. By submission here, we signify submission both to a scientific journal and to any other public forum. This is required of Participants both for their own projects and for projects they sponsor.

4.3.3 Thesis List

4.3.3.1 A Thesis List shall be maintained by the SDSS-II Spokesperson in an easily accessible format that lists Ph.D. thesis projects based on SDSS-II data. This will include the names of the student and the sponsoring Participant, together with a brief description of the thesis and an estimated schedule for completion.

4.3.3.2 It is the responsibility of the sponsoring Participant to ensure that the SDSS-II Spokesperson is provided with the information needed to create and maintain an accurate and up-to-date posting for his/her student.

4.3.3.3 The Spokesperson will establish procedures to ensure that Ph.D. students can complete theses with SDSS data without undue competition from within the Collaboration.

4.4 Authorship

4.4.1 Any Participant, at any stage of a research project within a Core Program covered by this participant's subscription, may request that his/her name be added to the list of authors, with the presumption that permission will be granted if he or she has made any significant contribution to that research project, and subject to the author responsibilities described in Section 4.4.3.

4.4.2 The Spokesperson shall maintain a Builders List. Builders are individuals who have provided an exceptional level of service to the SDSS during the construction and commissioning phases of the project. They will be appointed to the Builders List by the Director from among nominees provided by the Participating Institutions. All

Builders from SDSS-I retain their Builder status for SDSS-II. Builders will be automatically granted authorship on any SDSS scientific publication they request, subject to the author responsibilities described in Section 4.4.3.

4.4.3 By signing one's name to an SDSS paper, all co-authors, including Builders, are claiming an intellectual responsibility for the paper. They therefore must have read the paper, and to the extent appropriate for their scientific background, have understood the basic scientific content of the paper.

4.4.4 Disputes concerning matters of authorship will be resolved by the procedure described in the SDSS Scientific and Technical Publication Policy. In particular, if an agreement cannot be reached, the matter will be referred to the Ombudsperson (Section 1.5.4 of the NSF Project Execution Plan), whose decision will be final.

4.5 Additional Guidelines for Implementation

The SDSS-II Spokesperson may develop more detailed guidelines concerning the implementation of the publication policies in Section 4, as he/she deems appropriate. A copy of these guidelines will be available from the Spokesperson, and must be read and agreed to by the Participants, a relevant institutional officer at Participating Institutions, and collaborators. These guidelines must be consistent with and may not supersede the basic principles of the PoO-II. Important examples of such documents for SDSS-I are: "SDSS Scientific and Technical Publication Policy" and "A Guide to SDSS Publication Procedures." The SDSS-II Spokesperson is responsible for updating these documents.

4.6 Sanctions

4.6.1 If a project is added to the Publications List without due notice on the Projects List, the Director may rule for a delay in publication on the advice of the SDSS-II Spokesperson.

4.6.2 If the SDSS-II Director, with advice from the SDSS-II Project Scientist, deems a project not technically ready for publication, the SDSS-II Director may rule for a delay in publication.

4.6.3 Anyone who submits for publication results based on SDSS-II data prior to public release of that data, without notifying the Collaboration by ensuring the project is listed on the Projects List and Publications List may be barred from further access to SDSS-II data by the SDSS-II Director, on the advice of the SDSS-II Spokesperson.

4.6.4 In the unlikely event of the protest of these rulings, the issue may be appealed to the AC-II, which will have jurisdiction on the basis of a majority vote.

5. Proposals and Initiatives

5.1 Proposals by ARC As-A-Whole

Proposals submitted by ARC as-a-whole to Federal or philanthropic sources to secure funds to support the construction, operation, or scientific exploitation of the SDSS-II require approval by the Board following a recommendation by the AC-II. Such Proposals take precedence over other SDSS-related Proposals by anyone, and the Board may take appropriate steps to protect them, with proper notification to the Collaboration.

5.2 Other Proposals to Fund Scientific Research

The following policies, procedures, and guidelines apply to Proposals by anyone that seeks substantial (more than \$30K total) funding for the primary purpose of supporting research using SDSS-II data. These policies and procedures apply only to the use of data that have not been released to the public. The purposes of such strictures are to:

- * Protect the scientific integrity of the SDSS-II;
- * Ensure that SDSS-II data are described in a technically responsible manner;
- * Foster equity and collegiality within the Collaboration;
- * Present an organized, rational funding plan to financial sponsors and the scientific community;
- * Effectively manage Proposals that might otherwise compete for the same funds;
- * Ensure that Proposals do not contain items or describe arrangements that conflict with the PoO-II, MOU's, or agreements already in place with major SDSS-II funding sources;
- * Ensure that the Proposals do not increase the cost of the Core Programs to Participating Institutions or require additional fund-raising by the Collaboration.

5.2.1 A Proposals List shall be maintained by the SDSS-II Spokesperson in an easily accessible format which lists, for each Proposal, the title, associated Core Program (Legacy, SEGUE, Supernova or Others), brief research summary, list of team members, estimated total budget, and final disposition. It is the responsibility of the PI to provide this information to the SDSS-II Spokesperson in a timely manner.

5.2.2 Proposing institutions or individuals are responsible for all incremental costs deriving from the proposed research.

5.2.3 Proposals submitted by a Participating Institution shall be carefully vetted by that institution to ensure that they do not contain items or describe arrangements that conflict with the PoO-II, the MOU's, or the agreements already in place with major SDSS-II funding sources.

5.2.4 Proposals submitted by non-Participating Institutions will be vetted by the Director for the purpose described in subsection 5.2.3. To this end, the PI must send a summary of the Proposal to the SDSS-II Director in advance of the deadline for

submission. The summary must give the anticipated budget, describe the overall scope of the proposed work, list any proposed projects that rely on SDSS-II data, and detail any implicit or explicit commitments to use or publish SDSS-II data or analyses of them. The submitted Proposal must be consistent with this summary. The SDSS-II Director may request a copy of the full Proposal for review prior to submission if he or she deems it necessary.

5.2.5 It is the responsibility of the members of the AC-II to ensure that their Participants and the relevant institutional officers (e.g. Departmental Chair, Director of Sponsored Programs, etc.) are informed of the above procedures, as is implied by that institution's acceptance of the PoO-II. This responsibility falls directly on the individual Participants if they are not at a Participating Institution. Such Participants are expected to enlist the advice of other relevant Collaboration members to ensure compliance with the above strictures.

5.2.6 Persons violating these policies may have their status as a Participant and other eligibility for access to the Science Archive revoked by the SDSS-II Director. In the unlikely event of an appeal, the issue will be settled by the AC-II on the basis of a majority vote.

5.3 Initiatives for Extension Beyond the Primary Survey

5.3.1 Initiatives to use or augment the SDSS-II hardware, operations, or data for purposes that are not part of the Core Programs may be approved by the SDSS-II Director after review by the SDSS-II Project Scientist to assess scientific merit and then by the SDSS-II Project Manager to ensure their technical appropriateness and assess their financial impact. Subsequent review by the AC-II and approval by the Board is required only if the SDSS-II Director determines there may be financial impact on the Collaboration or potential conflict with existing institutional arrangements. The proponents will be responsible for any resulting incremental costs.

5.3.2 The SDSS-II Director will determine any required modification of the PoO-II and will prepare a recommendation to the AC-II. The Chair of the AC-II will transmit the Initiative, the SDSS-II Director's recommendation, and the AC-II's own recommendations to the Board if necessary. Approval of the Initiative may be granted contingent upon the proponents securing the necessary financial resources.

5.4 Initiatives for Use of Intellectual Property

Initiatives to use the intellectual property of the SDSS or SDSS-II Collaboration will be covered by the Intellectual Property Policy of ARC, Inc., a copy of which is available from the ARC Secretary.

6. The Observatory

6.1 The SDSS-II facilities will operate on ARC's Apache Point site and share infrastructure and administrative staff with the 3.5m telescope, affording both projects the benefits of a broader skill mix. Shared staff and other common operations support costs will be apportioned between the projects by mutual agreement of the SDSS-II and 3.5m directors.

6.2 The SDSS-II will provide its own dedicated observing staff.

6.3 Data from SDSS-II and 3.5m monitoring equipment will be available to users of both telescopes.

6.4 When the SDSS-II project is completed, operation and/or disposition of SDSS facilities will be determined by the Board, with advice from the AC-II. Proper consideration will be given to any prior contributions to the capital value of the assets.

Appendix – SDSS-II Participating Institutions

(current as of 27 October 2005)

Partners invested in Legacy, SEGUE, and Supernova

The University of Chicago
The Johns Hopkins University
The University of Washington
Princeton University
New Mexico State University
Japanese Participation Group
United States Naval Observatory
Fermi National Accelerator Laboratory
Max-Planck-Institute fuer Astrophysik, Garching
Los Alamos National Laboratory
Korean Scientist Group
Ohio State University
Large Area Multiple Object Survey Telescope (LAMOST) Project

Partner Invested in Legacy and SEGUE

Max-Planck-Institute fuer Astronomie, Heidelberg

Partners invested only in Legacy

University of Pittsburgh
Institute for Advanced Study
University of Portsmouth
Case Western Reserve University
Drexel University

Partners invested in SEGUE and Supernova

Cambridge University
American Museum of Natural History
Astrophysikalisches Institut, Potsdam
Joint Institute for Nuclear Astrophysics (Notre Dame)

Partner invested only in SEGUE

University of Basel

Partner invested only in Supernova

Kavli Institute for Particle Astrophysics and Cosmology (Stanford)