

FY11 Plan for **ASTROPHYSICS / DES**

Prepared by: Steve Kent/Liz Buckley

Date: May 4, 2010

Relevant Strategic Plans - [Cosmic Computing](#)

Tactical Plan Goal

Work with DES collaboration to deliver DECam to CTIO and to conduct survey planning and mock data challenges to prepare for start of survey operations by 2011.

Provide a secondary DES archive node consisting of a database and flatfile storage containing a full copy of the raw and processed data.

Executive Summary of Objectives for FY11

Maintenance/Compliance Drivers

1. Support computers for SISPI; CCD testing

Upgrades and Enhancement Drivers

1. Data challenge 6
2. Data challenge 7

Strategic Drivers

1. Procure and install mirror Oracle database
2. Procure and install Portal Server
3. Procure and install archive filesystem
4. Procure and install analysis computing nodes
5. Collect test & calibration data in advance of survey operations

Activities and Work Definition

Activity = Astrophysics / DES / Camera and Planning

- Activity type: Project
- Description: Construction activities on DECam project
- Timescale: Milestones extend throughout year
- Milestones:

Milestone	Target Completion
SISPI	As Defined in DECam project schedule
Data Challenge 6	Sept 2010
Data Challenge 7	Sept 2011

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Activity = Astrophysics / DES / Data Management

- Activity type: Project
- Description: Development of pipeline code/ Evaluate Data Challenges
- Timescale: Through FY11
- Milestones:

Milestone	Target Completion
Deliver calibration code modules for use in DC7	Q3 FY11
Evaluate results of DC6	Q1 Fy11
Evaluate results of DC7	Q4 FY11

Activity = Astrophysics / DES / Data Operations

- Activity type: Project
- Description: Text here...
- Timescale: Est. Start: MMM, YY; Est. Complete: MMM,YY
- Milestones: *Insert rows as necessary...*

Milestone	Target Completion
Procure and commission Oracle Rack System	
Procure and commission portal servers	
Procure and install archive disk, Dcache disk, and tapes	
Procure and install grid computing nodes	

Activity = Astrophysics / DES / Management

- Activity type: Service

- Description: Management of EAG activities on DES
- Timescale: Continuing throughout year
- Milestones: Budget and reporting deadlines

Milestone	Target Completion
FY12 budget	Q3

Detailed Tactical Plan Objectives and Priorities

Maintenance and Compliance Drivers

Objectives:

1. Provide system administration support for CCD/SISPI testing computers at SiDet.
2. Maintain framework for managing data from CCD detector testing program.

Assumptions and Risks (may be 2 sections if it makes your points clearer)

1. Assumes that personnel providing support continue to be available.

Upgrades and Enhancement Drivers

Objectives:

1. Continue to enhance simulation software framework for generating simulated data.
2. Continue to develop the study the PSF homogenization used in the co-addition pipeline.
3. Continue with planning and implementation of survey strategy, science requirements, calibration techniques and data challenge co-ordination
4. Produce simulated data for Data Challenge 6 (DC6) and DC7 and other datasets as required by the DES Science Working Groups.

Assumptions and Risks:

1. The schedule for the data challenges, particularly DC7, depend on the success and progress in assessing the results of the priori data challenge. Intermediate data challenges may be required.

Strategic Drivers

Objectives:

1. We plan to maintain a mirror copy of the Oracle database and the database portal. These are a duplicate of the systems at NCSA. The current thinking is that only the science data will be mirrored; however for planning purposes, we assume we are mirroring the full database. The portal provides user access to the database. We are assuming Hitachi storage running RAID-10 for the filesystem.
2. We plan to archive a portion of the 1 Petabyte file archive at NCSA on a combination of disk and tape. The total needs for FY11 are 349 TB.
3. We plan to acquire computers for data analysis and code development. These machines would eventually replace the SDSS/DES computing cluster.
4. Conduct observing to collect test and/or calibration data required in advance of survey operations. This activity involves travel to CTIO to use PreCam and is shared with other members of the DES collaboration.

Assumptions and Risks:

1. These drivers are the largest M&S items in the budget. It is assumed that the budget available for ASTROPHYSICS is sufficient to pay for all required travel (the main expense required for collecting test and calibration data).
2. RISK: The bulk of the M&S (including all of the computing equipment and licenses) are included in a request made to DOE for DES operations; they are all off of project 50 in the budget. If this request is not approved, it will seriously impact the ability of anyone to do science with the DES data.
3. It is assumed that all hardware for analysis will be absorbed into common CD infrastructure such as the GPCF, and that the existing SDSS/DES computing cluster will be retired. RISK: The common CD infrastructure may not come into existence or provide the necessary functionality.

Staffing Issues:

The plan calls for 2.5 FTEs of computing professionals to provide support. Of this amount, 0.5 FTE is for a database expert assumed to come from outside EAG, 1.3 FTE are provided by existing CPs within EAG. Thus, we require 0.7 FTEs as a new hire.

In addition, we are dependent on support from other CD departments in areas such as DCache storage, System Administration for the analysis cluster, database machine and archive portal, DocDB support, support for control room logbook, and support for the central DES webserver.

FY11 Plan for **Astrophysics / SDSS II**

Prepared by: Steve Kent

Date: May 3, 2010

Relevant Strategic Plans - [Cosmic Frontier](#)

Tactical Plan Goal

1. Ensure that SDSS archive continues to operate for the benefit of Fermilab scientists, the SDSS collaboration, and the scientific community and general public.
2. Provide computing analysis environment to enable science analyses
- 3.

Executive Summary of Objectives for FY11

Maintenance/Compliance Drivers

5. Support hosting of the SDSS archive for the next 3 years.
6. Support processing of astronomy data collected from various other telescopes (e.g, APO, HST).
7. Provide build/installation support of the astronomy tools need for science analysis on the EAG cluster.
8. Purchase maintenance for Blue-Arc disk and CAS servers once warranty expires
9. Migrate supernova database off old server.

Upgrades and Enhancement Drivers

3. Replace out-of-warranty CAS servers

Activities and Work Definition

Activity = ASTRO/SDSS II / SDSS Data Archiving And Servicing

- Activity type: Service
- Description: Maintain SDSS DAS and CAS functionality
- Timescale: Continues through 2013
- Metrics: System uptime; volume of data distributed and trends

Activity = ASTRO / SDSS II / Suport

- Activity type: Service
- Description: Suport for SDSS II analysis computing

- Timescale: Through 2011
- Metrics: Analysis cluster uptime and software tool availability

Detailed Tactical Plan Objectives and Priorities

Maintenance and Compliance Drivers

Objectives:

2. EAG and the CD are committed to maintaining the SDSS Archive (Data Archive Server and Catalog Archive Server) for another 3 years.
3. The SDSS/DES computing cluster is relied on for SDSS analysis processing and storage. Most of the machines are going out of warranty, and the presumption is that remaining analysis activities will migrate to the remaining servers.

Assumptions and Risks (may be 2 sections if it makes your points clearer)

2. Assumption is that ARC funding is sufficient to cover hardware costs and labor.
3. Assumption that any necessary migrations occur seamlessly.
4. Assumption is that existing software products will not “break” during the migration.

Upgrades and Enhancement Drivers

Objectives:

3. Replace CAS servers going out of warranty

Assumptions and Risks:

4. ARC agreement can cover all costs.

Staffing Issues:

Small amounts of time from EAG personnel and other CD personnel only are required. A database expert is paid out of the ARC funding. Admin support for the SDSS/DES cluster is provided by other personnel in CD.

FY11 Plan for **Astrophysics / JDEM**

Prepared by: Steve Kent

Date: May 3, 2010

Relevant Strategic Plans - [Cosmic Frontier](#)

Tactical Plan Goal

Continue development of a prototype of the Science Operations Center.

Executive Summary of Objectives for FY11

Upgrades and Enhancement Drivers

4. Enhance prototype for a Science Operations Center (including a Quality Assurance framework, data reductions, and database R&D) leading to a credible and defensible plan.

Activities and Work Definition

Activity = Astrophysics / JDEM / Science Operations Center

- Activity type: Project
- Description: Science Ops Center prototype
- Timescale: One year
- Milestones:

Milestones	Target Completion
Milestones are established in conjunction with the DOE/JDEM project office	Various throughout the year

Activity = Astrophysics / JDEM / Computing

- Activity type: Project
- Description: Duplicates SOC
- Timescale:
- Metrics:

Detailed Tactical Plan Objectives and Priorities

Upgrades and Enhancement Drivers

Objectives:

10. The full set of objectives will be determined in conjunction with the DOE/JDEM project office at LBNL. The objectives at present are expected to be to further develop the prototype SOC so as to be able to integrate with focal plane demonstrator being developed at LBNL and to be compatible with overall planning for the ground support systems.
11. Develop and implement data analysis algorithms for slitless spectroscopy and IR detector calibration for incorporation into JDEM SOC prototype dataflow

Assumptions and Risks:

5. Assumption: All funding is expected to be provided by the DOE/JDEM project.
6. RISKS: JDEM mission development is contingent on a large number of factors whose outcome is unsure at present. Effort planned for JDEM may be diverted for DES if the latter encounters unexpected difficulties.

Staffing Issues:

The present plan does not envisage any issues - the scope of work is commensurate with the effort available.

FY11 Plan for **Astrophysics / CDMS**

Prepared by: Steve Kent / Don Holmgren

Date: May 3, 2010

Relevant Strategic Plans - [Cosmic Frontier](#)

Tactical Plan Goal

Support the data acquisition and data reduction activities of CDMS (E891).

Executive Summary of Objectives for FY11

Maintenance/Compliance Drivers

12. Maintain the software for “tapeless” data movement from Soudan to Fermilab mass storage and monitor tapeless data movement operations
13. Administrate the systems composing the CDMS analysis cluster at Fermilab, including support of the operating system and maintenance of the disk RAID sets
14. Administrate the systems composing the CDMS data acquisition cluster at Soudan, including support of the operating system, maintenance of device drivers, VME readout subsystems, and miscellaneous digital I/O

Upgrades and Enhancement Drivers

5. Contribute to design efforts for DAQ software to support new detector electronics for SuperCDMS at Snolab. This includes porting the event builder (cdmsr2dm).

Activities and Work Definition

Activity = Astrophysics / CMDS / Computing

- Activity type: Service
- Description: Computing support for CDMS
- Timescale: Continuous
- Metrics: DAQ: Detector livetime, issue response time; Tapeless data movement: uptime; Data Reduction Support:

Detailed Tactical Plan Objectives and Priorities

Maintenance and Compliance Drivers

Objectives:

4. The CDMS DAQ software is based on a combination of Java RMI slow control code and fast loop (event building) code derived from the R2DM software product. The R2DM software base in turn relies on other underpinnings, some actively supported (ACE) and others no longer supported (ITC). All of the Java developers have either graduated and have moved onto post doc positions, or have moved to faculty positions. Fermilab will maintain the C and C++ event building code, and the CDMS collaboration will maintain the Java code.

Assumptions and Risks (may be 2 sections if it makes your points clearer)

7. RISK: Although the DAQ software has been very stable over the last 5 years, it is important during the remaining years of CDMS II to maintain the software sufficiently to maintain required livetime.

Staffing Issues:

There are no staffing issues.

FY11 Plan for **Scientific Research And Leadership**

Prepared by: Steve Kent

Date: May 3, 2010

Relevant Strategic Plans - [Cosmic Frontier; Scientific Research](#)

Tactical Plan Goal

6. Maximize the ability of Fermilab scientists to extract science analyses from SDSS data.

7. Develop science analysis capability for DES.

Perform science analyses relevant to JDEM design concepts on behalf of DOE/JDEM project office

3. Investigate new experiments and opportunities, including 21 cm Dark Energy, Holometer, and JDEM.

Executive Summary of Objectives for FY11

Upgrades and Enhancement Drivers

6. SDSS II: Continue to follow-up additional lensing candidates in SDSS data. Continue analysis of lensing candidates. Finish and publish analysis of supernova data from years 2 and 3. Continue studies of galaxy clustering and weak lensing in the Southern Coadd. Continue analysis of SDSS supernova data.
7. DES: Continue to provide leadership in the DES Supernova, Strong Lensing, Milky Way and photometric redshift Science Working Groups.
8. JDEM: Work with DOE/JDEM project office as appropriate to evaluate new designs for JDEM satellite.

Strategic Drivers

5. 21 cm: Work with the collaboration to prepare a design report, build the collaboration, and develop a proposal for a 10% prototype.
6. Holometer: Continue work with member of PPD and external collaborators to determine feasibility of constructing and operating two interferometers in the MP tunnel.

Activities and Work Definition

Activity = Scientific Research / SDSS II

- Activity type: Project
- Description: SDSS Research
- Timescale:
- Milestones:

Milestone	Target Completion
Publish supernova year 2 & 3 results	Q4
Submit papers for publication	Distributed throughout year

Activity = Scientific Research / DES

- Activity type: Project
- Description: Science Analyses of Data Challenge
- Timescale: Q1
- Milestones

Milestone	Target Completion
Validate DES science using DC6	Q1 (?)

Activity = Scientific Research / JDEM

- Activity type: Project
- Description: Evaluate JDEM designs
- Timescale: Q1 (TBD)
- Milestones:

Milestone	Target Completion
Evaluate new JDEM designs	TBD

Activity = Scientific Research / 21 CM

- Activity type: Project
- Description: 21cm R&D activities
- Timescale: Continuing throughout FY11

- Milestones:

Milestone	Target Completion
Design Report	Q2
R&D Plan	Q4

Activity = Scientific Research / Holometer

- Activity type: Project
- Description: Holometer R&D
- Timescale: Est. Start: Oct 2010 Est. Complete: Sept. 2011
- Milestones:

Milestone	Target Completion
Feasibility study for 2 interferometers in MP tunnel	Q4

Detailed Tactical Plan Objectives and Priorities

Upgrades and Enhancement Drivers

Objectives:

4. Research continues into SDSS-discovered strongly lensed arcs, essentially using gravitational lensing as an opportunistic telescopes. Followup data are obtains with a variety of facilities, including APO, HST, and Gemini. Work also continues on the structure of the Milky Way halo and inferences about the darark matter distribution using SDSS data. Supernova data analysis is expected to be completed this fiscal year.
5. DES: The main activities are conducting mock science analyses based on the mock data challenges. These analyses are in conjunction with the various DES working groups.
6. JDEM: During the remainder of FY10, the current JDEM concept design will undergo an Independent Cost Estimate. Also, the Astro2010 Decadal Survey report will be issues in August. Once these activities occur, any further direction for the design of JDEM will be better defined. It is possible that a refinement or further development of the current concept designs will occur and will require continuing analysis of their capabilities.

Assumptions and Risks:

5. SDSS: The assumption is that the SDSS/DES analysis cluster will remain operating, and that the new hardware for DES will arrive in a timely fashion. An additional

- assumption is that migration of data and software products off machines going out-of-warranty will be smooth.
6. SDSS Risk: SDSS analysis infrastructure code is receiving no maintenance; there is a risk that it will cease functioning as we migrate data and databases to new servers, with no effort allocated to support this task.
 7. JDEM Assumption: Funding from LBNL will cover M&S
 8. JDEM RISK: Funding from LBNL may not be forthcoming.

Strategic Drivers

Objectives:

15. 21 cm: a) Produce zeroth order design report; b) conduct advanced simulation and design studies; c) develop formal R&D plan for 10% prototype.
16. Holometer: Our goal is to have a demonstration of a 1-dimensional optical cavity in the MP tunnel by September 1, 2010. Then we will use R&D funds to investigate whether we can construct 2 interferometers and operate them in the MP tunnel by September 1, 2011.

Assumptions and Risks:

8. Both activities rely on R&D funding that is being procured mainly through other divisions.

Staffing Issues:

All effort is available within EAG or via postdocs, summer students, and (if available) internships.

FY11 Plan for **Scientific Research And Leadership / Pierre Auger**

Prepared by: Steve Kent / Paul Lebrun

Date: May 3, 2010

Relevant Strategic Plans - [Cosmic Frontier](#)

Tactical Plan Goal

Support data archive/mirroring of Auger South.

Executive Summary of Objectives for FY11

Maintenance/Compliance Drivers

- 17. Maintain augerd1.fnal.gov

Upgrades and Enhancement Drivers

- 9. Acquire addition 6 TB of blue arc disk.

Strategic Drivers

Develop plan to construct new surface detector calibration system.

Activities and Work Definition

Activity = Scientific Research and Leadership / Pierre Auger

- Activity type: Project
- Description: Computing support for Auger
- Timescale: Continuous
- Metrics:

Milestone	Target Completion
Blue arc	FY11
SD Calibration System Plan	FY11

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Detailed Tactical Plan Objectives and Priorities

Maintenance and Compliance Drivers

Objectives:

9. Maintenance up to now has been satisfactory; the plan is to continue unchanged.

Assumptions and Risks (may be 2 sections if it makes your points clearer)

Upgrade and Enhancement Drivers

Objectives:

10. Work with Ray Pasetes to acquire and install next round of BlueArc disk.

Assumptions and Risks

In the past this order fell “through the cracks”, causing a bit of scrambling.

Strategic Drivers

Objectives:

18. Recent analysis shows that a new SD calibration system is really needed, and some D.A. effort will be needed. However, fair enough, so far, it has been mumblings rather than a real plan. The first step is to focus on a calibration system. Both timing and amplitude of the signal. Signal amplitude calibration seems more important. Existing industry standard stuff is adequate to build a prototype for this new SD calibration system.

Assumptions and Risks (may be 2 sections if it makes your points clearer)

The SD calibration system upgrade plan is not firmly agreed to by the collaboration.

Staffing Issues:

There are no staffing issues.