

FY12 Plan for **ASTROPHYSICS / DES**

Prepared by: Steve Kent/Liz Buckley

Date: Oct 25, 2011

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 during 2012.

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 FY12

Maintenance/Compliance Drivers

1. Support computers for SISPI; CCD testing
2. Augment pipeline calibration modules as necessary for data management

Upgrades and Enhancement Drivers

1. Evaluate data challenge 6
2. Complete data challenge 7
3. Complete development of ObsTac for survey strategy

Strategic Drivers

1. Support installation and commissioning of DECam at CTIO
2. Procure and install mirror Oracle database
3. Procure and install archive filesystem
4. Procure and install analysis computing nodes
5. Collect test & calibration data in advance of survey operations

Discretionary Drivers

1. Develop algorithms for coadd pipeline

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
Deliver code for DC7 simulation	April 2012
Complete Simulations for Data Challenge 7	June 2012
Deliver ObsTac	June 2012
Support installation, commissioning at CTIO	Multiple phases in project schedule between Nov 2011 and Sept. 2012

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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
Evaluate Data Challenge 6	Dec 2011
Deliver calibration code modules for use in DC7	Q1 FY12
Evaluate calibration results of DC7	Q2 Fy12

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 install archive disk, Dcache disk, and tapes	
Procure and install grid computing nodes	
Establish mirroring and image backup capability from NCSA	

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
FY13 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. These machines will continue used for SISPI development even after DECam is delivered to CTIO since development at CTIO is difficult for remote users.
2. Maintain framework for managing data from CCD detector testing program.
3. ObsTac is the program that implements the overall survey strategy for the DES observing. Its completion requires input from multiple groups in the collaboration.

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

1. Assumes that personnel providing support continue to be available.
2. Assumes that survey strategy can be definitively agreed to in time to complete ObsTac before the start of regular survey operations.

Upgrades and Enhancement Drivers

Objectives:

1. Continue to enhance simulation software framework for generating simulated data.
2. Continue with planning and implementation of survey strategy, science requirements, calibration techniques and data challenge co-ordination
3. Participate in evaluating science results from Data Challenge 6 (DC6).
4. Generate multiple 10 sq. deg. “Golden Standard Night” simulated data for pipeline developers and science working groups.
5. Generate 500 sq. deg. final “stress test” simulated data for DC7.

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. The installation and commissioning of DECam is a multiphase process for which the plans are continuously evolving. We anticipate that some travel to CTIO will be required to support and commission the various portions of DECam for which EAG personnel are responsible.
2. 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.
3. 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 FY12 are 349 TB.
4. We plan to acquire computers for data analysis and code development. These machines would eventually replace the SDSS/DES computing cluster.
5. 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 other CTIO telescopes 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 51 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.
4. Timing of the hardware acquisition is driven by the overall project schedule, which has slipped by several months relative to last year's plan.

Discretionary Drivers

1. Continue to develop the study the PSF homogenization used in the co-addition pipeline. These algorithms are difficult but important for DES and LSST, among others.

Assumptions and Risks:

1. Assumes availability of effort

Staffing Issues:

The plan calls for 2.9 FTEs of computing professionals to provide support. Of this amount, 0.3 FTE is for a database expert assumed to come from outside EAG, 0.1 FTE comes from FEF-SSS, 2.0 FTEs are provided by existing CPs within EAG. Thus, we require 0.5 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: Oct 25, 2011

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

Executive Summary of Objectives for FY12

Maintenance/Compliance Drivers

1. Support hosting of the SDSS archive for the next 2 years.
2. Support processing of astronomy data collected from various other telescopes (e.g, APO, HST).
3. Provide build/installation support of the astronomy tools need for science analysis on the EAG cluster.
4. Purchase maintenance for Blue-Arc disk and CAS servers once warranty expires

Upgrades and Enhancement Drivers

1. Replace out-of-warranty CAS servers

Discretionary Drivers

1. Return retired SDSS DAQ system from APO and terminate loan.

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

Detailed Tactical Plan Objectives and Priorities

Maintenance and Compliance Drivers

Objectives:

1. EAG and the CD are committed to maintaining the SDSS Archive (Data Archive Server and Catalog Archive Server) for another 2 years.
2. 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)

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

Upgrades and Enhancement Drivers

Objectives:

1. Replace CAS servers going out of warranty

Assumptions and Risks:

1. ARC agreement can cover all M&S 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 / CDMS**

Prepared by: Steve Kent / Don Holmgren

Date: Oct 25, 2011

Relevant Strategic Plans - [Cosmic Frontier](#)

Tactical Plan Goal

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

Executive Summary of Objectives for FY12

Maintenance/Compliance Drivers

1. Maintain the software for “tapeless” data movement from Soudan to Fermilab mass storage and monitor tapeless data movement operations
2. Administrate the systems composing the CDMS analysis cluster at Fermilab, including support of the operating system and maintenance of the disk RAID sets
3. 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

1. 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:

1. 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)

1. 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: Oct 25, 2011

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

Tactical Plan Goal

1. Maximize the ability of Fermilab scientists to extract science analyses from SDSS and DES data.
2. Develop science analysis capability for DES.
3. Contribute to success of Holometer project.
4. Investigate new experiments and opportunities, including LSST and DESpec.

Executive Summary of Objectives for FY12

Upgrades and Enhancement Drivers

1. 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.
2. DES: Continue to provide leadership in the DES Supernova, Strong Lensing, Milky Way and photometric redshift Science Working Groups.

Strategic Drivers

1. Holometer: Finish construction of two interferometers in MP8 tunnel. Commission and operate to search for holographic signal.
2. LSST: Work with LSST project office as appropriate to evaluate LSST software level 3 strategies.

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	Q2
Submit papers for publication	Distributed throughout year

Activity = Scientific Research / DES

- Activity type: Project
- Description: Science Analyses of Data Challenge
- Timescale: Q4
- Milestones

Milestone	Target Completion
Validate DES science using DC7	Q4(?)

Activity = Scientific Research / LSST

- Activity type: Project
- Description: Evaluate LSST data management strategies
- Timescale: Q1 (TBD)
- Milestones:

Milestone	Target Completion
Implement coadd pipeline using LSST software	TBD

Activity = Scientific Research / 21 CM

- Activity type: Project
- Description: 21cm R&D activities
- Timescale: Continuing throughout FY12

- 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 2011 Est. Complete: Sept. 2012
- Milestones:

Milestone	Target Completion
Operation of two interferometers in MP tunnel	Q4

Detailed Tactical Plan Objectives and Priorities

Upgrades and Enhancement Drivers

Objectives:

1. 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.
2. 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. Additionally, various analyses are being conducted regarding various aspects of survey strategy, including the footprint layout, supernova survey locations, and plans for a test area to be observed to its 5-year depth. This work involves, among other things, travel to collaboration meetings and to other smaller meetings as required.

Assumptions and Risks:

1. 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.

2. 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.

Strategic Drivers

Objectives:

1. LSST: One area where EAG and Fermilab could make a contribution to LSST is in “level 3” data management; however, this task is outside of DOE's commitment to LSST and thus would need to be funded by the LSST project office. At present, we are exploring areas of synergy between LSST data management and SDSS/DES. One possible area is coadd software, which so far has been developed independently by all three projects.
2. Holometer: The experiment could be operating interferometers by January, 2012. Data collection will take from 2 hours to 2 years.

Assumptions and Risks:

1. Both activities rely on R&D funding that is being procured mainly through other divisions.
2. LSST RISK: Funding from LSST project may not be forthcoming.

Staffing Issues:

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

FY12 Plan for **Scientific Research And Leadership / Pierre Auger**

Prepared by: Steve Kent / Paul Lebrun

Date: Nov 1, 2011

Relevant Strategic Plans - [Cosmic Frontier](#)

Tactical Plan Goal

Support data archive/mirroring of Auger South.

Executive Summary of Objectives for FY12

Maintenance/Compliance Drivers

1. Maintain augerd1.fnal.gov

Upgrades and Enhancement Drivers

1. Acquire addition 3 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	FY12
SD Calibration System Plan	FY12

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Detailed Tactical Plan Objectives and Priorities

Maintenance and Compliance Drivers

Objectives:

1. 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:

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

Assumptions and Risks

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

Strategic Drivers

Objectives:

1. 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 mumbblings 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.