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2 August 2007

To: Paul Philp
DOE Project Manager, Dark Energy Camera Project

From: Brenna Flaugher
Project Manager for the Dark Energy Camera Project

Subject: DECam Project July 2007 Report

Attached, you will find the monthly report summarizing the July 2007 activities and progress for the DECam Project.

cc:
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DECam Project
Progress Report No. 1
July 2007

I. PROJECT DESCRIPTION

The Dark Energy Survey (DES) is a 5000 sq. degree griz imaging survey that will be conducted using a new 3 sq. degree wide-field mosaic camera, Dark Energy Camera (DECam), mounted on the CTIO Blanco 4m telescope. The DES combination of telescope aperture, camera field-of-view, red-sensitive detectors, and synergy with the South Pole Telescope will make it over ten times more powerful and more precise than any other existing facility and, therefore, unique in the world. The Collaboration will build and deploy DECam.

The primary scientific goal of the DES is to constrain the coupled dark energy and dark matter cosmological parameters via four complementary methods: galaxy clusters, weak lensing, galaxy angular correlations, and Type Ia supernovae. Each will independently measure the dark energy equation of state, w, with 5-15% statistical errors. When the four measurements are combined the resulting error will be much smaller than the error of any single measurement. Currently, w is only constrained at the 30% level by a combination of different experiments.

II. OVERVIEW OF PROJECT STATUS – Brenna Flaugher

Highlights for the month of July include….

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III. PROJECT MILESTONE SUMMARY (as of 31 July 2007)

Tables 1 and 2, below, list approved DOE and Fermilab Director's milestone dates along with the Project's current and previous month's forecast for achieving them. Forecast dates that have changed significantly in the last month are discussed in Section IV, Part 1.1 of this report.

L1/L2 Milestones vs. Current Forecast – Sorted by Baseline Start Date

WBS	Milestone Description	L1/L2 Baseline	May 07 Forecast Start	June 07 Forecast Start	Baseline Variance (work days)	Monthly Variance (work days)	Notes
1.1.4.2	L1 - CD-1 DOE Review	5/1/07	5/1/07	5/1/07	0 w	0	**Complete**
1.1.4.3	L1 - CD-1 Approval Granted by DOE	7/2/07	7/31/07	7/31/07	3.8 w	0	
1.4.7.4	L2 - Corrector Element Polishing Contract Awarded	11/28/07	8/30/07	8/30/07	-12.4 w	0	
1.3.1.14.3	L2 - CCD readout review - go ahead for V2	2/15/08	1/28/08	1/28/08	-2.6 w	0	
1.1.4.5	L1 - CD-2 Approval Granted by DOE	3/3/08	3/3/08	3/3/08	0 w	0	
1.1.4.7	L1 - CD-3 Approval Granted by DOE	3/3/08	3/3/08	3/3/08	0 w	0	
1.5.2.16.3	L2 - Design Review of Camera and Cooling Complete	8/27/08	6/2/08	6/2/08	-12.2 w	0	
1.2.1.10.4	L2 - v2 CCD Processing and Packaging Review Complete	10/3/08	7/7/08	7/7/08	-12.4 w	0	
1.5.2.16.15	L2 - Barrel ready for telescope simulator	12/16/08	10/22/08	10/22/08	-7.2 w	0	
1.2.1.10.5	L1 - v2 CCD Processing and Packaging Review Complete	1/6/09	7/7/08	7/7/08	-23.4 w	0	
1.2.2.1.4	L2 - 30 production wafers delivered to FNAL	2/27/09	11/21/08	11/21/08	-11.2 w	0	
1.2.2.1.5	L1 - 30 production wafers delivered to FNAL	5/5/09	11/21/08	11/21/08	-20.8 w	0	
1.4.7.7	L2 - Ready To Install Cells On Lenses at UCL	6/10/09	3/12/09	3/12/09	-12.6 w	0	
1.2.2.11.5	L2 - Final Lot 2 CCD's at FNAL	7/13/09	4/29/09	4/29/09	-10.2 w	0	
1.3.2.12.8	L2 - Production Electronics Review Complete	8/16/09	5/28/09	5/28/09	-11 w	0	
1.2.2.11.8	L2 - 128 CCD's Tested and Graded	10/7/09	7/9/09	7/9/09	-12.2 w	0	
1.3.2.12.12	L2 - DES Front End Electronic Production Complete	10/12/09	9/29/09	9/29/09	-1.8 w	0	
1.2.2.11.9	L1 - 128 CCD's Tested and Graded	11/23/09	7/9/09	7/9/09	-19 w	0	
1.4.7.10	L2 - Barrel and C5 Cell Arrive At UCL From Fermilab	11/24/09	8/26/09	8/26/09	-12.4 w	0	
1.5.2.16.9	L2 - Prime Focus Cage Complete	2/5/10	10/23/09	10/23/09	-12.2 w	0	
1.5.2.16.10	L1 - Prime Focus Cage Complete	6/23/10	10/23/09	10/23/09	-31.6 w	0	
1.5.2.16.17	L2 - Telescope Simulator Tests Complete	7/19/10	4/20/10	4/20/10	-12.4 w	0	
1.6.13.5	L2 - SISPI Complete	9/17/10	6/2/10	6/2/10	-14.8 w	0	
1.8.3.5	L2 - Corrector Arrives at CTIO	9/29/10	6/29/10	6/29/10	-12.6 w	0	
1.4.7.13	L2 - Corrector Assembly and Alignment Testing Complete	10/7/10	5/4/10	5/4/10	-21.8 w	0	
1.8.3.8	L2 - Camera and Cage Arrive at CTIO	10/21/10	7/23/10	7/23/10	-12.6 w	0	
1.7.5.3	L2 - Survey Strategy Complete	11/2/10	7/28/10	7/28/10	-13.4 w	0	
1.5.2.16.19	L1 - Camera Assembled and Tested At Fermilab	1/5/11	4/20/10	4/20/10	-34.2 w	0	
1.8.3.12	L2 - Acceptance Testing Complete	2/18/11	11/1/10	11/1/10	-13 w	0	
1.8.3.13	L1 - Acceptance Testing Complete	5/3/11	11/1/10	11/1/10	-23.6 w	0	
1.1.4.14	L1 - CD4 Date for DOE	10/23/11	5/12/11	5/12/11	-22.6 w	0	
						status date:	7/31/2007

Table 1: DECam Project Level 1 and 2 Milestones vs. Current Month forecast. Monthly variances are also provided.

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L3 Milestones vs. Current Forecast - Sorted by Baseline Start Date

WBS	Milestone Description	L3 Baseline Start	Apr 07 Forecast Start	May 07 Forecast Start	Baseline Variance (work days)	Monthly Variance (work days)	Notes
1.5.3.14	L3 - Multi-CCD Test Vessel Ready For CCD Installation	2/9/07	1/10/07	1/10/07	-4.4 w	0	**Complete**
1.2.1.10.2	L3 - v1 CCD Processing and Packaging Review Complete	8/12/07	9/11/07	9/11/07	4 w	0	
1.4.7.2	L3 - Blanks Ordered	8/12/07	7/13/07	7/13/07	-4 w	0	
1.3.1.5.3	L3 - Clock v1 Card Tests at FNAL Complete	8/26/07	9/24/07	9/24/07	3.8 w	0	
1.4.7.3	L3 - Corrector Element Polishing Contract Awarded	9/29/07	8/30/07	8/30/07	-3.8 w	0	
1.3.1.14.2	L3 - CCD readout review - go ahead for V2	11/30/07	1/28/08	1/28/08	6 w	0	
1.6.13.1	L3 - SISPI Subsystems Requirements Documents Complete	12/15/07	10/5/07	10/5/07	-9.6 w	0	
1.5.1.6.4	L3 - Design review of focal plate Complete	3/20/08	2/28/08	2/28/08	-3 w	0	
1.5.2.16.5	L3 - Design review for cage and f/8 plans Complete	4/4/08	5/12/08	5/12/08	5.2 w	0	
1.5.2.16.2	L3 - Design Review of Camera and Cooling Complete	6/28/08	6/2/08	6/2/08	-3.8 w	0	
1.5.2.16.7	L3 - Camera Cooling Plant Review Complete	6/28/08	6/2/08	6/2/08	-3.8 w	0	
1.2.1.10.3	L3 - v2 CCD Processing and Packaging Review Complete	8/5/08	7/7/08	7/7/08	-4 w	0	
1.6.13.2	L3 - SISPI Subsystem Prototypes Complete	9/16/08	7/28/08	7/28/08	-7 w	0	
1.3.2.12.1	L3 - Internal Pre-amp Board & Kapton Cable Tests Complete	10/3/08	9/3/08	9/3/08	-4.2 w	0	
1.3.2.12.4	L3 - Testing of DES Master Control Board Complete	10/23/08	12/9/08	12/9/08	6.2 w	0	
1.5.2.16.14	L3 - Barrel ready for telescope simulator	10/24/08	10/22/08	10/22/08	-0.4 w	0	
1.6.13.3	L3 - Integrated SISPI Prototype Reviewed	11/7/08	9/25/08	9/25/08	-6 w	0	
1.2.2.1.3	L3 - 30 production wafers delivered to FNAL	12/6/08	11/21/08	11/21/08	-1.6 w	0	
1.3.2.12.3	L3 - Vacuum Interface Boards For Camera Tests Complete	1/30/09	12/15/08	12/15/08	-4.4 w	0	
1.3.2.12.2	L3 - v1 DES Clock and Transition Card Tests Complete	4/3/09	5/13/09	5/13/09	5.8 w	0	
1.5.2.16.16	L3 - All Process Input/Output Systems Complete	4/3/09	4/17/09	4/17/09	2.2 w	0	
1.4.7.6	L3 - Ready To Install Cells On Lenses at UCL	4/11/09	3/12/09	3/12/09	-4.2 w	0	
1.4.7.8	L3 - First Lens Shipped To University College London	4/23/09	3/24/09	3/24/09	-4.4 w	0	
1.3.2.12.9	L3 - Production DES Clock & Transition Card Tests Complete	4/26/09	6/11/09	6/11/09	6.6 w	0	
1.2.2.1.9	L3 - Final Lot 2 CCD's at FNAL	5/14/09	4/29/09	4/29/09	-2.2 w	0	
1.2.2.11.4	L3 - 1st prod. CCD ready for testing	6/15/09	5/18/09	5/18/09	-3.6 w	0	
1.3.2.12.7	L3 - Production Electronics Review Complete	6/17/09	5/28/09	5/28/09	-2.8 w	0	
1.2.2.11.7	L3 - 128 CCD's Tested and Graded	8/7/09	7/9/09	7/9/09	-4 w	0	
1.3.2.12.11	L3 - DES Front End Electronic Production Complete	8/13/09	9/29/09	9/29/09	6.2 w	0	
1.5.2.16.11	L3 - Camera Vessel Ready For Installation On Barrel	8/26/09	7/28/09	7/28/09	-4 w	0	
1.4.7.9	L3 - Barrel and C5 Cell Arrive At UCL From Fermilab	9/25/09	8/26/09	8/26/09	-4 w	0	
1.4.3.14	L3 - Final Lens Shipped To University College London	10/14/09	9/14/09	9/14/09	-4.4 w	0	
1.6.13.4	L3 - Final SISPI Testing at FNAL Complete	11/3/09	9/16/09	9/16/09	-6.6 w	0	
1.5.2.16.8	L3 - Prime Focus Cage Complete	11/22/09	10/23/09	10/23/09	-4 w	0	
1.5.2.16.13	L3 - Shutter and Filter Delivered to Fermilab	11/29/09	10/30/09	10/30/09	-3.6 w	0	
1.5.2.16.18	L3 - Camera testing complete	2/21/10	1/19/10	1/19/10	-4.6 w	0	
1.2.2.2.4	L3 - Lot 3A CCD's at FNAL	4/7/10	3/8/10	3/8/10	-4.4 w	0	
1.4.6.7	L3 - Filters complete	4/9/10	2/17/10	2/17/10	-7.2 w	0	
1.8.3.10	L3 - Filters Arrive at CTIO	5/6/10	3/17/10	3/17/10	-7 w	0	
1.5.2.16.12	L3 - Electronic Crate Cooling System Complete	5/7/10	3/22/10	3/22/10	-6.6 w	0	
1.5.2.13.20	L3 - Telescope Simulator Tests Complete	5/20/10	4/20/10	4/20/10	-4.4 w	0	
1.4.7.12	L3 - Corrector Assembly and Alignment Testing Complete	6/17/10	5/4/10	5/4/10	-6 w	0	
1.8.3.4	L3 - Corrector Arrives at CTIO	7/16/10	6/16/10	6/16/10	-4.2 w	0	
1.7.5.1	L3 - Image Simulation Complete	8/5/10	6/29/10	6/29/10	-5 w	0	
1.8.3.7	L3 - Camera and Cage Arrive at CTIO	8/22/10	7/23/10	7/23/10	-4 w	0	
1.2.2.3.4	L3 - Final Contingency CCD's at FNAL	8/27/10	7/28/10	7/28/10	-4.4 w	0	
1.7.5.2	L3 - Survey Strategy Complete	9/9/10	7/28/10	7/28/10	-5.8 w	0	
1.8.3.11	L3- Acceptance Testing Complete	12/4/10	11/1/10	11/1/10	-4.4 w	0	
						status date:	7/31/2007

Table 2: DECam Project Level 3 Milestones vs. Current Month forecast. Monthly variances are also provided.

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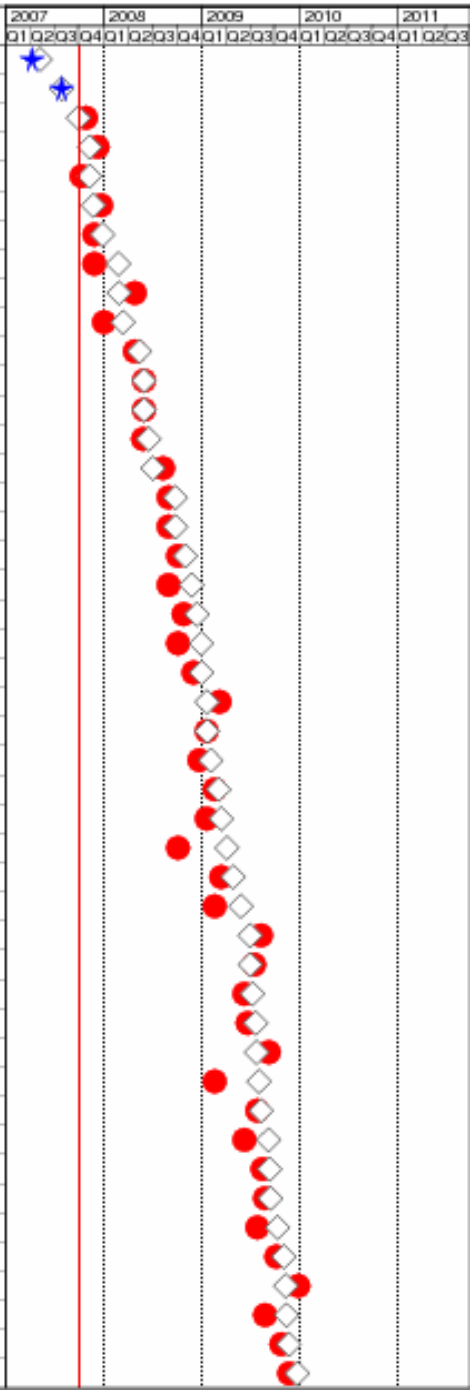
DECam Milestones Through FY09 (Levels 1 - 3)
Sorted By Baseline Start Date

WBS	Name	Forecast Start	Baseline Start	Variance
1.5.3.14	L3 - Multi-CCD Test Vessel Ready For CCD Installation	1/10/07	2/9/07	-4.4 wks
1.1.4.2	L1 - CD-1 DOE Review	5/1/07	5/1/07	0 wks
1.1.4.3	L1 - CD-1 Approval Granted by DOE	7/31/07	7/2/07	3.8 wks
1.2.1.10.2	L3 - v1 CCD Processing and Packaging Review Complete	9/11/07	8/12/07	4 wks
1.4.7.2	L3 - Blanks Ordered	7/13/07	8/12/07	-4 wks
1.3.1.5.3	L3 - Clock v1 Card Tests at FNAL Complete	9/24/07	8/26/07	3.8 wks
1.4.7.3	L3 - Corrector Element Polishing Contract Awarded	8/30/07	9/29/07	-3.8 wks
1.4.7.4	L2 - Corrector Element Polishing Contract Awarded	8/30/07	11/28/07	-12.4 wks
1.3.1.14.2	L3 - CCD readout review - go ahead for V2	1/28/08	11/30/07	6 wks
1.6.13.1	L3 - SISPI Subsystems Requirements Documents Complete	10/5/07	12/15/07	-9.6 wks
1.3.1.14.3	L2 - CCD readout review - go ahead for V2	1/28/08	2/15/08	-2.6 wks
1.1.4.5	L1 - CD-2 Approval Granted by DOE	3/3/08	3/3/08	0 wks
1.1.4.7	L1 - CD-3 Approval Granted by DOE	3/3/08	3/3/08	0 wks
1.5.1.6.4	L3 - Design review of focal plate Complete	2/28/08	3/20/08	-3 wks
1.5.2.16.5	L3 - Design review for cage and f/8 plans Complete	5/12/08	4/4/08	5.2 wks
1.5.2.16.2	L3 - Design Review of Camera and Cooling Complete	6/2/08	6/28/08	-3.8 wks
1.5.2.16.7	L3 - Camera Cooling Plant Review Complete	6/2/08	6/28/08	-3.8 wks
1.2.1.10.3	L3 - v2 CCD Processing and Packaging Review Complete	7/7/08	8/5/08	-4 wks
1.5.2.16.3	L2 - Design Review of Camera and Cooling Complete	6/2/08	8/27/08	-12.2 wks
1.6.13.2	L3 - SISPI Subsystem Prototypes Complete	7/28/08	9/16/08	-7 wks
1.2.1.10.4	L2 - v2 CCD Processing and Packaging Review Complete	7/7/08	10/3/08	-12.4 wks
1.3.2.12.1	L3 - Internal Pre-amp Board and Kapton Cable Tests Complet	9/3/08	10/3/08	-4.2 wks
1.3.2.12.4	L3 - Testing of DES Master Control Board Complete	12/9/08	10/23/08	6.2 wks
1.5.2.16.14	L3 - Barrel ready for telescope simulator	10/22/08	10/24/08	-0.4 wks
1.6.13.3	L3 - Integrated SISPI Prototype Reviewed	9/25/08	11/7/08	-6 wks
1.2.2.1.3	L3 - 30 production wafers delivered to FNAL	11/21/08	12/6/08	-1.6 wks
1.5.2.16.15	L2 - Barrel ready for telescope simulator	10/22/08	12/16/08	-7.2 wks
1.2.1.10.5	L1 - v2 CCD Processing and Packaging Review Comple	7/7/08	1/6/09	-23.4 wks
1.3.2.12.3	L3 - Vacuum Interface Boards For Camera Tests Complete	12/15/08	1/30/09	-4.4 wks
1.2.2.1.4	L2 - 30 production wafers delivered to FNAL	11/21/08	2/27/09	-11.2 wks
1.3.2.12.2	L3 - v1 DES Clock and Transition Card Tests Complete	5/13/09	4/3/09	5.8 wks
1.5.2.16.16	L3 - All Process Input/Output Systems Complete	4/17/09	4/3/09	2.2 wks
1.4.7.6	L3 - Ready To Install Cells On Lenses at UCL	3/12/09	4/11/09	-4.2 wks
1.4.7.8	L3 - First Lens Shipped To University College London	3/24/09	4/23/09	-4.4 wks
1.3.2.12.9	L3 - Production DES Clock and Transition Card Tests Comple	6/11/09	4/26/09	6.6 wks
1.2.2.1.5	L1 - 30 production wafers delivered to FNAL	11/21/08	5/5/09	-20.8 wks
1.2.2.1.9	L3 - Final Lot 2 CCD's at FNAL	4/29/09	5/14/09	-2.2 wks
1.4.7.7	L2 - Ready To Install Cells On Lenses at UCL	3/12/09	6/10/09	-12.6 wks
1.2.2.11.4	L3 - 1st prod. CCD ready for testing	5/18/09	6/15/09	-3.6 wks
1.3.2.12.7	L3 - Production Electronics Review Complete	5/28/09	6/17/09	-2.8 wks
1.2.2.11.5	L2 - Final Lot 2 CCD's at FNAL	4/29/09	7/13/09	-10.2 wks
1.2.2.11.7	L3 - 128 CCD's Tested and Graded	7/9/09	8/7/09	-4 wks
1.3.2.12.11	L3 - DES Front End Electronic Production Complete	9/29/09	8/13/09	6.2 wks
1.3.2.12.8	L2 - Production Electronics Review Complete	5/28/09	8/16/09	-11 wks
1.5.2.16.11	L3 - Camera Vessel Ready For Installation On Barrel	7/28/09	8/26/09	-4 wks
1.4.7.9	L3 - Barrel and C5 Cell Arrive At UCL From Fermilab	8/26/09	9/25/09	-4 wks

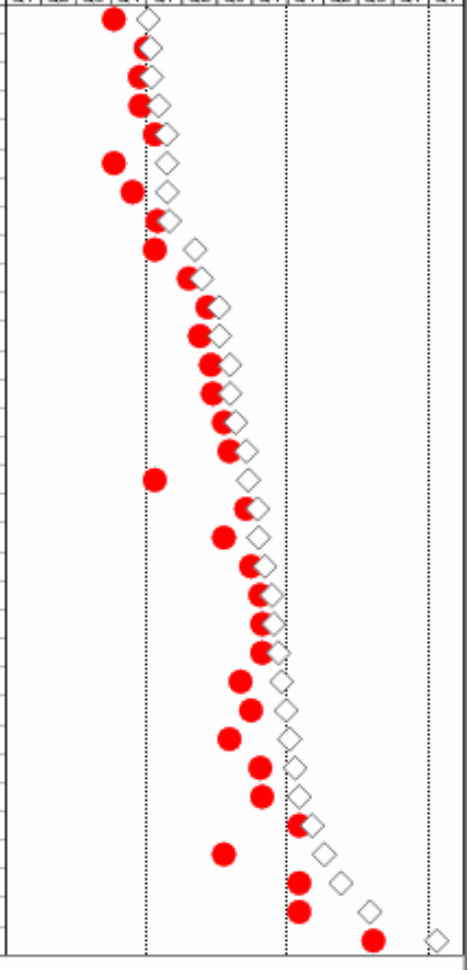


Open Diamond = Baseline MS Date **Solid Red Circle = Forecast MS Date** **Blue Star = Completed MS**

Figure 1: Level 1, 2, and 3 Milestones through Project End

DECam Milestones FY10 and FY11 (Levels 1 - 3)
Sorted By Baseline Start Date

WBS	Name	Forecast Start	Baseline Start	Variance
1.2.2.11.8	L2 - 128 CCD's Tested and Graded	7/9/09	10/7/09	-12.2 wks
1.3.2.12.12	L2 - DES Front End Electronic Production Complete	9/29/09	10/12/09	-1.8 wks
1.4.3.14	L3 - Final Lens Shipped To University College London	9/14/09	10/14/09	-4.4 wks
1.6.13.4	L3 - Final SISPI Testing at FNAL Complete	9/16/09	11/3/09	-6.6 wks
1.5.2.16.8	L3 - Prime Focus Cage Complete	10/23/09	11/22/09	-4 wks
1.2.2.11.9	L1 - 128 CCD's Tested and Graded	7/9/09	11/23/09	-19 wks
1.4.7.10	L2 - Barrel and C5 Cell Arrive At UCL From Fermilab	8/26/09	11/24/09	-12.4 wks
1.5.2.16.13	L3 - Shutter and Filter Delivered to Fermilab	10/30/09	11/29/09	-3.6 wks
1.5.2.16.9	L2 - Prime Focus Cage Complete	10/23/09	2/5/10	-12.2 wks
1.5.2.16.18	L3 - Camera testing complete	1/19/10	2/21/10	-4.6 wks
1.2.2.2.4	L3 - Lot 3A CCD's at FNAL	3/8/10	4/7/10	-4.4 wks
1.4.6.7	L3 - Filters complete	2/17/10	4/9/10	-7.2 wks
1.8.3.10	L3 - Filters Arrive at CTIO	3/17/10	5/6/10	-7 wks
1.5.2.16.12	L3 - Electronic Crate Cooling System Complete	3/22/10	5/7/10	-6.6 wks
1.5.2.13.20	L3 - Telescope Simulator Tests Complete	4/20/10	5/20/10	-4.4 wks
1.4.7.12	L3 - Corrector Assembly and Alignment Testing Complete	5/4/10	6/17/10	-6 wks
1.5.2.16.1(	L1 - Prime Focus Cage Complete	10/23/09	6/23/10	-31.6 wks
1.8.3.4	L3 - Corrector Arrives at CTIO	6/16/10	7/16/10	-4.2 wks
1.5.2.16.17	L2 - Telescope Simulator Tests Complete	4/20/10	7/19/10	-12.4 wks
1.7.5.1	L3 - Image Simulation Complete	6/29/10	8/5/10	-5 wks
1.8.3.7	L3 - Camera and Cage Arrive at CTIO	7/23/10	8/22/10	-4 wks
1.2.2.3.4	L3 - Final Contingency CCD's at FNAL	7/28/10	8/27/10	-4.4 wks
1.7.5.2	L3 - Survey Strategy Complete	7/28/10	9/9/10	-5.8 wks
1.6.13.5	L2 - SISPI Complete	6/2/10	9/17/10	-14.8 wks
1.8.3.5	L2 - Corrector Arrives at CTIO	6/29/10	9/29/10	-12.6 wks
1.4.7.13	L2 - Corrector Assembly and Alignment Testing Complete	5/4/10	10/7/10	-21.8 wks
1.8.3.8	L2 - Camera and Cage Arrive at CTIO	7/23/10	10/21/10	-12.6 wks
1.7.5.3	L2 - Survey Strategy Complete	7/28/10	11/2/10	-13.4 wks
1.8.3.11	L3- Acceptance Testing Complete	11/1/10	12/4/10	-4.4 wks
1.5.2.16.1(	L1 - Camera Assembled and Tested At Fermilab	4/20/10	1/5/11	-34.2 wks
1.8.3.12	L2 - Acceptance Testing Complete	11/1/10	2/18/11	-13 wks
1.8.3.13	L1 - Acceptance Testing Complete	11/1/10	5/3/11	-23.6 wks
1.1.4.14	L1 - CD4 Date for DOE	5/12/11	10/23/11	-22.6 wks



Open Diamond = Baseline MS Date **Solid Red Circle = Forecast MS Date** **Blue Star = Completed MS**

Figure 2: Level 1, 2, and 3 Milestones through Project End

IV. PROJECT HIGHLIGHTS BY WBS SECTION

WBS 1.1 Project Management – Brenna Flaugher and K. Wyatt Merritt

Management and Administration

Director's Reviews, DOE Reviews, and money allocation issues.

Project Milestones

This section contains milestones scheduled for completion during the month, milestones completed during the month, and an explanation of any target dates that moved (slipped or gained) by 10 days or more.

No milestones were scheduled or achieved during July and no milestone dates moved by 10 days or more.

WBS 1.2 Focal Plane Detectors - Tom Diehl and Juan Estrada

We received 5 finished wafers from Lot 2A from LBNL, for a total of 10 from that lot. We received the three control wafers from Lot 2B from LBNL. Cold probe analysis of the Lot2A devices indicates some are expected to be useful for final production devices for DECam. Cold probe analysis of Lot2B devices indicated that the Dalsa processing steps on the lot were a success. We submitted the req for processing of the 24 wafers of Lot 2E at Dalsa. It is awaiting final signatures at Fermilab.

We finished packaging of 9 devices during July: 3 V2.0 pedestal packages with a JFET source-follower mounted on the aluminum-nitride circuit; three 1/2k x 1k, and three 2k x 2k picture frame devices. These devices will determine if we can attain better readout noise performance with the JFET mounted 2 cm closer to the CCD than in the present best design, to determine if a manual wirebonder can be used to produce working CCDs, and to add statistics to our CCD cosmetic yield calculation.

We performed detailed yield tests on the 5 Lot 2A 2k x 2k devices that were packaged last month. Four of them pass all specifications. One did not readout, consistent with expected production losses. We finished testing of the V2.0 pedestal packages with JFET's on the AlN circuit; they performed no better than previous pedestal packages. We tested one of the three new 1/2k x 1k small picture frame devices; it worked, indicating the manual wirebonding is at least a partial success.

We continued to develop better-automated CCD testing and test-data analysis procedures and we implemented a change in the CCD readout sequencer suggested by our Collaborators at CTIO. This allows us to increase the readout speed to under 4 microseconds per pixel at 8 electrons noise. We are now meeting the readout noise spec at the readout speed spec.

We operated the multi-CCD test vessel, successfully reading out four CCD's using the new sequencer code described above. We achieved noise results on the 4 devices similar to what we had achieved when we read them out one at a time. We continue to study the test data.

WBS 1.3 Front End Electronics - Terri Shaw

The front end electronics group was happy to host a visit from our Spanish colleagues at the beginning of the month. Two engineers from CIEMAT (Madrid) came over to test a new Clock Board. The Clock Board (CB) has the ability to drive 135 clocks, compared to the 32 we get from the NOAO Clock & Bias Board (CBB). Things went well. We were able to develop a focal plane to utilize the Clock board in our readout system and overcame a layout problem with the Clock Transition Board by wiring up a kludge. By the end of their visit, we were able to replace the CBB in one of our Monsoon systems at SiDet and show that we could readout a CCD at 3.7us with about 12e^- noise. We would like to obtain a lower noise figure and are awaiting a new Clock Transition Board from IFAE (Barcelona). The new board will fix the previous layout problem and provide some additional filtering on the power supply and signal lines.

Also occurring during this visit, was the successful conversion from the Systran optical link to S-Link on two machines. IFAE colleagues provided the engineering manpower required for this task. Once installed at Fermilab, the link passed all our tests.

We also took delivery of the next prototype Vacuum Interface Board (VIB). This version, v2, will allow us to readout the Multi-CCD test dewar with the new Clock Board and the 12-Channel

Acquisition Board. The current VIB only allows readout with the original NOAO Monsoon modules. We hope to test and install this new VIB board into the dewar sometime next month.

We've done several tests on cabling inside the dewar. We were able to test a parallel JFET driver and saw slightly improved performance (less than an electron). Additional testing showed that while we might get away from having a preamp at a 6us (6.5e- noise without a preamp and 7e- with a preamp) readout rate, when we go to a 3.7us readout rate there is quite a difference in noise. At 3.7us readout rate, we saw 11e- noise without a preamp and 7.5e- with a preamp.

Tests reading out 4 CCDs in the Multi-CCD test dewar have also proven that we have much better signal integrity when we transfer the video signal on coax. This will become our plan for production.

AlN Boards were produced with the JFET located onboard and tests are underway to understand its performance. Initial results look like some component may be getting affected by the extreme temperature of the dewar.

Some work was done with the Vicor switch power supplies at Fermilab. Currently they are too noisy to use in our production system. External filter components have been ordered and will be tested to try to mitigate noise. University of Illinois engineers are exploring a linear power supply solution as a backup.

WBS 1.4 Optics – Peter Doel

The DES MC reviewed the responses to the optics review and authorized UCL to proceed to order glass blanks. Now the actual contract is waiting on the contracts with the universities. The expected completion is Aug. 10th. The tender for lens polishing went out July 27th. It has a 40 day response cycle. Funding for the polishing is planned to be covered by the UK funding, following submission of a report by UCL to PPARK/STSC.

The Filter specifications work is making good progress and is on schedule to be complete by mid August. This will be sent around for the Collaboration to review prior to sending out for RFI.

The revised cell design meets the requirements. Plans for a prototype are being developed using a spare at UCL (large lens ~ 550 mm in diameter). A solid model was prepared and we are starting to get cost estimates for the stray light analysis and baffle design

WBS 1.5 Opto-Mechanical Systems – Andy Stefanik

We finished fabricating the flatness scanner for the MCCDTV and have approved the fabrication drawing for the 200 liter LN2 vessel. Two internal reviews were held regarding the imager LN2 cooling system. We're updating documents based on review comments. We also completed the AL 300 cryocooler capacity and vibration tests.

We completed the hexapod specification and Purchasing issued the formal hexapod RFI to seven vendors. This will have a bid closing date of August 31. Purchasing has also issued an RFQ for the camera vessel weldment. We were also successful in obtaining a preliminary budget quotation from an outside contractor for the stray light analysis and baffles.

We checked combined deflections of C1 cell (UCL) and barrel cone (Fermilab). The combined deflections are within the specified limits. We will eventually have one all inclusive FEM at Fermilab rather than having separate FEM's at these two institutions.

We are looking (solid modeling and FEA) at different ways to stiffen and lighten the barrel cone. We will build a pre-prototype cone to help develop weld procedures. The plan is to send either a mounting plate or the pre-prototype cone to UCL to mount the prototype cell.

We completed first drafts of the Barrel RSD, Instrument Control System ICD, WBS 1.5 TDR outline, and TDR barrel section. We also spent time and have successfully developed a conceptual design for a hexapod alternative.

CTIO has specified preliminary requirements and the location for the new F/8 handler. We've modeled pertinent areas of the dome floors and will make drawings of the area. CTIO will add as-built dimensions to the drawings.

WBS 1.6 Survey Image System Processing Integration – Jon Thaler and Klaus Honscheid

OCS: We have a working "state machine" model of the OCS, written in Python. I think that models of this sort will be a good way to test the validity of much of the SISPI architecture, and possibly become real code.

Quality Analysis: Joe Mohr and I met yesterday to begin discussing quality analysis requirements. We expect to have, for CD2, a realistic description of what tests top perform and an estimate of the CPU requirements. This affects, among other things the number of Image Builder processors we will need. At this time, our estimate of six or so seems OK.

At next week's SN workshop at Argonne, we will discuss what (if any) DAQ requirements follow from SN science needs. I hope to begin similar discussions with the other science working groups.

At Inga's request, Juan took measurements to study the effect on image quality of speeding the vertical CCD clocking. The science CCDs are clocked at 120 us per row, which does not affect their readout time significantly. However, with ROI readout, this vertical clocking dominates the guide CCD readout time (310 ms). If we speed the vertical clock to 20 us per row, readout time becomes 110 ms. We have not yet seen the results of Juan's analysis. The potential issues are, I think, CTE and trailing.

WBS 1.7 Survey Planning – Jim Annis and Huan Lin

We completed scientist effort (H. Lin) on preparing the input catalogs for the Level 3 catalog simulations. This included work to update the scripts to prepare so-called "pointing files", i.e., catalogs (in binary fits table format) of galaxies and stars that are read by the image simulation code to render objects on the simulated images.

Also, responding to requests from Joe Mohr on the DES Data Management project, we (N. Kouropatkine and H. Lin) also worked on production of a small set of "Gold Standard Light" science and calibration images. This data set was requested in order to provide Data Management with simulated images that conformed to an updated image file and header format data model, as well as to correct a number of bugs in photometry and astrometry that had been uncovered in the simulated images. This effort also leads into the start of the Level 3 image

simulation production task in August 2007, which will begin with additional, larger test data sets to be validated with the Data Management group in advance of full production.

V. PROCUREMENT and FINANCIAL STATUS – Brenna Flaugher

Cost accounting against project cost codes began on August 1, 2007. The "% Complete" reflected in the Table below is based on DOE costs from COBRA. The "% Complete" calculated by Microsoft Project is 0% based on Level 2 Manager reports.

MONTH: July 2007	Direct Costs + OH in $K		
	R&D	MIE	Total
YTD Through June 2007	$0.0	$0.0	$0.0
Costed this month (July 07)	$0.0	$0.0	$0.0
Total Cost of Project to date	$0.0	$0.0	$0.0
Total Cost of Project	$4,166,026	$14,425,410	$18,591,436
% of Project Work Completed	0.0%	0.0%	0.0%
Total Cost of Project	$1,633	$2,637	$4,270

Table 3: DECam Financial Status (Based on DOE Costs only)

VI. PROJECT COSTS AND OBLIGATIONS (as of 31 July 2007)

DECam Obligations Report - This report provides a Level 2 summary of outstanding Purchase Orders (PO's) where funds have been committed but for which the Project hasn't been invoiced. Brief descriptions of the columns and cost summaries in this report are given below:

- Year to Date (YTD) Costs – Total cost charged to the Project in the current fiscal year.
- Current Month Obligations – The total obligations against the Project for this month.
- YTD Obligations with Reqs In Process (w/RIPS) – Total obligations against the Project for the current FY plus the amount of reqs that have not yet become PO's.
- Current Open Purchase Orders – The total of the open commitments against the Project. It includes open commitments from the current and all prior years.
- Current Reqs in Process – Total amount of requisitions that have not yet become PO's.
- Costs Thru FY06 - The total cost charged to the project through the end of FY06.
- Total Project Inception-To-Date Costs are the YTD Costs plus the Prior Year Costs.
- The Total Project Inception-To-Date Obligations equals the Total Project Inception-To-Date Costs plus the Current PO Open Commitment amount.

DECam Project Cost Performance Report (CPR) – This report is generated from COBRA and provides a summary of the WBS 1.2-1.4 costs of the Project down to Level 3 of the Work Breakdown Structure. Silicon detector subproject closeout costs are not tracked here. Input data originates with the status (% Complete) of the Project schedules as reported by the Level 2 managers and actual costs extracted from the Fermilab accounting system. Where possible, costs are accrued for items that have been delivered, but not yet invoiced. This is only possible for a small fraction of

our cost. Financial summaries are shown for this reporting period (columns 2-6) as well as the project to date (columns 7-11). Column 12 contains our baseline BAC, and will only be changed after the formal implementation of the Change Control process. Column 13 is the projected BAC, based on the current month's schedule. A number of specialized financial terms and abbreviations used in the CPR are defined here for convenience:

ACWP – Actual Cost of Work Performed. The actual cost of tasks that have been completed.

BAC – Budget at Completion. The BAC is the estimated total cost of the project when completed. It is equivalent to the BCWS at completion. The baseline value of the BCWS is contained in column 12 of the Cost Performance Report.

BCWP – Budgeted Cost of Work Performed. The scheduled cost profile of completed tasks.

BCWS – Budgeted Cost of Work Scheduled. This is the sum of the budgets for all planned work to be accomplished within a given time period.

EAC – Estimate At Completion. This is the ACWP to date, plus the BCWS (current scheduled estimate) of remaining tasks. $EAC = (BAC\ (current) - BCWP) + ACWP$

ETC – Estimate to Completion. $ETC = EAC - ACWP + Contingency$

Percent Complete - $\%Com = \frac{BCWP}{BAC}$

SV – Schedule Variance or SPI – Schedule Performance Indicator. $SV = BCWP - BCWS$

For SPI, >1 is good because you've accomplished work faster than originally planned.

CV – Cost Variance or Cost Performance Indicator - CPI. $CV = BCWP - ACWP$

For CPI, >1 is good because it means you've done more than you thought you would for less money than you anticipated. 1 = on target. Less than 1 means somebody has some explaining to do!

DRAFT

DECam Cost Performance Report
Through 30 June 2007

DES June 07 CPR	CUMULATIVE TO DATE					AT COMPLETION
ITEM	BUDGETED COST		ACTUAL COST	VARIANCE		
	WORK SCHEDULED	WORK PERFORMED	WORK PERFORMED	SCHEDULE	COST	BUDGETED
EQU Equipment						
1.1 Management	0	0	0	0	0	2,031,446
1.2 Focal Plane Detectors	0	0	0	0	0	3,505,713
1.3 Front End Electronics	0	0	0	0	0	1,531,126
1.4 Optics	0	0	0	0	0	821,865
1.5 Opto-Mechanical System	0	0	0	0	0	4,916,992
1.6 Survey Image System Process Integration (SISPI)	0	0	0	0	0	525,416
1.7 Survey Planning	0	0	0	0	0	647,263
1.8 CTIO Integration	0	0	0	0	0	445,591
Funding Type-CTotals:	0	0	0	0	0	14,425,410
GEN Generic						
1.1 Management	331,753	331,929	204,433	176	127,496	368,810
1.2 Focal Plane Detectors	1,367,599	1,321,061	671,272	-46,538	649,789	1,595,148
1.3 Front End Electronics	1,018,087	928,242	780,947	-89,845	147,295	1,087,973
1.4 Optics	24,830	24,830	0	0	24,830	24,830
1.5 Opto-Mechanical System	848,395	699,787	559,726	-148,608	140,061	958,197
1.6 Survey Image System Process Integration (SISPI)	0	0	0	0	0	0
1.7 Survey Planning	92,426	92,426	278,065	0	-185,639	92,426
Funding Type-CTotals:	3,683,091	3,398,276	2,494,443	-284,815	903,832	4,127,386
RD R&D						
1.1 Management	0	0	0	0	0	386,606
1.2 Focal Plane Detectors	0	0	0	0	0	970,470
1.3 Front End Electronics	0	0	0	0	0	1,252,110
1.4 Optics	0	0	0	0	0	118,041
1.5 Opto-Mechanical System	0	0	0	0	0	893,192
1.6 Survey Image System Process Integration (SISPI)	0	0	0	0	0	135,424
1.7 Survey Planning	0	0	0	0	0	315,539
1.8 CTIO Integration	0	0	0	0	0	94,967
Funding Type-CTotals:	0	0	0	0	0	4,166,348
Total	3,683,091	3,398,276	2,494,443	-284,815	903,832	22,719,144