L A N D S A T

LDCM

Data Continuity Mission

LDCM Project Status for the Landsat Science Team

Phil Sabelhaus
LDCM Project Manager
August 16, 2011

Agenda

- **Project Status**
  - General
  - Operational Land Imager
  - Thermal Infrared Sensor
  - Spacecraft
  - Launch Vehicle
  - Open Issues
  - Top Risks
  - Other Concerns
- **Summary**

Project Status

Project Status

- **General:**
  - Launch Readiness Date (LRD) is December 1, 2012
    - Currently have 55 days of schedule slack
- **Reviews:**
  - LDCM conducted a successful Critical Design Review (CDR) in May 2010 at GSFC
  - OLI Pre Environmental Review (PER) held on January 5-6, 2011 at Ball
  - OLI Pre Ship Review (PSR) held August 3-4, 2011 at Ball
  - System Integration Review (SIR) being held on September 6-9, 2011 here at Orbital
    - Instrument Integration Readiness Review (IIRR) will be covered that week as well
    - Key Decision Point–D (KDP-D) occurs in October after the SIR
    - Transition to phase D occurs after KDP-D
  - TIRS PER scheduled for September 20-21, 2011 at GSFC

LDCM - Project Organization

LDCM

Project Science Office
Jim Irons
- Deputy – Bruce Cook
- Instruments – Phil Dabney
- SSAI Contractors
- RA – Jason Baldessari
- TIRS Instrument Scientist – Dennis Reuter

Project Manager – Phil Sabelhaus
Deputy Project Manager - Del Jenstrom
DPR/Resources – Lorrie Eakin

Admin Asst. – Sarah DiMarco

- NASA HQ Program Exec – David Jarrett
- KSC – Bruce Reid
- USGS LDCM Project Mgr – David Hair
- USGS HQ LRS Principal Systems Eng - Tim Newman

Financial Management
Carolyn Ellenes
- RA – Sandy Sumner
- RA – Katerina Martinez-Muniz
- RA – Peter Ondrus

TIRS Financial Management
Jahi Wartts
- RA – Kim Coles

Project Support Management
Karla Kahler
- Scheduling/EVM – Jeff Slade
- Jimmie Harrell
- CM - Colvin Bert

Chief S&MA Officer - Patty Huber
- Safety - Paul Gibbons
- Reliability - Paula Pruessner
- QA H/W - Peggy Reno
- QA S/W - Robert Hopkins
- QA H/W BATC On-Site - Cathy Yonts
- QA H/W Orbital On-Site - George Mudrenko
- QA H/W Orbital On-Site - DeVere Hall
- AETD Discipline Engrs

Mission System Engineering
Evan Webb - Systems Manager & TA
- Verification Mgr. – Katie Barthelme
- Verification SE – Leland Chemerys
- Observatory I/F SE - Ted Grems
- S/C Systems Engr, - Robert Patschke
- Mission Software Mgr. – Kim Hawkins
- Flight Software Engr. – Don Glenn
- Ground Software Engr.– Shane Albright
- Risk Manager - Tim Dudenhoefer
- TIRS I/F Eng – Tracy Meyer
- Reqts. Mgmt. – Dorothy Wertz

USGS Representative(s)
LDCM Chief Engr – Jim Lacasse

Procurement Manager - Steve Kramer
Contracting Officer - Patty Dombrowski
Contracting Officer – Lisa Mullen

Education & Public Outreach
Anita Davis
- Laura Rocchio
- Jeannie Allen
- Mike Taylor

Observatory Mgr
Bill Anselm
- Sr. DO Admin Asst, Linda Fathi-Yar
- AETD Discipline Engrs
- Orbital On-Site, Jim Kelley

Launch Vehicle i/f Mgr
Mike Goeser

Mission I&T Mgr
Nancy Stafford
- Sujee Haskins

Cal/Val Mgr
Brian Markham
- USGS Lead, Ron Morfitt
- USGS Geom. Lead, James Storey
- Cal/Val Team

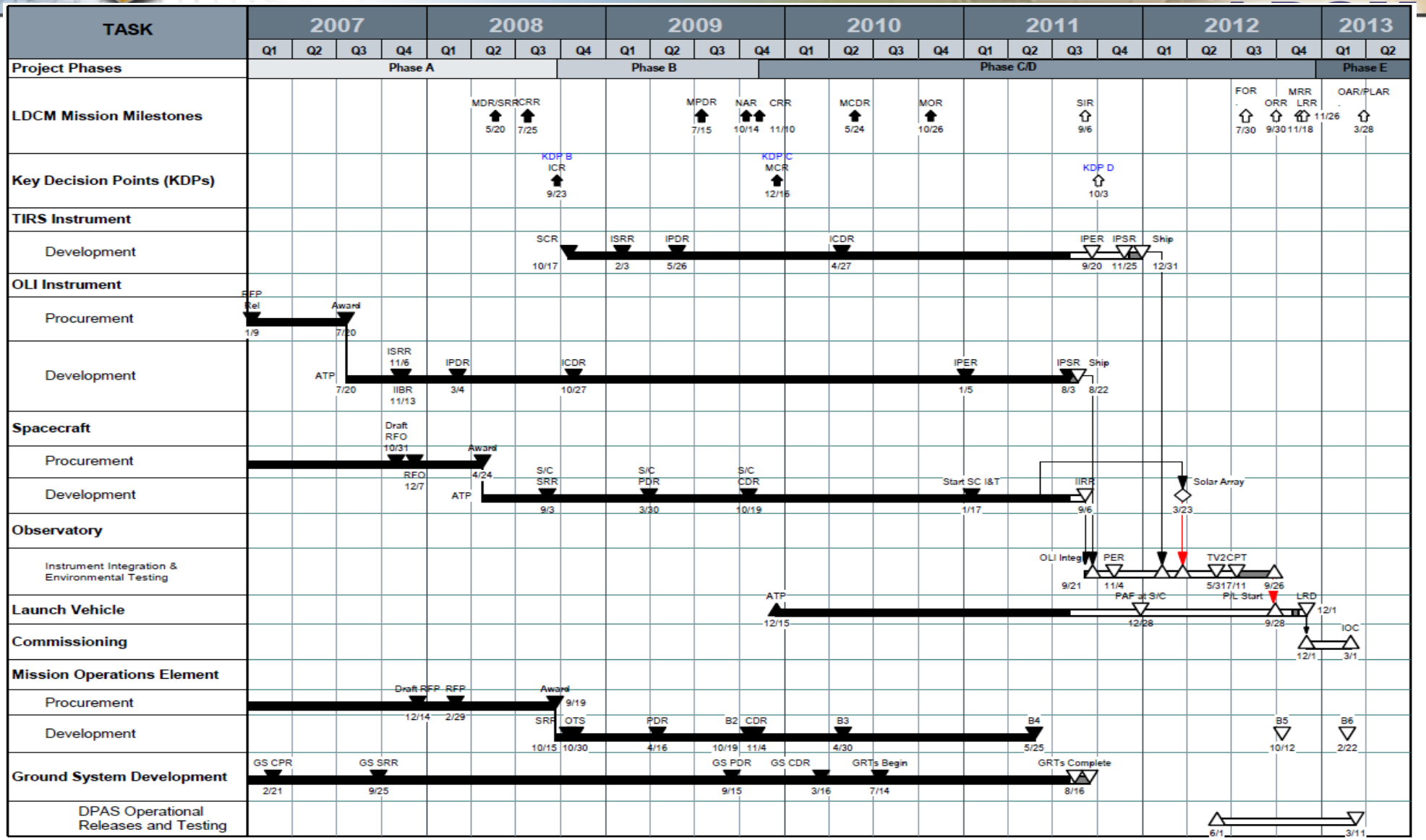
Land Imager Mgr
Jeanine Murphy
- ISE - Steve Bidwell
- AETD Discipline Engrs
- BATC On-Site, Jeff Pedelty

TIRS Instr Mgr
Cathy Richardson
- Deputy IM - Betsy Forsbacka
- Deputy IM – Caleb Principe
- Lead ISE – Fernando Pellerano
- CSO – Dann Brown

Ground Systems Mgr
Vicki Dulski
- Deputy GS Mgr. – Kari Wulf
- GS Chief Eng – Jonathan Gal-Edd
- USGS Integra. Lead- Doug Daniels
- GRM – Travis Chezick
- Ops. Eng – Paul Wilkin
- MOE COTR – Vicki Dulski
- MOC/NISN i/f – Norm Reese
- ITSecurity - Don Hager/Jim Turner
- USGS GS Manager – Jim Nelson

Mission Ops Mgr
Julio Marius
- USGS Deputy MOM Jason Williams (acting)
- System Support – Bob Shendock
- FOT
- PRDS Dev – Steve Kreisler

LDCM Schedule



Operational Land Imager

OLI Significant Progress

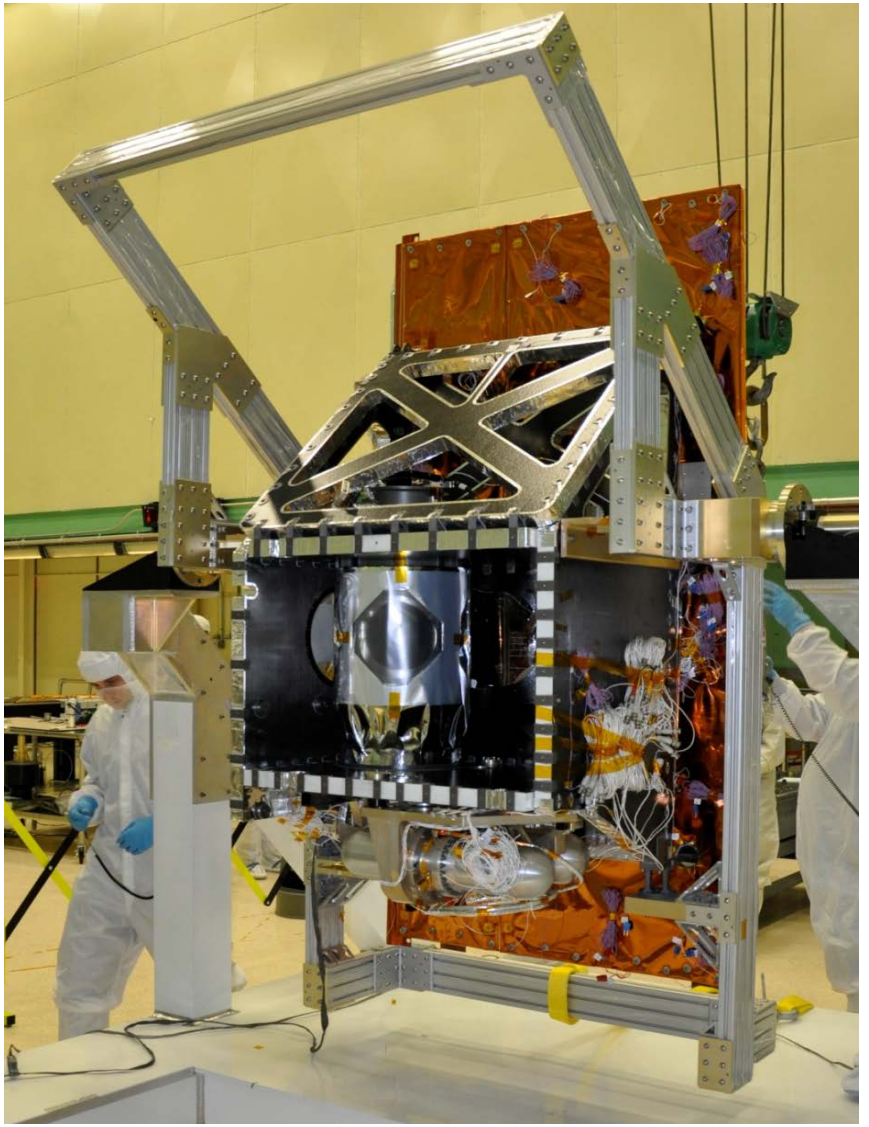
- **Operational Land Imager (OLI)**
  - **Instrument calibration is complete. Instrument performance is excellent**
  - **The Instrument Support Electronics, Focal Plane Electronics, Thermal Control Subsystem, temperature sensors, harnessing and blanketing were integrated with the sensor on the baseplate to complete the OLI Assembly**
    - Instrument Comprehensive Functional Test was completed
  - **All environmental, EMI/EMC, vibration and thermal vacuum, testing were successfully completed**
  - **All life testing has been successfully completed**
  - **Instrument was ready to ship on July 20th**
    - Currently working a heater circuit anomaly
    - Issue is a lien to shipping the instrument to Orbital on August 21st
  - **Plan was and still may be to integrate the OLI to the Spacecraft in late September**

OLI on Baseplate

Thermal Infrared Sensor (TIRS)

TIRS Significant Progress

- **Integration and Test**
  - **Completed mechanical, cryo and electrical integration sans the launch lock (holds down the cryo cooler isolation system at launch)**
  - **All harnesses were completed and installed on the sensor unit**
  - **Thermal hardware, including blankets, installation complete**
  - **Long form ambient functional testing is completed last week**
  - **TVAC #1 should start this week**
  - **Launch lock integration scheduled for September**



TIRS Near Term Milestones (Next 6 months)

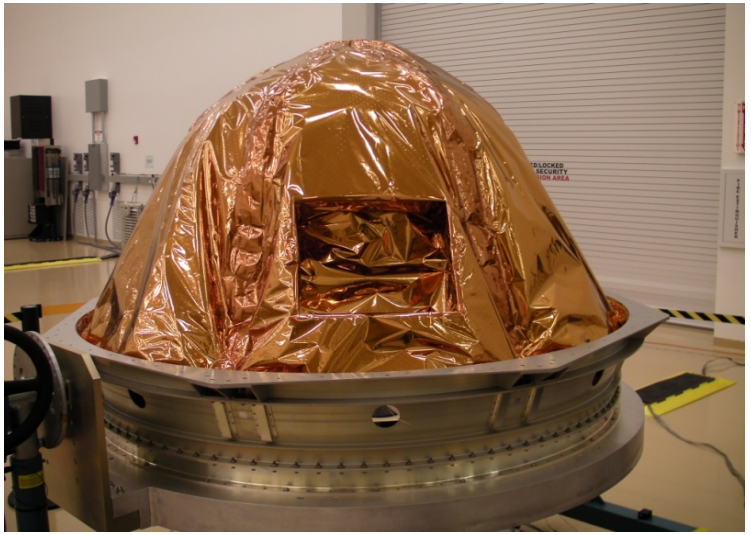
- **Complete remaining subsystem deliveries to I&T:**
  - **Launch lock**
- **Start and complete TVAC #1**
- **Pre-Environmental Review (PER) in September 2011**
- **Start and complete environmental testing**
- **Ship instrument to Orbital**

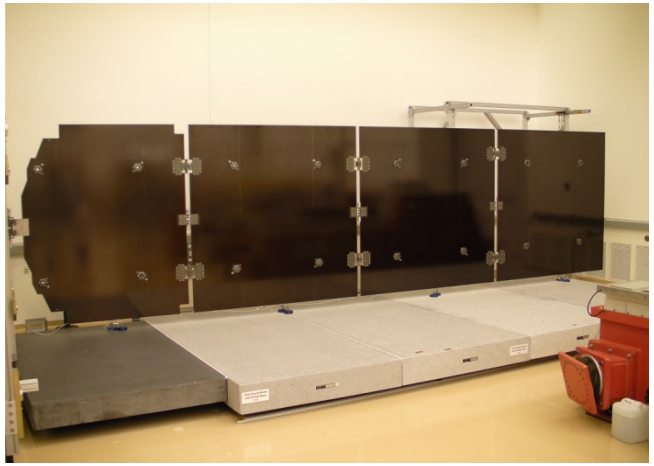
Spacecraft Bus Status

Spacecraft Significant Progress

- **Spacecraft bus Integration and Test (I&T) well underway**
  - **Flight boxes installed: magnetometer, torque rods, oscillator, array drive and its control unit, reaction wheels, sun sensors, harness interface box, solid state recorder (SSR) advanced multi-mode (S Band) transceiver, S-Band Antennas, GPS and SIRU**
  - **Delivered and ready for installation: Load Control Unit (LCU), Charge Control Unit (CCU), Integrated Electronics Module (IEM) and X Band Transmitter**
  - **EM boxes installed: star tracker, Payload Interface Electronics (PIE)**
  - **Hydrazine Propulsion Module also installed on spacecraft**
  - **Subsystem functional testing underway**
    - ACS sensor/actuator interfaces verified
- **Solar array deployed and panels shipped to EMCORE for cell lay down**
- **OLI and TIRS Interface Simulators tested with S/C Interface Simulator**
- **Spacecraft Simulator (SOS) (including the OLI simulator) delivered to GSFC**
- **Flight Battery cells activated**
- **Flight battery cells delivered to GSFC for life testing**

Spacecraft Overview





Spacecraft Near Term Milestones (Next 6 months)

- **Complete remaining flight component deliveries to I&T:**
  - **Star Trackers**
  - **Payload Interface Electronics (PIE)**
  - **Replace power module card in IEM**
- **Hold OLI Instrument Integration Readiness Review (IIRR) in September**
- **Integrate the OLI in late September (TBR)**
- **Perform “run for the record” bus Comprehensive Performance Test (CPT) in October**
- **Start risk reduction testing in November**

Launch Vehicle

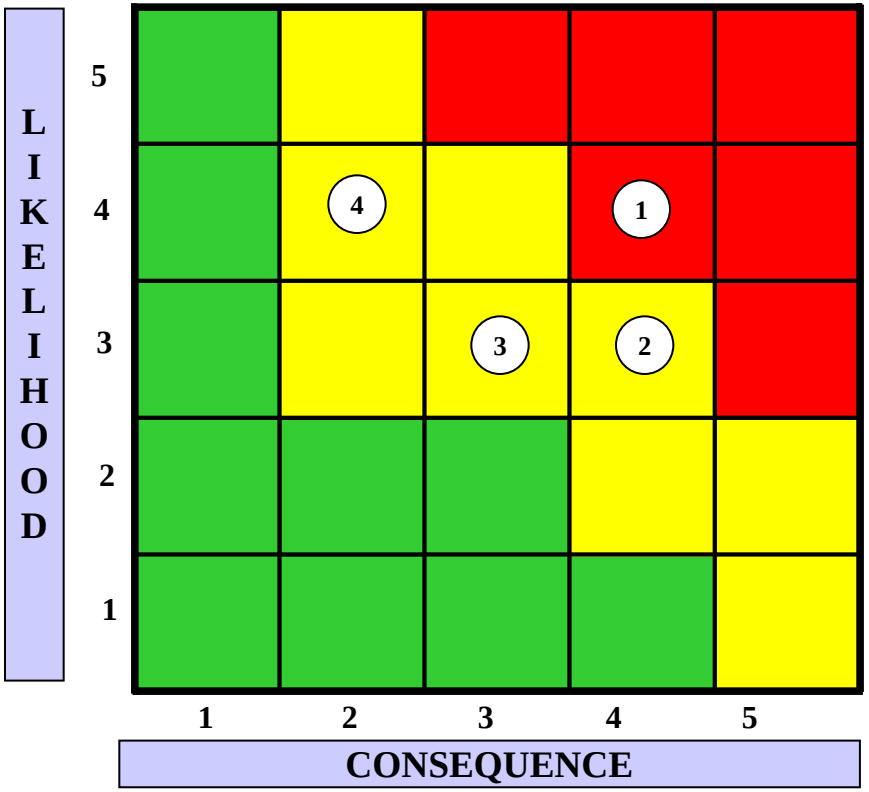
Atlas V Launch Vehicle

- **Atlas V 401 selected by KSC**
  - **Contract with United Launch Alliance (ULA)**
  - **Kickoff meeting held in October 2010**
  - **Launch Vehicle to Observatory ICD was released for signature in early August**
  - **Spacecraft processing facility selection scheduled for this fall**

Top Risks

LDCM Top Risks

LDCM



L*C Trend	Risk ID	Approach	Risk Title
LDCM RISKS			
1	PM-71	M	TIRS Schedule
2	PM-95	M	Centaur ESD
3	PM-107	M	Spacecraft Verification
4	PM-104	M	Schedule for ROS

Criticality

- High
- Med
- Low

Approach

- M - Mitigate
- W - Watch
- A - Accept
- R - Research

L x C Trend

- Decreasing (improving)
- Increasing (worsening)
- Unchanged
- * New since last month

Importance of Maintaining December 2012 LRD

- **Need to maintain December 2012 LRD at all costs**
  - **Launch window is December 1-30, 2012**
    - **Targeting December 1st**
    - **Currently have 55 days of schedule slack**
  - **Atlas V manifest is very crowded in 2013**
    - **Only open slot was October 2013 at VAFB; as of December 2010**
  - **If the December 2012 LRD is missed, LDCM will be severely impacted**
    - **Potential for a minimum 10 month delay but could be longer**
    - **Current KSC contact expires at the end of 2012**
    - **Project and SMD exposed to potentially excessive launch delay costs**
- **Consequences of missing the December 2012 LRD greatly increases the importance of meeting the 50% confidence launch date established at KDP-C**
  - **June 2013 is external (Congressional/OMB) commitment**
- **So, it is imperative we have adequate cost reserves in both FY12 and 13 to cover issues which arise including unknown unknowns**
  - **We will not wait for TIRS but are everything possible to get it ready**
  - **NASA HQ has been very supportive to date**

Summary

Project Summary

LDCM

- Launch Readiness Date is December 1, 2012 with ~3 months of schedule reserve
  - In addition, we have flexibility in the observatory risk reduction testing scheduled for this fall
- OLI is scheduled to ship to Orbital on August 21st
  - Need to resolve heater anomaly
  - Sensor performance is excellent
- TIRS I&T well underway
  - All flight components except the launch lock have been delivered to I&T
  - Current delivery date is December 31, 2011
- Spacecraft bus I&T well underway
  - Concerned about the late delivery of remaining flight components
  - Implementing workarounds to accommodate the late deliveries
- Ground System activities are going well
  - Major GRT and MRT coming up later this summer
- Launch vehicle activities are on track to a December 2012 LRD