Lunar Lander Project

Initial Implementation

May 10, 2007

CONSTELLATION

Background

- The Constellation Program is standing up a new project office, the Lunar Lander Project Office
- Initial project implementation will consist of an in-house design team
- The project will periodically post status updates to the following website. www.exploration.nasa.gov

Goals for in-house design team

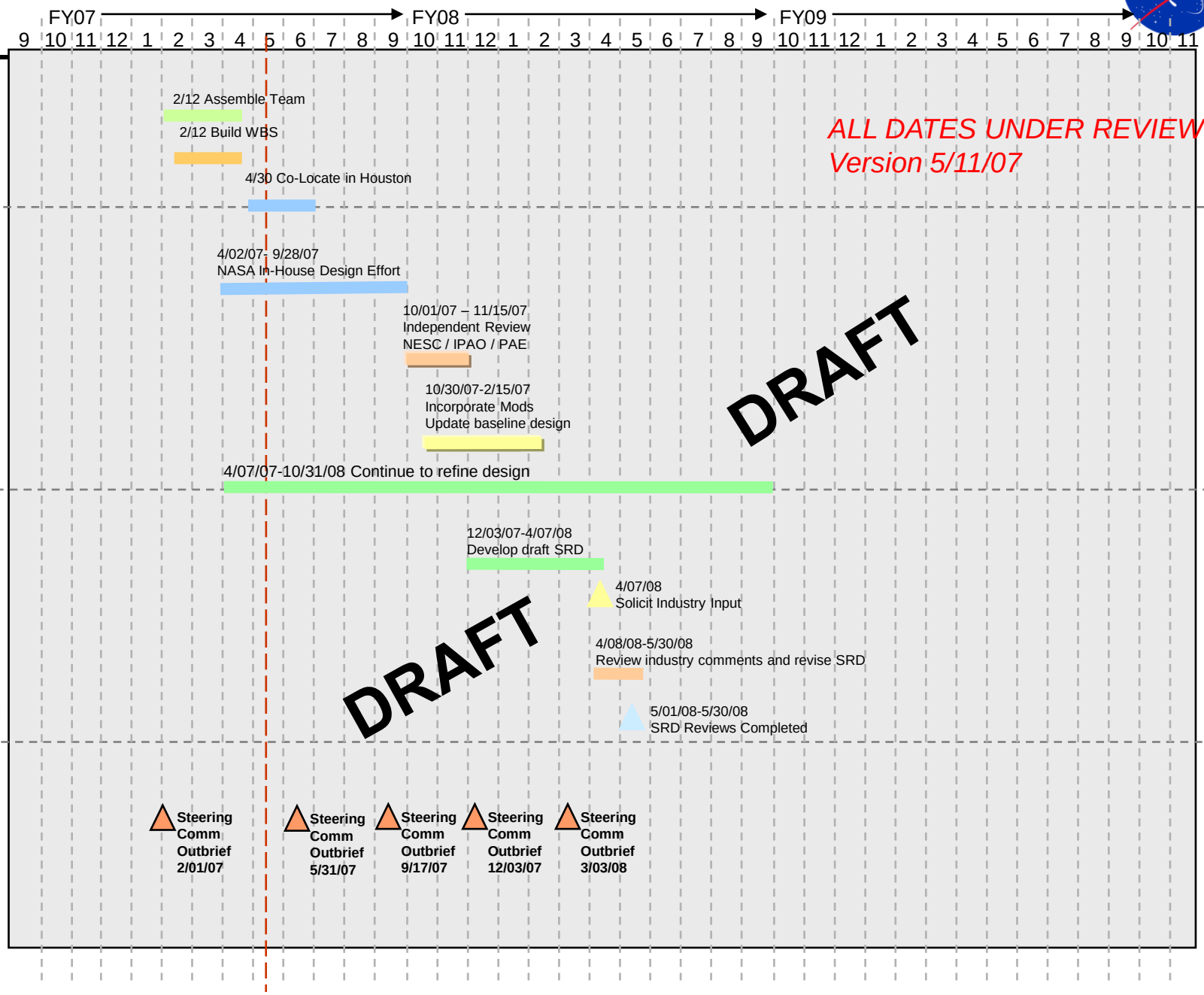
- **Two main goals for in-house design team:**
  - Get smart on design and be able to produce and validate a good set of requirements
    - Provide integration with other projects to ensure architecture closes
    - Increased confidence in design, cost and schedule estimates
    - May allow us to pull long term development schedule to left
  - Try out a different approach for early project development that will hopefully allow a more streamlined Phase A/B

- **Long Term Vision:**
  - By the time we let a major Lander contract
    - have a government design team that is smart enough to know what is needed
    - to have written excellent requirements for it
    - to get there in as streamlined a manner as possible

Overview of Approach for In-house Design Team

- **Using a Smart Buyer approach**
  - Take 6-9 months to develop a preliminary government design
- **Coming out of initial design effort, have independent, agency-wide review**
- **Iterate on design following independent review**
- **Using knowledge gained from in-house design effort, create draft vehicle design requirements**
- **Get out to industry for comment/input**
- **Continue to refine design & requirements based on industry input**
- **In FY09 have a vehicle requirements review, and baseline requirements**
- **Between 2009 – 2011, build hardware/test beds to mature confidence in path for forward design (lower risk of unknown surprises)**
- **Continue to mature design in-house until PDR timeframe**

Lander Design Team Integration Roadmap – 40 months



Infrastructure

- Assemble Team
- Build WBS
- Co-Locate in Houston

Design

- NASA In-house Design Effort
- Independent Review (NESC/IPAO/PAE)
- Incorporate mods and update baseline design
- Continue to refine design

Industry Input

- Develop draft SRD
- Release SRD to industry for comment
- Review industry comments, revise SRD
- SRD Reviews Completed

Milestones

- Steering Committee Outbrief

Approach (cont.)

- **Team started with ground rules & constraints imposed by overall CxPO transportation architecture and current LAT-2 for surface systems**
  - Many physical constraints imposed by architecture (mass, delta V, etc.)
  - Surface systems architecture less mature. However, Lander and LAT-2 agreed on a packaging configuration and initial scenarios
- **Examined what's been done to date, but opened up all the design trades to the extent the architecture allows**
- **Maturing design effort – drawings, CAD models, performance analyses, etc.**
- **Keep process overhead to the minimum required**
  - Recognizing that a small, dynamic team doesn't need all of the process overhead that a much larger one does
  - But…. It still needs the basics

Lander Design Team Initial Team Structure

PP&C
- Cost Support
- Scheduling
- Procurement

Lunar Lander Project Office
Lauri Hansen, Project Manager
Clinton Dorris, Deputy PM (JSC)
Dan Schumacher, Deputy PM (MSFC)

VE&I
John Connolly, Lead
- Vehicle Integration
- Mass Properties
- CAD/models
- MEL
- Power bookkeeping
- Data bookkeeping

Prog/Proj Integration
Lee Graham, Lead

Technology Integration
Julie Bassler, (Acting)

Ops Integration
Brent Jett, (Detailee)

Matrix Support

Vehicle Subsystem Leads

- Avionics
  - GN&C
  - C & T
  - C&DH
- ECLSS
- Active Thermal
- Power
- Structures & Mechanics
- Passive Thermal
- Propulsion
  - Main Propulsion
  - RCS

Additional SE&I Support

- Environments
- Flight Mechanics
- Habitability/Human Factors

Project/Project Integration

- ARES V/EDS
- Orion
- EVA
- Ground Ops

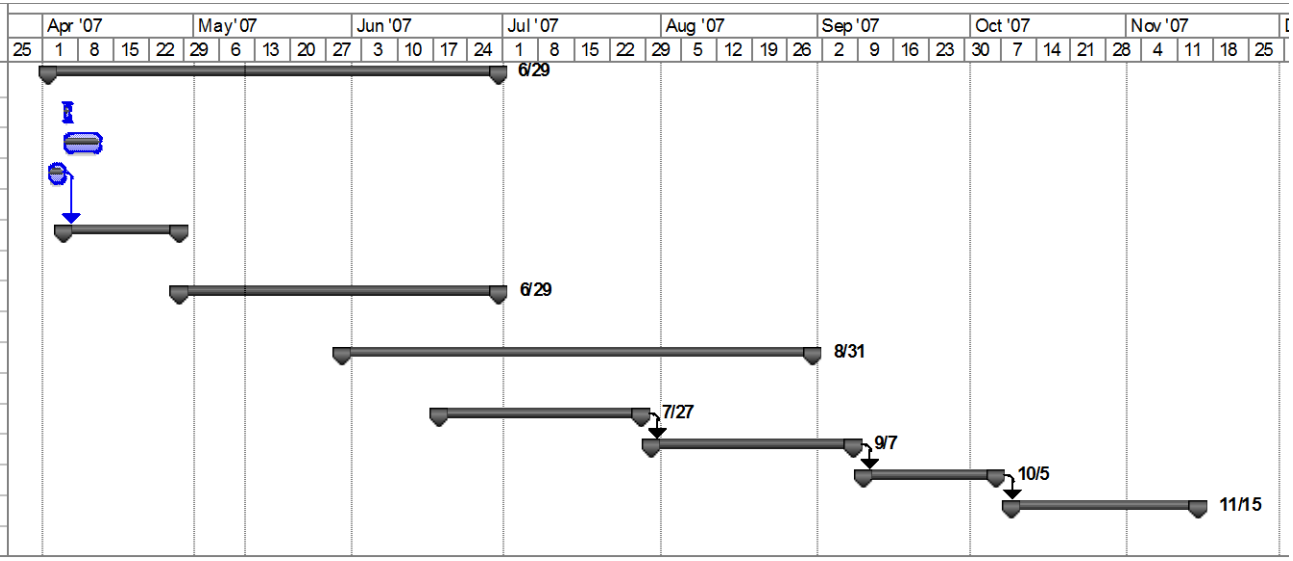
Crew

Safety

ALL DATES UNDER REVIEW
Version 5/11/07

Lunar Design Analysis Cycle Schedule – 6 months

ID	Task Name
1	**Lander Starworks**
2	Pre LDAC-1
3	Mission Timelines
4	Kickoff Meeting
5	
6	**Pre LDAC-1 Homework**
37	
38	**LDAC-1 (Colocation)**
231	
232	**LAT Support**
238	
239	**LDAC-1 Delta**
247	**LDAC-2**
249	**LDAC-3**
251	**Independent Reviews**
254	



Forward Work

- **Need to flesh out implementation after initial set of design iterations**
- **Several significant drivers:**
  - How far does NASA want to take the in-house design? PDR? CDR?
    - Changes the nature of the baselined requirements
  - How long does the project stay in initial operating mode, and what does the transition look like
    - Initial team is made of designers, analysts, integrators. Not necessarily the same skill set as requirement and RFP writers
  - How much money will be available in 2009 -2011 timeframe to build hardware and test beds to
    - Buy down risk
    - Finalize design trades
  - Even if NASA extends the design in-house, need industry engagement/interest & help

Current Status

- **Current Project Status**
  - Completed initial meeting with Steering Committee & received go-ahead for implementation
  - Completed staffing of Acency-wide team
  - Initial kick-off week was 4/2 in Houston
  - Team co-location occurred 4/30 in Houston
  - LDAC1 underway