3rd Space Exploration Conference

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Altair Project

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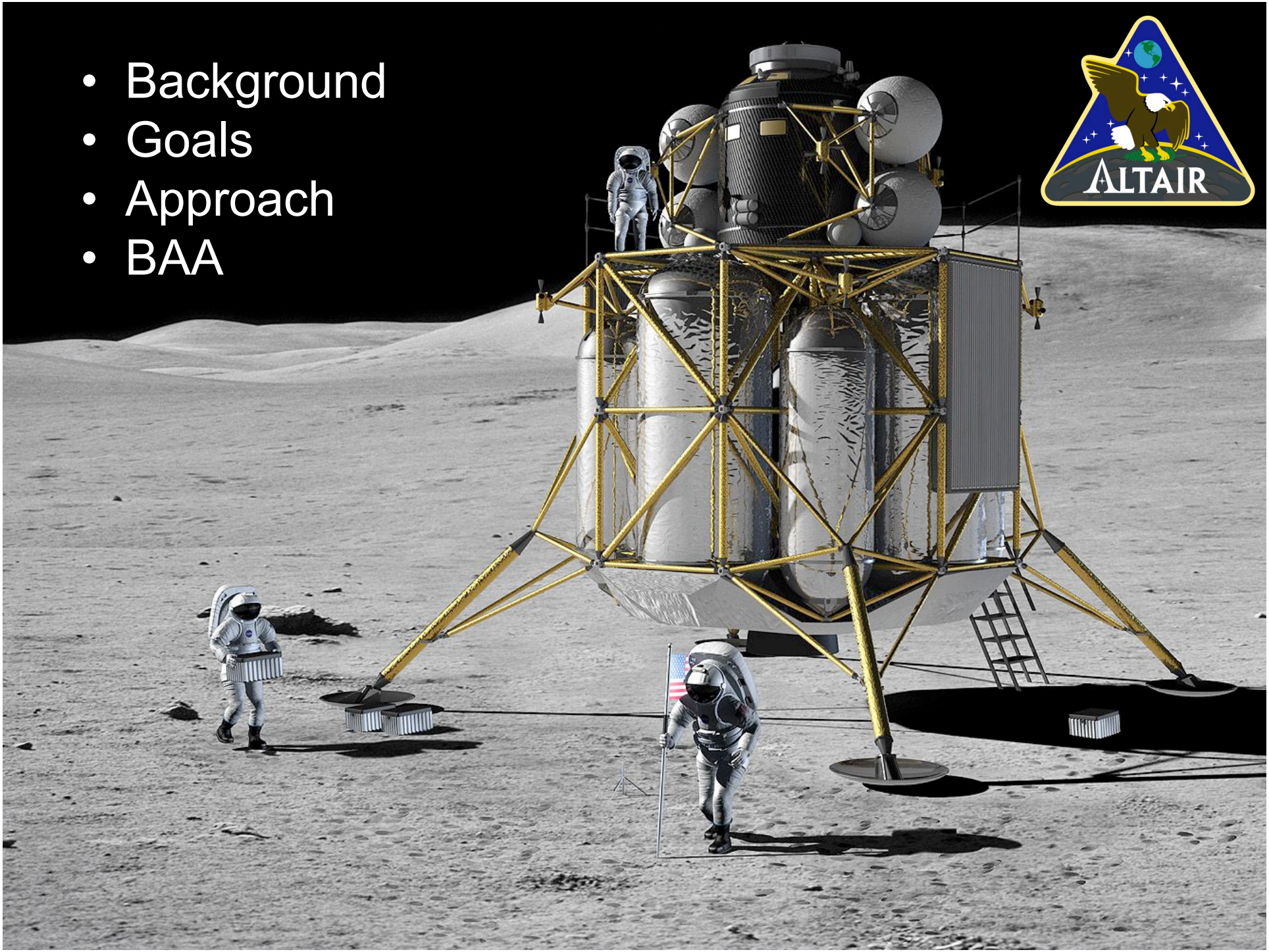


- Background
- Goals
- Approach
- BAA

Background

- **December 2006, MSFC and JSC led a study to determine the cost for a Lander through Phase B**
  - Assumed an approach to project management that complied with agency standards and policies for large scale projects
- **Cost estimate far exceeded Program's funding capability**
- **Two alternatives:**
  - Defer any significant Lander work until 2011/2012
  - Pursue a different approach

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
    - 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

Approach

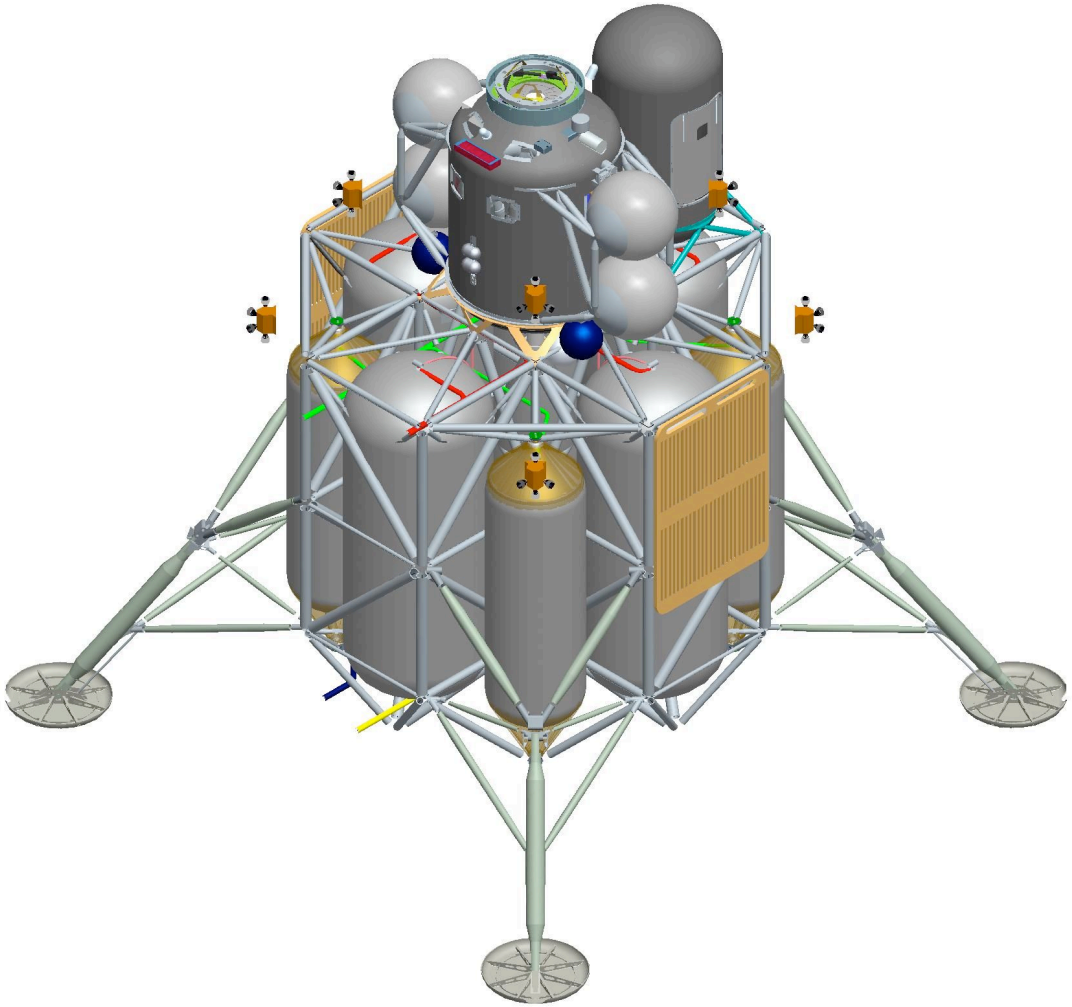
- Using a Smart Buyer approach
- Agency-wide independent review
- Iterate on design
- Create draft vehicle design requirements
- Get out to industry for comment/input
- Continue to refine design & requirements based on industry input
- In FY09 have a vehicle requirements review and baseline requirements
- Between 2009 – 2011, build hardware/test beds to mature confidence (lower risk of unknown surprises)

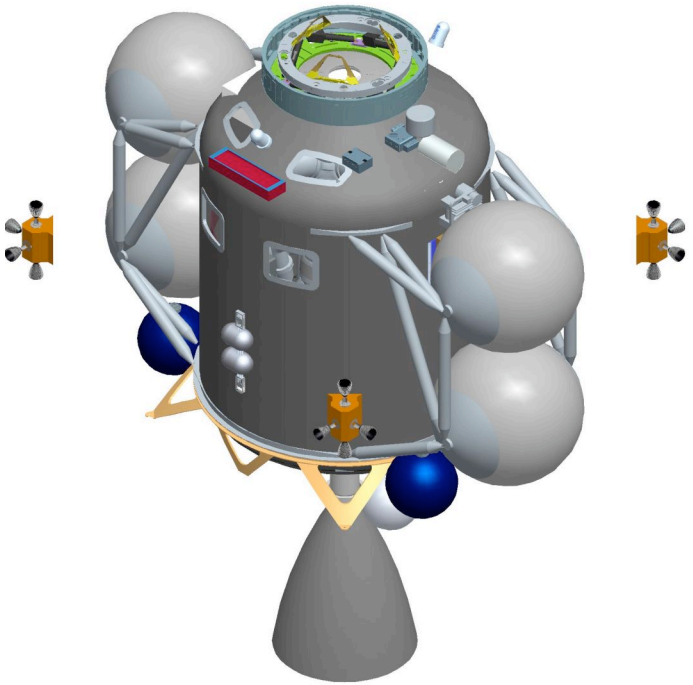
"Minimum Functional"

- **Minimum Functional**
  - Does not consider contingencies or redundancy (i.e., it is a single string implementation).
  - Enables a process that can add safety, reliability and other functionality to the vehicle with informed cost, risk and performance Δs

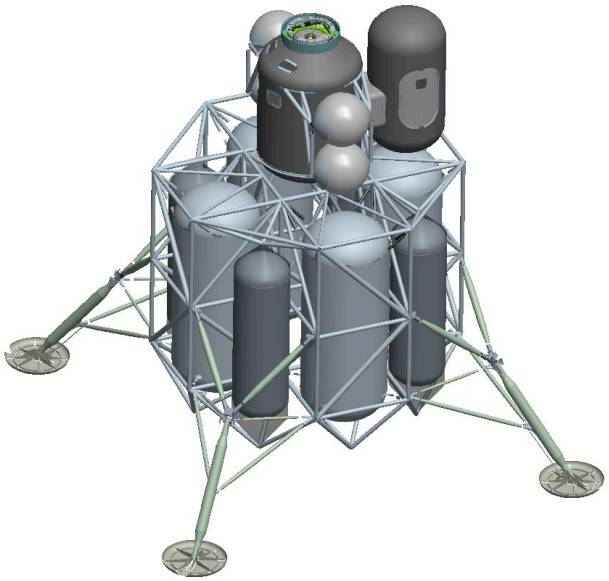
- **A "Minimum Functional" vehicle is NOT a design that would ever be contemplated as a "flyable" design!**

Lander Configuration





LDAC-1Δ "Minimum Functional" Design
8.4 m Ares V shroud, 45 mt control mass



Sortie Lander

Ascent Module	5,075 kg
Descent Module	32,718 kg
Airlock Module	949 kg
Proj. Mgr. Res.	2,857 kg
Available for Payload	3,401 kg

Cargo Lander

Descent Module	34,248 kg
Proj. Mgr. Res.	1,974 kg
Available for Payload	17,378 kg

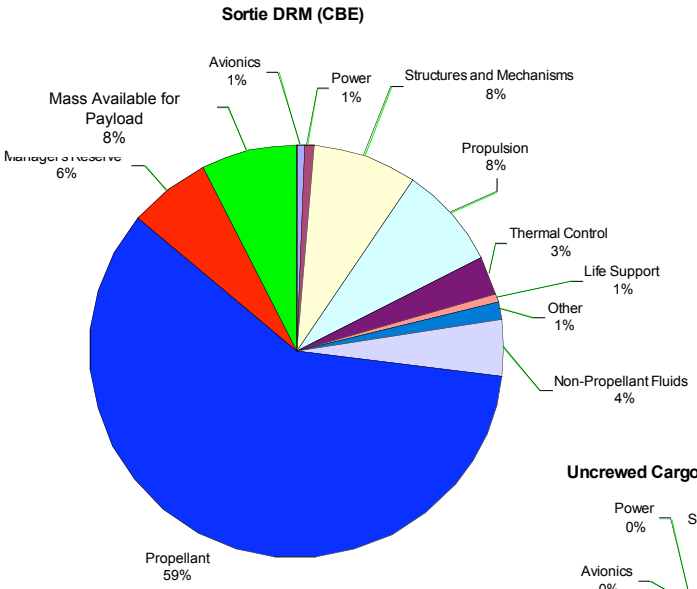
Crew to Outpost Lander

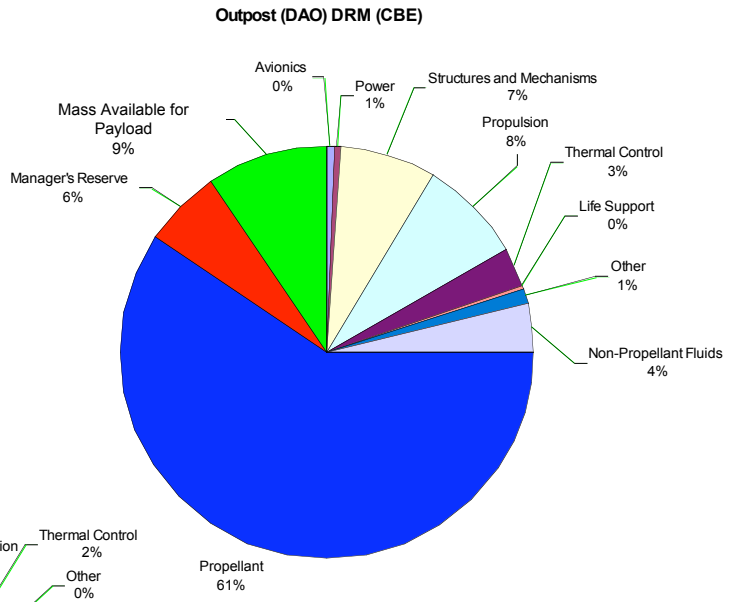
Ascent Module	5,356 kg
Descent Module	32,684 kg
Proj. Mgr. Res.	2,691 kg
Available for Payload	4,269 kg

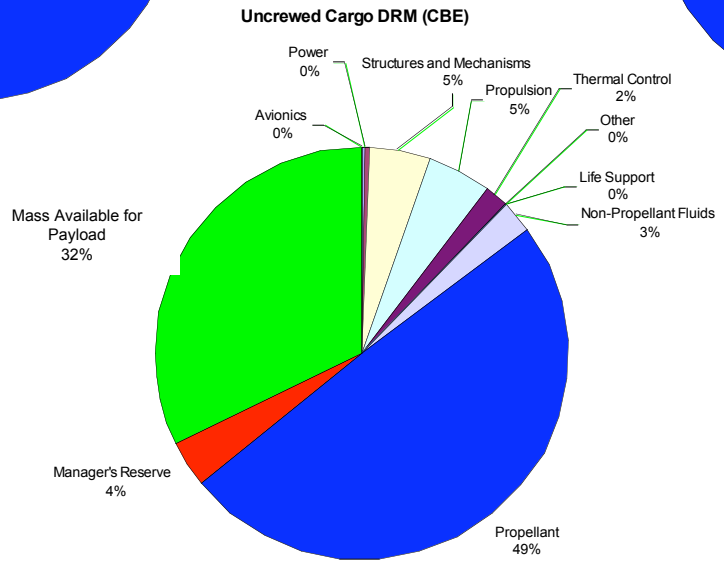
Lander Configuration 711-A

- "Minimum Functional" design – starting point without redundancy or contingencies
- Single descent stage design for sortie, cargo and crewed outpost missions
  - LOX/H2, single 18,600 lbf RL-10 derivative engine
  - Cruciform truss structure (fits 8.4 m shroud)
- Combined ascent/hab module provides sortie mission surface habitation
  - MMH/NTO, single 5500 lbf engine
  - LIDS docking system
- Sortie mission airlock (left behind on surface)

MEL Summary – Subsystem Mass Detail







BAA Overview

- **LLPO released a Broad Agency Announcement (BAA) in January 2008**
- **Goal is to enable early collaboration**
- **Multiple Awards**
  - Max individual award amount $350k
  - Max total award amount $1.5M
- **Seeks study/analytical input vs hardware development**
- **Schedule**
  - Proposals submitted 15 February 2008
  - Contract Award – Mid March ’08
  - Contract Duration – 210 days