



Masten

Get your
science
on the Moon

January 2018



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Sean Mahoney, CEO, Masten Space Systems

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Dr. Clive Neal, Grandpoohbah

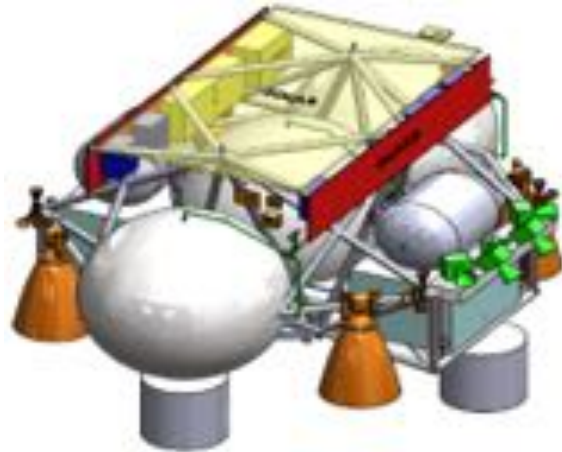
Masten Take Aways

1) Talk to Matt Kuhns or myself at this workshop.

2) Two designs available to begin conversation

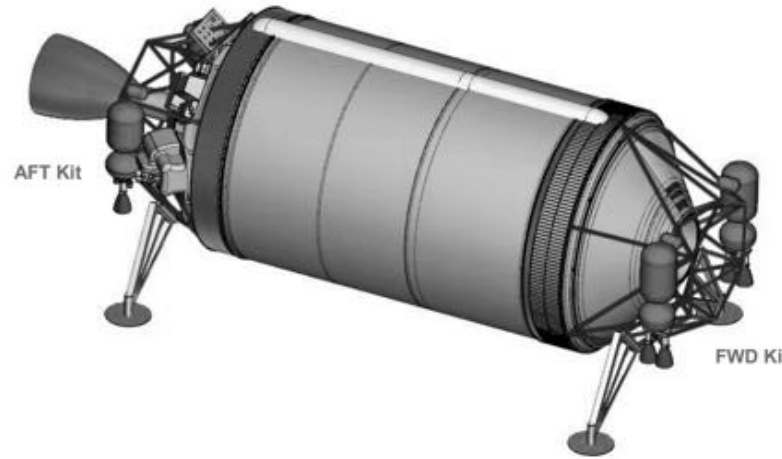
XL-1

- 100 kg to the surface
- Soon



Xeus

- 1.5 mt to the surface
- Soon after



3) Masten has been reducing risks to your landing for 14 years and *hundreds* of landing operations.

**Mission
Driven Design**



**Capability
Driven Design**

**Reuse
changes the
development
approach**

**Increase n :
Don't rely on
everything right the
first time.**

**Iterate quickly.
Iterate frequently.**

Increase n :

Don't rely on

every

time.

Iterate quickly.






Iterate frequently.



Use Flight Opportunities to get hands-on experience for your team and tech before selection and before launch

- * or feel free to contract directly, of course
- * See Alex from Flight Opportunities (wave)

Save Finger-crossing for the kids soccer game. Know it works with Reusable Rocket-powered landers

XA-0.1-B-1	XA-0.1-E-1	XA-0.1-E-2	XA-0.1-E-4	XA-0.1-E-5
				
<p>B-class type A vehicle "Xombie" in service since 2009</p>	<p>E-class type A vehicle "Xoie" in service during 2009</p>	<p>E-class type B vehicle "Xaero" in service between 2010 and 2012</p>	<p>E-class type B vehicle "XaeroB" entered test qualification service in 2014</p>	<p>E-class type C vehicle "Xodiac" entered test qualification service in 2015</p>

5 Reusable Lander Vehicles Demonstrated
400+ Flights · Multiple Flights per Day · Small Team

Operation

XL-1: Efficient Lunar Lander

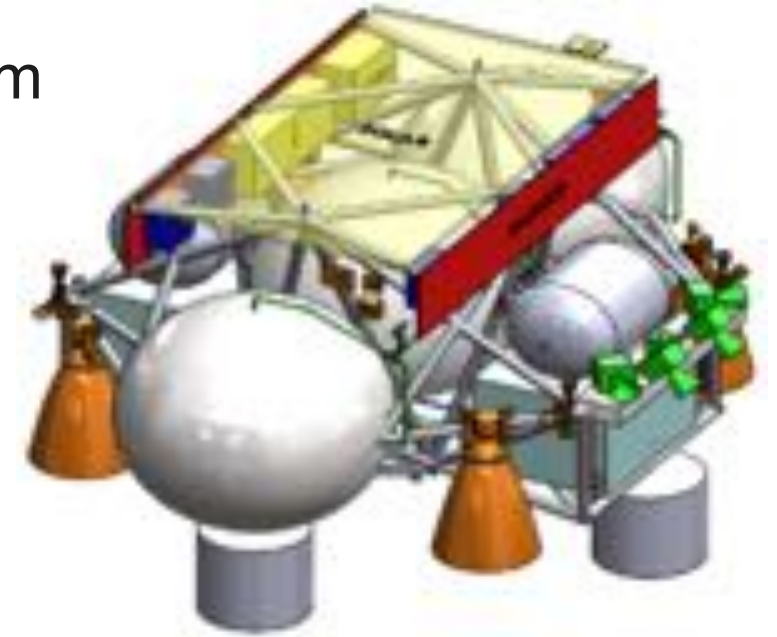
Robust Lunar Delivery For Customer Payloads

Design supported by NASA Lunar Catalyst Program

Storable non-cryogenic fuels remove thermal roll during transit

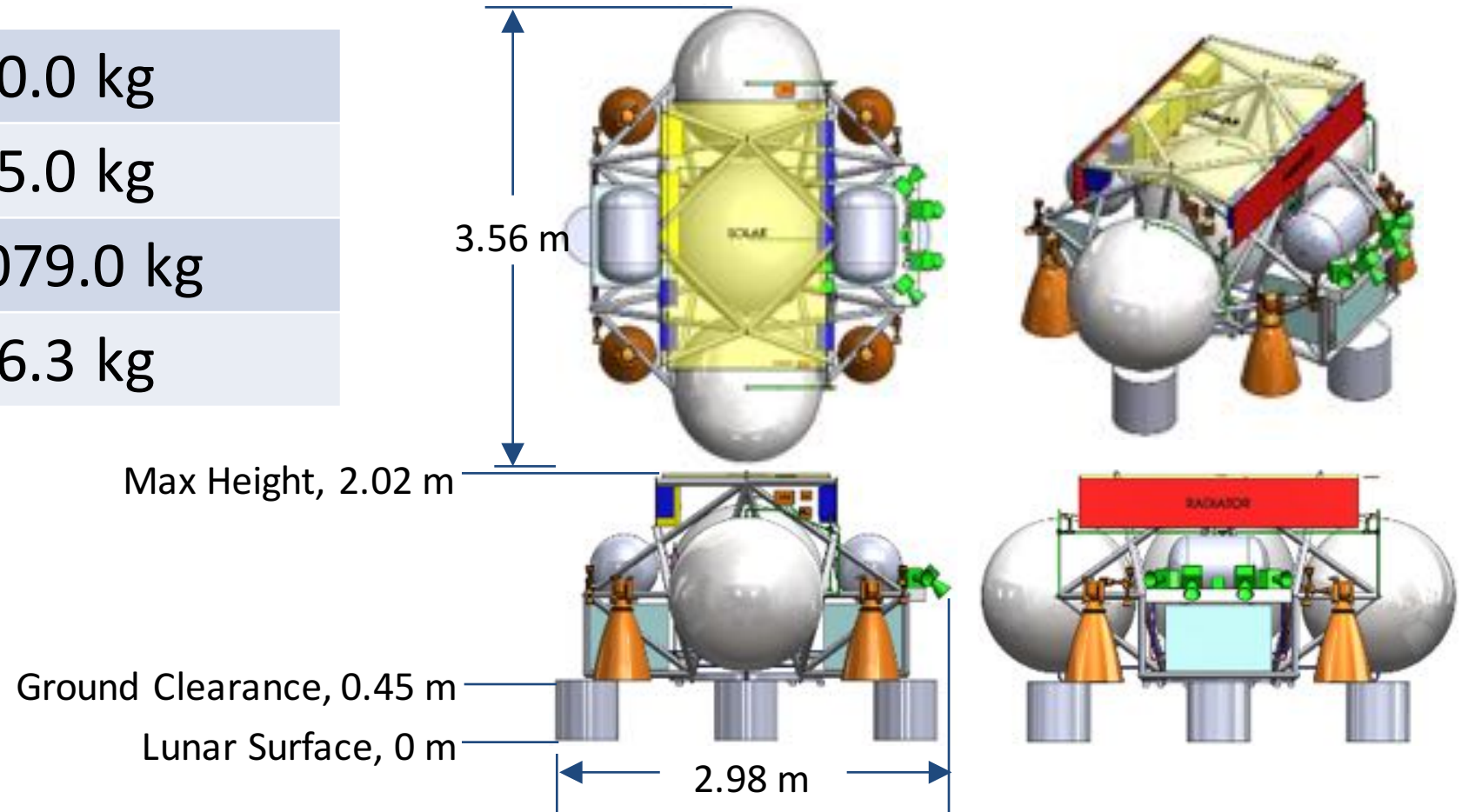
Detailed design across all aspects of system

- Leverages Masten technology for engines and controls
- Uses unique proprietary new green/non-toxic propellant
- Enables a wide variety of potential missions



XL-1 design Overview

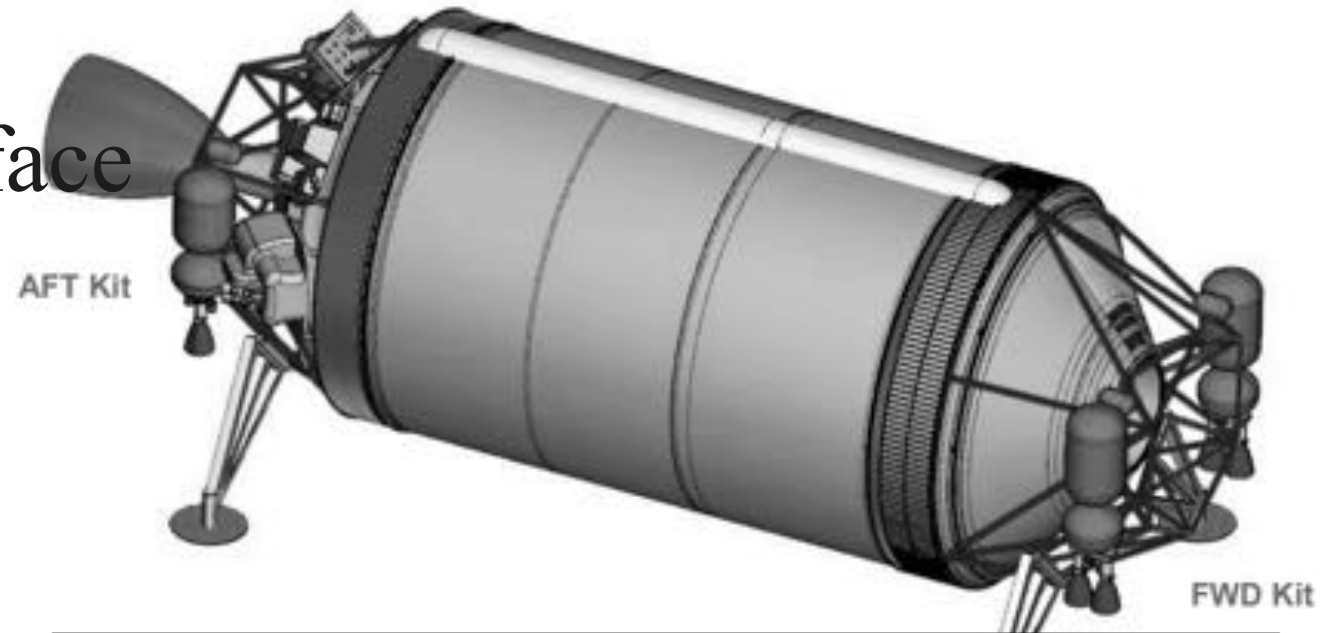
Payload Mass:	100.0 kg
Dry Mass:	465.0 kg
GLOM:	2,079.0 kg
Landed Mass:	506.3 kg



Xeus - Enhanced Upper Stage Lander

Heavy Lift to Lunar Surface

- Mission kit to land large mass (~1.5 mt)
- Innovative Dual Thrust Axis design
- Proven Masten technology for pinpoint EDL targeting



Dual Thrust-Axis Advantages:

- Crew and cargo closer to surface
- Land on steeper slopes
- Improved operability and reliability
- Higher mass fraction



Masten Space Systems
Lunar Delivery Services

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Cislunar Ecosystem Needs Full Solution

Out of Masten
Scope
(Infrastructure)

Blue Origin
Industry in space

ESA
Moon Village

ULA
Cislunar 1000

NASA
Return to Moon,
Journey to Mars

SpaceX
Mars Vision

Masten Scope
Design & Test
Propulsion
Control Systems
Operations



There is a need for connection between large infrastructure and the direct, disparate users. There is a need in space for end point transportation.

Masten: Space's Last Mile Company



Out of Masten
Scope
(Customers)

Applications
Tourism mining/extraction manufacturing science entertainment settlement