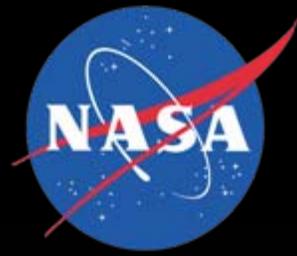


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# ***Orion Weight and Ares 1 Performance***

## ***News Media Lunch & Learn***

***Scott "Doc" Horowitz***

***Associate Administrator***

***NASA Exploration Systems Mission Directorate***

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# Ares I

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**Example: Ares I, designed for safety using simple design, reliable components**

## 5 segment SRB/J2X

**Performance:** 58,000 lbs to 28.5 deg LEO  
52,000 lbs to 51.6 deg LEO

**PRA:**  
Launch Vehicle ~ 1:400

Escape System ~ 80%

$P_{Loc}$  ~ 1:2,000

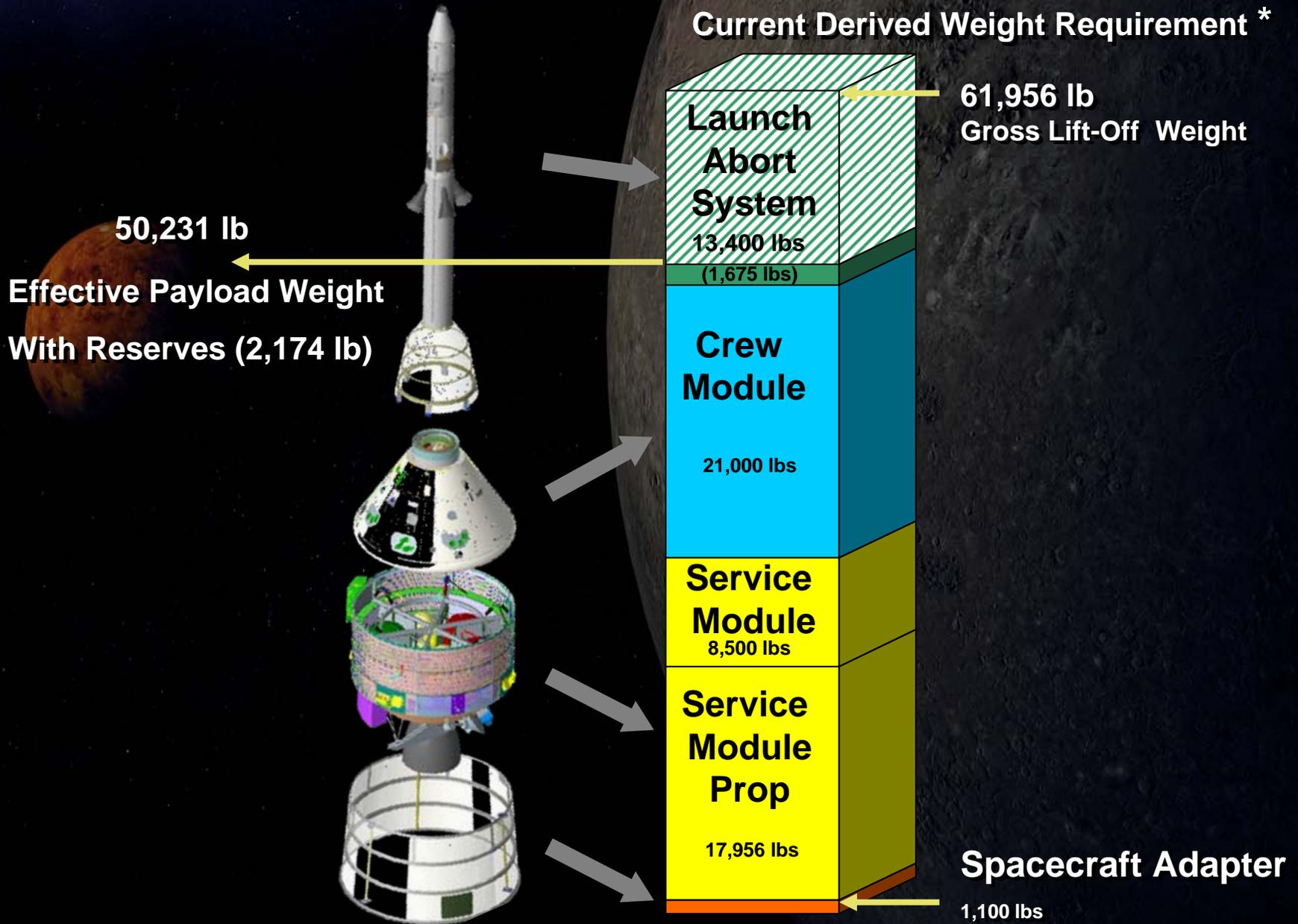
**Ares I  
(Crew)**

**Ares V  
(Cargo)**

***Need a safe, reliable, affordable method of transporting crews to/from LEO (space) separate from major cargo elements.***

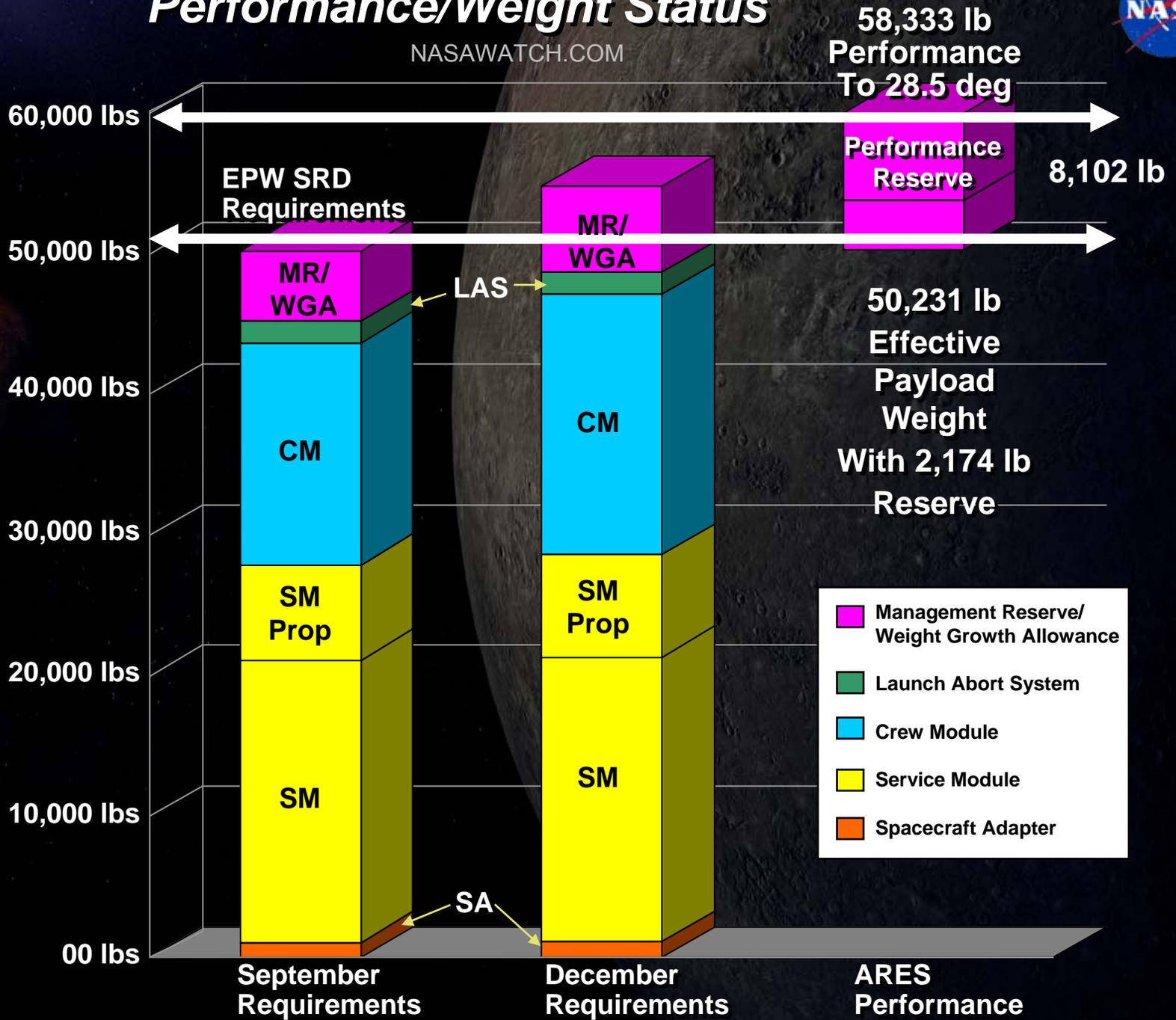
# Ares I Weight Requirements

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# Performance/Weight Status

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# Historical Performance Comparison

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## Saturn V, Ares I First Stage Flight Comparison

	Saturn V AS-502 Vehicle <sup>*</sup>	Ares I
Liftoff Thrust	7675200 lbf	3186764 lbf
Liftoff Weight	6134361 lb	1997506 lb
Thrust to Weight Ratio	1.25	1.6
Max. Q	760.4 psf	820 psf
Time of Max. Q	74.82 sec.	52 sec.
Altitude at Max. Q	39370 ft.	31230 ft.
Peak Alpha in Max Q Region	3.48 deg.	6 deg.
Max. Pitch Engine Deflection	0.52 deg.	0.3 deg.
Max. yaw Engine Deflection	-0.49 deg.	0.85 deg.
Max. Pitch Attitude Rate	-1.03 deg/sec	-1 degsec
Max. Yaw Attitude Rate	0.58 deg/sec	-0.5 degsec
Time of Booster Stage Separation	148.7 sec.	130.2 sec.
Q at Booster Stage Separation	24.07 psf	12 psf

<sup>\*</sup> Ref. BOEING Report D5-15509(F)-4, "Saturn V Launch Vehicle Flight Dynamics Analysis, AS-504", January 20, 1969

- Ares I flight conditions are similar to Saturn V. Other vehicle similarities reinforce Ares I control system design methodology.