



How to get to space...

...and stay there

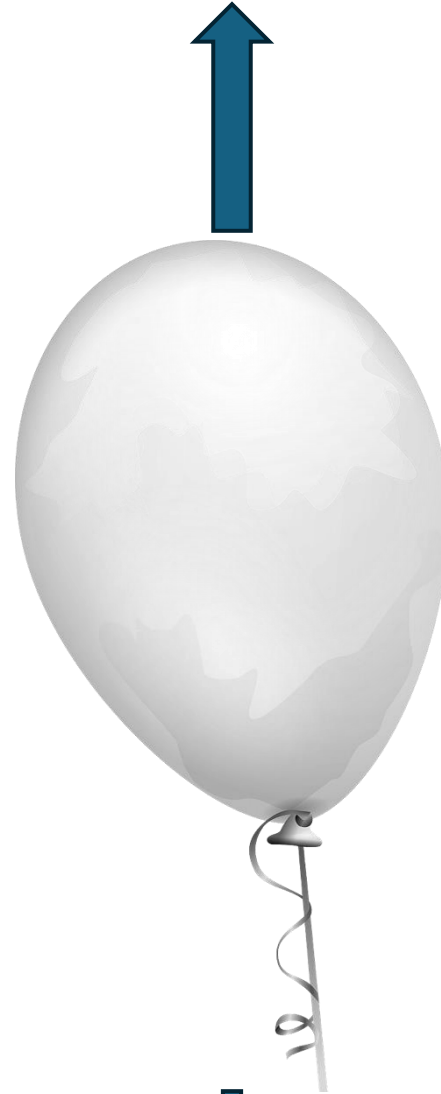
A talk on rocketry by
Gary Newport





**Why does
it fall?**

Upward buoyancy



weight

**Why does
a helium
balloon
rise?**

0 seconds



0.25 seconds



0.5 seconds



0.75 seconds



**How quickly
does gravity
make things
fall?**

0.75 seconds



0.5 seconds



0.25 seconds



0 seconds



**What happens
when we throw
a ball upwards?**

How high can we go?



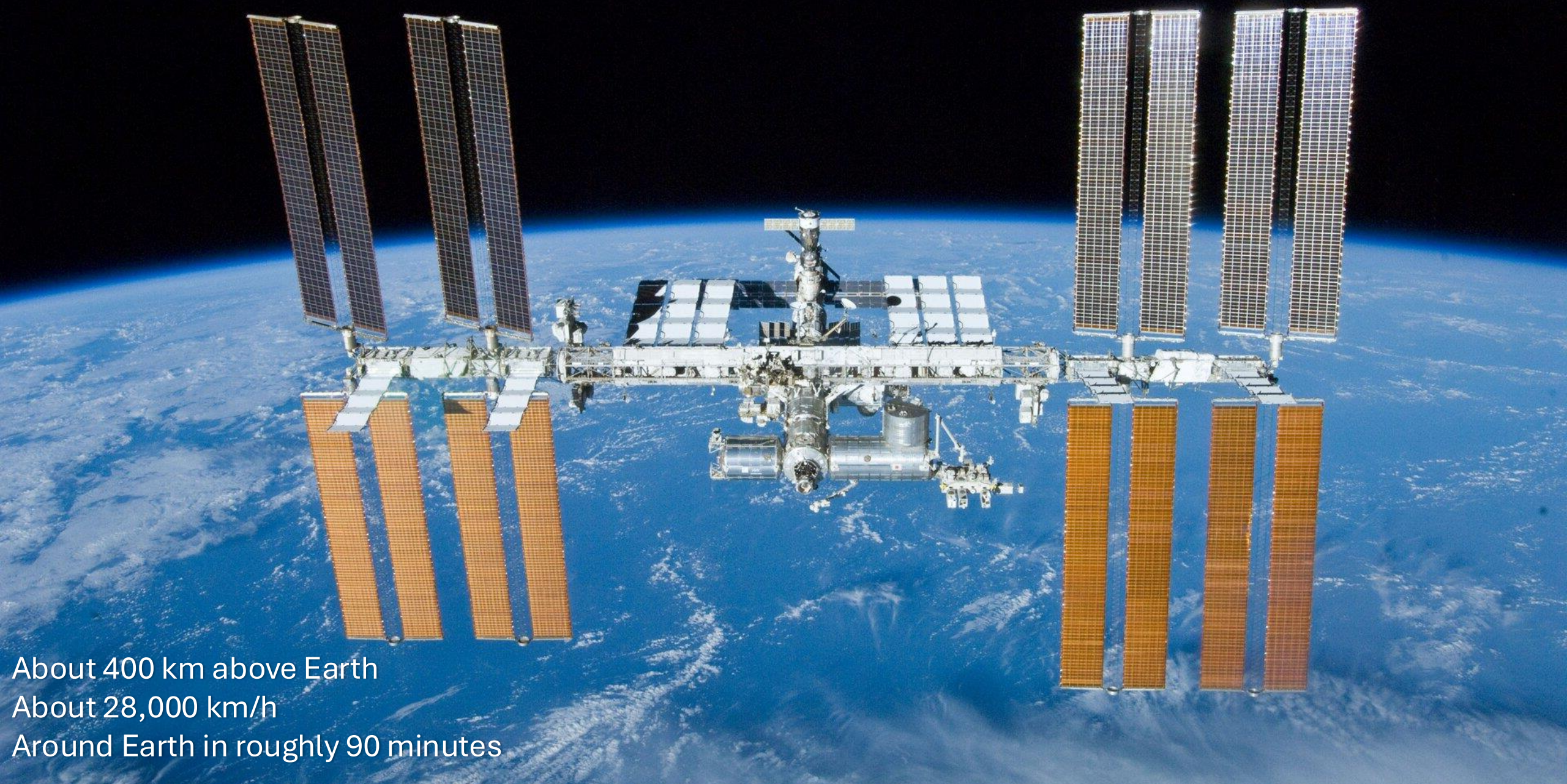


What if we throw a ball sideways?





Why do the astronauts float?



About 400 km above Earth

About 28,000 km/h

Around Earth in roughly 90 minutes

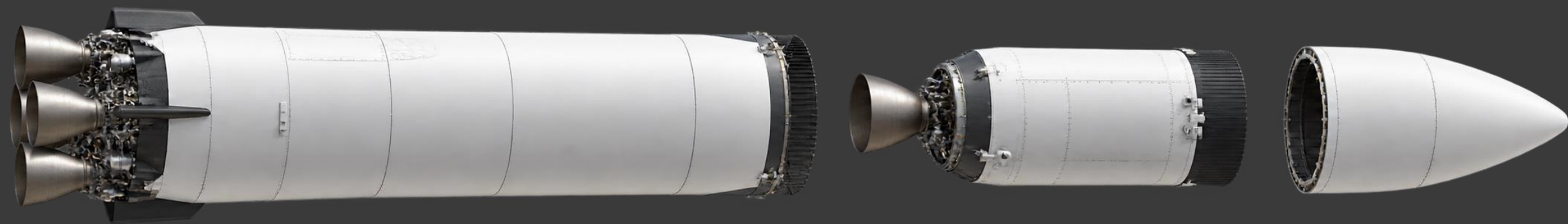
AI-generated illustration



Meeting the ISS

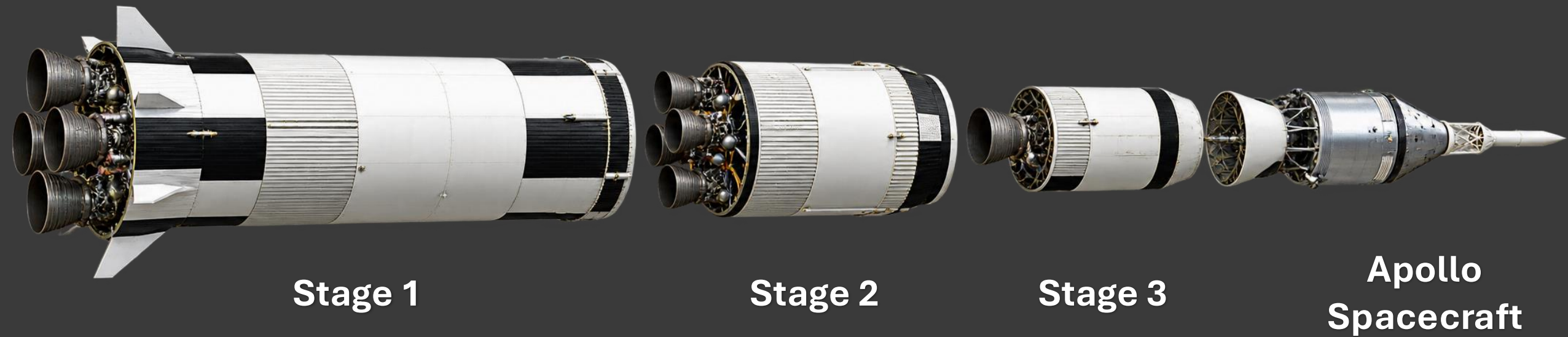


Mass = Propellant = Mass





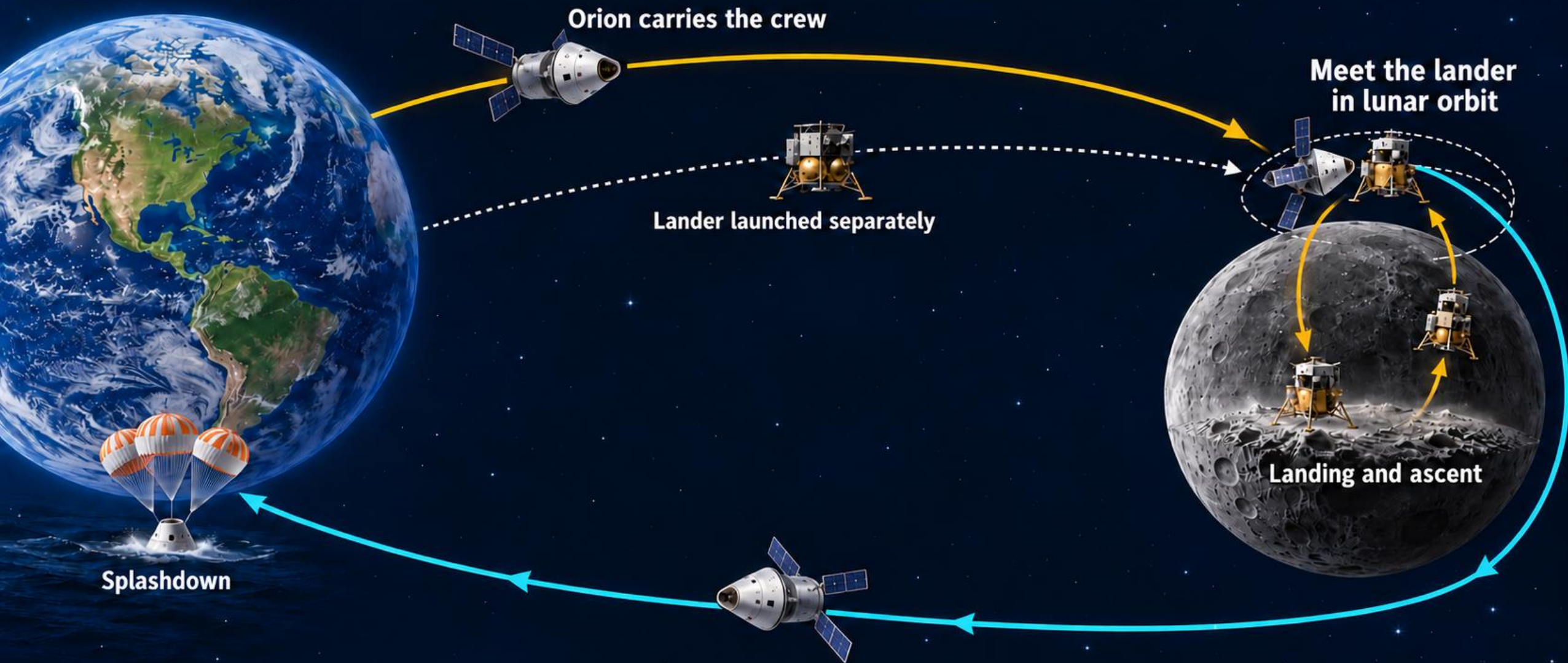
Saturn V Rocket



Apollo 11: to the Moon and back



Artemis: a lunar landing journey



Simplified mission sequence. Not to scale. Mission details may change.

Carry more...

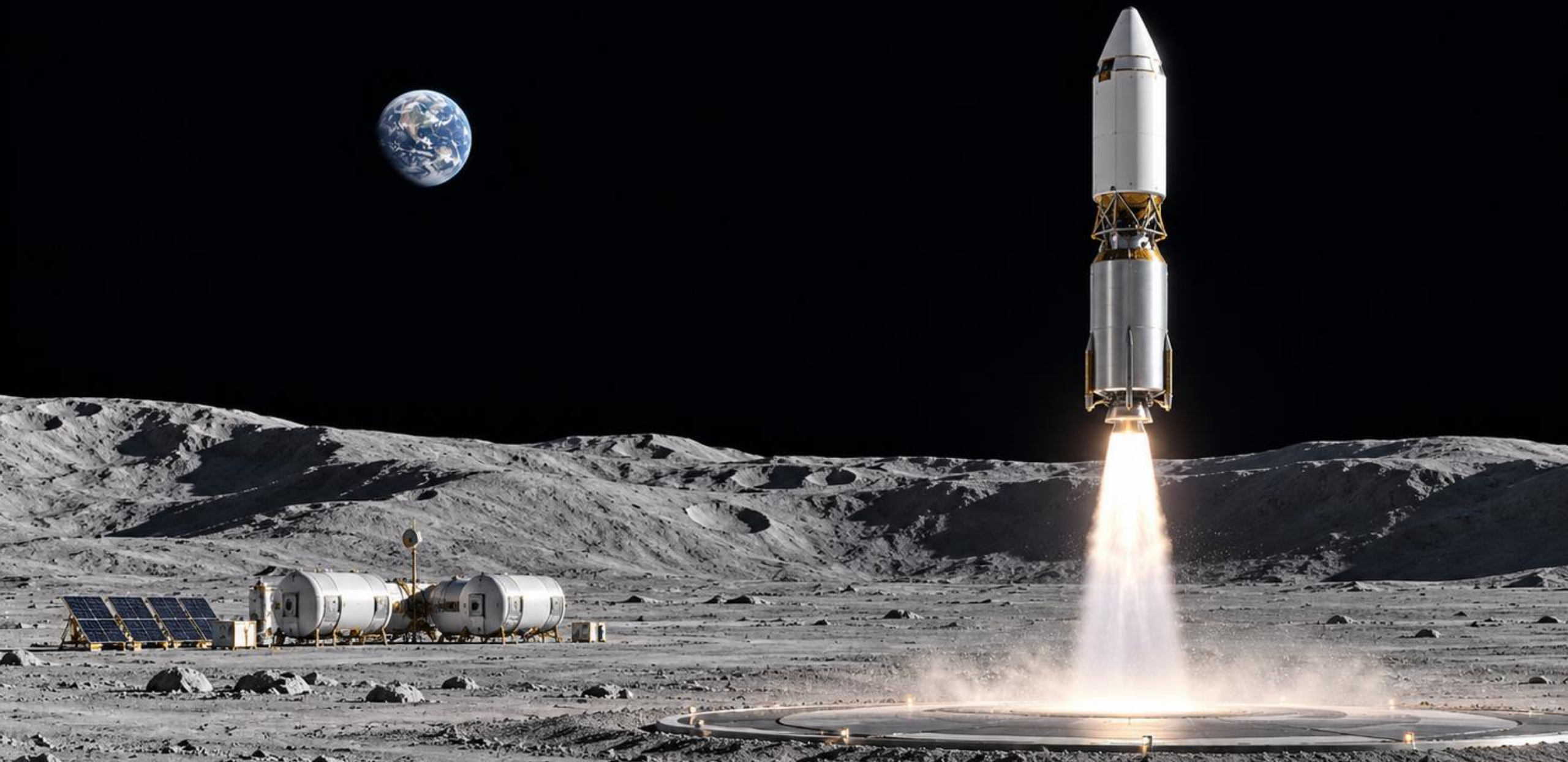


AI-generated illustration

Use propellant more efficiently...



Start elsewhere...



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