

Post-Impact Lunar Accretion Report

Simulation of New Martian Satellite Formation

1. Accretion Summary

Following the "Hex-Impact" event, the debris cloud undergoes **gravitational accretion**. Over approximately 100,000 to 1,000,000 years, the diffuse ring of dust and rock fragments will coalesce into **three distinct new moonlets**.

Moon Alpha

Diameter: ~65 km

Gravity: *0.022 m/s²*

Orbit: 18,000 km
(Equatorial)

Moon Beta

Diameter: ~40 km

Gravity: *0.014 m/s²*

Orbit: 22,500 km
(Equatorial)

Moon Gamma

Diameter: ~15-30 km

Gravity: *0.008 m/s²*

Orbit: 27,000 km
(Inclined)

2. Orbital Dynamics & Lifespan

The new moons would settle into orbits influenced by the remaining debris and the existing moons, Phobos and Deimos.

Property	Alpha & Beta (Equatorial)	Gamma (Inclined)
Orbital Angle	<i>0.5° - 1.2°</i> relative to Equator	<i>15° - 25°</i> (Polar origin)
Spin/Rotation	Initially chaotic, later Tidally Locked	Fast rotation, complex wobble
Lifespan	> 50 Million Years	~10 Million Years (Unstable)

3. Gravity and Physical State

The gravity on these bodies would be extremely weak (microgravity environment). An astronaut could easily jump off the surface into space. These moons are not "spherical" but "rubble piles"—loose collections of rock held together by their own faint gravity.

4. Formation Timeline

- **Year 1-50:** Formation of a dense, opaque ring system.
- **Year 1,000:** Debris "clumping" begins (formation of moonlets).
- **Year 100,000:** Small moonlets collide to form the final 3 major satellites.
- **Year 1,000,000:** Orbits stabilize; debris ring clears significantly.

*Calculations assume a fragment retention rate of 15% post-impact.