# Interplanetary Rocket Design

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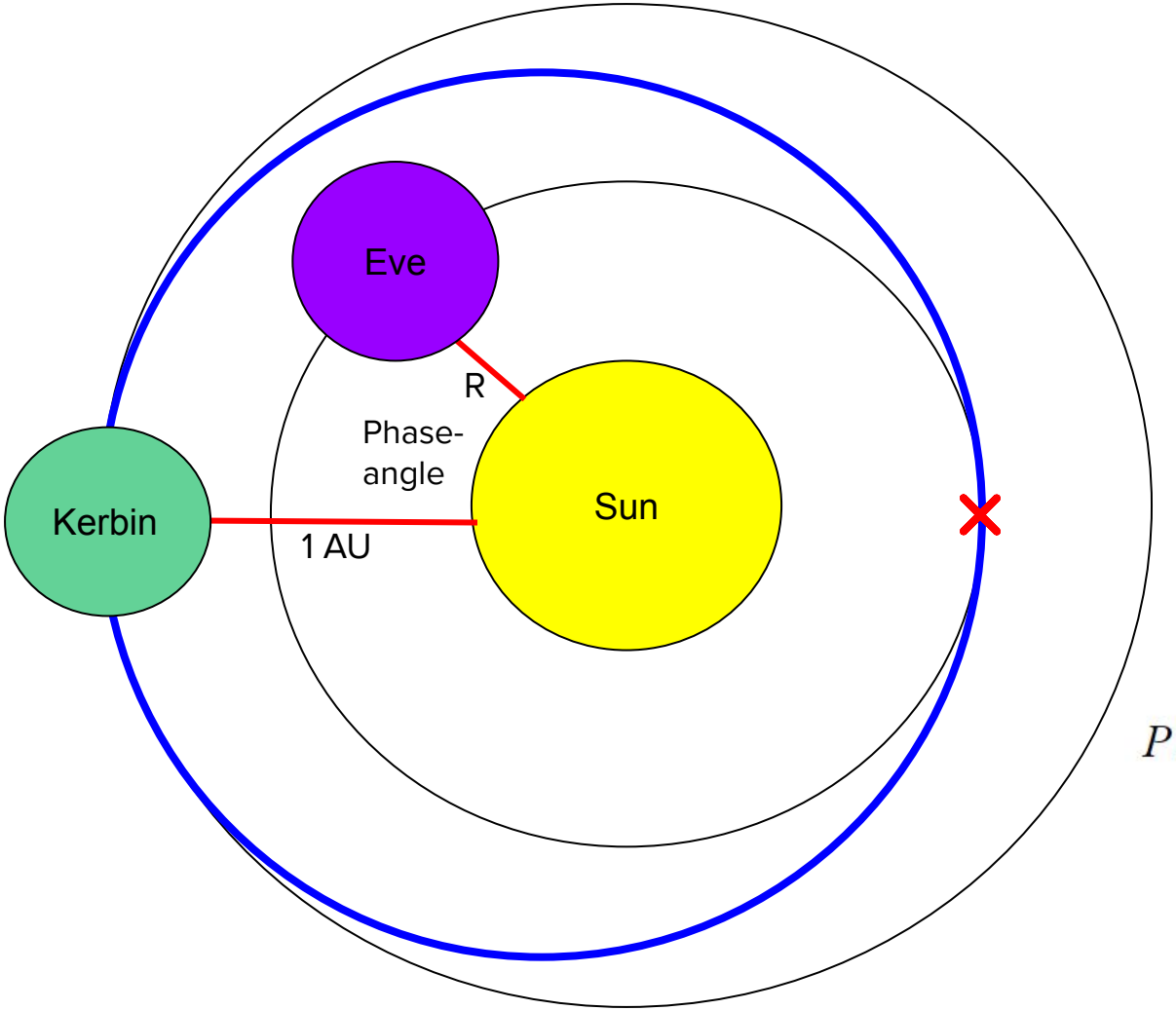
# Mission Plan


https://kerbalspaceprogram.com




Goal: to find the phase-angle if we know R.

$t^2 \propto r^3$

Kerbin: 1 year$^2$ = k(2 AU)$^3$

$8t^2 = (R + 1)^3$

Time = $\sqrt{\frac{(R+1)^3}{8}} \div 2 = \frac{\sqrt{2(R+1)^3}}{8}$

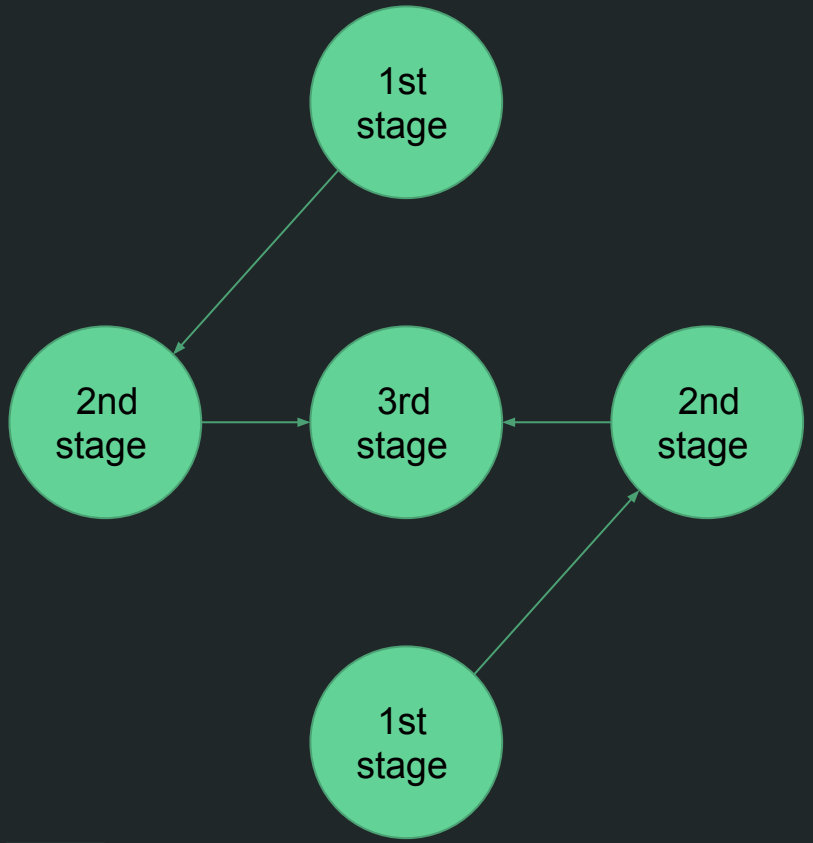
$$t = \frac{\sqrt{2(R+1)^3}}{8} \times \frac{1}{\sqrt{R^3}}$$

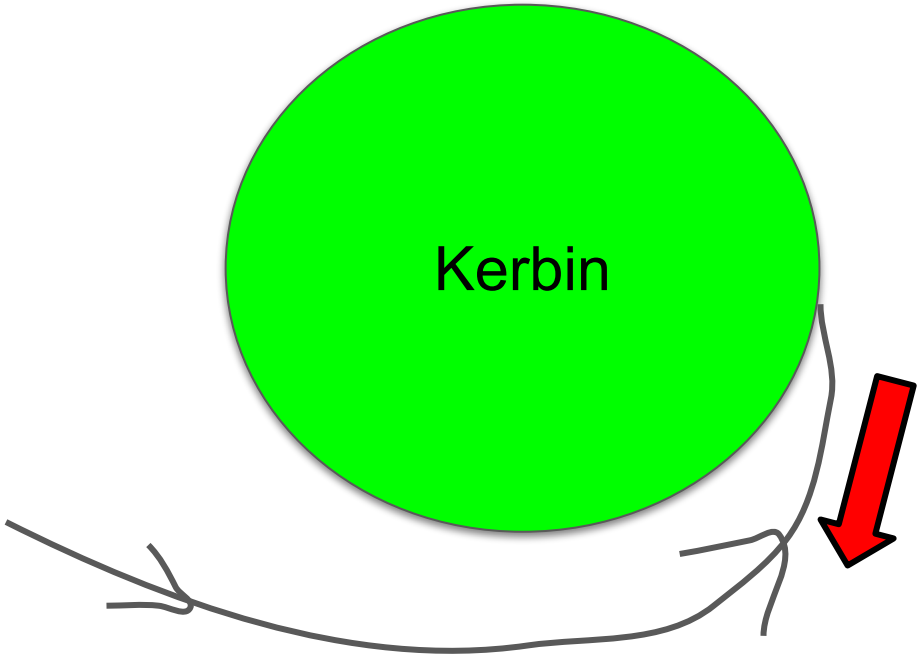
$$Phase\ angle = 45\sqrt{2\left(\frac{R+1}{R}\right)^3} - 180$$

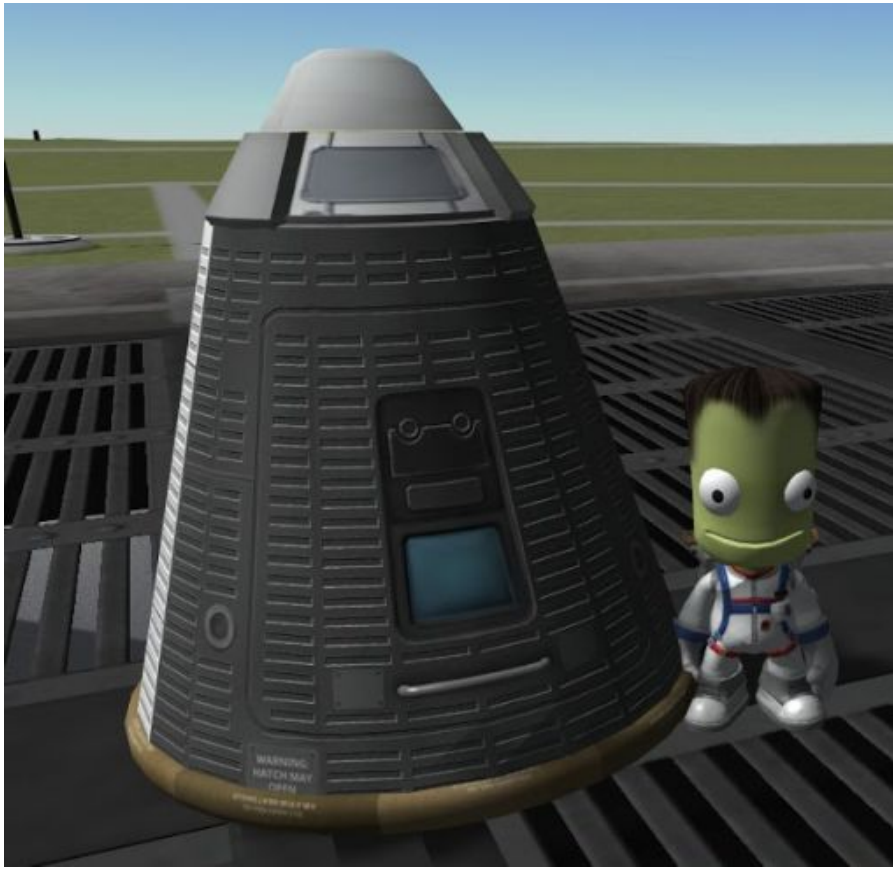
R = 0.723 AU, so the phase-angle is 54.1 degrees.

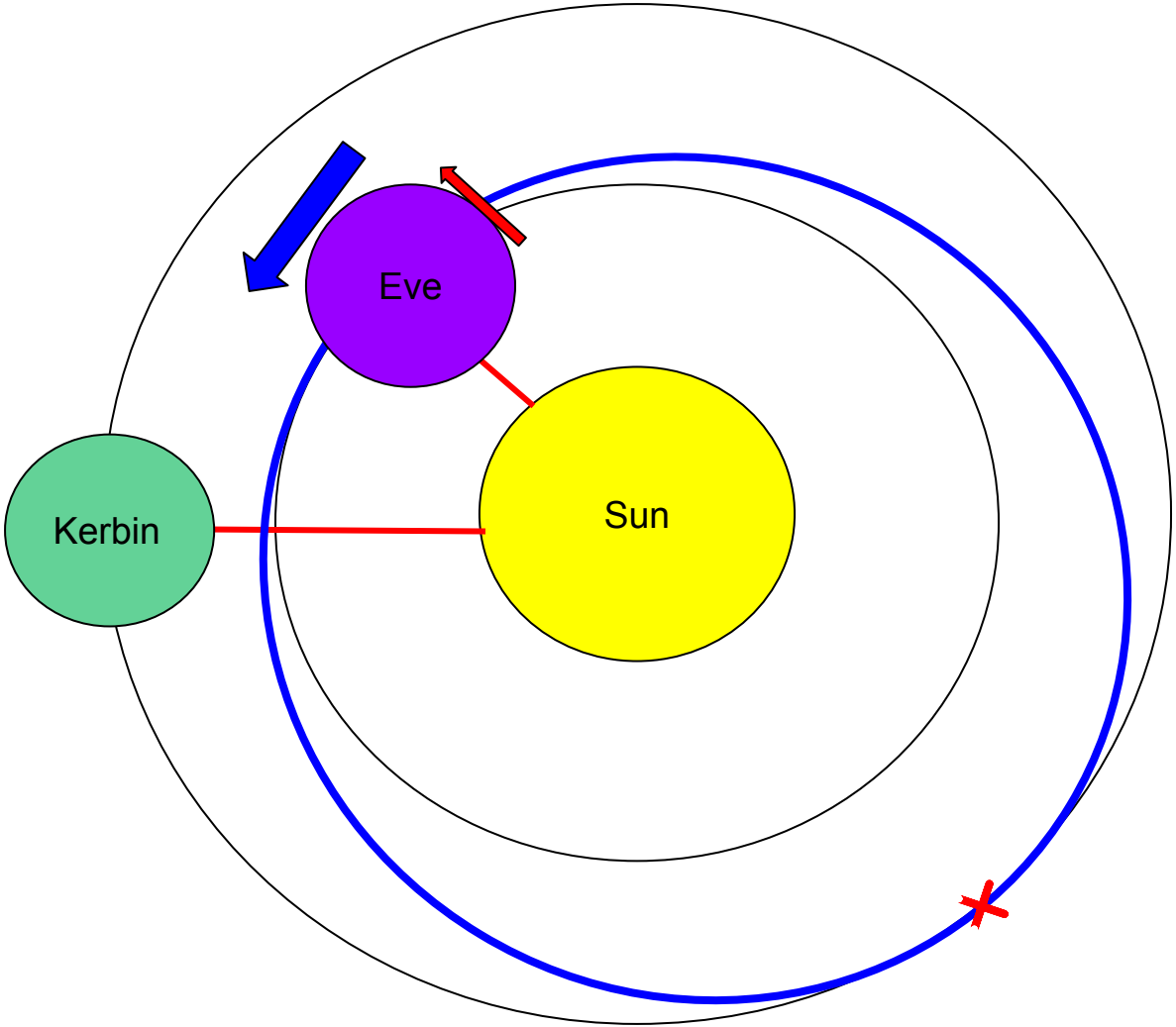
# Rocket Construction

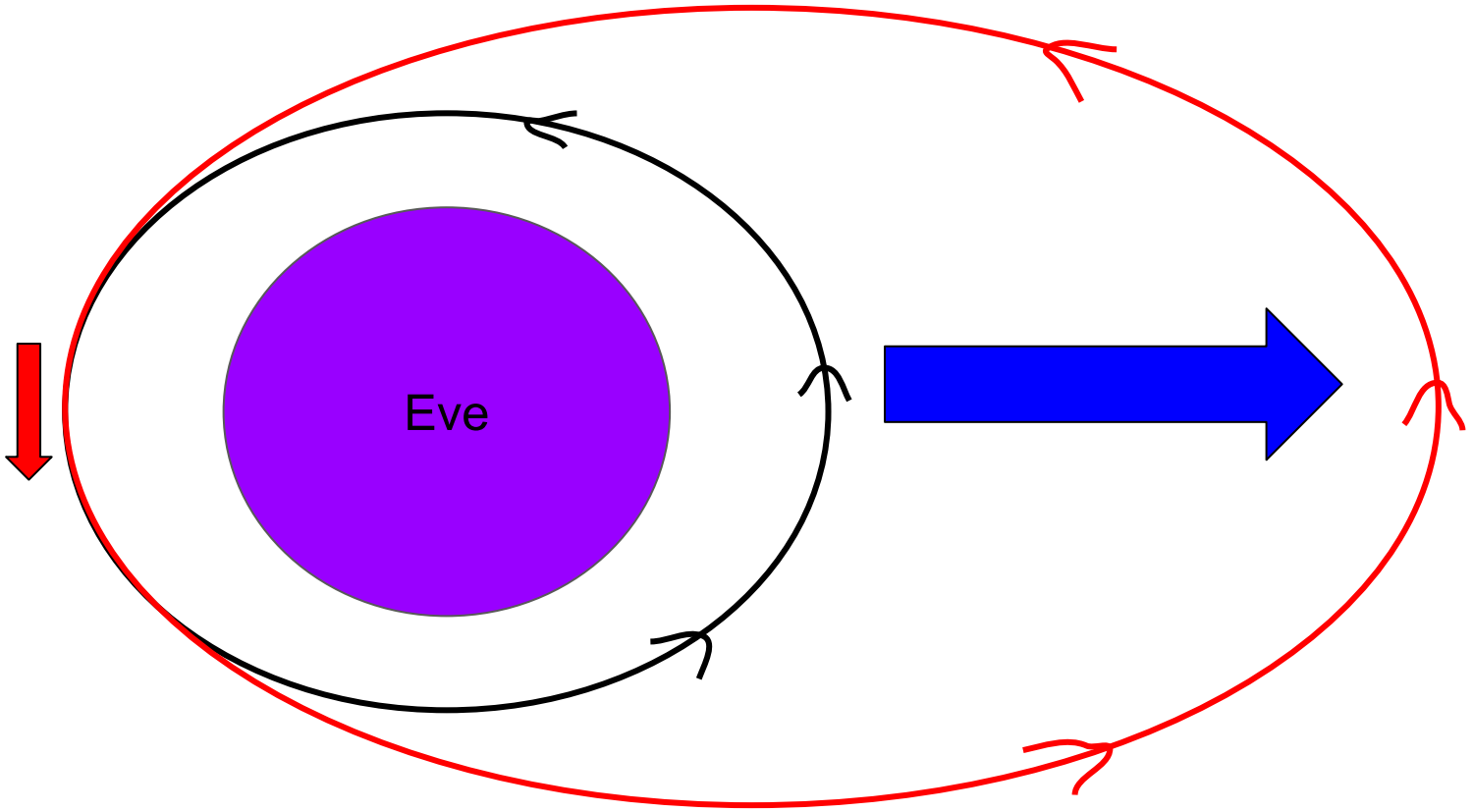
# Asparagus Staging


Kerbin




Eve
Kerbin
Sun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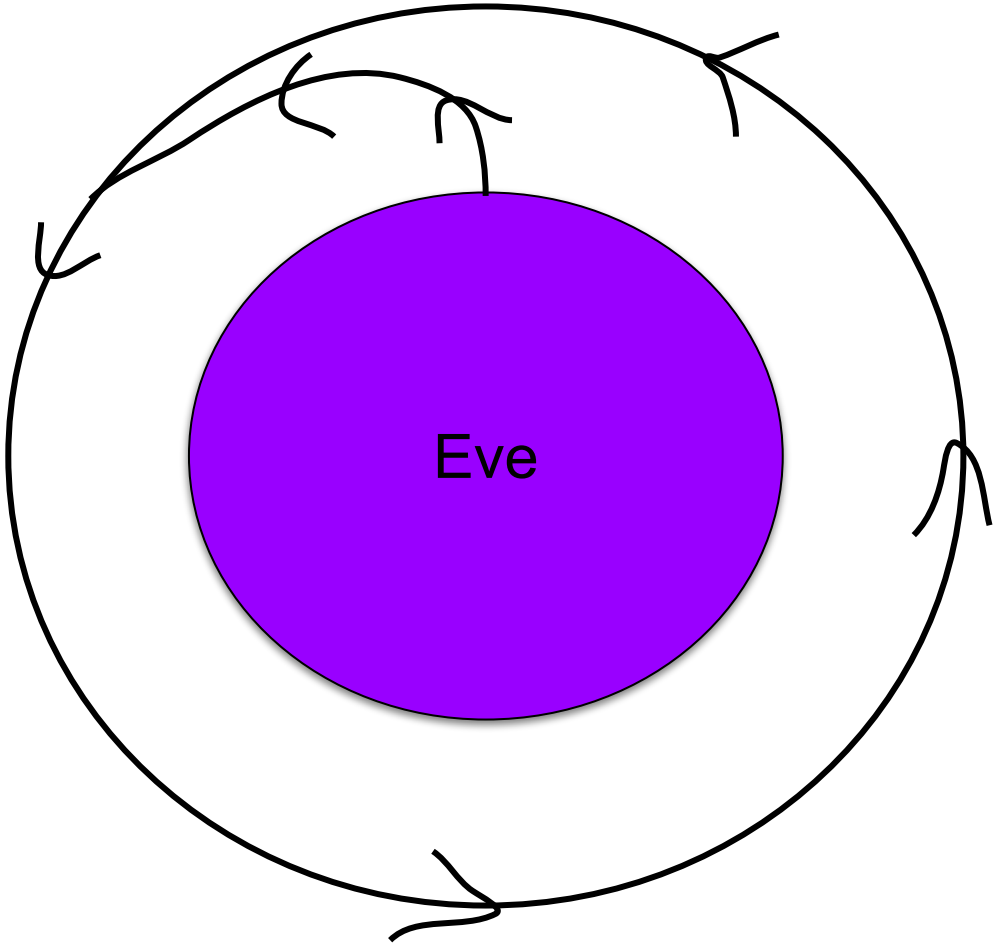
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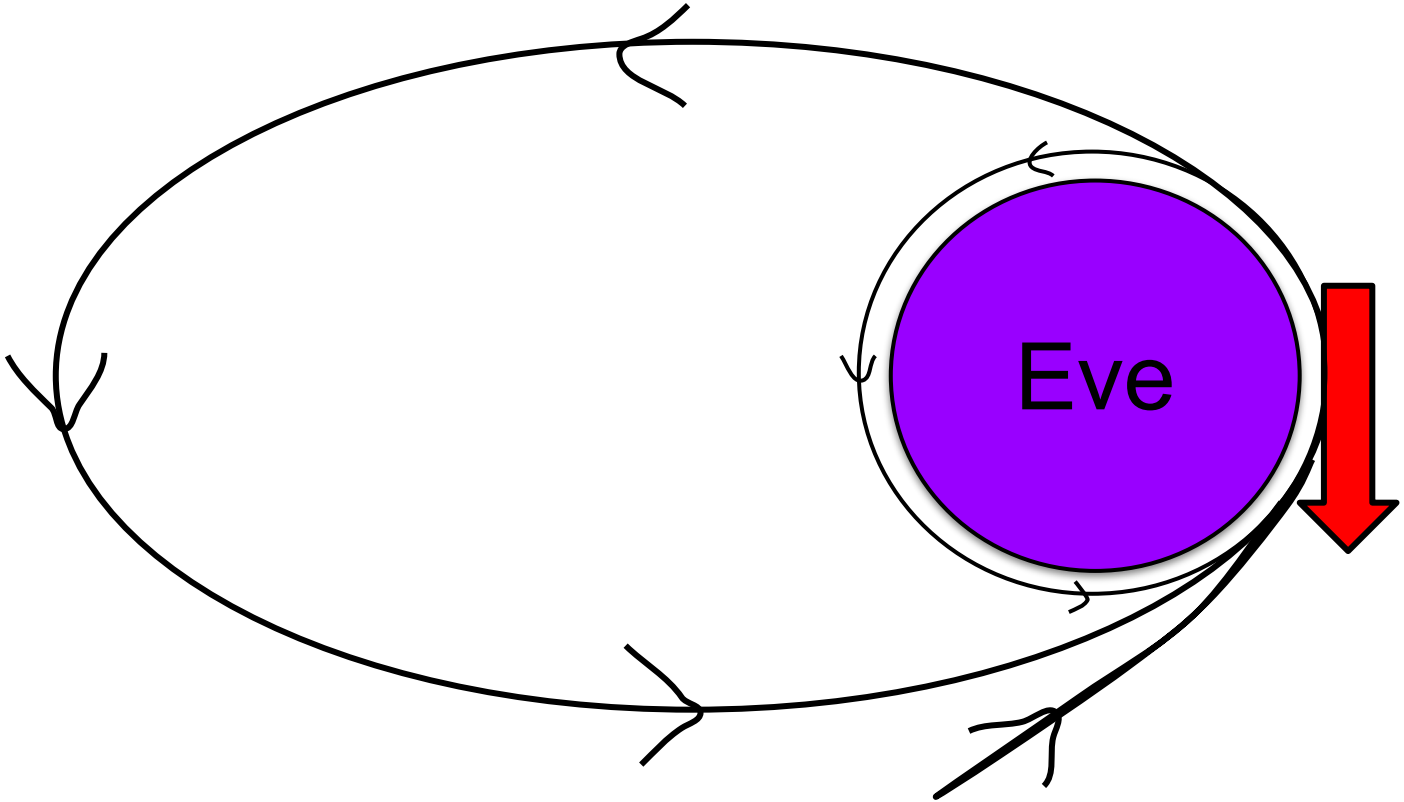
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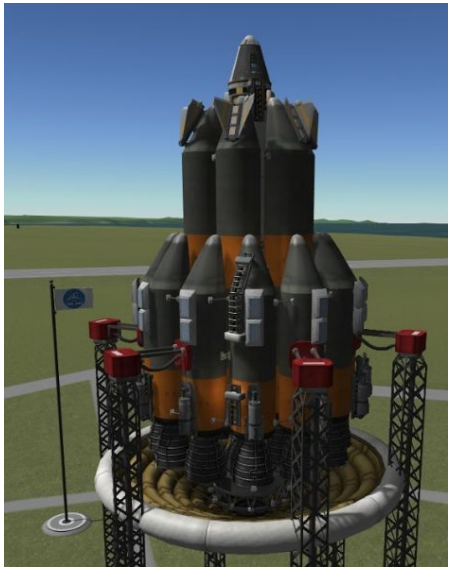
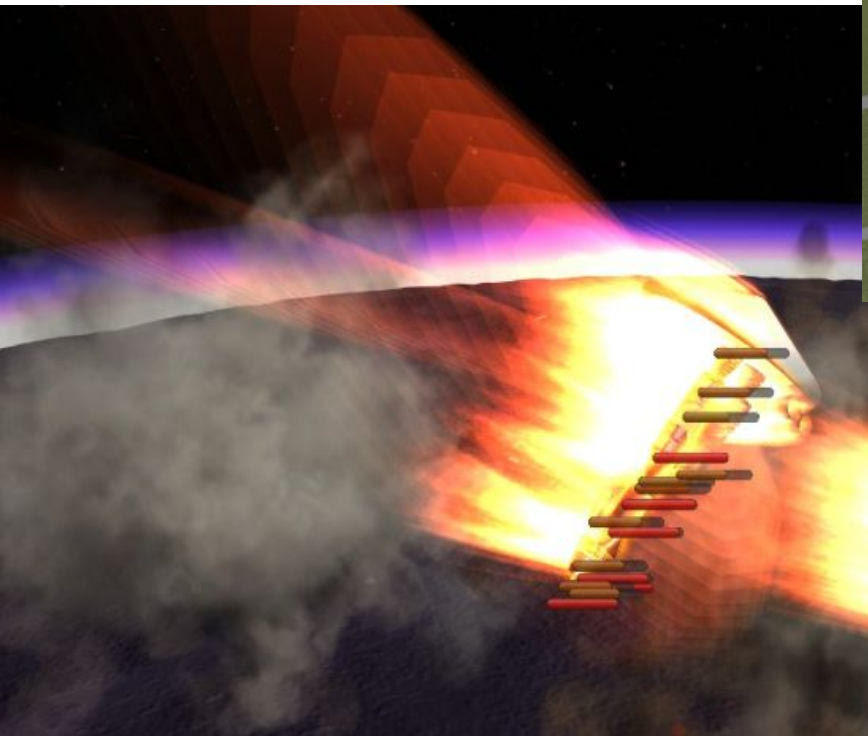
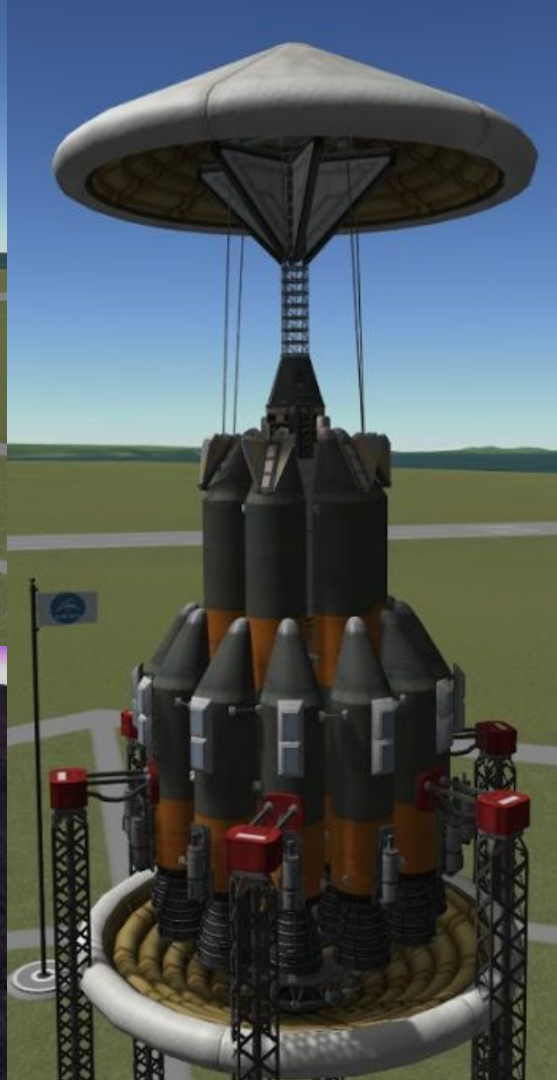
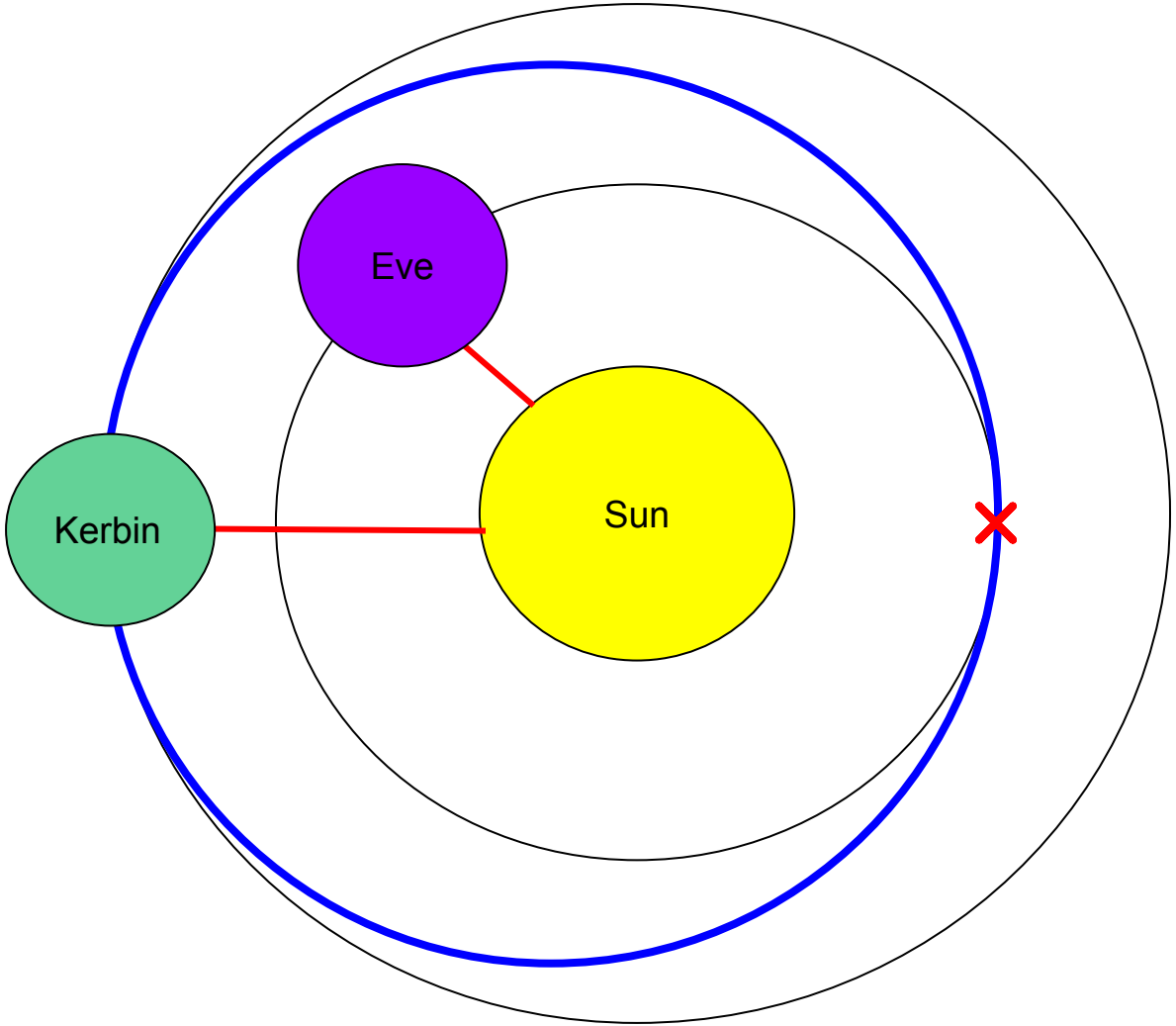
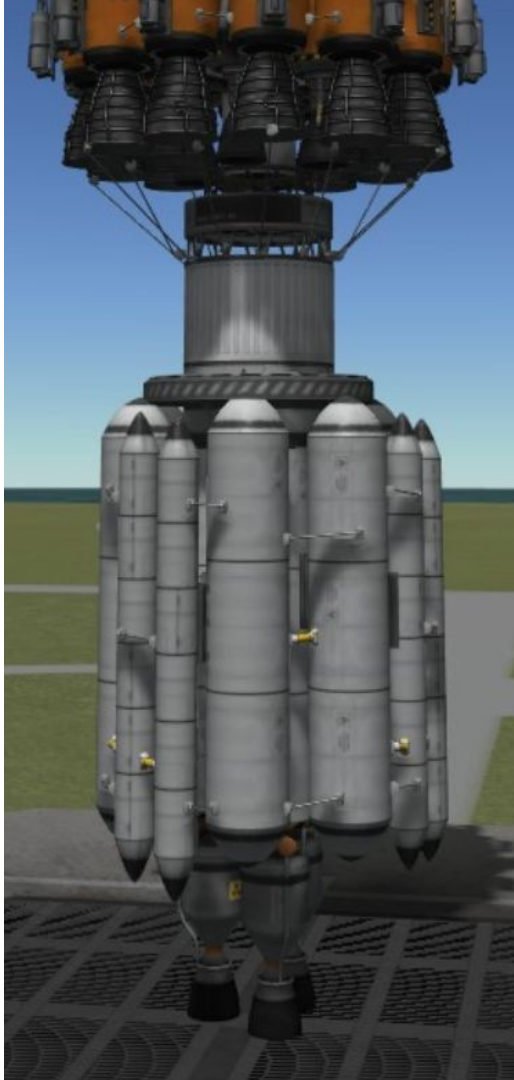


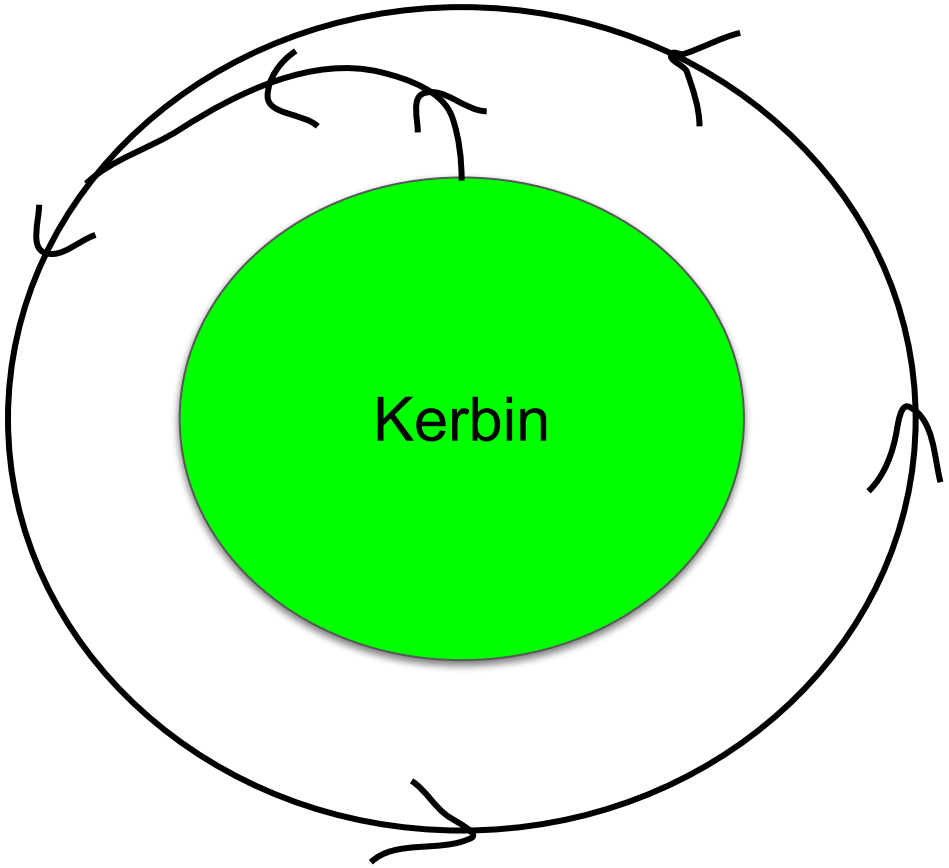
# Aerodynamics during atmospheric entry






Eve
Kerbin
Sun

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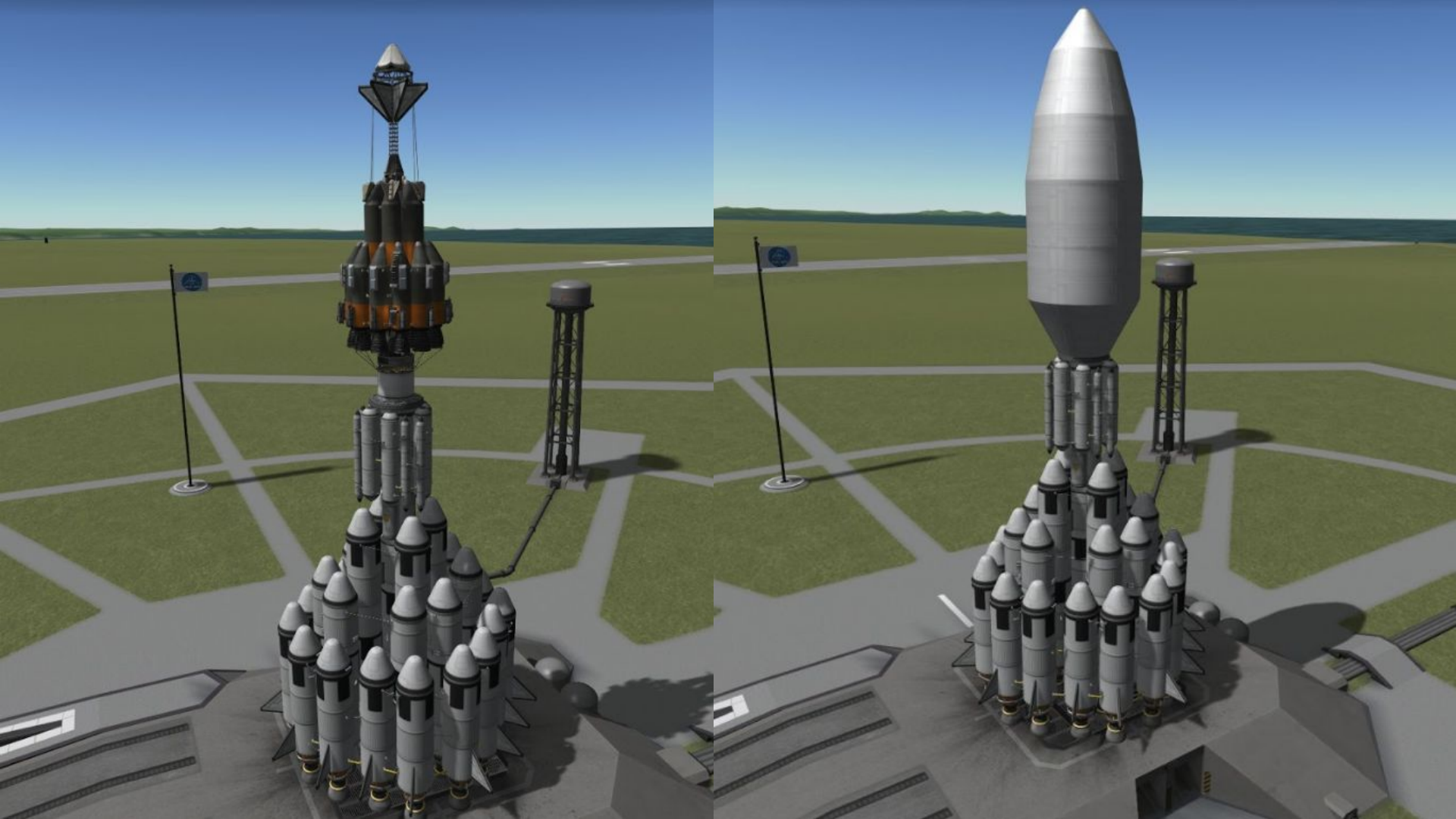
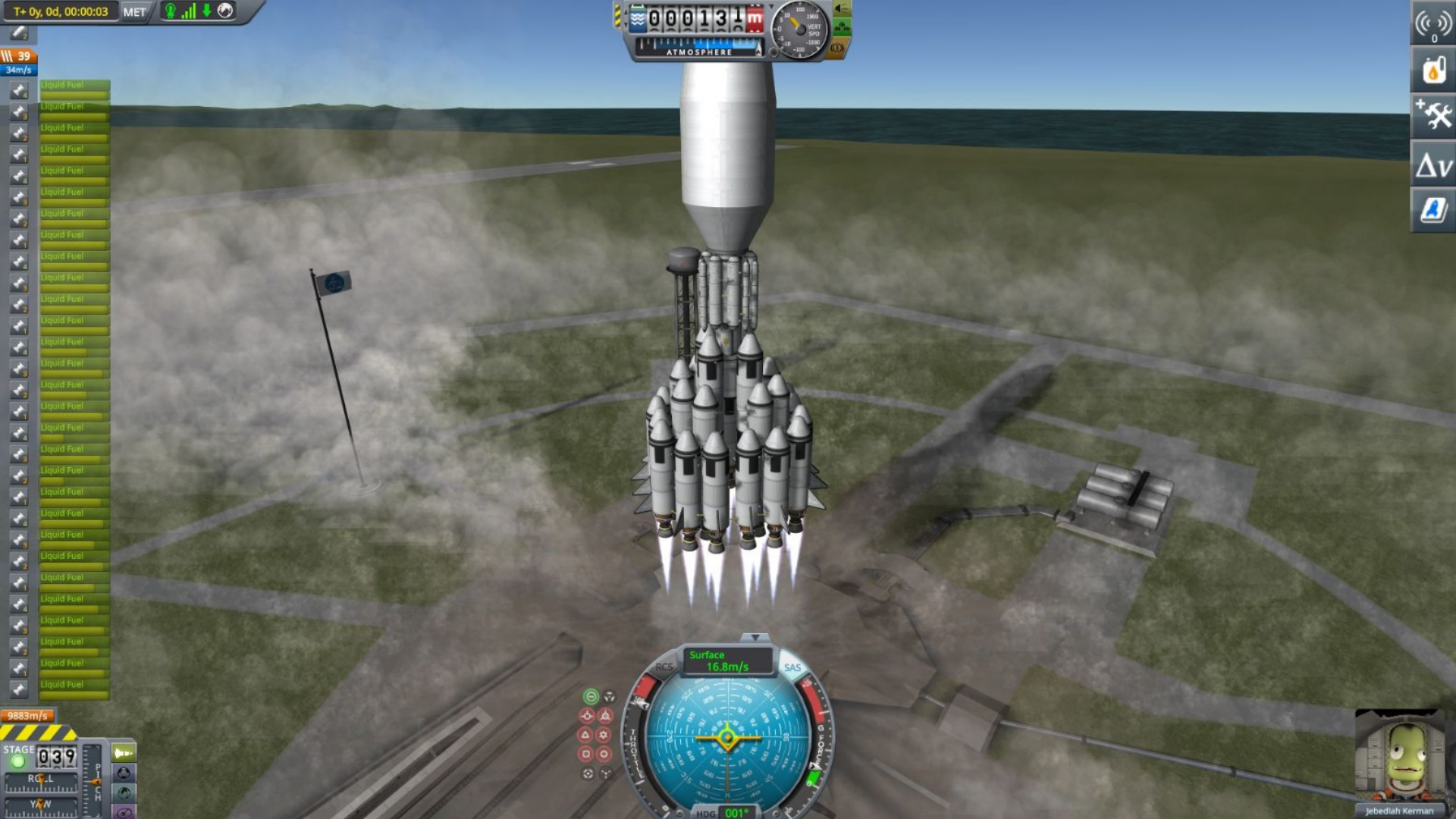


# Launch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Liquid Fuel
000131m
ATMOSPHERE
VERT SPD
Surface
16.8m/s
RCS
SAS
HDG
001°
9883m/s
STAGE
039
ROLL
PITCH
YAW
Jebediah Kerman


T+ 0y, 0d, 00:02:56
MET
051307
m
ATMOSPHERE
Resources
Oxidizer 23132 / 30140 (162.83)
Liquid Fuel 32326 / 38060 (133.22)
Electric Charge 1050 / 1050 (0)
Ablator 200 / 200 (0)
Monopropellant 0.00 / 10.00 (0)
Stage View
Δv
16
17
18
19
20
21
357m/s
22
86m/s
23
84m/s
24
25
450m/s
26
479m/s
Liquid Fuel
Liquid Fuel
Liquid Fuel
11886m/s
Orbit
APOAPSIS
PERIAPSIS
58.2158km
-500.624km
T - 47s
T - 7m, 17s
PERIOD
12m, 59s
Orbit
1233.7m/s
RCS
SAS
HDG 091°
Jebediah Kerman