

Energy Balance in LEO	7/3/2015	Assumptions: Power off, .9 surface emissivity;
Case: Aft Facing Sun	Alpha Cubesat	high reflective surface on aft
Ram Facing Earth	Revision 1	
Power ON	Eric Gustafson	Energy Balance 6U AlphaCube Sat w/ Aft facing Sun and Ram facing earth

Ref: Heat Transfer, 8th Ed., Holman, JP, McGraw Hill, 1997

[http://wiki.naturalfrequency.com/wiki/Absorptance\\_and\\_Emittance](http://wiki.naturalfrequency.com/wiki/Absorptance_and_Emittance)

Watts emitted		W/(m^2*K^4)					
Item Description	Energy (Watts)	Emissivity/ absorption	Area (m^2)	Length (m)	height (m)	Stephan-Boltz	
Panel 1 (AFT) Solar Heat Flux	5.58	0.2		0.02	0.1	0.2	5.67E-08
Panel 2 (Ram) Emit	-2.45E+00	0.9		0.02	0.1	0.2	5.67E-08
(Emitted to Earth)	-4.10E+00	0.9		0.02	0.1	0.2	5.67E-08
Panel 3 (Zenith) Emit	-3.67E+01	0.9		0.06	0.3	0.2	5.67E-08
Panel 4 (Port) Emit	-3.67E+01	0.9		0.06	0.3	0.2	5.67E-08
Panel 5 (Nadir) Emit	-3.67E+01	0.9		0.06	0.3	0.2	5.67E-08
Panel 6 (Starport) Emit	-3.67E+01	0.9		0.06	0.3	0.2	5.67E-08
System Electronics Power	26.5						
Ion Thruster Power	40						
Ion Thruster Radiative loss	-8.62E+01	0.96	0.13194678	0.942477		0.14	5.67E-08
Extended Radiative surfaces	-7.39E+00	0.96	0.011309724	0.03769908		0.3	5.67E-08
Solar Panel Radiate	-1.18E+02	0.96	0.18	0.6		0.3	5.67E-08
Solar Panel Absorb	203.391	0.9	0.18	0.6		0.3	5.67E-08
Solar Panel Radiate	-1.18E+02	0.96	0.18	0.6		0.3	5.67E-08
Solar Panel Absorb	203.391	0.9	0.18	0.6		0.3	5.67E-08
Energy Balance, Watts	-3.436940185						



K		K	W/m^2	
Temp -Radiate	View Factor	Panel Temp	Heat Flux	
6000		1		1395
4	-0.2	331		
289	-0.8	331		
		331		
4	-1	331		
		331		
4	-1	331		
		331		
4	-1	331		
		331		
4	-1	331		
		331		
4	-1	331		
4	-1	331		
		331		
4	-1	331		
4	0.9	331	1395	
4	-1	331		
4	0.9	331	1395	