Calculation of Orbit time

altitude of aausatii:	400km		700km		900km	
LEO aausatiit (r):	6.770.000	m	7.070.000	m	7.270.000	m
Velocity aausatii (v):	7669	m/s	7505	m/s	7401	m/s
orbit period (T):	5546	s.	5919	s.	6172	s.
Time of one Orbit (t):	**1:32:26**	**tt:mm:ss**	**1:38:39**	**tt:mm:ss**	**1:42:52**	**tt:mm:ss**
Radius of Earth (R_E):	6370000	m				
Mass of Earth (M_E):	5,97E+24	m				
Gravity constant (G):	6,67E-011	N*m^2/kg^2				

Calculation of the orbit eclipse

altitude of aausatii:	400km		700km		900km	
LEO aausatii (r):	6,770E+06	m	7,070E+06	m	7,270E+06	m
Angle Earth/Eclipse:	69,94	degrees	64,02	degrees	60,92	degrees
Percentage of Orbit in shadow:	**38,85**	**%**	**35,57**	**%**	**33,84**	**%**
Radius of Earth (R_e):	6,370E+06	m				
Radius of Sun (R_s):	6,960E+08	m				
Distance Earth_Sun (D):	1,496E+11	m				
Angle Eclipse:	0,2665	degrees				
Length of cone:	1,369E+09	m				

Time for the aausatii in eclipse during one Orbit

altitude of aausatii:	400km		700km		900km	
Time of one Orbit (t):	1:32:26	h:mm:ss	1:38:39	h:mm:ss	1:42:52	h:mm:ss
	1,54	*Hours*	*1,64*	*Hours*	*1,71*	*Hours*
Time of Orbit in shadow:	**35:55**	**h:mm:ss**	**35:05**	**h:mm:ss**	**34:49**	**h:mm:ss**
	0,60	*Hours*	0,584781493	*Hours*	0,580244797	*Hours*
Time in the Sun (Charging period):	56:31	h:mm:ss	1:03:34	h:mm:ss	1:08:03	h:mm:ss
	0,94	*Hours*	*1,05938517*	*Hours*	*1,13419965*	*Hours*

Power calculations

Emcore dimension:		
b	3,865	cm
h	6,34	cm
Area of one solar cell	24,51	cm2
Emcore info:		
BOL Efficiency at 28° C:	0,22	
Solar input:		
D	0,135	W/cm2
Efficiency loss diode	8,454	%

	Instant Power (mW)	
	Relative area (Cm2)	Power (mW)
Area with payload-side orthogonal to sun (two Solar cell)	49,02	1459,2
Area with two sides 45 degrees towards the sun (four solar cell)	69,33	2063,7
Area with payload orthogonal to the sun (six solar cell)	83,69	2491,1
Area with one corner towards the sun. and max. solar cell area in sunlight (six solar cells)	90,06	2680,8

Example:

Power (mW) after 1. diode	Efficiency PCU	Instant Power out PCU (mW)	Efficiency PRU and PDU	Instant Power out PCU (mW)	Average input power pr. orbit	Power balance in 'normal mode' for four different satellite-sun positions including worst and best				
						Loads			Sum of Loads	Power in - Power out
						EPS	COM	OBC		
1335,9	0,8	1068,70	0,8	854,96	550,88	56,00	285,72	200,00	541,72	9,15
1889,2	PCU powerconsumption of 23 mW is included in the efficiency above	1511,37	PRU and PDU consumtion of about 6,75 mW is included in the efficiency above	1209,09	779,05	56,00	285,7206	200,00	541,72	237,33
2280,5		1824,38		1459,51	940,40	56,00	285,7206	200,00	541,72	398,68
2454,2		1963,32		1570,66	1012,02	56,00	285,7206	200,00	541,72	470,30

							Capacity available at the battery:			10,00	Wh		
Mode	Average input power	Average loads for each subsystem [mW]					Sum of loads	Power in - Power out		Batt. Status after 1 h	Discharge/ charge time [minutes]		
	[mW]	EPS	COM	OBC	ADCS	Payload	[mW]	[mW]	[Wh]	10,00			
Safe		**56,00**	**0,00**	**0,00**	**0,00**	**0,00**	**56,00**	**764,59**	**2,75**	10,00	Fully charged		
Recovery		**56,00**	**329,26**	**0,00**	**0,00**	**0,00**	**385,26**	**435,33**	**1,57**	10,00	Fully charged		
Normal		**56,00**	**285,72**	**200,00**	**0,00**	**0,00**	**541,72**	**278,87**	**1,00**	10,00	Fully charged		
									0,00	10,00	Equilibrium		
									0,00	10,00	Equilibrium		
	820,59								**0,00**	10,00	Equilibrium		
									0,00	10,00	Equilibrium		
									0,00	10,00	Equilibrium		
									0,00	10,00	Equilibrium		
									0,00	10,00	Equilibrium		
									0,00	10,00	Equilibrium		
		Eksample: Whit fictiv concumtion 'gestimats' for ADCS and Payload											
state 1		56,00	285,72	200,00	91,00	0,00	632,72	187,87	**0,68**	10,00	Fully charged	0,00	8,00
state2		56,00	285,72	200,00	188,00	0,00	729,72	90,87	**0,33**	10,00	Fully charged		
state3		56,00	285,72	200,00	221,00	393,00	1155,72	335,13	**1,21**	10,00	497,32		
state4	820,59	56,00	571,44	200,00	330,00	393,00	1550,44	729,85	**2,63**	7,37	228,36		
state5		56,00	857,16	200,00	330,00	393,00	1836,16	1836,16	**6,61**	0,76	66,92		
state6		56,00	0,00	200,00	0,00	85,85	341,85	341,85	**1,23**	0,00	Totally emty		
		56,00	0,00	200,00	0,00	0,00	256,00	256,00	**0,92**	0,00	Totally emty		
		56,00	0,00	0,00	0,00	0,00	56,00	764,59	**2,75**	2,75	174,39		

Subsystems	States	Duty cycle			Consumption	Total		
		Safe	Recovery	Normal	[mW]	Safe	Recovery	Normal
COM	Standby	0,000	0,000	0,000	102,3	0,0	329,3	285,7
	Listening	0,000	0,924	0,927	184,8			
	TX	0,000	0,076	0,052	2085,6			
	RX	0,000	0,000	0,021	283,8			
	Off	1,000	0,000	0,000	0,0			
OBC	On	0,00	0,00	1,00	200,0	0,0	0,0	200,0
	Off	1,00	1,00	0,00	0,0			
ADCS	Idle	0,00	0,00	0,00	130,0	0,0	0,0	0,0
	Detumbling	0,00	0,00	0,00	142,0			
	Detumbled	0,00	0,00	0,00	130,8			
	Attitude maneuver	0,00	0,00	0,00	97,0			
	Desaturation	0,00	0,00	0,00	91,0			
	Off	1,00	1,00	1,00	0,0			
Payload	Normal	0,00	0,00	0,00	459,0	0,0	0,0	0,0
	Off	1,00	1,00	1,00	0,0			
EPS	Safe (only charging)	1,00	0,00	0,00	79,2	79,2	85,9	85,9
	Normal	0,00	1,00	1,00	85,9			
	Off	0,00	0,00	0,00	0,0			