SpaceANT-D Power Budget

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Energy Generation Prediction

Parameters	Abbreviations/Units	Value
Solar cell efficiency	(ηpv)	0.25
Solar constant	(sPower, [W/m2])	1358
Number of solar cell on each side	(nPX, nMX, nPY, nMY, nMZ)	2,2,2,2,2
Solar cell effective area	(cArea,[m2])	0.00657
Energy generation per one orbit	[Wh]	1.58
Efficiency of electronics devices (dc/dc)	(η1)	0.95
Total energy available per orbit	[Wh]	1.50

Subsystem Power Consumption

Subsystem	Components	Maximum Allocated Power	Active Duty Cycle	Power consumption	Duty Cycle per Orbit	Average Energy per orbit
		mW	%	mW	hour	mWh
Payload	LoRa Rx	39.93	6.25	2.50	0.10	3.99
Telecommunications	Housekeeping Tx	396.0	31.25	123.75	0.50	198.00
	Command Rx	39.9	56.25	22.46	0.90	35.94
	Mission Tx	396.0	6.25	24.75	0.10	39.60
Power	EPS	31.0	100.00	30.96	1.60	49.53
On-board Computer	OBC	30.8	100.00	30.85	1.60	49.35
	Total					376.41
	20% margin					451.70

Operation Modes Power Consumption

Subsystem	Components	Average Energy per orbit	Initial	Deployment	CW beacon	Uplink command	Rx Mission	Tx mission
		mWh	mWh	mWh	mWh	mWh	mWh	mWh
Payload	LoRa Rx	3.99	OFF	OFF	OFF	OFF	3.99	OFF
Telecommunications	Housekeeping Tx	198.00	OFF	OFF	198.00	OFF	OFF	OFF
	Command Rx	35.94	OFF	OFF	OFF	35.94	OFF	OFF
	Mission Tx	39.60	OFF	OFF	OFF	OFF	OFF	39.60
Power	EPS	49.53	49.53	49.53	49.53	49.53	49.53	49.53
On-board Computer	OBC	49.35	49.35	49.35	49.35	49.35	49.35	49.35
Mechanism	Antenna deploym	75.60	OFF	75.60	OFF	OFF	OFF	OFF
	Total	452.01	98.9	174.5	296.9	134.8	102.9	138.5
	20% margin		118.7	209.4	356.3	161.8	123.5	166.2