

SORTIE CubeSat Mission License Extension Request Summary:

SORTIE currently has been approved for an experimental license under Call Sign: WJ2XHR granted on 10/18/2018. Due to launch delays of the spacecraft and launch vehicle combination, we are currently slated for launch to the ISS and activation sometime in the October/November 2019 timeframe. Our original license submission requested a 1 year on-orbit lifetime and license activation, so the currently approved grant (0880-EX-CN-2017) expires on October 01, 2020.

The approved ODAR (summary table shown below, ODAR had waiver submitted several months later to correct issues and re-adjust mass) shows a total spacecraft mass of approximately 8.5 kg. We have increased our mass using Aluminum ballast material to 9.6 kg (summary table also shown below), which is still under the allocated/approved loading level of the launch vehicle. The ballast material and updated materials list has been approved by NASA's ODAR office as completely burning up upon re-entry of the spacecraft. A memo stating such and approved by NASA is imminent to the ASTRA team and will be submitted under "additional attachments" to license application 0084-EX-CM-2019.

Row Number	Name	External/Internal (Major/Minor Components)	Qty	Material	Body Type	Mass (g)	Diameter/Width (mm)	Length (mm)	Height (mm)
1	SORTIE								
2	CubeSat Structure	External - Major	1	Aluminum 6061	Box	3000	239.19	365	115.37
3	Antennae	External - Major	1	Steel 410	whip	25	12.7	165	0.3
4	Antennae Structure	External - Major	1	DELIRIN 150	Box	125	38.6	67.95	43.18
5	Solar Panels	External - Major	3	Aluminum honeycomb structure	plate	500	7.26	309.88	200
6	Sep Springs	External - Minor	0	Steel	N/A	N/A	N/A	N/A	N/A
7	Sep Switches	External - Minor	3	aluminum 6061 : steel 316 stainless	box	1.95	6.25	22.565	24.546
8	Payload mIVM	External - Minor	1	Copper Alloy ;Aluminum 6061: FR-4	box	800	97.23	94.183	63.42
9	Payload uPLP	External - Minor	1	Copper Alloy ;Aluminum 6061: FR-4	box	300	82.55	100	2.68
10	Batteries	Internal - Major	2	Lithium-Ion	box	1850	41.22	76.38	64.27
11	ADCS Components	Internal - Major	1	PCB FR-4 ; FR-4 PCB ;	box	825	100	100	50
12	Comm Board	Internal - Major	1	PCB FR-4 ;Aluminum 6061	box	350	82.5	82.5	17
13	Battery Board	Internal - Major	1	PCB FR-4	PCB board	400	91.1	97.7	25.7
14	C&DH Board	Internal - Major	1	PCB FR-4	PCB board	200	96	90	20
15	Fasteners*	Internal - Minor	203	18-8 Stainless Steel	Fastener	125.86	6.16	8.92	6.16
16	Cabling	Internal - Minor		Teflon insulated Copper alloy					
CURRENT EXPECTED MASS:						8503 g			
*Representative values						8.503 kg			

Figure 1. Original ODAR summary table. This was submitted as a modification to the official ODAR document provided by NASA and the updated analysis results were provided in 0880-EX-CN-2017.

Row Number	Name	External/Internal (Major/Minor Components)	Qty	Material	Body Type	Mass (g)	Diameter/Width (mm)	Length (mm)	Height (mm)	Total Mass (kg)
1	SORTIE									
2	CubeSat Structure	External - Major	1	Aluminum 6061	Hollow Box	4132	239.2	366	113.4	4.132
3	Antennae	External - Major	1	Steel 410	whip	25	12.7	165	0.3	0.025
4	Antennae Structure	External - Major	1	Delrin 150	Hollow Box	60	38.6	68	43.2	0.06
5	6U Solar Panel	External - Major	1	Aluminum honeycomb structure	Plate	202	200	309.9	12	0.202
6	3U Solar Panel	External - Major	2	Polyimide w/ Kapton, GaAs Solar Cell	Plate	150	88	309.5	5.5	0.3
7	Sep Switches	External - Minor	3	aluminum 6061 : steel 316 stainless	Box	6.2	18	27.8	10.3	0.0372
8	Payload mIVM	External - Minor	1	Copper Alloy ;Aluminum 6061: FR-4	Box	810	97.23	94.183	63.42	0.81
9	Payload uPLP	External - Minor	1	Copper Alloy ;Aluminum 6061: FR-4	Box	215	86.4	100	16.5	0.215
10	GPS Antenna	External - Minor	1	PCB FR-4; Aluminum 6061	Plate	16	45.2	N/A	7.2	0.016
11	Batteries	Internal - Major	8	Lithium-Ion	Cylinder	46.5	18.2	N/A	65	0.372
12	Battery housing	Internal - Major	1	Aluminum 6061; Ultem; PCB FR-4	Box	188	100	100	48.4	0.188
13	ADCS Components	Internal - Major	1	Aluminum 6061; PCB FR-4	Box	1030	100	100	70	1.03
14	Power Distribution Boards	Internal - Major	4	PCB FR-4	Plate	107.5	90.2	95.9	3.175	0.43
15	C&DH Boards	Internal - Major	3	PCB FR-4	Plate	100	76.2	83.9	3.175	0.3
16	Radio	Internal - Major	1	Aluminum 6061; PCB FR-4	Box	92	68.6	76.1	21.6	0.092
17	Ballast Mass 1	Internal - Major	1	Aluminum 6061	Box	151.7	35	65	25	0.1517
18	Ballast Mass 2	Internal - Major	1	Aluminum 6061	Box	306.7	50.8	112	20	0.3067
19	Ballast Mass 3	Internal - Major	1	Aluminum 6061	Box	403.4	50	60	50	0.4034
20	Fasteners* (#2, #4)	Internal - Minor	285	18-8 Stainless Steel	-	0.35	6.16	8.92	6.16	0.09975
21	Standoffs*	Internal - Minor	34	18-8 Stainless Steel	-	1.8	4.76	4.76	13.5	0.0612
22	Cabling*	Internal - Minor	330	Teflon insulated Copper alloy	Cylinder	1.2	0.51	304.8	N/A	0.396
CURRENT EXPECTED MASS:						9628 g				9.62795 kg
*Representative values						9.628 kg				

Figure 2. Updated ODAR showing increased mass to 9.68kg.

This increase in mass is expected to provide anywhere between 9-13 months of extra time on orbit depending on drag densities. As such, the license modification request under 0084-EX-CM-2019 is a request to extend the approved license from October 01, 2020 to December 01, 2021 (15 months). This will provide complete operational coverage of the mission through to re-entry.

No other parameters aside from spacecraft mass have changed that directly affects the FCC filing. We are still planning to use the Wallops Island facility for communications, and our radio on-board the spacecraft is still provided by L3 Communications. The only difference between application 0084-EX-CM-2019 and the granted 0880-EX-CN-2017 license is the increase in mass and request for longer license approval time.

Payment of the license application fee also was completed on June 3 and the application should now be paid in full.

If any additional information is needed, please contact ASTRA.

Sincerely,

Erik Stromberg

Erik Stromberg
Director
Space Systems Division

ASTRA, LLC
282 Century Place, Suite 1000 | Louisville, CO 80027
Office (303) 993-8039x716 | Cell (801) 231-6590