Orbital Debris Assessment Report

Prepared by OSS

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NASA DAS Software Version: 3.2.3

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Version 4

Self Assessment

Reqm't #	Launch Vehicle					Spacecraft				Comments
	Compliant	N/A	Not Compliant	Std. Non-Compliant	Incomplete	Compliant	N/A	Not Compliant	Incomplete	*For all incompletes, include risk assessment (low, medium, or high risk) of non-compliance & Project Risk Tracking #*
4.3-1.a *25 year limit*	☐	☐	☐	☐	☐	☒	☐	☐	☐	
4.3-1.b *<100 object x year limit*	☐	☐	☐	☐	☐	☐	☒	☐	☐	
4.3-2 *GEO +/- 200km*	☐	☐	☐	☐	☐	☐	☒	☐	☐	
4.4-1 *<0.001 Explosion Risk*	☐	☐	☐	☐	☐	☐	☒	☐	☐	
4.4-2 *Passivate Energy Sources*	☐	☐	☐	☐	☐	☐	☒	☐	☐	
4.4-3 *Limit BU Long term Risk*	☐	☐	☐	☐	☐	☐	☒	☐	☐	
4.4-4 *Limit BU Short term Risk*	☐	☐	☐	☐	☐	☐	☒	☐	☐	
4.5-1 *<.001 10cm Impact Risk*	☐	☐	☐	☐	☐	☒	☐	☐	☐	
4.5-2 *Postmission Disposal Risk*	☐	☐	☐	☐	☐	☒	☐	☐	☐	
4.6-1a-c *Disposal Method*	☐	☐	☐	☐	☐	☒	☐	☐	☐	Compliant with propulsion.
4.6-2 *GEO Disposal*	☐	☐	☐	☐	☐	☐	☒	☐	☐	
4.6-3 *MEO Disposal*	☐	☐	☐	☐	☐	☐	☒	☐	☐	
4.6-4 *Disposal Reliability*	☐	☐	☐	☐	☐	☒	☐	☐	☐	
4.7-1 *Ground Population Risk*	☐	☐	☐	☐	☐	☒	☐	☐	☐	
4.8-1 *Tether Risk*	☐	☐	☐	☐	☐	☐	☒	☐	☐	

Section 1: Program Management and Mission Overview/Mission Description Brief

Description: OSS is developing and operating an Electro-Optical / Infrared (EO/IR) (EWS) sensing satellite. The LEO-based Rapid Revisit Optical Cloud Imager (RROCI) has an experimental mission to design, develop, and demonstrate an 8-channel prototype system. OSS's imager will utilize commercial off-the-shelf systems to measure cloud characteristics from a 12U satellite.

Launch: RROCI-2 is planned to launch on February 1, 2024 as a rideshare from SpaceX Falcon 9, Transporter-10 out of Vandenberg, CA, USA.

Mission Duration: RROCI-2's mission is to conduct measurement on orbit for 1 year.

Launch Profile: RROCI-2 is planned to be ejected from a canister attached to the SpaceX vehicle into a circular orbit at an altitude of 590 km (+/- 25km) at a sun-synchronous (~ 97.75° inclination). This configuration provides ideal, repeatable LEO cloud observing.

Spacecraft On Orbit Maneuverability: The RROCI spacecraft contains 4x metal propellant propulsion (MPT) components. Each firing of a MPT produces a small, repeatable Impulse Bit. This approach allows for precise attitude and position control as well as a orbital maneuvers. This design is capable of years of dormancy, yet it activates instantly when required. There is zero power consumption when the system is idle. RROCI-2 has a Total Impulse of 5000 Ns and 450 g of total fuel. The fuel mass results in ~265 dV (m/s) and deorbit capability from > 800 km, which is far above RROCI-2 orbit. The propulsion system will be used for intermediate attitude

maintenance over the mission 1 year lifetime. At the end of the mission, OSS will initiate and control the full de-orbit and descent of the spacecraft. OSS does not expect any interaction or potential physical interference with other operational spacecraft, but can exercise defensive maneuvers if needed.

Spacecraft On Orbit Attitude Control: The RROCI-2 spacecraft contains magnetometers, sun sensors and star trackers that support an active continuously engaged 3-axis attitude control system comprised of reaction wheels and torquer rods. The system specifications are shown below:

Performance		
Total momentum storage per axis	+/-15, +/-30, +/-50[7]	mN.m.s
Maximum torque	2	mN.m
Magnetic moment	X/Y: 0.5 , Z: 0.4	$A.m^2$
Attitude determination accuracy	30	arcseconds
Pointing accuracy	<< 1	°
Slew rate	> 1.5[7]	°/s
Radiation tolerance	> 45[8]	krad (Si)
Operating temperature	- 45 / - 20 to + 40 / + 85[6]	°C

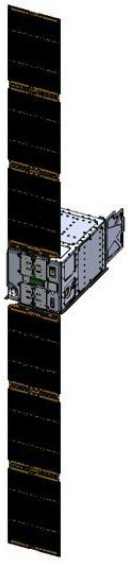
Spacecraft Power System: The RROCI-2 spacecraft uses solar panels to generate energy on- orbit, with local battery storage. There are no other sources of on-orbit energy generation or storage. The power design includes two triple panel wings (articulated) and two single panel wings (fixed) for a 128.0W peak power generation BoL and 115.8W peak power generation EoL. The batteries are 3500mAh 18650 Li-ion cells with 10A peak output current and 100Wh energy storage per battery, for a total of 168W peak power output.

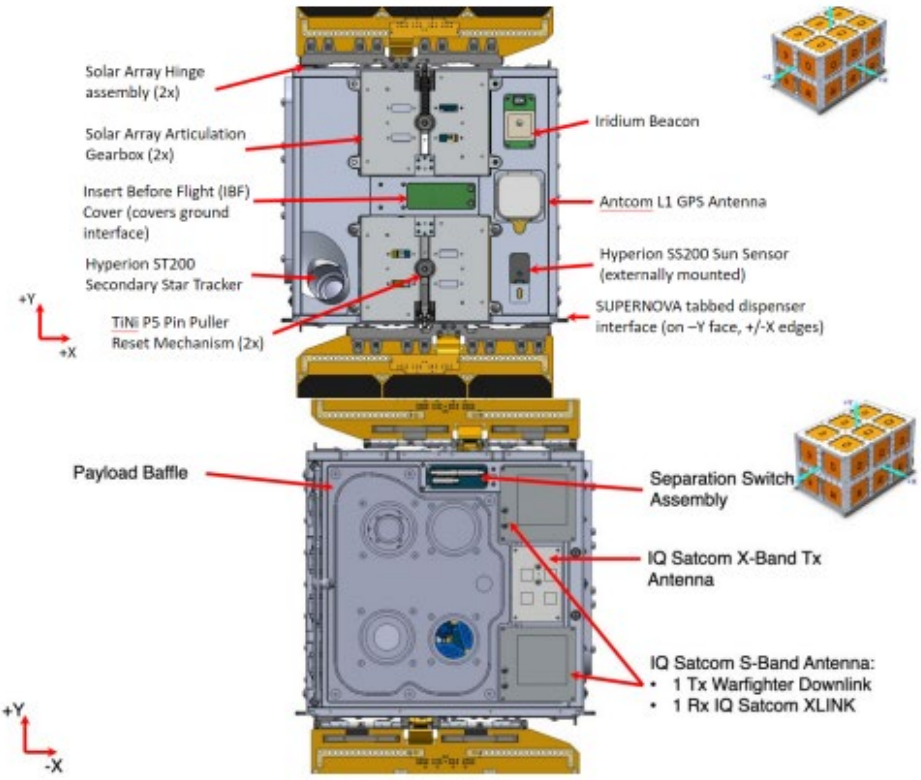
Section 2: Spacecraft Description

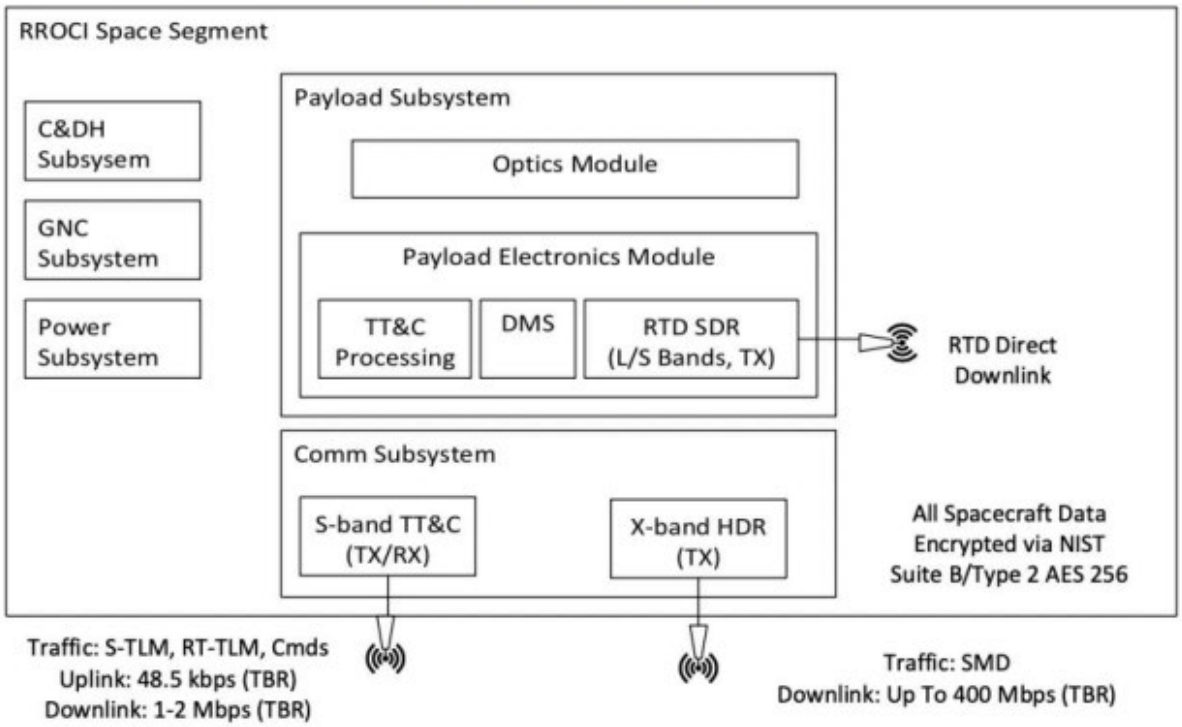
A detailed illustration of the RROCI spacecraft in the mission operation configuration with dimensional markings and marked component locations is shown below:

Stowed:

Deployed:




Solar Array Hinge assembly (2x)
Solar Array Articulation Gearbox (2x)
Insert Before Flight (IBF) Cover (covers ground interface)
Hyperion ST200 Secondary Star Tracker
TiNi P5 Pin Puller Reset Mechanism (2x)
Iridium Beacon
Antcom L1 GPS Antenna
Hyperion SS200 Sun Sensor (externally mounted)
SUPERNOVA tabbed dispenser interface (on –Y face, +/-X edges)
+Y
+X
Payload Baffle
Separation Switch Assembly
IQ Satcom X-Band Tx Antenna
IQ Satcom S-Band Antenna:
• 1 Tx Warfighter Downlink
• 1 Rx IQ Satcom XLINK
+Y
-X


RROCI Space Segment
C&DH Subsysem
GNC Subsystem
Power Subsystem
Payload Subsystem
Optics Module
Payload Electronics Module
TT&C Processing
DMS
RTD SDR (L/S Bands, TX)
RTD Direct Downlink
Comm Subsystem
S-band TT&C (TX/RX)
X-band HDR (TX)
All Spacecraft Data Encrypted via NIST Suite B/Type 2 AES 256
Traffic: S-TLM, RT-TLM, Cmds
Uplink: 48.5 kbps (TBR)
Downlink: 1-2 Mbps (TBR)
Traffic: SMD
Downlink: Up To 400 Mbps (TBR)

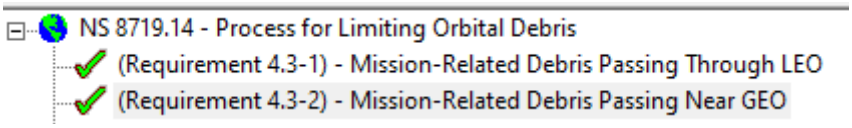
The system mass budget, at launch, is shown below:

System Mass Budget		
Component	CBE (kg)	Method
Spacecraft		
RROCI Structure Assembly	2.6	Pumpkin EIDP
SUPERNOVA SAP Covers	0.2	Pumpkin EIDP
RROCI Solar Panel Assembly	2.1	Pumpkin EIDP
Antenna	0.2	Pumpkin EIDP
SUPERNOVA Avionics - Hyperion	4.4	Pumpkin EIDP
Xantus MPT Thruster Assembly	1.1	Xantus ICD
Sub Total	10.60	Pumpkin EIDP
Instrument		
Electronics Module	1.64	Scale Weight
Optics Module	3.29	CBE
Radiators	1.28	Scale Weights
Optics Baffle	0.23	Scale Weight
Deployable Cover	0.20	Scale Weight
Misc (i.e. fasteners, harnesses, MLI)	0.30	CBE
Sub Total	6.94	Scale Weight
Interface Harnesses	<1.26	CBE
Final Total	<18.8	Scale Weight

The propulsion system consumable is a solid, with up to 450 g being used on orbit over the mission lifetime, including de-orbit (see description in Section 1). There are no fluids on the RROCI-2 spacecraft. The attitude control system is described in Section 1. There are no pyrotechnic devices on RROCI-2. There are no radioactive materials on RROCI-2. There are no planned proximity operations for the RROCI-2 mission. The power system is described in Section 1.

Section 3: Assessment of Spacecraft debris released during normal operations

There are no objects >1 mm expected to be released from the RROCI spacecraft any time after launch, including object dimensions, mass, and material. RROCI is compliant with 4.3-1 and 4.3-2 (not applicable).

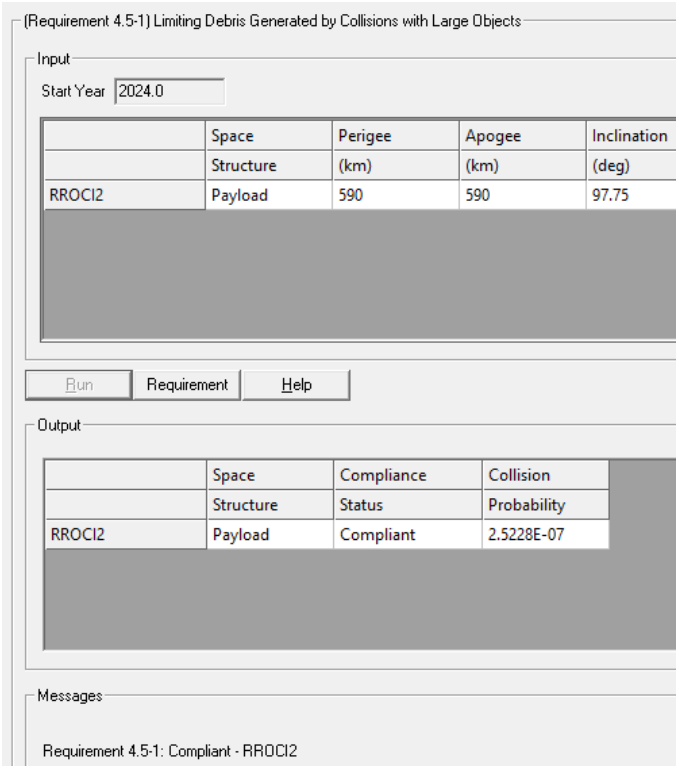


Section 4: Assessment of Spacecraft intentional breakups and potential for explosions

There are no identified potential causes of spacecraft breakup during deployment and mission operations on RROCI-2. There are no credible failure modes identified which may lead to an accidental explosion. RROCI-2 will not perform intentional breakups or collisions during mission operations. No components will be passivated at EOM. RROCI-2 is compliant with Requirements 4.4-1 through 4.4-4 (not applicable).

Section 5: Assessment of Spacecraft potential for on-orbit collisions

The probability of collision of the RROCI-2 spacecraft probability with space objects larger than 10 cm in diameter during the orbital lifetime of the spacecraft is shown below, and is compliant with requirement 4.5-1.



The probability of collision with space objects, including orbital debris and meteoroids, of sufficient size to prevent postmission disposal is negligible. The RROCI-2 propulsion system is redundant and comprised of solid propellent (i.e., a rupture of a gas tank is not applicable). There are no liquids on RROCI-2. The power system includes redundant solar panel strings and batteries. RROCI-2 is compliant with requirement 4.5-2.

Section 6: Assessment of Spacecraft post-mission disposal plans and procedures

At the end of the mission, OSS will initiate and control the full de-orbit and descent of the spacecraft using its on-board propulsion system (see Section 1). For RROCI-2, 5000 Ns Total Impulse and 450 g of total fuel. The fuel mass results in ~ 265 dV (m/s) and deorbit capability from > 800 km. RROCI is fully compliant with Requirements 4.6-1 through 4.6-4 by utilizing the on-board propulsion for a controlled re-entry for postmission disposal below the 525 initial altitude.

RROCI is fully compliant with Requirements 4.6-1 through 4.6-4 by utilizing the on-board propulsion for a controlled re-entry for postmission disposal below the 525km initial altitude.

Section 7: Assessment of Spacecraft Hazardous Materials

- Detailed description of spacecraft components by size, mass, material, shape, and original location on the space vehicle, if the atmospheric reentry option is selected.

  This information can be found in Appendix A, output from ODAR, with size, mass, material, and shape, with altitude of disintegration defined.

- Summary of objects expected to survive an uncontrolled reentry, using NASA DAS3.2.3, NASA Object Reentry Survival Analysis Tool (ORSAT), or comparable software

  This information can be found in Appendix A, output from ODAR, line 72

- Calculation of probability of human casualty for the expected year of uncontrolled reentry and the spacecraft orbital inclination

  Output from the ODAR analysis (NASA DAS 3.2.3) is 1:100000000.

- Assessment of spacecraft compliances with Requirement 4.7-1

  Spacecraft is compliant with Requirement 4.7-1.

Section 7A: Assessment of Spacecraft Hazardous Materials

- Summary of the hazardous materials contained on the spacecraft using all columns and the format in paragraph 4.7.4.10.

  The only hazardous materials on RROCI are the battery modules, which are shown to reenter at 69.4km with no human casualty risk.

347	710-01552 Battery Module 2	273	2	Aluminum 6061-T6	Box	0.502	0.089	0.093	0.044	69.4	0	0

Section 8: Assessment for Tether Missions

Not applicable.

See Appendix A for DAS Activity Log

Reentry Data

Row Num	Name	Parent	Qty	Material	Body Type	Thermal M	Diameter /	Length	Height	Status	Risk	Demise Alt	Total DCA	KE	
1	RROCI-2	0	1	Aluminum	Box	18.35	0.226	0.366	0.226	Compliant	'0'		0		
2	MODULE-	1	1	Aluminum	Box	1.5278	0.159	0.201	0.053			76.3	0	0	
3	ASSY-DMS	2	1	Fiberglass	Box	0.1598	0.189	0.218	0.146			76.1	0	0	
4	PCA-DATA	3	1	Fiberglass	Box	0.1538	0.189	0.218	0.146			75.8	0	0	
5	WEDGELO	3	2	Aluminum	Box	0.0015	0.006	0.147	0.006			76.1	0	0	
6	SHCS- 0-80	3	6	Stainless S	Cylinder	0.0005	0.0037	0.006				75.3	0	0	
7	ASSY- HEA	2	1	Aluminum	Box	0.5719	0.149	0.169	0.013			75.3	0	0	
8	PLATE- HE	7	1	Aluminum	Box	0.4617	0.149	0.169	0.013			74.5	0	0	
9	SHIELD-RF	7	1	Aluminum	Box	0.0073	0.034	0.066	0.003			75.2	0	0	
10	PHCS-PHIL	7	4	Stainless S	Cylinder	0.0002	0.0029	0.004				74.9	0	0	
11	PHCS-PHIL	7	6	Stainless S	Cylinder	0.0002	0.0024	0.006				75	0	0	
12	BERGQUIS	7	1	Polyamide	Box	0.0014	0.032	0.051	0.001			75.3	0	0	
13	CABLE-AM	7	1	Copper All	Box	0.0995	0.034	0.066	0.008			73.7	0	0	
14	CONN-RCP	13	1	Polyamide	Box	0.0004	0.013	0.018	0.009			73.7	0	0	
15	CONN- SO	13	4	Copper All	Cylinder	0.0001	0.002	0.011				73.6	0	0	
16	WIRE- STR	13	1	Copper All	Cylinder	0.0015	0.0018	0.081				73.5	0	0	
17	WIRE- STR	13	1	Copper All	Cylinder	0.0016	0.0019	0.081				73.5	0	0	
18	AMPLIFIER	13	1	Fiberglass	Box	0.0956	0.04	0.07	0.0186			72.1	0	0	
19	ENCL- MO	2	1	Aluminum	Box	0.5888	0.159	0.201	0.053			75.7	0	0	
20	WARFIGHT	2	1	Fiberglass	Box	0.077	0.09	0.09	0.018			75.6	0	0	
21	PHMS-PHI	2	4	Stainless S	Cylinder	0.0005	0.0032	0.008				75.7	0	0	
22	SHCS- 4-40	2	14	Steel A-28	Cylinder	0.0005	0.003	0.011				75.9	0	0	
23	STANDOFF	2	2	Stainless S	Cylinder	0.0041	0.006	0.029				75.3	0	0	
24	SHCS- 2-56	2	10	Steel A-28	Cylinder	0.0005	0.0034	0.007				75.8	0	0	
25	GAP PAD 1	2	1	Polyamide	Box	0.0002	0.007	0.013	0.002			76.3	0	0	
26	GAP PAD 2	2	1	Polyamide	Box	0.0003	0.01	0.011	0.002			76.3	0	0	
27	GAP PAD 3	2	1	Polyamide	Box	0.0004	0.01	0.014	0.002			76.3	0	0	
28	GAP PAD 4	2	1	Polyamide	Box	0.0002	0.01	0.01	0.002			76.3	0	0	
29	GAP PAD 5	2	1	Polyamide	Box	0.0005	0.014	0.014	0.002			76.3	0	0	
30	GAP PAD 6	2	1	Polyamide	Box	0.0008	0.014	0.022	0.002			76.3	0	0	
31	GAP PAD 7	2	1	Polyamide	Box	0.0018	0.027	0.027	0.002			76.3	0	0	
32	GAP PAD 8	2	1	Polyamide	Box	0.0001	0.008	0.008	0.002			76.3	0	0	
33	GAP PAD 9	2	1	Polyamide	Box	0.0001	0.008	0.008	0.002			76.3	0	0	
34	GAP PAD 1	2	1	Polyamide	Box	0.0005	0.014	0.014	0.002			76.3	0	0	
35	GAP PAD 1	2	1	Polyamide	Box	0.0008	0.015	0.02	0.002			76.3	0	0	
36	GAP PAD 1	2	1	Polyamide	Box	0.0024	0.031	0.031	0.002			76.2	0	0	
37	PHMS-PHI	2	4	Stainless S	Cylinder	0.0002	0.0029	0.004				75.9	0	0	
38	STANDOFF	2	2	Stainless S	Cylinder	0.0014	0.006	0.01				75.5	0	0	
39	SHCS- 2-56	2	4	Steel A-28	Cylinder	0.0007	0.0036	0.009				75.8	0	0	
40	CABLE-RF-	2	1	Copper All	Cylinder	0.0119	0.008	0.425				76.2	0	0	
41	CONN SMP	40	1	Copper All	Cylinder	0.0014	0.005	0.016				75.9	0	0	

42	CONN-SM	40	1	Copper All	Cylinder	0.0023	0.008	0.029			76	0	0
43	FLEXIBLER	40	1	Copper All	Cylinder	0.0082	0.003	0.425			76.1	0	0
44	CABLE-RF-	2	1	Copper All	Cylinder	0.0089	0.008	0.387			76.2	0	0
45	CONN SMA	44	1	Copper All	Cylinder	0.0009	0.008	0.017			76.1	0	0
46	CONN SMA	44	1	Copper All	Cylinder	0.0022	0.008	0.029			76	0	0
47	FLEXIBLER	44	1	Copper All	Cylinder	0.0058	0.003	0.387			76.1	0	0
48	CABLE-RF-	2	1	Copper All	Cylinder	0.0085	0.008	0.386			76.2	0	0
49	CONN-MM	48	1	Copper All	Cylinder	0.0014	0.0036	0.016			75.8	0	0
50	CONN-SM	48	1	Copper All	Cylinder	0.0014	0.008	0.021			76.1	0	0
51	FLEXIBLER	48	1	Copper All	Cylinder	0.0057	0.003	0.386			76.1	0	0
52	CABLE-DM	2	1	Copper All	Cylinder	0.0127	0.005	0.08			75.6	0	0
53	CONN-SEL	52	2	Copper All	Box	0.00275	0.005	0.015	0.005		75	0	0
54	STANDOFF	52	4	Stainless S	Cylinder	0.0009	0.003	0.08			75.5	0	0
55	PHMS-PHI	52	4	Stainless S	Cylinder	0.0009	0.0043	0.008			74.7	0	0
56	CABLE-RF-	2	1	Copper All	Cylinder	0.0067	0.004	0.328			76.2	0	0
57	CONN-MM	56	1	Copper All	Cylinder	0.0009	0.004	0.018			76	0	0
58	CONN-SM	56	1	Copper All	Cylinder	0.0009	0.004	0.018			76	0	0
59	FLEXIBLER	56	1	Copper All	Cylinder	0.0049	0.003	0.328			76.1	0	0
60	CABLE-WF	2	1	Copper All	Cylinder	0.034	0.011	0.184			75.8	0	0
61	CABLE-NA	60	1	Copper All	Box	0.0114	0.011	0.184	0.003		75.6	0	0
62	GLENAIRN	60	2	Copper All	Box	0.0113	0.011	0.184	0.003		75.6	0	0
63	GROMMET	2	2	Stainless S	Cylinder	0.0014	0.005	0.019			75.7	0	0
64	NUT- GRO	2	1	Stainless S	Cylinder	0.0009	0.008	0.003			75.5	0	0
65	NUT- HEX-	2	3	Stainless S	Cylinder	0.0018	0.01	0.003			74.9	0	0
66	WASHER-F	2	3	Stainless S	Cylinder	0.0005	0.009	0.003			75.9	0	0
67	SUB ASSEM	1	1	Aluminum	Box	2.9512	0.173	0.206	0.168		76.1	0	0
68	ASSY- CALI	67	1	Aluminum	Box	0.1208	0.038	0.14	0.011		75.6	0	0
69	CALIBRATO	68	1	Aluminum	Box	0.0318	0.038	0.14	0.011		75.4	0	0
70	BLACK BOD	68	1	Copper All	Cylinder	0.0222	0.034	0.0102			74.3	0	0

71	STANDOFF	68	3	Fiberglass	Cylinder	0.0001	0.0032	0.007			75.5	0	0
72	COUNTER	68	5	Tungsten	Cylinder	0.0077	0.01	0.006			0	1.44	8.1
73	BACKER- D	68	2	Fiberglass	Cylinder	0.00405	0.022	0.007			74.9	0	0
74	SPECTRALO	68	1	Aluminum	Flat Plate	0.0002	0.032	0.032			75.6	0	0
75	RING- RET	68	1	Aluminum	Cylinder	0.0014	0.023	0.007			75.5	0	0
76	FMS- 2-56	68	3	Titanium (	Cylinder	0.0002	0.003	0.012			75.3	0	0
77	CPSS- 6-32	68	1	Stainless S	Cylinder	0.0001	0.004	0.003			75.4	0	0
78	O-RING- D	68	1	Teflon	Cylinder	0.0001	0.023	0.007			75.6	0	0
79	CABLE- CA	68	1	Copper All	Cylinder	0.0175	0.033	0.511			75.5	0	0
80	CONN- MI	79	1	Polyamide	Box	0.0001	0.013	0.015	0.005		75.5	0	0
81	SENSOR- T	79	1	Lead Elem	Cylinder	0.0001	0.002	0.044			75.5	0	0
82	SENSOR- T	79	1	Macor Cer	Box	0.0005	0.006	0.007	0.005		75.2	0	0
83	HEATER- B	79	1	Copper All	Flat Plate	0.0018	0.033	0.033			75.5	0	0
84	WIRE 30 A	79	1	Copper All	Cylinder	0.0075	0.0015	0.511			75.4	0	0
85	WIRE 30 A	79	1	Copper All	Cylinder	0.0075	0.0015	0.511			75.4	0	0
86	SUB ASSEM	67	1	Aluminum	Box	0.2765	0.081	0.206	0.026		75.6	0	0
87	BAFFLE- IN	86	1	Aluminum	Box	0.2365	0.081	0.206	0.021		75.2	0	0
88	MOUNT- H	86	1	Aluminum	Cylinder	0.0288	0.044	0.014			75.1	0	0
89	SPACER- M	86	3	Fiberglass	Cylinder	0.0001	0.005	0.003			75.6	0	0
90	SPACER- B	86	3	Fiberglass	Cylinder	0.0001	0.046	0.014			75.6	0	0
91	FMS- 2-56	86	3	Steel A-28	Cylinder	0.0005	0.003	0.014			75.3	0	0
92	CABLE- BLA	86	1	Copper All	Cylinder	0.0091	0.015	0.269			75.6	0	0
93	CONN- MI	92	1	Polyamide	Box	0.0001	0.013	0.015	0.005		75.6	0	0
94	HEATER- A	92	1	Copper All	Flat Plate	0.0033	0.053	0.053			75.5	0	0
95	Thermistor	92	3	Lead Elem	Cylinder	0.0001	0.002	0.044			75.6	0	0
96	WIRE- 30 A	92	1	Copper All	Cylinder	0.0054	0.002	0.269			75.4	0	0
97	LWIR SUB	67	1	Aluminum	Box	0.2508	0.058	0.106	0.041		75.4	0	0
98	CAMERA M	97	1	Aluminum	Box	0.0844	0.053	0.058	0.041		75	0	0
99	PCA- BREA	97	1	Fiberglass	Box	0.0059	0.037	0.053	0.019		75.3	0	0
100	THERMAL	97	1	Copper All	Box	0.068	0.026	0.095	0.006		74.3	0	0
101	SPACER- B	97	4	Fiberglass	Cylinder	0.0001	0.004	0.007			75.3	0	0
102	DOWEL RO	97	2	Titanium (	Cylinder	0.0001	0.003	0.004			75.1	0	0
103	CLAMP- BR	97	1	Aluminum	Box	0.0027	0.009	0.032	0.006		75.3	0	0
104	CAMERA- B	97	1	Aluminum	Box	0.0137	0.021	0.021	0.012		75	0	0
105	SHCS- 4-40	97	3	Steel A-28	Cylinder	0.0005	0.003	0.011			75	0	0
106	SHIM- LEN	97	1	Aluminum	Cylinder	0.0036	0.041	0.013			75.3	0	0
107	PIN- LENS-	97	2	Stainless S	Cylinder	0.0005	0.003	0.013			75	0	0
108	LENS- BOS	97	1	Aluminum	Cylinder	0.0494	0.041	0.04			74.8	0	0
109	SHCS- 4-40	97	4	Steel A-28	Cylinder	0.0005	0.004	0.008			75	0	0
110	SHCS- 2-56	97	5	Steel A-28	Cylinder	0.0005	0.004	0.006			74.9	0	0
111	SHCS- M1.	97	8	Steel A-28	Cylinder	0.0005	0.003	0.011			75	0	0
112	CABLE- LW	97	1	Copper All	Cylinder	0.0045	0.007	0.015			74.5	0	0
113	CONN- PLU	112	1	Copper All	Cylinder	0.00225	0.006	0.015			74	0	0
114	CONN- PLU	112	1	Copper All	Cylinder	0.00225	0.006	0.015			74	0	0
115	CABLE- LW	97	1	Copper All	Cylinder	0.007	0.025	0.254			75.4	0	0
116	CONN- MI	115	1	Polyamid	Box	0.0001	0.013	0.015	0.005		75.4	0	0

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117	HEATER- L	115	2	Copper All	Flat Plate	0.0005	0.025	0.038			75.4	0	0
118	SENSOR- T	115	2	Macor Cer	Box	0.0005	0.008	0.009	0.004		75.2	0	0
119	WIRE- 30 A	115	1	Copper All	Cylinder	0.0049	0.002	0.254			75.2	0	0
120	SUB ASSEM	67	1	Aluminum	Box	0.4934	0.073	0.136	0.067		75.3	0	0
121	CAMERA M	120	1	Aluminum	Box	0.1379	0.067	0.071	0.06		74.8	0	0
122	PCA- BREA	120	1	Fiberglass	Box	0.0083	0.024	0.047	0.019		75	0	0
123	SHIM- MW	120	1	Aluminum	Box	0.0064	0.044	0.061	0.001		75.2	0	0
124	CAMERA-	120	1	Aluminum	Box	0.2177	0.061	0.074	0.045		74.5	0	0
125	SHCS- 4-40	120	12	Steel A-28	Cylinder	0.0005	0.003	0.011			74.9	0	0
126	MWIR LEN	120	1	Aluminum	Cylinder	0.1053	0.062	0.052			74.6	0	0
127	SHCS- 0-80	120	4	Stainless S	Cylinder	0.0005	0.003	0.01			74.8	0	0
128	CABLE- CR	120	1	Copper All	Cylinder	0.0033	0.003	0.076			75	0	0
129	CONN- HO	128	2	Polyamide	Flat Plate	0.0001	0.01	0.01			75	0	0
130	CONN- SO	128	4	Polyamide	Flat Plate	0.0001	0.01	0.01			75	0	0
131	WIRE- STR	128	1	Copper All	Cylinder	0.0014	0.002	0.076			74.9	0	0
132	WIRE- STR	128	1	Copper All	Cylinder	0.0013	0.002	0.076			74.9	0	0
133	CABLE- M	120	1	Copper All	Cylinder	0.0065	0.025	0.254			75.3	0	0
134	CONN- MI	133	1	Polyamide	Box	0.0001	0.013	0.015	0.005		75.3	0	0
135	HEATER- M	133	1	Copper All	Flat Plate	0.0005	0.025	0.051			75.2	0	0
136	SENSOR- T	133	2	Macor Cer	Box	0.0005	0.008	0.009	0.004		75	0	0
137	WIRE- 30 A	133	1	Copper All	Cylinder	0.0049	0.002	0.254			75.1	0	0
138	SUB ASSEM	67	1	Aluminum	Box	0.2024	0.063	0.09	0.042		75.5	0	0
139	CAMERA M	138	1	Aluminum	Box	0.0186	0.04	0.049	0.023		75.3	0	0
140	CAMERA M	138	1	Aluminum	Box	0.0195	0.04	0.049	0.027		75.3	0	0
141	PCA- BREA	138	1	Fiberglass	Box	0.0084	0.038	0.038	0.018		75.2	0	0
142	SHCS- M2	138	4	Steel A-28	Cylinder	0.0005	0.004	0.007			75	0	0

143	TAU 1202	138	1	Aluminum	Box	0.0942	0.038	0.046	0.038		74.8	0	0
144	SWIR LENS	138	1	Aluminum	Cylinder	0.0521	0.033	0.033			74.6	0	0
145	SHCS- M1.	138	2	Steel A-28	Cylinder	0.0005	0.004	0.005			74.9	0	0
146	PHCS- PHIL	138	2	Stainless S	Cylinder	0.0005	0.002	0.021			75.1	0	0
147	SPACER- 1/	138	2	Stainless S	Cylinder	0.0005	0.004	0.005			74.8	0	0
148	CABLE- TEC	138	1	Copper All	Cylinder	0.0046	0.013	0.056			75.3	0	0
149	CABLE- TEC	148	1	Copper All	Cylinder	0.0038	0.013	0.056			75.1	0	0
150	CONN- HO	148	1	Polyamide	Flat Plate	0.0001	0.01	0.01			75.3	0	0
151	CONN- SO	148	2	Polyamide	Flat Plate	0.0001	0.01	0.01			75.3	0	0
152	CABLE- SW	148	1	Copper All	Cylinder	0.0005	0.003	0.044			75.2	0	0
153	CONN- MI	152	1	Polyamide	Box	0.0001	0.005	0.013	0.003		75.2	0	0
154	SENSOR- T	152	1	Lead Elem	Cylinder	0.0001	0.002	0.044			75.2	0	0
155	WIRE- 30 A	152	1	Copper All	Cylinder	0.0003	0.002	0.025			75.1	0	0
156	SUB ASSEM	67	1	Aluminum	Box	0.1321	0.062	0.098	0.042		75.7	0	0
157	CAMERA M	156	1	Aluminum	Box	0.019	0.039	0.048	0.027		75.6	0	0
158	CAMERA M	156	1	Aluminum	Box	0.018	0.039	0.048	0.023		75.6	0	0
159	VISIBLE CA	156	1	Aluminum	Box	0.092	0.037	0.098	0.037		75.4	0	0
160	SHCS- M3	156	6	Steel A-28	Cylinder	0.0005	0.004	0.007			75.3	0	0
161	CABLE- VIS	156	1	Copper All	Cylinder	0.0001	0.003	0.044			75.7	0	0
162	CONN- MI	161	1	Polyamide	Box	0.00003	0.005	0.013	0.003		75.7	0	0
163	SENSOR- T	161	1	Lead Elem	Cylinder	0.00003	0.002	0.044			75.7	0	0
164	WIRE- 30 A	161	1	Copper All	Cylinder	0.00004	0.001	0.028			75.7	0	0
165	CABLE- MO	67	1	Copper All	Cylinder	0.2391	0.008	0.533			74.7	0	0
166	CONN- MI	165	1	Polyamide	Box	0.0001	0.005	0.013	0.003		74.7	0	0
167	WIRE- 30 A	165	1	Copper All	Cylinder	0.0107	0.002	0.533			74.5	0	0
168	ASSY- MOT	165	1	Aluminum	Cylinder	0.2283	0.04	0.09			73.3	0	0
169	PLATE- EN	168	1	Polyamide	Cylinder	0.0005	0.012	0.004			73.2	0	0
170	MOTOR- S	168	1	Aluminum	Cylinder	0.2267	0.04	0.08			71.8	0	0
171	FHMS- PHI	168	1	Stainless S	Cylinder	0.0002	0.003	0.005			73	0	0
172	CODEWHE	168	1	Fiberglass	Cylinder	0.0009	0.028	0.009			73.3	0	0
173	BENCH- OP	67	1	Aluminum	Box	0.4377	0.127	0.206	0.01		75.4	0	0
174	BACKER- B	67	1	Aluminum	Box	0.3561	0.165	0.206	0.01		75.6	0	0
175	BAFFLE- IN	67	1	Aluminum	Box	0.1846	0.068	0.206	0.021		75.7	0	0
176	SHIM- VIS	67	1	Aluminum	Box	0.0231	0.051	0.063	0.003		75.9	0	0
177	SHIM- VISI	176	1	Aluminum	Box	0.0231	0.051	0.063	0.003		75.7	0	0
178	SHIM- SWI	67	1	Aluminum	Box	0.0177	0.051	0.063	0.003		76	0	0
179	SHIM- SWI	178	1	Aluminum	Box	0.0177	0.051	0.063	0.003		75.8	0	0
180	SHIM- MW	67	1	Aluminum	Box	0.0286	0.06	0.071	0.003		75.9	0	0
181	SHIM- MW	180	1	Aluminum	Box	0.0286	0.06	0.071	0.003		75.7	0	0
182	SHIM- LWI	67	1	Aluminum	Box	0.0209	0.053	0.058	0.003		75.9	0	0
183	SHIM- BOS	182	1	Aluminum	Box	0.0209	0.053	0.058	0.003		75.7	0	0
184	MOUNT- M	67	1	Aluminum	Box	0.01	0.028	0.062	0.007		75.8	0	0
185	WASHER-	67	16	Fiberglass	Cylinder	0.0001	0.013	0.004			76.1	0	0
186	STANDOFF	67	4	Fiberglass	Cylinder	0.0018	0.013	0.028			75.9	0	0
187	HOOK- MLI	67	2	FRCI-12 (sh	Box	0.001	0.016	0.024	0.013		76	0	0
188	HOOK- MLI	67	2	Fiberglass	Box	0.0027	0.016	0.024	0.013		75.9	0	0
189	MOUNT- E	67	1	Aluminum	Box	0.0132	0.019	0.041	0.013		75.6	0	0
190	MOUNT- E	67	1	Aluminum	Box	0.015	0.019	0.041	0.011		75.5	0	0
191	BLANKET-	67	1	MLI	Box	0.0032	0.104	0.203	0.006		76.1	0	0
192	BLANKET-	67	1	MLI	Box	0.0045	0.168	0.203	0.006		76.1	0	0
193	DOWEL PIN	67	12	Stainless S	Cylinder	0.0003	0.002	0.013			75.7	0	0
194	SHCS 6-32	67	15	Steel A-28	Cylinder	0.0012	0.004	0.016			75.6	0	0
195	SHCS- 6-32	67	6	Steel A-28	Cylinder	0.0017	0.004	0.023			75.6	0	0
196	SHCS- 5-40	67	4	Steel AISI 3	Cylinder	0.0008	0.004	0.012			75.7	0	0
197	SHCS- 6-32	67	8	Steel A-28	Cylinder	0.0012	0.004	0.015			75.5	0	0
198	SHCS- 6-32	67	4	Steel A-28	Cylinder	0.0009	0.004	0.011			75.6	0	0
199	SHCS- 2-56	67	2	Steel A-28	Cylinder	0.0003	0.003	0.009			75.8	0	0
200	SHCS- 4-40	67	2	Steel A-28	Cylinder	0.0011	0.003	0.022			75.6	0	0
201	MACHINE	67	1	Stainless S	Box	0.0002	0.003	0.006	0.002		75.8	0	0
202	CBL TIE MN	67	3	Teflon	Box	0.0009	0.011	0.016	0.007		76.1	0	0
203	RETAINING	67	16	Stainless S	Cylinder	0.0001	0.01	0.003			76	0	0
204	CABLE- EN	67	1	Copper	Cylinder	0.007	0.025	0.064			76	0	0

				All									
205	CONN- MI	204	1	Polyamide	Box	0.0001	0.01	0.013	0.003		75.9	0	0
206	ENCODER	204	2	Fiberglass	Cylinder	0.00085	0.025	0.008			75.9	0	0
207	WIRE- 28 A	204	1	Copper	Cylinder	0.0013	0.002	0.064			75.8	0	0
				All									
208	WIRE- 28 A	204	1	Copper	Cylinder	0.0013	0.002	0.064			75.8	0	0
				All									
209	WIRE- 28 A	204	1	Copper	Cylinder	0.0013	0.002	0.064			75.8	0	0
				All									
210	WIRE- 28 A	204	1	Copper	Cylinder	0.0013	0.002	0.064			75.8	0	0
				All									
211	CABLE- OP	67	1	Copper	Cylinder	0.0265	0.076	0.508			76.1	0	0
				All									
212	CONN- MI	211	1	Polyamide	Box	0.0001	0.013	0.021	0.003		76.1	0	0
213	OPTICS BE	211	2	Copper	Flat Plate	0.0009	0.025	0.076			76.1	0	0
				All									
214	SENSOR- T	211	2	Lead Elem	Cylinder	0.0001	0.002	0.044			76.1	0	0

215	WIRE- 30 A	211	1	Copper All	Cylinder	0.0101	0.002	0.508			75.9	0	0
216	WIRE- 26 A	211	1	Copper All	Cylinder	0.0143	0.002	0.508			75.8	0	0
217	CABLE- OP	67	1	Copper All	Cylinder	0.0119	0.012	0.587			76.1	0	0
218	CONN- MI	217	1	Polyamide	Box	0.0001	0.012	0.013	0.003		76.1	0	0
219	SENSOR- T	217	1	Lead Elem	Cylinder	0.0001	0.002	0.044			76.1	0	0
220	WIRE- 30 A	217	1	Copper All	Cylinder	0.0117	0.002	0.587			75.9	0	0
221	CABLE- SEN	67	1	Copper All	Cylinder	0.001	0.006	0.051			76	0	0
222	CONN- MI	221	1	Polyamide	Box	0.0001	0.006	0.013	0.003		76	0	0
223	SENSOR- T	221	1	Lead Elem	Cylinder	0.0001	0.002	0.044			76	0	0
224	WIRE- 30 A	221	1	Copper All	Cylinder	0.0008	0.002	0.051			75.9	0	0
225	ASSY- FRO	1	1	Aluminum	Box	0.0953	0.052	0.188	0.016		77.7	0	0
226	FRONT- M	225	1	Aluminum	Box	0.0725	0.052	0.188	0.003		77.4	0	0
227	SPACER- 1/	225	2	Stainless S	Cylinder	0.0001	0.003	0.002			77.3	0	0
228	SHCS- 2-56	225	2	Steel A-28	Cylinder	0.0003	0.003	0.007			77.3	0	0
229	CABLE- PE	225	1	Copper All	Cylinder	0.022	0.084	0.533			77.7	0	0
230	CONN- RCP	229	1	Polyamide	Box	0.0004	0.013	0.018	0.009		77.7	0	0
231	CONN- SO	229	4	Copper All	Cylinder	0.00005	0.002	0.002			77.5	0	0
232	HEATER- S	229	1	Copper All	Flat Plate	0.0009	0.032	0.084			77.7	0	0
233	THERMAL	229	1	Aluminum	Cylinder	0.0054	0.018	0.008			76.6	0	0
234	WIRE- 26 A	229	1	Copper All	Cylinder	0.0151	0.002	0.533			77.4	0	0
235	SUB ASSEM	1	1	Aluminum	Box	0.2526	0.146	0.188	0.019		77.6	0	0
236	BAFFLE- LW	235	1	Aluminum	Box	0.0128	0.057	0.057	0.016		77.5	0	0
237	BAFFLE- M	235	1	Aluminum	Box	0.0105	0.051	0.051	0.016		77.5	0	0
238	BAFFLE- S	235	1	Aluminum	Box	0.0097	0.044	0.044	0.016		77.5	0	0
239	BAFFLE- VI	235	1	Aluminum	Box	0.0111	0.051	0.051	0.016		77.5	0	0
240	BAFFLE- EX	235	1	Aluminum	Box	0.1516	0.146	0.188	0.012		77.4	0	0
241	FHCS- PHIL	235	16	Stainless S	Cylinder	0.0001	0.002	0.006			77.3	0	0
242	CORD STO	235	1	Teflon	Cylinder	0.0032	0.002	0.556			77.6	0	0
243	SHCS- 4-40	235	2	Steel A-28	Cylinder	0.0002	0.003	0.011			77.4	0	0
244	CABLE- TIN	235	1	Copper All	Cylinder	0.043	0.025	0.485			77.4	0	0
245	CONN- RCP	244	1	Polyamide	Box	0.0004	0.009	0.013	0.008		77.4	0	0
246	CONN- SO	244	4	Copper All	Cylinder	0.0001	0.013	0.004			77.4	0	0
247	WIRE- STR	244	1	Copper All	Cylinder	0.0136	0.002	0.485			77.1	0	0
248	WIRE- STR	244	1	Copper All	Cylinder	0.0136	0.002	0.485			77.1	0	0
249	ML50 Micr	244	1	Stainless S	Cylinder	0.015	0.025	0.017			75.5	0	0
250	CABLE- SEN	235	1	Copper All	Cylinder	0.0087	0.003	0.432			77.5	0	0
251	CONN- MI	250	1	Polyamide	Box	0.0001	0.003	0.013	0.003		77.4	0	0
252	SENSOR- T	250	1	Lead Elem	Cylinder	0.0001	0.002	0.044			77.5	0	0
253	WIRE- 30 A	250	1	Copper All	Cylinder	0.0085	0.002	0.432			77.3	0	0
254	SUB ASSEM	1	1	Aluminum	Box	0.2339	0.147	0.188	0.008		77.6	0	0
255	SUB ASSEM	254	2	Aluminum	Box	0.0065	0.016	0.034	0.008		77.2	0	0
256	HINGE- MO	255	1	Aluminum	Box	0.0026	0.01	0.024	0.008		76.8	0	0
257	HINGE- CO	255	1	Aluminum	Box	0.0022	0.01	0.034	0.003		76.9	0	0

258	BUSHING-	255	2	Teflon	Cylinder	0.00005	0.006	0.002		77.1	0	0
259	MICRO SPR	255	1	Stainless S	Cylinder	0.0001	0.002	0.004		76.8	0	0
260	TORSION S	255	1	Stainless S	Cylinder	0.0005	0.005	0.007		76.6	0	0
261	SHLDR SCR	255	1	Stainless S	Cylinder	0.0009	0.003	0.016		76.4	0	0
262	CORD STO	255	1	Teflon	Cylinder	0.0001	0.004	0.004		77.1	0	0
263	SUB-ASSE	254	2	Aluminum	Box	0.007	0.022	0.034	0.008	77.2	0	0
264	HINGE- MO	263	1	Aluminum	Box	0.0027	0.013	0.022	0.008	76.9	0	0
265	HINGE- CO	263	1	Aluminum	Box	0.0027	0.01	0.034	0.003	76.9	0	0
266	BUSHING-	263	2	Teflon	Cylinder	0.00005	0.006	0.002		77.2	0	0
267	MICRO SPR	263	1	Stainless S	Cylinder	0.0001	0.002	0.004		76.8	0	0
268	TORSION S	263	1	Stainless S	Cylinder	0.0005	0.005	0.007		76.7	0	0
269	SHLDR SCR	263	1	Stainless S	Cylinder	0.0008	0.003	0.016		76.5	0	0
270	CORD STO	263	1	Teflon	Cylinder	0.0001	0.004	0.004		77.2	0	0
271	DEPLOYAB	254	1	Aluminum	Box	0.1637	0.147	0.188	0.005	77.3	0	0
272	SHCS- 2-56	254	8	Steel A-28	Cylinder	0.0054	0.014	0.005		75.9	0	0
273	BUS- PUM	1	1	Aluminum	Box	10.8947	0.226	0.366	0.226	70.6	0	0
274	703-02409	273	1	Aluminum	Box	0.018	0.034	0.063	0.01	70.4	0	0
275	703-02330	273	1	Aluminum	Box	0.414	0.239	0.365	0.007	69.9	0	0
276	703-02331	273	1	Aluminum	Box	0.354	0.222	0.348	0.007	70.3	0	0
277	703-02332	273	1	Aluminum	Box	0.434	0.198	0.348	0.012	70.3	0	0
278	703-02333	273	1	Aluminum	Box	0.418	0.198	0.348	0.012	70.3	0	0
279	703-02335	273	1	Aluminum	Box	0.124	0.198	0.198	0.011	70.5	0	0
280	703-02334	273	1	Aluminum	Box	0.4499	0.198	0.206	0.01	70	0	0
281	McMaster	273	2	Steel A-28	Cylinder	0.0015	0.008	0.006		70	0	0
282	Fastener S	273	30	Steel A-28	Cylinder	0.0006	0.006	0.012		70.4	0	0
283	Fastener S	273	26	Steel A-28	Cylinder	0.0004	0.006	0.008		70.4	0	0
284	EWS Radia	273	1	Aluminum	Box	0.1172	0.056	0.206	0.01	70.3	0	0
285	EWS Radia	273	1	Aluminum	Box	0.1172	0.056	0.206	0.01	70.3	0	0
286	EWS Radia	273	1	Aluminum	Box	0.0634	0.025	0.185	0.007	70.3	0	0

287	EWS Radia	273	1	Aluminum	Box	0.032	0.025	0.185	0.007		70.4	0	0
288	703-01485	273	3	Aluminum	Box	0.0272	0.082	0.082	0.002		70.5	0	0
289	Fastener S	273	4	Steel A-28	Cylinder	0.0002	0.005	0.004			70.4	0	0
290	M2.5x3.4 U	273	16	Steel A-28	Cylinder	0.0002	0.005	0.003			70.4	0	0
291	EWS SAP A	273	1	Aluminum	Box	0.0213	0.082	0.082	0.002		70.5	0	0
292	SUPERNOV	273	2	Aluminum	Box	0.0284	0.082	0.082	0.002		70.4	0	0
293	Solar Mech	273	1	Aluminum	Box	0.3204	0.214	0.353	0.02		70.4	0	0
294	DASA Gear	293	2	Aluminum	Box	0.0173	0.088	0.127	0.02		70.3	0	0
295	703-0xxxx	293	1	Aluminum	Box	0.171	0.088	0.127	0.02		69.3	0	0
296	710-01757	293	1	Fiberglass	Box	0.0124	0.081	0.102	0.003		70.3	0	0
297	DASA Pin-P	293	1	Aluminum	Cylinder	0.0346	0.032	0.032			69.1	0	0
298	DASA Mot	293	2	Fiberglass	Box	0.0185	0.04	0.074	0.011		70.1	0	0
299	Tri-Lobe Li	293	1	Titanium (	Box	0.0013	0.008	0.024	0.004		70	0	0
300	DASA Pane	293	1	Aluminum	Box	0.0083	0.015	0.02	0.011		70.1	0	0
301	DASA Gear	293	1	Aluminum	Box	0.0212	0.027	0.047	0.02		69.9	0	0
302	DASA Tripl	273	2	Fiberglass	Box	0.787	0.214	0.353	0.011		69.2	0	0
303	SpectroLab	302	63	Germaniu	Box	0.0036	0.04	0.068	0.001		69.1	0	0
304	705-01742	302	1	Fiberglass	Box	0.187	0.214	0.353	0.002		68.9	0	0
305	705-01743	302	2	Fiberglass	Box	0.1496	0.214	0.331	0.002		68.9	0	0
306	703-01184	302	2	Aluminum	Box	0.0015	0.006	0.023	0.005		69	0	0
307	703-01183	302	2	Aluminum	Box	0.0015	0.006	0.023	0.005		69	0	0
308	703-01718	302	1	Aluminum	Box	0.0058	0.012	0.087	0.011		69.1	0	0
309	703-01717	302	1	Aluminum	Box	0.0058	0.012	0.087	0.011		69.1	0	0
310	703-01188	302	4	Steel A-28	Box	0.0005	0.006	0.008	0.002		68.9	0	0
311	703-01716	302	2	Aluminum	Box	0.0031	0.021	0.067	0.001		69.1	0	0
312	703-01823	302	2	Aluminum	Box	0.0015	0.011	0.061	0.01		69.1	0	0
313	McMaster	302	8	Steel A-28	Cylinder	0.0002	0.004	0.006			69.1	0	0
314	703-01221	302	36	Polyamide	Cylinder	0.0001	0.005	0.004			69.2	0	0
315	703-01821	302	2	Aluminum	Box	0.0007	0.01	0.015	0.004		69.1	0	0
316	703-01196	302	2	Aluminum	Box	0.0002	0.005	0.015	0.001		69.1	0	0
317	McMaster	302	4	Steel A-28	Cylinder	0.0001	0.004	0.004			69.1	0	0
318	McMaster	302	2	Steel AISI 3	Cylinder	0.0005	0.003	0.01			68.8	0	0
319	McMaster	302	2	Steel A-28	Cylinder	0.0002	0.004	0.003			68.9	0	0
320	Locking Sid	302	4	Aluminum	Box	0.0089	0.018	0.073	0.006		68.9	0	0
321	McMaster	302	8	Steel A-28	Cylinder	0.0001	0.004	0.005			69.1	0	0
322	Hyperion i	273	1	Aluminum	Box	1.5889	0.095	0.096	0.066		67.6	0	0
323	Hyperion S	273	1	Aluminum	Cylinder	0.055	0.031	0.061			70.1	0	0
324	703-02341	273	1	Aluminum	Box	0.047	0.039	0.054	0.033		70.3	0	0
325	SUPERNOV	273	1	Aluminum	Box	0.0382	0.1	0.1	0.006		70.5	0	0
326	703-02351	273	1	Aluminum	Box	0.0567	0.1	0.1	0.027		70.4	0	0
327	703-02350	273	1	Aluminum	Box	0.07	0.1	0.1	0.006		70.3	0	0
328	710-00908	273	1	Fiberglass	Box	0.109	0.09	0.096	0.016		69.7	0	0
329	710-01725	273	1	Fiberglass	Box	0.2	0.09	0.096	0.02		69	0	0

330	710-01362	273	1	Fiberglass	Box	0.095	0.09	0.096	0.019		69.8	0	0
331	710-01390	273	1	Fiberglass	Box	0.107	0.09	0.096	0.017		69.7	0	0
332	710-01391	273	1	Fiberglass	Box	0.043	0.09	0.096	0.015		70.2	0	0
333	629-00876	273	4	Aluminum	Cylinder	0.0001	0.006	0.002			70.5	0	0
334	629-00876	273	8	Aluminum	Cylinder	0.0009	0.007	0.016			70.5	0	0
335	703-0xxxxx	273	4	Aluminum	Cylinder	0.001	0.007	0.015			70.5	0	0
336	634-00909	273	4	Aluminum	Cylinder	0.0004	0.006	0.007			70.5	0	0
337	703-01901	273	1	Aluminum	Box	0.0353	0.1	0.1	0.006		70.4	0	0
338	Helicoil M3	273	12	Steel AISI 3	Cylinder	0.0002	0.003	0.005			70.3	0	0
339	McMaster	273	4	Steel A-28	Cylinder	0.0012	0.006	0.025			70.4	0	0
340	Fastener S	273	6	Steel A-28	Cylinder	0.0008	0.006	0.016			70.4	0	0
341	710-01848	273	1	Fiberglass	Box	0.0558	0.09	0.096	0.017		70.1	0	0
342	IQ Wireles	273	1	Aluminum	Box	0.1734	0.065	0.09	0.025		70	0	0
343	710-02113	273	1	Fiberglass	Box	0.0212	0.025	0.062	0.022		70.2	0	0
344	710-02404	273	1	Fiberglass	Box	0.028	0.025	0.087	0.024		70.2	0	0
345	710-02375	273	1	Aluminum	Box	0.0104	0.022	0.057	0.007		70.4	0	0
346	EWS PDB	273	1	Fiberglass	Box	0.0282	0.092	0.095	0.008		70.4	0	0
347	710-01552	273	2	Aluminum	Box	0.502	0.089	0.093	0.044		69.4	0	0
348	703-02379	273	1	Aluminum	Box	0.152	0.104	0.205	0.014		70.3	0	0
349	703-02309	273	1	Aluminum	Box	0.0267	0.017	0.101	0.011		70.4	0	0
350	703-02307	273	1	Aluminum	Box	0.0267	0.017	0.101	0.011		70.4	0	0
351	703-02321	273	1	Aluminum	Box	0.105	0.056	0.172	0.01		70.3	0	0
352	Antcom L1	273	1	Aluminum	Box	0.0468	0.04	0.04	0.011		70.1	0	0
353	NSL Simple	273	1	Fiberglass	Box	0.015	0.026	0.045	0.007		70.1	0	0
354	MPT4.2C A	273	1	Aluminum	Box	2.1	0.142	0.191	0.067		68.6	0	0
355	RADIATOR	1	1	Aluminum	Box	0.2989	0.187	0.187	0.004		77.5	0	0
356	RADIATOR	1	1	Aluminum	Box	0.2989	0.187	0.187	0.004		77.5	0	0
357	RADIATOR	1	1	Aluminum	Box	0.3397	0.187	0.187	0.008		77.5	0	0
358	RADIATOR	1	1	Aluminum	Box	0.2976	0.187	0.187	0.003		77.5	0	0

359	SPACER- B	1	8	Fiberglass	Cylinder	0.0003	0.01	0.004			77.9	0	0
360	SPACER- R	1	19	Fiberglass	Cylinder	0.0003	0.01	0.004			77.9	0	0
361	WASHER- R	1	27	Fiberglass	Cylinder	0.0001	0.01	0.003			78	0	0
362	SPACER- R	1	8	Aluminum	Cylinder	0.0005	0.01	0.012			78	0	0
363	FMS- 6-32	1	32	Steel A-28	Cylinder	0.0077	0.009	0.015			76	0	0
364	FMS- 6-32	1	27	Steel A-28	Cylinder	0.0077	0.009	0.015			76	0	0
365	FMS- 6-32	1	13	Steel A-28	Cylinder	0.0077	0.009	0.016			76.1	0	0
366	FMS- 4-40	1	21	Steel A-28	Cylinder	0.005	0.009	0.01			76.3	0	0
367	FHCS- 82 D	1	8	Stainless S	Cylinder	0.0077	0.01	0.013			75.5	0	0
368	SHCS- M2	1	8	Steel A-28	Cylinder	0.0064	0.01	0.01			76	0	0
369	FMS- 6-32	1	10	Steel A-28	Cylinder	0.0041	0.007	0.013			76.5	0	0
370	SHCS- M2	1	4	Steel A-28	Cylinder	0.0059	0.01	0.01			76.2	0	0
371	FHCS- HEX-	1	12	Steel A-28	Cylinder	0.0041	0.007	0.013			76.5	0	0
372	CABLE- SPA	1	1	Copper All	Cylinder	0.0032	0.023	0.198			78	0	0
373	CABLE- PO	1	1	Copper All	Cylinder	0.1104	0.009	0.196			76.2	0	0
374	CONN- D-S	373	1	Copper All	Box	0.0009	0.006	0.006	0.006		75.8	0	0
375	CONN- RCP	373	3	Copper All	Cylinder	0.0001	0.003	0.002			76	0	0
376	CONN SOC	373	30	Copper All	Cylinder	0.0001	0.003	0.002			76	0	0
377	CONN- RCP	373	1	Copper All	Cylinder	0.0001	0.003	0.002			76	0	0
378	CONN- RCP	373	1	Copper All	Cylinder	0.0002	0.004	0.003			76	0	0
379	WIRE- 24 A	373	1	Copper All	Cylinder	0.0146	0.003	0.381			76	0	0
380	WIRE- 24 A	373	1	Copper All	Cylinder	0.052	0.003	1.382			76	0	0
381	WIRE- 24 A	373	1	Copper All	Cylinder	0.0146	0.003	0.381			76	0	0
382	WIRE- 24 A	373	1	Copper All	Cylinder	0.013	0.003	0.338			76	0	0
383	WIRE- 24 A	373	1	Copper All	Cylinder	0.0108	0.003	0.282			76	0	0
384	CABLE- SU	1	1	Copper All	Cylinder	0.0694	0.016	0.04			74.8	0	0
385	CONN- RCP	384	1	Copper All	Cylinder	0.0011	0.006	0.005			74.3	0	0
386	OPTICS BE	384	1	Polyamide	Box	0.0005	0.007	0.008	0.006		74.7	0	0
387	THERMAL	384	1	Aluminum	Cylinder	0.0054	0.02	0.007			74	0	0
388	WIRE- 24 A	384	1	Copper All	Cylinder	0.0312	0.003	0.813			74.6	0	0
389	WIRE- 24 A	384	1	Copper All	Cylinder	0.0312	0.003	0.813			74.6	0	0
390	CABLE- SEN	1	1	Aluminum	Box	0.0018	0.011	0.034	0.008		77.9	0	0
391	CABLE- CA	1	1	Aluminum	Box	0.0449	0.03	0.04	0.015		77.4	0	0
392	CONN- MI	391	2	Aluminum	Cylinder	0.0222	0.023	0.02			75.5	0	0
393	WIRE- 26 A	391	1	Copper All	Cylinder	0.0005	0.001	0.184			77.3	0	0
394	CABLE- CA	1	1	Copper All	Cylinder	0.0181	0.005	0.104			77.1	0	0
395	CABLE- RF-	1	1	Copper All	Cylinder	0.0072	0.003	0.24			77.8	0	0
396	CONN SMP	395	1	Copper All	Cylinder	0.0014	0.005	0.016			77.4	0	0
397	CONN- MM	395	1	Aluminum	Box	0.001	0.007	0.018	0.003		77.5	0	0
398	FLEXIBLE R	395	1	Copper All	Cylinder	0.0048	0.003	0.323			77.7	0	0
399	CABLE- RF-	1	1	Copper All	Cylinder	0.0107	0.008	0.472			77.9	0	0
400	CONN SMP	399	1	Copper All	Cylinder	0.0014	0.005	0.016			77.5	0	0
401	CONN SMA	399	1	Copper All	Cylinder	0.0023	0.008	0.029			77.7	0	0
402	FLEXIBLE R	399	1	Copper	Cylinder	0.007	0.003	0.472			77.8	0	0

403	CABLE- CA	1	1	All Aluminum	Box	0.0549	0.03	0.035	0.02		77.2	0	0
404	CONN- MI	403	2	Aluminum	Cylinder	0.02225	0.025	0.02			75.5	0	0
405	WIRE- 26 A	403	1	Copper	Cylinder	0.0104	0.003	0.165			76.8	0	0
406	CABLE- CA	1	1	All Aluminum	Box	0.0386	0.025	0.035	0.02		76.5	0	0
407	CONN- MI	406	2	Aluminum	Cylinder	0.01905	0.025	0.015			74.7	0	0
408	WIRE- 26 A	406	1	Copper	Cylinder	0.0005	0.001	0.104			76.4	0	0
409	CABLE- SC	1	1	All Copper	Cylinder	0.0009	0.001	0.19			77.9	0	0
410	CABLE- OM	1	1	All Copper	Cylinder	0.0098	0.002	0.419			77.8	0	0
411	CONN- 4 P	410	3	All Polyamide	Box	0.0004	0.006	0.012	0.004		77.7	0	0
412	CONN- SO	410	12	Copper	Cylinder	0.00045	0.004	0.005			77.4	0	0
413	CONN- MI	410	3	All Polyamide	Box	0.0001	0.005	0.013	0.003		77.7	0	0
414	WIRE- 2 CO	410	1	Copper	Cylinder	0.0029	0.001	1.321			77.7	0	0
415	CABLE- PU	1	1	All Copper	Cylinder	0.0076	0.002	0.267			77.7	0	0
416	CONN- MM	415	1	All Stainless S	Cylinder	0.0018	0.004	0.018			76.7	0	0
417	CONN- MC	415	1	Stainless S	Cylinder	0.0018	0.004	0.018			76.7	0	0
418	FLEXIBLE R	415	1	Copper	Cylinder	0.004	0.003	0.267			77.6	0	0
419	CABLE- SEN	1	1	All Copper	Cylinder	0.0144	0.004	0.21			77.6	0	0
420	CONN- MI	419	1	All Polyamide	Box	0.0001	0.003	0.013	0.003		77.6	0	0
421	SENSOR- T	419	1	Copper	Cylinder	0.0059	0.015	0.008			76.7	0	0
422	WIRE- STR	419	1	All Copper	Cylinder	0.0042	0.002	0.21			77.4	0	0
423	WIRE- STR	419	1	All Copper	Cylinder	0.0042	0.002	0.21			77.4	0	0
424	CABLE- SEN	1	1	All Copper	Cylinder	0.001	0.002	0.051			77.8	0	0
425	CONN- MI	424	1	All Polyamide	Box	0.0001	0.003	0.013	0.003		77.8	0	0
426	Thermistor	424	1	Lead Elem	Cylinder	0.0001	0.002	0.044			77.8	0	0
427	WIRE- STR	424	1	Copper	Cylinder	0.0008	0.002	0.051			77.6	0	0
428	CABLE- SEN	1	1	All Copper	Cylinder	0.001	0.002	0.051			77.8	0	0
429	CONN- MI	428	1	All Polyamide	Box	0.0001	0.003	0.013	0.003		77.8	0	0
430	Thermistor	428	1	Lead Elem	Cylinder	0.0001	0.002	0.044			77.8	0	0

431 WIRE- STR	428	1	Copper All	Cylinder	0.0008	0.002	0.051			77.6	0	0