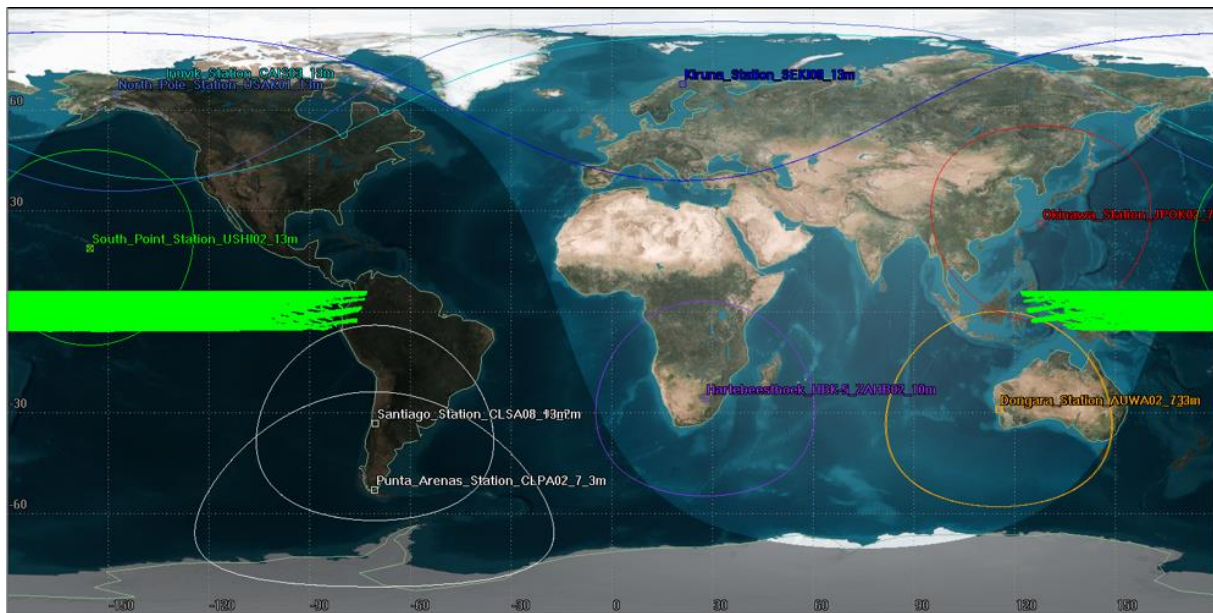


USN LEOP Support for H2SAT from Hawaii

H2SAT is a LEOP mission of OHB Germany. This spacecraft will explore and verify technical and scientific information of payload and platform technologies including high-performance multi-stage plasma thrusters for station keeping, multi-beam antenna, broadband telecommunications to provide high data rates for mobile users, and sensor acquisition.

Planned support from SSC is for a period of 180 days as it moves towards the GEO belt.



H2SAT typical coverage from Hawaii

The below analysis covers all possible visibilities from USN Hawaii. It is expected that a total of 273 passes from the below visibilities will be supported over 30 days.

	Downlink	Uplink
H2SAT	2285.973 MHz	2105 MHz

H2SAT

```
1 0U 2022000A 22347.87500000 0.00001625 00000+0 40347-3 0 12
2 0 6.0249 219.1059 7285108 177.9089 6.1302 2.27920488 17
```

H2SAT Possible Passes

Access	Start Time (UTCG)	Stop Time (UTCG)	Duration (sec)
1	3 Mar 2023 10:33:58.685	3 Mar 2023 15:12:46.934	16728.249
2	3 Mar 2023 17:10:19.892	3 Mar 2023 22:04:13.892	17634.000
3	4 Mar 2023 02:26:29.107	4 Mar 2023 02:37:55.032	685.926
4	4 Mar 2023 13:39:13.549	4 Mar 2023 23:35:59.276	35805.727
5	5 Mar 2023 10:29:46.322	5 Mar 2023 20:30:05.044	36018.721
6	6 Mar 2023 07:25:34.670	6 Mar 2023 17:15:43.945	35409.275
7	7 Mar 2023 15:30:27.228	8 Mar 2023 01:16:25.082	35157.855
8	8 Mar 2023 12:12:56.194	8 Mar 2023 22:12:40.464	35984.270
9	9 Mar 2023 09:06:12.859	9 Mar 2023 19:04:30.210	35897.351

10	10 Mar 2023 06:03:47.806	10 Mar 2023 06:20:23.185	995.379
11	10 Mar 2023 09:42:34.730	10 Mar 2023 15:40:42.561	21487.831
12	10 Mar 2023 17:43:41.963	10 Mar 2023 21:11:08.252	12446.289
13	11 Mar 2023 13:59:14.293	11 Mar 2023 23:53:41.635	35667.342
14	12 Mar 2023 10:47:57.340	12 Mar 2023 20:48:30.858	36033.518
15	13 Mar 2023 07:43:02.088	13 Mar 2023 17:36:36.141	35614.053
16	14 Mar 2023 10:52:10.565	14 Mar 2023 13:45:54.661	10424.096
17	14 Mar 2023 15:53:38.931	14 Mar 2023 22:24:11.169	23432.239
18	15 Mar 2023 01:05:11.917	15 Mar 2023 01:33:15.779	1683.862
19	15 Mar 2023 12:31:28.519	15 Mar 2023 22:30:08.512	35919.993
20	16 Mar 2023 09:23:34.058	16 Mar 2023 19:22:57.483	35963.424
21	17 Mar 2023 06:20:04.469	17 Mar 2023 07:00:36.974	2432.505
22	17 Mar 2023 08:42:10.774	17 Mar 2023 16:04:04.236	26513.462
23	17 Mar 2023 18:36:04.047	17 Mar 2023 20:01:45.511	5141.464
24	18 Mar 2023 14:18:52.485	19 Mar 2023 00:10:13.257	35480.771
25	19 Mar 2023 11:05:11.351	19 Mar 2023 21:05:32.617	36021.265
26	20 Mar 2023 07:59:23.003	20 Mar 2023 17:55:20.012	35757.010
27	21 Mar 2023 09:58:33.727	21 Mar 2023 14:20:33.275	15719.548
28	21 Mar 2023 16:17:52.956	21 Mar 2023 21:31:38.622	18825.666
29	22 Mar 2023 01:36:28.619	22 Mar 2023 01:48:18.686	710.067
30	22 Mar 2023 12:49:03.988	22 Mar 2023 22:46:15.022	35831.035
31	23 Mar 2023 09:39:48.810	23 Mar 2023 19:39:54.844	36006.034
32	24 Mar 2023 06:35:36.112	24 Mar 2023 16:24:29.261	35333.148
33	25 Mar 2023 14:38:13.276	26 Mar 2023 00:25:38.233	35244.957
34	26 Mar 2023 11:21:39.712	26 Mar 2023 21:21:32.763	35993.051
35	27 Mar 2023 08:14:59.409	27 Mar 2023 18:12:40.990	35861.580
36	28 Mar 2023 05:12:41.728	28 Mar 2023 05:26:05.652	803.924
37	28 Mar 2023 09:10:26.479	28 Mar 2023 14:46:20.728	20154.249
38	28 Mar 2023 16:45:13.759	28 Mar 2023 20:43:00.921	14267.162
39	29 Mar 2023 13:06:13.886	29 Mar 2023 23:01:26.088	35712.202
40	30 Mar 2023 09:55:19.593	30 Mar 2023 19:55:42.000	36022.407
41	31 Mar 2023 06:50:19.668	31 Mar 2023 16:42:36.845	35537.177
42	1 Apr 2023 10:28:45.381	1 Apr 2023 12:40:22.459	7897.078
43	1 Apr 2023 14:57:40.225	1 Apr 2023 21:58:18.565	25238.340
44	2 Apr 2023 00:05:12.657	2 Apr 2023 00:39:49.373	2076.717
45	2 Apr 2023 11:37:14.187	2 Apr 2023 21:36:14.713	35940.526
46	3 Apr 2023 08:29:29.669	3 Apr 2023 18:28:21.702	35932.033
47	4 Apr 2023 05:26:02.055	4 Apr 2023 05:56:28.325	1826.270
48	4 Apr 2023 08:18:34.423	4 Apr 2023 15:07:18.586	24524.163
49	4 Apr 2023 17:20:22.515	4 Apr 2023 19:48:43.171	8900.656
50	5 Apr 2023 13:22:37.154	5 Apr 2023 23:15:19.352	35562.198
51	6 Apr 2023 10:09:47.005	6 Apr 2023 20:10:09.808	36022.803
52	7 Apr 2023 07:04:04.403	7 Apr 2023 16:58:54.785	35690.382
53	8 Apr 2023 09:32:36.668	8 Apr 2023 13:17:44.157	13507.489
54	8 Apr 2023 15:17:31.345	8 Apr 2023 21:05:07.343	20855.998
55	9 Apr 2023 00:37:09.501	9 Apr 2023 00:52:36.450	926.949
56	9 Apr 2023 11:52:04.559	9 Apr 2023 21:49:56.566	35872.006
57	10 Apr 2023 08:43:12.651	10 Apr 2023 18:42:53.128	35980.477
58	11 Apr 2023 05:38:59.609	11 Apr 2023 15:25:26.654	35187.045
59	12 Apr 2023 13:38:43.239	12 Apr 2023 23:28:15.339	35372.100
60	13 Apr 2023 10:23:29.526	13 Apr 2023 20:23:31.923	36002.398
61	14 Apr 2023 07:16:55.579	14 Apr 2023 17:13:33.303	35797.724
62	15 Apr 2023 04:15:04.992	15 Apr 2023 04:23:14.113	489.120
63	15 Apr 2023 08:46:30.808	15 Apr 2023 13:42:23.385	17752.577
64	15 Apr 2023 15:38:44.038	15 Apr 2023 20:19:30.297	16846.259
65	16 Apr 2023 12:06:03.321	16 Apr 2023 22:02:21.104	35777.783
66	17 Apr 2023 08:55:47.673	17 Apr 2023 18:55:53.451	36005.778
67	18 Apr 2023 05:50:51.554	18 Apr 2023 15:41:01.521	35409.967
68	19 Apr 2023 13:54:15.845	19 Apr 2023 21:52:52.462	28716.617
69	19 Apr 2023 22:40:55.650	19 Apr 2023 23:39:50.163	3534.513

70	20 Apr 2023 10:36:08.974	20 Apr 2023 20:35:38.723	35969.749
71	21 Apr 2023 07:28:45.801	21 Apr 2023 17:26:46.210	35880.409
72	22 Apr 2023 04:25:30.128	22 Apr 2023 04:45:34.538	1204.410
73	22 Apr 2023 08:01:24.984	22 Apr 2023 14:01:54.566	21629.582
74	22 Apr 2023 16:02:54.833	22 Apr 2023 19:33:54.229	12659.396
75	23 Apr 2023 12:19:25.310	23 Apr 2023 22:13:50.137	35664.827
76	24 Apr 2023 09:07:38.651	24 Apr 2023 19:07:54.743	36016.092
77	25 Apr 2023 06:02:02.354	25 Apr 2023 15:54:56.470	35574.116
78	26 Apr 2023 09:20:02.060	26 Apr 2023 11:59:14.832	9552.772
79	26 Apr 2023 14:09:56.592	26 Apr 2023 20:45:55.826	23759.234
80	26 Apr 2023 23:25:50.798	26 Apr 2023 23:50:24.588	1473.790
81	27 Apr 2023 10:48:06.103	27 Apr 2023 20:46:43.383	35917.280
82	28 Apr 2023 07:39:41.672	28 Apr 2023 17:38:35.661	35933.989
83	29 Apr 2023 04:35:30.790	29 Apr 2023 05:15:03.944	2373.153
84	29 Apr 2023 07:10:04.853	29 Apr 2023 14:17:49.995	25665.141
85	29 Apr 2023 16:36:09.276	29 Apr 2023 18:40:27.680	7458.403
86	30 Apr 2023 12:32:01.749	30 Apr 2023 22:24:03.900	35522.150
87	1 May 2023 09:18:23.119	1 May 2023 19:18:32.916	36009.797
88	2 May 2023 06:12:03.942	2 May 2023 16:07:01.429	35697.487
89	3 May 2023 08:31:45.179	3 May 2023 12:26:45.547	14100.367
90	3 May 2023 14:25:38.292	3 May 2023 20:00:22.894	20084.602
91	3 May 2023 23:48:12.059	3 May 2023 23:59:18.433	666.374
92	4 May 2023 10:59:03.209	4 May 2023 20:56:36.528	35853.319
93	5 May 2023 07:49:36.706	5 May 2023 17:49:10.320	35973.615
94	6 May 2023 04:44:48.935	6 May 2023 14:31:27.589	35198.654
95	7 May 2023 12:44:06.108	7 May 2023 22:33:19.750	35353.642
96	8 May 2023 09:28:21.155	8 May 2023 19:28:13.611	35992.456
97	9 May 2023 06:21:18.784	9 May 2023 16:17:48.602	35789.819
98	10 May 2023 03:18:24.821	10 May 2023 03:29:25.730	660.909
99	10 May 2023 07:49:52.074	10 May 2023 12:45:58.834	17766.760
100	10 May 2023 14:42:21.944	10 May 2023 19:18:57.516	16595.572
101	11 May 2023 11:09:17.854	11 May 2023 21:05:27.913	35770.059
102	12 May 2023 07:58:35.435	12 May 2023 17:58:28.026	35992.591
103	13 May 2023 04:53:06.151	13 May 2023 14:42:52.254	35386.103
104	14 May 2023 12:55:33.008	14 May 2023 20:47:03.257	28290.249
105	14 May 2023 21:49:12.652	14 May 2023 22:41:18.139	3125.487
106	15 May 2023 09:37:10.951	15 May 2023 19:36:32.267	35961.316
107	16 May 2023 06:29:20.719	16 May 2023 16:26:59.898	35859.179
108	17 May 2023 03:25:23.985	17 May 2023 03:46:24.512	1260.528
109	17 May 2023 07:08:39.931	17 May 2023 13:00:43.506	21123.575
110	17 May 2023 15:00:49.975	17 May 2023 18:37:14.424	12984.449
111	18 May 2023 11:18:34.027	18 May 2023 21:13:09.307	35675.280
112	19 May 2023 08:06:33.854	19 May 2023 18:06:37.931	36004.077
113	20 May 2023 05:00:32.015	20 May 2023 14:52:45.761	35533.745
114	21 May 2023 08:34:21.163	21 May 2023 10:50:09.705	8148.542
115	21 May 2023 13:06:44.046	21 May 2023 19:49:04.726	24140.680
116	21 May 2023 22:23:20.823	21 May 2023 22:48:18.997	1498.174
117	22 May 2023 09:45:17.966	22 May 2023 19:43:58.465	35920.499
118	23 May 2023 06:36:37.113	23 May 2023 16:35:05.774	35908.662
119	24 May 2023 03:31:55.352	24 May 2023 04:07:40.188	2144.836
120	24 May 2023 06:24:23.330	24 May 2023 13:12:35.045	24491.715
121	24 May 2023 15:24:51.319	24 May 2023 17:51:04.447	8773.128
122	25 May 2023 11:27:11.523	25 May 2023 21:19:50.330	35558.806
123	26 May 2023 08:13:35.616	26 May 2023 18:13:35.145	35999.529
124	27 May 2023 05:06:53.579	27 May 2023 15:00:56.422	35642.842
125	28 May 2023 07:47:43.273	28 May 2023 11:14:51.089	12427.817
126	28 May 2023 13:17:36.986	28 May 2023 19:06:57.458	20960.472
127	28 May 2023 22:40:18.678	28 May 2023 22:53:56.551	817.873
128	29 May 2023 09:52:18.366	29 May 2023 19:50:06.752	35868.386
129	30 May 2023 06:42:42.096	30 May 2023 16:41:46.827	35944.731

130	31 May 2023 03:37:26.155	31 May 2023 05:02:00.134	5073.979
131	31 May 2023 05:06:47.022	31 May 2023 13:22:06.390	29719.368
132	1 Jun 2023 11:34:54.490	1 Jun 2023 21:25:22.627	35428.137
133	2 Jun 2023 08:19:36.995	2 Jun 2023 18:19:27.439	35990.444
134	3 Jun 2023 05:12:20.356	3 Jun 2023 15:07:52.129	35731.774
135	4 Jun 2023 02:08:55.441	4 Jun 2023 02:18:19.282	563.841
136	4 Jun 2023 07:08:26.183	4 Jun 2023 11:30:57.350	15751.167
137	4 Jun 2023 13:28:38.441	4 Jun 2023 18:28:49.398	18010.957
138	4 Jun 2023 22:52:55.970	4 Jun 2023 22:57:57.028	301.058
139	5 Jun 2023 09:58:33.518	5 Jun 2023 19:55:21.459	35807.941
140	6 Jun 2023 06:47:58.302	6 Jun 2023 16:47:26.176	35967.874
141	7 Jun 2023 03:42:08.496	7 Jun 2023 13:29:48.512	35260.016
142	8 Jun 2023 11:42:01.148	8 Jun 2023 21:29:54.002	35272.854
143	9 Jun 2023 08:24:39.886	9 Jun 2023 18:24:08.170	35968.284
144	10 Jun 2023 05:16:40.072	10 Jun 2023 15:13:16.212	35796.141
145	11 Jun 2023 02:12:12.676	11 Jun 2023 02:28:49.645	996.969
146	11 Jun 2023 06:31:36.447	11 Jun 2023 11:42:10.737	18634.291
147	11 Jun 2023 13:40:06.626	11 Jun 2023 17:51:34.882	15088.256
148	12 Jun 2023 10:03:40.527	12 Jun 2023 19:59:17.554	35737.027
149	13 Jun 2023 06:52:00.733	13 Jun 2023 16:51:43.553	35982.820
150	14 Jun 2023 03:45:42.000	14 Jun 2023 13:35:46.314	35404.314
151	15 Jun 2023 11:48:17.920	15 Jun 2023 19:09:07.147	26449.227
152	15 Jun 2023 20:55:54.147	15 Jun 2023 21:33:17.194	2243.047
153	16 Jun 2023 08:28:43.751	16 Jun 2023 18:27:48.117	35944.366
154	17 Jun 2023 05:20:06.586	17 Jun 2023 15:17:36.699	35850.112
155	18 Jun 2023 02:15:04.118	18 Jun 2023 02:39:52.680	1488.562
156	18 Jun 2023 05:55:15.892	18 Jun 2023 11:50:41.511	21325.619
157	18 Jun 2023 13:53:11.006	18 Jun 2023 17:13:40.032	12029.026
158	19 Jun 2023 10:08:06.394	19 Jun 2023 20:02:23.691	35657.296
159	20 Jun 2023 06:55:16.088	20 Jun 2023 16:55:03.747	35987.658
160	21 Jun 2023 03:48:24.776	21 Jun 2023 13:40:18.864	35514.088
161	22 Jun 2023 07:26:49.637	22 Jun 2023 09:34:15.514	7645.878
162	22 Jun 2023 11:54:06.420	22 Jun 2023 18:25:58.901	23512.481
163	22 Jun 2023 21:12:22.402	22 Jun 2023 21:35:40.363	1397.961
164	23 Jun 2023 08:31:48.839	23 Jun 2023 18:30:18.265	35909.426
165	24 Jun 2023 05:22:25.710	24 Jun 2023 15:20:33.660	35887.950
166	25 Jun 2023 02:16:49.703	25 Jun 2023 02:53:14.811	2185.108
167	25 Jun 2023 05:16:42.450	25 Jun 2023 11:56:38.688	23996.239
168	25 Jun 2023 14:09:56.042	25 Jun 2023 16:31:52.724	8516.681
169	26 Jun 2023 10:11:26.091	26 Jun 2023 20:04:14.274	35568.183
170	27 Jun 2023 06:57:19.473	27 Jun 2023 16:57:07.410	35987.936
171	28 Jun 2023 03:49:59.310	28 Jun 2023 13:43:25.158	35605.848
172	29 Jun 2023 00:46:36.645	29 Jun 2023 00:51:04.189	267.544
173	29 Jun 2023 06:44:45.982	29 Jun 2023 09:52:28.584	11262.602
174	29 Jun 2023 11:59:13.100	29 Jun 2023 17:49:16.358	21003.258
175	29 Jun 2023 21:21:38.610	29 Jun 2023 21:36:53.490	914.880
176	30 Jun 2023 08:33:54.293	30 Jun 2023 18:31:48.132	35873.839
177	1 Jul 2023 05:23:49.741	1 Jul 2023 15:22:30.059	35920.318
178	2 Jul 2023 02:17:49.308	2 Jul 2023 03:14:47.922	3418.614
179	2 Jul 2023 04:30:13.005	2 Jul 2023 12:00:55.962	27042.957
180	2 Jul 2023 14:42:16.124	2 Jul 2023 15:34:37.375	3141.251
181	3 Jul 2023 10:14:02.312	3 Jul 2023 20:05:13.056	35470.743
182	4 Jul 2023 06:58:32.903	4 Jul 2023 16:58:14.014	35981.111
183	5 Jul 2023 03:50:40.323	5 Jul 2023 13:45:16.281	35675.958
184	6 Jul 2023 00:45:59.004	6 Jul 2023 00:55:48.268	589.264
185	6 Jul 2023 06:09:37.145	6 Jul 2023 10:02:45.929	13988.784
186	6 Jul 2023 12:04:01.829	6 Jul 2023 17:15:27.533	18685.704
187	6 Jul 2023 21:26:53.808	6 Jul 2023 21:37:05.320	611.512
188	7 Jul 2023 08:34:59.223	7 Jul 2023 18:32:07.832	35828.610
189	8 Jul 2023 05:24:04.325	8 Jul 2023 15:23:05.035	35940.710

190	9 Jul 2023 02:17:35.926	9 Jul 2023 12:03:16.325	35140.398
191	10 Jul 2023 10:15:31.079	10 Jul 2023 20:04:55.203	35364.124
192	11 Jul 2023 06:58:32.552	11 Jul 2023 16:58:04.807	35972.255
193	12 Jul 2023 03:50:11.818	12 Jul 2023 13:45:49.065	35737.247
194	13 Jul 2023 00:44:57.934	13 Jul 2023 00:59:04.560	846.626
195	13 Jul 2023 05:37:13.138	13 Jul 2023 10:09:10.324	16317.186
196	13 Jul 2023 12:08:23.603	13 Jul 2023 16:42:46.096	16462.493
197	13 Jul 2023 21:30:10.377	13 Jul 2023 21:35:58.732	348.355
198	14 Jul 2023 08:35:06.534	14 Jul 2023 18:31:30.935	35784.401
199	15 Jul 2023 05:23:26.649	15 Jul 2023 15:22:45.381	35958.732
200	16 Jul 2023 02:16:36.391	16 Jul 2023 12:04:22.561	35266.170
201	17 Jul 2023 10:16:20.897	17 Jul 2023 18:19:47.772	29006.875
202	17 Jul 2023 19:02:25.297	17 Jul 2023 20:03:48.719	3683.422
203	18 Jul 2023 06:57:43.910	18 Jul 2023 16:57:00.833	35956.924
204	19 Jul 2023 03:48:49.897	19 Jul 2023 13:45:12.723	35782.826
205	20 Jul 2023 00:43:03.629	20 Jul 2023 01:01:54.124	1130.495
206	20 Jul 2023 05:06:30.737	20 Jul 2023 10:12:34.826	18364.089
207	20 Jul 2023 12:12:52.700	20 Jul 2023 16:10:31.442	14258.742
208	20 Jul 2023 21:31:47.197	20 Jul 2023 21:33:24.685	97.489
209	21 Jul 2023 08:34:13.020	21 Jul 2023 18:29:44.956	35731.936
210	22 Jul 2023 05:21:39.788	22 Jul 2023 15:21:08.258	35968.470
211	23 Jul 2023 02:14:24.591	23 Jul 2023 12:03:52.051	35367.460
212	24 Jul 2023 10:16:05.085	24 Jul 2023 17:29:19.106	25994.022
213	24 Jul 2023 19:24:06.277	24 Jul 2023 20:01:28.116	2241.839
214	25 Jul 2023 06:55:43.317	25 Jul 2023 16:54:44.724	35941.407
215	26 Jul 2023 03:46:20.218	26 Jul 2023 13:43:24.438	35824.220
216	27 Jul 2023 00:40:14.639	27 Jul 2023 01:04:03.828	1429.189
217	27 Jul 2023 04:36:34.427	27 Jul 2023 10:13:56.985	20242.558
218	27 Jul 2023 12:17:27.696	27 Jul 2023 15:37:59.958	12032.262
219	28 Jul 2023 08:32:20.519	28 Jul 2023 18:27:01.751	35681.232
220	29 Jul 2023 05:18:58.767	29 Jul 2023 15:18:36.386	35977.619
221	30 Jul 2023 02:11:23.467	30 Jul 2023 12:02:16.305	35452.838
222	31 Jul 2023 06:26:41.448	31 Jul 2023 07:35:39.142	4137.694
223	31 Jul 2023 10:15:07.580	31 Jul 2023 16:53:54.808	23927.228
224	31 Jul 2023 19:30:32.462	31 Jul 2023 19:58:16.789	1664.327
225	1 Aug 2023 06:52:51.778	1 Aug 2023 16:51:32.910	35921.132
226	2 Aug 2023 03:42:55.208	2 Aug 2023 13:40:29.299	35854.091
227	3 Aug 2023 00:36:25.185	3 Aug 2023 01:06:15.647	1790.462
228	3 Aug 2023 04:06:56.579	3 Aug 2023 10:13:18.369	21981.790
229	3 Aug 2023 12:23:13.328	3 Aug 2023 15:04:18.340	9665.012
230	4 Aug 2023 08:29:25.209	4 Aug 2023 18:23:08.484	35623.275
231	5 Aug 2023 05:15:06.656	5 Aug 2023 15:14:46.723	35980.067
232	6 Aug 2023 02:07:07.714	6 Aug 2023 11:59:10.004	35522.289
233	6 Aug 2023 23:02:07.981	6 Aug 2023 23:06:48.922	280.941
234	7 Aug 2023 05:43:30.274	7 Aug 2023 07:52:35.916	7745.642
235	7 Aug 2023 10:13:02.445	7 Aug 2023 16:22:29.234	22166.789
236	7 Aug 2023 19:32:01.908	7 Aug 2023 19:53:50.131	1308.223
237	8 Aug 2023 06:48:46.903	8 Aug 2023 16:47:09.376	35902.473
238	9 Aug 2023 03:38:22.469	9 Aug 2023 13:36:25.740	35883.271
239	10 Aug 2023 00:31:38.474	10 Aug 2023 01:08:23.631	2205.157
240	10 Aug 2023 03:37:07.659	10 Aug 2023 10:11:12.004	23644.344
241	10 Aug 2023 12:31:16.179	10 Aug 2023 14:27:56.250	7000.071
242	11 Aug 2023 08:25:33.161	11 Aug 2023 18:18:21.658	35568.497
243	12 Aug 2023 05:10:23.776	12 Aug 2023 15:10:06.686	35982.910
244	13 Aug 2023 02:02:05.292	13 Aug 2023 11:55:06.428	35581.136
245	13 Aug 2023 22:56:26.961	13 Aug 2023 23:03:42.308	435.347
246	14 Aug 2023 05:11:05.920	14 Aug 2023 07:58:33.332	10047.412
247	14 Aug 2023 10:10:19.267	14 Aug 2023 15:53:45.226	20605.960
248	14 Aug 2023 19:30:38.351	14 Aug 2023 19:48:35.717	1077.366
249	15 Aug 2023 06:43:52.427	15 Aug 2023 16:41:51.359	35878.932

250	16 Aug 2023 03:32:54.608	16 Aug 2023 13:31:17.339	35902.731
251	17 Aug 2023 00:25:49.978	17 Aug 2023 01:11:47.018	2757.040
252	17 Aug 2023 03:06:00.932	17 Aug 2023 10:07:28.041	25287.109
253	17 Aug 2023 12:49:15.446	17 Aug 2023 13:41:23.133	3127.687
254	18 Aug 2023 08:20:37.478	18 Aug 2023 18:12:25.647	35508.169
255	19 Aug 2023 05:04:30.423	19 Aug 2023 15:04:11.649	35981.226
256	20 Aug 2023 01:55:50.181	20 Aug 2023 11:49:40.321	35630.140
257	20 Aug 2023 22:49:47.980	20 Aug 2023 22:59:05.737	557.757
258	21 Aug 2023 04:42:35.101	21 Aug 2023 07:59:40.479	11825.377
259	21 Aug 2023 10:06:28.248	21 Aug 2023 15:26:16.894	19188.646
260	21 Aug 2023 19:27:05.417	21 Aug 2023 19:42:07.808	902.391
261	22 Aug 2023 06:37:46.182	22 Aug 2023 16:35:24.354	35858.172
262	23 Aug 2023 03:26:20.651	23 Aug 2023 13:25:03.575	35922.924
263	24 Aug 2023 00:19:03.702	24 Aug 2023 01:17:41.210	3517.507
264	24 Aug 2023 02:32:01.515	24 Aug 2023 10:02:30.180	27028.665
265	25 Aug 2023 08:14:42.426	25 Aug 2023 18:05:34.664	35452.238
266	26 Aug 2023 04:57:44.120	26 Aug 2023 14:57:24.847	35980.728
267	27 Aug 2023 01:48:45.941	27 Aug 2023 11:43:18.104	35672.163
268	27 Aug 2023 22:42:25.370	27 Aug 2023 22:53:29.378	664.007
269	28 Aug 2023 04:16:47.788	28 Aug 2023 07:57:52.335	13264.547
270	28 Aug 2023 10:01:53.582	28 Aug 2023 15:00:20.377	17906.795
271	28 Aug 2023 19:21:49.782	28 Aug 2023 19:34:49.897	780.114
272	29 Aug 2023 06:30:47.612	29 Aug 2023 16:28:01.455	35833.843
273	30 Aug 2023 03:18:49.850	30 Aug 2023 13:17:44.842	35934.992

Flux Density impinging on the ground in Hawaii from H2SAT

The Flux density is calculated as:

$$\text{flux density} = \text{EIRP} / (4\pi RSE^2)$$

where RSE is the distance from spacecraft to the ground,
and EIRP is the Effective Isotropic Radiated Power of the spacecraft.

Data from the spacecraft vendor indicates that the nominal EIRP of the H2SAT spacecraft is -2.5 dBW. The closest distance to earth during an overhead pass is = 35,786 km.

Converting -2.5 dBW to scalar watts = 0.562 watts transmitted at 2285.973 MHz.

Therefore:

$$\text{flux density} = 0.562 / (4\pi 35786000^2)$$

$$\text{Flux density} = 3.492 \times 10^{-17} \text{ Watts/meter}^2$$

Or

$$\text{Flux density} = 3.492 \times 10^{-18} \text{ mW/cm}^2$$

Inclination: 0 degrees

Apogee: 35786 km

Perigee: 35786 km

Number of Orbital Planes: 1

Exhibit C
PETITION FOR WAIVER OF SECTION 25.137 AND 25.114 AND OF
THE U.S. TABLE OF FREQUENCY ALLOCATIONS

I. TO THE EXTENT THEY APPLY, GOOD CAUSE EXISTS FOR A WAIVER OF CERTAIN PORTIONS OF SECTIONS 25.137 AND 25.114

Universal Space Network, Inc. (USN) is provided limited legal and technical information for the H2SAT Satellite.¹ Pursuant to Section 25.137 of the Federal Communications Commission's ("Commission" or "FCC") rules, the same technical information required by Section 25.114 for U.S.-licensed space station, and certain legal information, must be submitted by earth station applicants "requesting authority to operate with a non-U.S. licensed space station to serve the United States..."² USN seeks authority to provide LEOP support TT&C for the H2SAT spacecraft, and not commercial service to the United States, and thus believes that Section 25.137 does not apply.

To the extent the Commission determines, however, that USN's request for authority to provide critical spacecraft risk mitigation support on a special temporary basis is a request to serve the United States with a non-U.S.-licensed satellite, USN respectfully requests a waiver of Sections 25.137 and 25.114 of the Commission's rules, to the extent that USN has not herein provided the information required by these rules.³ The Commission may grant a waiver for good cause shown.⁴ A waiver is therefore appropriate if special circumstances warrant a deviation from the general rule, and such a deviation will serve the public interest. The US public interest is supported by the sharing of collected data with the OHB Germany program.

In this case, good cause for a waiver of portions of Section 25.114 exists. USN seeks authority to conduct data collection testing support for H2SAT. Thus, any information sought by Section 25.114 that is not relevant to the critical support – e.g., antenna patterns, energy and propulsion and orbital debris - USN does not have. In addition, USN would not easily be able to obtain such information because USN is not the operator of the H2SAT satellite, nor is USN in contractual privity with that operator. Rather, USN has contracted with Swedish Space Corporation, Solna Sweden (SSC) to LEOP support in S-Band of the H2SAT satellite.

¹ FCC Form 312 Section B

² 47 C.F.R. § 25.137(a)

³ 47 C.F.R. §§25.137 and 25.114

⁴ 47 C.F.R. §1.3

Because it is not relevant to the service for which USN seeks authorization, and because obtaining the information would be a hardship, USN seeks a waiver of all the technical and legal information required by Section 25.114, to the extent it is not provided herein. As noted above, USN has provided the required information to the extent that it is relevant to the testing service for which USN seeks authorization.

Good cause also exists to waive portions of Section 25.137, to the extent the information required is not herein provided. Section 25.137 is designed to ensure that “U.S.-licensed satellite systems have effective competitive opportunities to provide analogous services” in other countries. Here, there is no commercial service being provided by the satellite; USN is providing LEOP support. Thus, the purpose of the information required by Section 25.137 is not implicated here. For example, Section 25.137(d) requires earth station applicants requesting authority to operate with a non-U.S.-licensed space station that is not in orbit and operating to post a bond.⁵ The underlying purpose in having to post a bond – i.e., to prevent warehousing of orbital locations by operators seeking to serve the United States – would not be served by requiring USN to post a bond in order to conduct the 180 days critical support of the H2SAT satellite.

It is USN’s understanding that H2SAT is licensed under the published name “H2M-TNG-0.5E” by the country of Germany. H2SAT is spacecraft meant to serve Germany, with data shared in preparation for telecommunication efficiency by the US. Thus, the purpose of Section 25.137 – to ensure that U.S. satellite operators enjoy “effective competitive opportunities” to serve foreign markets and to prevent warehousing of orbital locations service the United States – will not be undermined by grant of this waiver request.

Finally, USN notes that it expects to communicate with the H2SAT satellite using its U.S. earth station for a period of 180 days. Requiring USN to obtain technical and legal information from an unrelated party, where there is no risk of interference. Given these particular facts, the waiver sought herein is appropriate.

II. GOOD CAUSE EXISTS FOR A WAIVER OF THE UNITED STATES TABLE OF FREQUENCY ALLOCATIONS

USN further requests a waiver of the United States Table of Frequency Allocations (“U.S. Table”) as described in section 2.106 of the rules for the frequency bands 2025 – 2110 MHz (Earth-to-Space) and 2200 – 2290 MHz (Space-to-Earth).⁶ Section footnotes allow for non-federal Government use of these bands in the United States on a case-by-case non-interference basis. Such use by USN necessitates a waiver of the U.S. Table.

Good cause exists to grant USN a limited waiver of the U.S. Table to allow critical support for the H2SAT satellite. In considering request for case-by-case spectrum uses, the Commission has indicated that it would generally grant such waivers “where there is little potential for interference into any service authorized under the Table of Frequency Allocations and when the case-by-case operator accepts any interference from authorized services.”⁷ USN will coordinate with other parties operating communication systems in compliance with the Table of Frequency Allocations to ensure that no harmful interference is caused. USN seeks to operate only pursuant to special temporary authorization and thus agrees to accept any interference from authorized services. In summary, USN’s operation on a non-interference, non-protected basis support waiver of the U.S. Table.

⁵ 47 C.F.R. §25.137(d)(4)

⁶ 47 C.F.R. §2.106

⁷ Previously approved STA's for Universal Space Network SES-STA-20020725-01174; SES-STA-20021112-02008; SES-STA-20040315-00475; SES-STA-20220512-00477

Summary of Technical Information
For Coordination with NTIA/FAS/IRAC

Applicant: Universal Space Network, Inc.
File No.: _____
Call Sign: No Call Sign
Special Temporary Authority ("STA")

Purpose of operation: LEOP support for H2SAT.

Start Date: 3 March 2023

End Date: 30 August 2023

Site Location: Naalehu, HI

Latitude: 19 deg 00' 50.3" N (NAD-83)
Longitude: 155 deg 39' 46.6" W (NAD-83)

Transmit frequency: 2105 MHz
Polarization: R, L
Antenna manufacturer: Datron
Antenna Size in meter: 13m
Antenna model: 1453
Antenna Gain Transmit: 46.3 dBi @ 2105 MHz

<u>Frequency Band</u> (MHz)	<u>Emissions</u>	<u>Max.EIRP</u> (dBW)	<u>Max.EIRP Density</u> (dBW/4KHz)
2104.5-2105.5	1M20G9D	68	43.228
2285.473-2286.473	1M20G9D	68	43.228

Satellite: H2SAT