# Table 1 – TSM Points With Major Descriptors

| TSM# | Description | Thresholds/Action | Active on Startup? | APID (hex) | Mnemonic | Bit Mask (blank is all on) | Min Thresh | Event Max | Name | Funct # | Func Active |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **Data Collection Points 0-49** | | | | | | | | | | | |
| 0 | TC 1 Hz Packet | Data collect (getting current time) | ACTIVE | af | TC1HZDUMMY | x'FFFFFFFF' | | 50 | TC 1 Hz D/C | TS_VALIDATE_TIME_ID | YES |
| 7 | Separation signal 1 | Data collect | ACTIVE | 4c | DSEPSW1ST | x'2' | | 50 | Sep Sig 1 D/C | | |
| 8 | Separation signal 2 | Data collect | ACTIVE | 4c | DSEPSW2ST | x'4' | | 50 | Sep Sig 2 D/C | | |
| 9 | Separation signal 3 | Data collect | ACTIVE | 4c | DSEPSW3ST | x'8' | | 50 | Sep Sig 3 D/C | | |
| 11 | Get Battery Current | Data collect | ACTIVE | 12 | PBATI | x'0FFF' | | 50 | Batt Curr D/C | | |
| 16 | Get Battery Voltage | Data collect | ACTIVE | 10 | PBATVDC1 | x'FFFF' | | 50 | Battery Voltage | | |
| 17 | Get direction of sun vector | Data collect | ACTIVE | 52 | ACSSUNBDYZE | x'FFFFFFFF' | | 50 | Sun Vec Dir D/C | | |
| 18 | Get s/a yoke deployment | Data collect (stowed=0% released>20% deployed>95%) | ACTIVE | 36 | ACESAYKPOTCNT | x'FFFF' | | 50 | SA Yoke Dep D/C | | |
| 19 | Get s/a 1st panel deployment | Data collect (stowed=0% released>20% deployed>95%) | ACTIVE | 4B | DSADIHNGST_FAST | x'FFFF' | | 50 | SA Hinge 1 D/C | | |
| 20 | Get s/a 2nd panel deployment | Data collect (stowed=0% released>20% deployed>95%) | ACTIVE | 4B | DSADCHNGST_FAST | x'FFFF' | | 50 | SA Hinge 2 D/C | | |
| 21 | Get s/a 3rd panel deployment | Data collect (stowed=0% released>20% deployed>95%) | ACTIVE | 4B | DSADOHNGST_FAST | x'FFFF' | | 50 | SA Hinge 3 D/C | | |
| 22 | ACE HK Tlm | Data collect(only care about the last time packet received) | ACTIVE | 36 | ACETAMVREFK | x'FFFF' | | 50 | ACE HK Tlm D/C | | |
| 23 | PSE Fast Tlm | Data collect(only care about the last time packet received) | ACTIVE | 10 | PEO1BUSV1 | x'0FFF' | | 50 | PSE HK Tlm D/C | | |
| 24 | COMM HK Tlm | Data collect(only care about the last time packet received) | ACTIVE | 18 | XRSNCMDERR | x'00FF' | | 50 | COMM HK Tlm D/C | | |
| 28 | CI Codeblock Counter | Data collect (checking for static data) | ACTIVE | 2 | MCIACBC | x'0FF' | | 50 | CI Cdblk Ctr D/C | | |
| 30 | HOP 1 Power | Data Collect (checking if HOPS deployed) | ACTIVE | 4b | DHOP1PWR | x'0080' | | 50 | HOP1 D/C | | |
| 31 | HOP 2 Power | Data Collect (checking if HOPS deployed) | ACTIVE | 4b | DHOP2PWR | x'0100' | | 50 | HOP2 D/C | | |
| **End of Data Collection Points** | | | | | | | | 50 | | | |
| 50 | Low Battery State of charge | If >30% and <70%: call Safe Power RTS (#19). If <85% Issue event message | ACTIVE | 12 | PBATSOC | x'7FFF' | 3 | 50 | Low Battery SOC | | |
| 53 | Battery SOC < 99% at End of Day | Issue event message | ACTIVE | 13 | PBATSOCEOD | x'7FFF' | 3 | 50 | Battery SOC@EOD | | |
| 54 | Half Battery Voltage Differential | If abs() > 0.35 V then RTS 19 If > 0.08 then event message | ACTIVE | 12 | PBATDFVDC | x'0FFF' | 3 | 50 | Battery Diff | | |
| 55 | Battery temperature | 1) If >25 degrees: then RTS 18. 2) If > 23 degrees: issue event message | ACTIVE | 11 | TBATTMP | x'0FFF' | 3 | 50 | High Batt Temp | | |
| 56 | S/A disabled | If the Solar Array is disabled then enable it | | 34 | ACESADSTAT | 1 | 3 | 50 | S/A Drive not enabled | | |
| 57 | If in taper set BSOC = 100% | IF in VT taper then set BSOC=100%. (Enabled by RTS 18) | | 12 | PRSNCTL | x'000F' | 3 | 50 | In VT taper | | |
| 60 | Battery Voltage too low | If Bat V < 26.3 then RTS 59. If < 26.8 then event msg. | ACTIVE | 10 | PBATVDC1 | x'FFFF' | 3 | 50 | Low Battery V | | |
| 63 | Pre-separation power-on | If powered on with at least two signals showing attachment to the L.V. then prepare for separation (RTS#36) | ACTIVE | | DSEPSW1ST | 2 | 3 | 50 | Prepare for Sep | TS_PREPARE_SEP_ID | YES |
| 65 | Solar Array drive too hot | >50C for 3 samples: event message | ACTIVE | 4d | TSADAT | x'0FFF' | 3 | 50 | Hot S/A drive | | |
| 66 | Detect that ACE is in safehold | If ACE is in safemode configure s/c for safemode (RTS#2) | ACTIVE | 37 | ACEINSHMFS | 1 | 3 | 50 | ACE in Safehold | | |
| 67 | Instruments pointing toward sun | Z axis within 18 degrees of the sun: Safe the instruments | | 52 | ACSSUNBDYZE | x'FFFFFFFF' | 3 | 50 | Z axis < 18 deg from Sun | | |
| 68 | High rotation rate (A) | Gyro rate in any axis >1deg/sec: Close latch valve (RTS#4) | ACTIVE | 50 | ACSIRUARATS | x'7FFFFFFF' | 3 | 50 | Gyro A Rate High | | |
| 69 | High rotation rate (B) | Gyro rate in any axis >1deg/sec: Close latch valve (RTS#4) | ACTIVE | 50 | ACSIRUBRATS | x'7FFFFFFF' | 3 | 50 | Gyro B Rate High | | |
| 70 | High rotation rate (C) | Gyro rate in any axis >1deg/sec: Close latch valve (RTS#4) | ACTIVE | 50 | ACSIRUCRATS | x'7FFFFFFF' | 3 | 50 | Gyro C Rate High | | |
| 71 | L/V separation | If any two signals (TSMs 7,8,9) indicate separation begin separation sequence (RTS#33) | ACTIVE | 4c | DSEPSW1ST | 2 | 3 | 50 | L/V Separated | TS_VOTE_SEP_ID | YES |
| 72 | S/A release | If any two signals (TSMs 18,19,20,21) >20% begin s/a release sequence (RTS#34) | ACTIVE | 4c | DSADIHNGST | x'FFFF' | 3 | 50 | SA Released | TS_VOTE_SA_REL_ID | YES |
| 73 | S/A deployed | If all four signals (TSMs 18,19,20,21) indicate full deployment (>95%) begin deployment sequence (RTS#35) | ACTIVE | 4c | DSADIHNGST | X'FFFF' | 3 | 50 | SA Deployed | TS_CHECK_SA_DEPLOYED_ID | YES |
| 74 | WARP Reset | WARP experienced a reset during a memory operation - Turn WARP off. (RST#21) | ACTIVE | 3c | WHSRPBRST | X'FFFFFFFF' | 3 | 50 | WARP Reset | | |
| 75 | HOPs on and s/a deployed | If either HOP LVPC service on & any two s/a potentiometers show release(20%) then turn off HOPs (RTS#60) | ACTIVE | 4b | DHOP1PWR | X'80' | 3 | 50 | Check HOPS & S/A | TS_CHECK_HOPS_ID | YES |
| 76 | Chassis Current too high | If abs(chassis current) > 1A then loadshed. If > 0.2 Amps then event msg | ACTIVE | 10 | PEO1CHASI4 | x'0FFF' | 1 | 50 | Excessive Chassis Current | | |
| **100-125 reserved for ALI** | | | | | | | | 50 | | | |
| 100 | Excessive ALICE Radiator Temperature | Housekeeping Word 1 bits 8:15 (IHSKP_T36); (0 = -50.83C 255 = +60.83C) If 59C then RTS #8 | ACTIVE | 80 | IHSKP_T36 | x'00FF' | 4 | 50 | ALI Rad Temp | | |
| 101 | Excessive FPE Board 1 Temperature | Housekeeping Word 5 bits 8:15 (IHSKP_T38); (0 = -50.83C 255 = +60.83C) > 50 C RTS#8 | ACTIVE | 80 | IHSKP_T38 | x'00FF' | 4 | 50 | ALI FPE B1 Temp | | |

| TSM# | Description | Thresholds/Action | Active on Startup? | APID (hex) | Mnemonic | Bit Mask (blank is all on) | Min Thresh | Event Max | Name | Funct # | Func Active |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 103 | Out-of-Range ALICE 28V Current | If IHSKP_SPEP28V > 2.5 Amps then call RTS 7 (Shutdown) | ACTIVE | 80 | IHSKP_P28V | x'00FF' | 4 | 50 | ALI 28V Curr Rng | | |
| 116 | ALI focal plane too cold | If ALI Focal plane < -83 C then execute RTS 61 to turn on the outgas heater | ACTIVE | 27 | IHSKP_T19 | x'00FF' | 3 | 50 | ALI Focal plane too cold | | |
| **150-199 reserved for Hyperion** | | | | | | | | 50 | | | |
| 152 | Hyperion VNIR ASP (external) too hot | 1)Ext temp>55C for > 3 pkts. Hyperion shutdown (RTS #28) | ACTIVE | 11 | YVNIRASPT3 | x'0FFF' | 3 | 50 | Ext VNIRASP temp | | |
| 153 | Hyperion SWIR ASP (external) too hot | 1)Ext temp>55 C for 3 pkts. Hyperion shutdown (RTS #28) | ACTIVE | 4d | YSWIRASPT4 | x'0FFF' | 3 | 50 | Ext SWIRASP temp | | |
| 160 | Hyperion WD Timer Reset | Hyperion Reset (RTS#38) if watchdog reset bit == 1 (YWDOGRST) | ACTIVE | 7b | YWDOGRST | x'0200' | 1 | 50 | Hyp WD Reset | | |
| 207 | AC PSB too hot | If AC Power Supply Board temp >328K for 4 samples then turn off AC (RTS#20) | ACTIVE | 27 | L_PSBT | x'0FFF' | 4 | 50 | AC PSB Too Hot | | |
| 215 | ACE RSN errors and losing power | No ACE telemetry for >20 min and BSOC <80% and battery voltage <26.3 V power cycle ACE (RTS #9) | ACTIVE | af | TC1HZDUMMY | x'FFFF' | 10 | 50 | No ACE Dat >20 min | TS_ACE_ERRORS_ID | YES |
| 216 | PSE RSN errors | No PSE telemetry for >1 minute: send warm boot command (RTS#11) | ACTIVE | af | TC1HZDUMMY | x'FFFF' | 10 | 50 | No PSE Dat >1min | TS_TIMEOUT_ID | YES |
| 232 | No codeblocks received for 5 days | If no command(codeblock) received for one week:attempt downlink (RTS#27) | ACTIVE | af | TC1HZDUMMY | x'FFFF' | 33 | 50 | 1wk with No Cmds | TS_STATIC_TIMEOUT_ID | YES |
| 233 | X-band phased array too hot | >65 C for > 10 seconds: turn off (RTS#6) | ACTIVE | 45 | XBNDPAATEMP | x'FFFF' | 10 | 50 | XBNDPAA >65C/10s | | |
| 234 | Thrusters on too long | If thrusters on for >24 Sec (24 to 32 s) turn off (RTS #26) | ACTIVE | 34 | ACEPROPONOFR | x'FFFF' | 10 | 50 | Thrusters >30sec | | |

Table 2 – TSM Points With Flight Software Parameters

| TSM # | P1 | P2 | P3 | P4 | P5 | L1 Act | L1 Cont | L1 Op | L1 RTS# | L1 Thresh | L2 Act | L2 Cont | L2 Op | L2 RTS# | L2 Thresh | L3 Act | L3 Cont | L3 Op | L3 RTS# | L3 Thresh | L4 Act | L4 Cont | L4 Op | L4 RTS# | L4 Thresh | c1 | c2 | c3 | l1 | l2 | l3 | l4 | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 0 | | | | | | NO | NO | | | | NO | NO | | | | NO | NO | | | | NO | NO | | | | | | | | | | | | | | | |
| 7 | | | | | | YES | NO | = | | x'2' | NO | NO | | | | NO | NO | | | | NO | NO | | | | | | | | | | | | | | | |
| 8 | | | | | | YES | NO | = | | x'4' | NO | NO | | | | NO | NO | | | | NO | NO | | | | | | | | | | | | | | | |
| 9 | | | | | | YES | NO | = | | x'8' | NO | NO | | | | NO | NO | | | | NO | NO | | | | | | | | | | | | | | | |
| 11 | | | | | | NO | NO | | | | NO | NO | | | | NO | NO | | | | NO | NO | | | | | | | | | | | | | | | |
| 16 | | | | | | NO | NO | < | | 26300 | NO | NO | | | | NO | NO | | | | NO | NO | | | | | | | | | | | | | | | |
| 17 | | | | | | NO | NO | | | | NO | NO | | | | NO | NO | | | | NO | NO | | | | min | ? | max | 5% of range | 95% of range | | | range | | | | |
| 18 | | | | | | YES | NO | > | | 2265 | YES | NO | > | | 2417 | NO | NO | | | | NO | NO | | | | 2219 | 2339 | 2427 | 42 | 198 | | | 208 | | | | |
| 19 | | | | | | YES | NO | > | | 2339 | YES | NO | > | | 2540 | NO | NO | | | | NO | NO | | | | 2283 | 2417 | 2553 | 54 | 257 | | | 270 | | | | |
| 20 | | | | | | YES | NO | > | | 2390 | YES | NO | > | | 2798 | NO | NO | | | | NO | NO | | | | 2281 | 2549 | 2825 | 109 | 517 | | | 544 | | | | |
| 21 | | | | | | YES | NO | > | | 2393 | YES | NO | > | | 2798 | NO | NO | | | | NO | NO | | | | 2285 | 2555 | 2825 | 108 | 513 | | | 540 | | | | |
| 22 | | | | | | NO | NO | | | | NO | NO | | | | NO | NO | | | | NO | NO | | | | | | | | | | | | | | | |
| 23 | | | | | | NO | NO | | | | NO | NO | | | | NO | NO | | | | NO | NO | | | | | | | | | | | | | | | |
| 24 | | | | | | NO | NO | | | | NO | NO | | | | NO | NO | | | | NO | NO | | | | | | | | | | | | | | | |
| 28 | | | | | | NO | NO | | | | NO | NO | | | | NO | NO | | | | NO | NO | | | | | | | | | | | | | | | |
| 30 | | | | | | NO | NO | | | | NO | NO | | | | NO | NO | | | | NO | NO | | | | | | | | | | | | | | | |
| 31 | | | | | | NO | NO | | | | NO | NO | | | | NO | NO | | | | NO | NO | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | | | | | | min | slope | | 1st trip | 2nd trip | 3rd trip | | hex AO value | hex AP value | hex AQ value | | |
| 50 | | | | | | YES | YES | < | | x'2666' | YES | YES | < | 19 | x'5998' | YES | YES | < | | x'6CCB' | NO | NO | | | | 0 | 0.003 05185 | | 30 | 70 | 85 | | 2666 | 5998 | 6CCB | | |
| 53 | | | | | | YES | YES | < | | x'7EB7' | NO | NO | | | | NO | NO | | | | NO | NO | | | | 0 | 0.003 05185 | | 99 | | | | 7EB7 | | | | |
| 54 | | | | | | YES | YES | > | 19 | x'0967' | Yes | Yes | > | | x'0853' | YES | YES | < | 19 | x'069A' | Yes | Yes | < | | x'07AF' | -2 | 0.000 976 | | 0.35 | 0.08 | -0.35 | -0.08 | 0967 | 0853 | 069A | 07AF | 0.08 was 0.7 550.35 w56as 0.5 |
| 55 | | | | | | YES | YES | > | 18 | x'0959' | YES | YES | > | | x'0917' | NO | NO | | | | NO | NO | | | | - | 0.030 | | 25 | 23 | | | 0959 | 0917 | | | |

| TSM # | P1 | P2 | P3 | P4 | P5 | L1 Act | L1 Cont | L1 Op | L1 RTS# | L1 Thresh | L2 Act | L2 Cont | L2 Op | L2 RTS# | L2 Thresh | L3 Act | L3 Cont | L3 Op | L3 RTS# | L3 Thresh | L4 Act | L4 Cont | L4 Op | L4 RTS# | L4 Thresh | c1 | c2 | c3 | l1 | l2 | l3 | l4 | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | | | | | | | | | | | | | | | | | 47.5495 | 3141 | | | | | | | | | | |
| 56 | | | | | | YES | YES | = | 22 | 0 | NO | NO | | | | NO | NO | | | | NO | NO | | | | | | | | | | | | | | | |
| 57 | | | | | | YES | YES | = | 23 | 2 | NO | NO | | | | NO | NO | | | | NO | NO | | | | | | | | | | | | | | | |
| 60 | | | | | | YES | YES | < | 59 | 26300 | YES | YES | < | | 26800 | NO | NO | | | | NO | NO | | | | 0 | 0.001 | | 24.5 | | | | 5FB4 | | | | |
| 63 | | | | | | YES | NO | = | 36 | 1 | NO | NO | | | | NO | NO | | | | NO | NO | | | | | | | | | | | | | | | |
| 65 | | | | | | YES | YES | < | | 2319 | NO | NO | | | | NO | NO | | | | NO | NO | | | | Cal curve has negative slope at 50C | | | | | | | | | | | |
| 66 | | | | | | YES | YES | = | 2 | 1 | NO | NO | | | | NO | NO | | | | NO | NO | | | | | | | | | | | | | | | |
| 67 | | | | | | YES | YES | > | 12 | x'3F7374BC' | NO | NO | | | | NO | NO | | | | NO | NO | | | | | | | | | | | | | | | |
| 68 | | | | | | YES | YES | > | 4 | x'3C8F5C29' | NO | NO | | | | NO | NO | | | | NO | NO | | | | MSb masked out so that + and - are checked. | | | | | | | | | | | |
| 69 | | | | | | YES | YES | > | 4 | x'3C8F5C29' | NO | NO | | | | NO | NO | | | | NO | NO | | | | MSb masked out so that + and - are checked. | | | | | | | | | | | |
| 70 | | | | | | YES | YES | > | 4 | x'3C8F5C29' | NO | NO | | | | NO | NO | | | | NO | NO | | | | MSb masked out so that + and - are checked. | | | | | | | | | | | |
| 71 | | | | | | YES | NO | = | 33 | 1 | NO | NO | | | | NO | NO | | | | NO | NO | | | | | | | | | | | | | | | |
| 72 | | | | | | YES | NO | = | 34 | 1 | NO | NO | | | | NO | NO | | | | NO | NO | | | | | | | | | | | | | | | |
| 73 | | | | | | YES | NO | = | 35 | 1 | NO | NO | | | | NO | NO | | | | NO | NO | | | | | | | | | | | | | | | |
| 74 | | | | | | YES | NO | >= | 21 | 1 | NO | NO | | | | NO | NO | | | | NO | NO | | | | | | | | | | | | | | | |
| 75 | | | | | | YES | YES | = | 60 | 1 | NO | NO | | | | NO | NO | | | | NO | NO | | | | | | | | | | | | | | | |
| 76 | | | | | | YES | YES | > | 10 | x'08A1' | YES | YES | > | | x'0820' | YES | YES | < | 10 | x'075E' | YES | YES | < | | x'07DF' | -12.697 | 0.0062 | | 1 | 0.2 | -1 | -0.2 | 08A1 | 0820 | 075E | 07DF | |
| | | | | | | | | | | | | | | | | | | | | | | | | | | C0 | C1 | | | | | | | | | | |
| 100 | | | | | | YES | YES | > | 8 | x'00FA' | NO | NO | | | | NO | NO | | | | NO | NO | | | | -50.83 | 0.43788 | | 59 | 0 | | | 00FA | 0074 | 250.8221431 | | |
| 101 | | | | | | YES | YES | > | 8 | x'00E6' | NO | NO | | | | NO | NO | | | | NO | NO | | | | -50.83 | 0.43788 | | 50 | 0 | | | 00E6 | 0074 | 230.2685667 | | |
| 103 | | | | | | YES | YES | > | 7 | x'00BE' | NO | NO | | | | NO | NO | | | | NO | NO | | | | -5.075 | 0.039803 | | 2.5 | | | | 00BE | 007F | 190.312288 | | |
| 116 | | | | | | YES | YES | > | 61 | x'00B5' | NO | NO | | | | NO | NO | | | | NO | NO | | | | -39.55 | -0.23882 | | -83 | | | | 00B5 | | 181.9361862 | | |
| | | | | | | | | | | | | | | | | | | | | | | | | | | | Note negative cal curve. | | | | | | | | | |
| 152 | | | | | | YES | YES | <= | 28 | 2318 | NO | NO | | | | NO | NO | | | | NO | NO | | | | NOTE: This curve runs backwards! 65deg=2214 62deg=2233 58deg=2259 so the comparison operator MUST BE backwards too! | | | | | | | | | | | |
| 153 | | | | | | YES | YES | <= | 28 | 2283 | NO | NO | | | | NO | NO | | | | NO | NO | | | | NOTE: This curve runs backwards! 65deg=2214 62deg=2233 58deg=2259 so the comparison operator MUST BE backwards too! | | | | | | | | | | | |
| 160 | | | | | | YES | YES | = | 38 | x'0200' | NO | NO | | | | NO | NO | | | | NO | NO | | | | y intrecpt | Slope | Input temp | calculated counts | input count | calc. temp | | | | | | |
| 207 | | | | | | YES | YES | > | 20 | 3391 | NO | NO | | | | NO | NO | | | | NO | NO | | | | -500 | 0.24414 | 328 | 3391.4967 | 3391 | 327.9 | | X=(Y+500)/0.24414 | | | | |
| 215 | 22 | 20 | 2 | | | YES | NO | = | 9 | 1 | NO | NO | | | | NO | NO | | | | NO | NO | | | | | | | | | | | | | | | |
| 216 | 23 | 1 | 2 | | | YES | NO | = | 11 | 1 | NO | NO | | | | NO | NO | | | | NO | NO | | | | | | | | | | | | | | | |
| 232 | 28 | 5 | 4 | | | YES | NO | = | 27 | 1 | NO | NO | | | | NO | NO | | | | NO | NO | | | | | | | | | | | | | | | |
| 233 | | | | | | YES | YES | < | 6 | 2215 | NO | NO | | | | NO | NO | | | | NO | NO | | | | | | | | | | | | | | | |
| 234 | | | | | | YES | YES | >= | 26 | 2064 | NO | NO | | | | NO | NO | | | | NO | NO | | | | | | | | | | | | | | | |

Heading Notes:

Op means operator, Act means active, Cont means continue, Thresh means threshold