## IBEX Command Approval Checklist Rev 16b incorporates post-ST anomaly changes and resetting the SSR pointers in an APL contact.

Orbit	355	Special Ops	Eclipse Ops, ISN Season Pointing			
14 R <sub>E</sub> asc. Date/Time	01/28 05:28					
Apogee	02/01 09:05	Maneuver Window Start	01/31 23:03	Maneuver 02/01 19:03		
Apogee Target		443500000000000 981909999999999	02 targetY:-0.665 998	530500000000004		
15 R <sub>E</sub> desc. Date/Time	02/05 11:33		14 R <sub>E</sub> desc. Date/Time	02/05 13:05		
Perigee	02/05 23:17	Maneuver Window Start	02/05 13:33	Maneuver Window Stop	02/06 09:27	
Perigee Target	_	89170000000000 53702999999999	05 targetY:-0.573 999	349399999999995		
Eclipse	Yes	Eclipse Start	02/06 01:24	Eclipse End	02/06 02:40	
Sun Mnvr	None	Apogee/Perigee	N/A	Sun Angle at DESCENDING	N/A	
Approved Version	IBEX_2017_027_o0355a_v001.scr					

Activity	Command Checks	Date Done	Done By
Supporting Materials	<ol> <li>IBEX_CrossingTimes_<date>_v00x.txt on SFTP at /IBEX/fdg/PredictedEphemeris/Orbit Events/.</date></li> <li>Orbit Events File on SFTP at /IBEX/moc/Moc-Soc/oef/.</li> <li>Command Constraint Violations Report on SFTP at /IBEX/moc/Moc-Soc/cvr/.</li> <li>Contacts this orbit Orbit_oXXX.txt included in the ATS approval email.</li> <li>Science Tasking File at /IBEX/moc/Soc-Moc/stf/.</li> <li>Merged ATS at <a href="http://ibex.unh.edu/cgi-bin/ats.cgi">http://ibex.unh.edu/cgi-bin/ats.cgi</a>.</li> </ol>		
Sun Maneuvers	<ul> <li>Additional contacts should not be planned to support IBEX Sun Precession Maneuvers due to star tracker outages. The standard apogee and perigee contacts should be used to verify that a maneuver has occurred. If it is not possible to plan one of the standard contacts after the star tracker outage is down to 50% and a valid quaternion reading can be made to verify the maneuver, the coarse Sun sensor angle and the thruster pulse count will be used to determine a) whether a maneuver took place, and b) whether the pointing after the maneuver is as expected +/- 2 degrees.</li> </ul>		
	<ul> <li>The nominal off-Sun pointing constraint is 7.25 degrees. Based on the missed maneuver in orbit 114, the payload team has determined that there is no hardware risk associated with off-Sun pointing up to angles of at least 13 degrees. There is a higher background noted in the data starting at around 9.5 degrees off Sun pointing.</li> </ul>		
File Input Check	<ol> <li>Current OEF inputs are Forecast STF, last orbit's OEF &amp; latest ephemeris.</li> <li>ATS inputs are this orbit's OEF &amp; STF. (And ABS if present.)</li> <li>ATS filename is of the format IBEX_yyyy_doy_o0xxxa_v0zz.scr.         where IBEX is capitalized, yyyy is the year, doy is the day of year, xxx is the 3-digit orbit number and zz is the 2-digit version number.         Any special operations ATSs will have another designation between the orbit number and version number (i.e. *o0186a_hgc_v001 for the Hi gain curve).</li> </ol>	01/16/2017	CLR

Colingos	1.	Check OEF for eclipses during the orbit.	04/46/2017	CL D
Eclipses	3.	Verify long eclipse flag start & stop times reflect Ryan Tyler's recommendations based on his eclipse diagnostic tool. Suggestions made by Ryan after the use of this tool trump the general guidelines below. (Please note, specific timing may shift if the recommendations are relative to eclipse timing. For example, it may say set LE flag to false X hours after the end of the eclipse with a given FALSE time suggested. If the eclipse timing changes as the ephemeris becomes more refined, this command time may shift.)  Verify no contacts planned during an eclipse. Note: If in conflict, the eclipse diagnostic recommendations will trump the general guidelines below.  a Verify transmitter OFF from 30 minutes before eclipse start through the end of the eclipse.  b For an eclipse where the long eclipse flag is set, schedule a SOH contact directly following the end of the eclipse (or per Ryan's assessment).  c Set the LE flag according to Ryan's assessments.  Verify no maneuver planned during an eclipse. Note: If in conflict, the eclipse diagnostic recommendations will trump the general guidelines below.  a Verify no maneuver or cat bed heaters on from 3 hours before eclipse start through 3 hours after eclipse end.  b Verify no maneuver or cat bed heaters are on while the long eclipse flag is set.  Verify the following additional constraints (from battery balancing section).  a Verify the first command sets the long eclipse flag to TRUE, the second command sets the flag to FALSE.  b Verify p/L is in HVSTANDBY or HVENG.  c Verify no charging cycle within 2 hours of ASCENDING or DESCENDING macro execution.  This applies to all eclipses, not just moderate or long eclipses.	01/16/2017	CLR
Moon In Lo FOV	1.		01/16/2017	CLR
		MoonInLoFovStop 02-01T09:27		
	2.	<ul> <li>Check for corresponding Moon in Lo FOV start commands in ATS (timing will not be exact).</li> <li>PMT_LVL 300 01:31:05:07</li> <li>IF_STAR_ADJ 0</li> <li>Note: if the Moon is closer than 30Re, the PMT will be set to 250. The distance to the moon can be found in the STF.</li> </ul>		
	3.	Check for corresponding Moon in Lo FOV stop commands.  IF_STAR_ADJ 250 Not needed – session ends at apogee maneuver  PMT_LVL 800  Note: if the Moon is still in the FOV at the time of DESCENDING, no Moon in Lo FOV stop commands will be present in ATS. The values are reset to the default at next set of ASCENDING macros.		
	4.	If Moon in Lo FOV starts in arc a & ends in arc b, check Moon in Lo FOV Start commands resent		
	5.	after apogee ASCENDING commands.  If Moon in Lo FOV starts within apogee HVSTANDBY period, check Moon in Lo FOV Start commands sent after apogee ASCENDING commands.		

Contact	1	Fach contact has 5 commands	01/16/2017	CLR
Commands	1.	Each contact has 5 commands.	01/16/2017	CLK
Commands	1.	Verify STX on/off times, downlink rate against <i>Orbit_oXXX.txt</i> file.		
ļ	2.	Verify contacts in the previous ATS have not been duplicated.		
ļ ļ	3.	Verify all currently planned contacts in Orbit_xxx.txt are in the ATS.		
ļ	4.	Verify each contact contains the following 5 commands.		
ļ		SetRelay stx,on		
ļ ļ		• SetDownlink2K (2K, 40K, 64K, 160K, or 320K)		
ļ		SetBilevelOutputControlReg STXMODE_Strobe,ON		
ļ		SetBilevelOutputControlReg COHERENT,ON		
ļ	_	SetRelay stx,off		
ļ	5.	If contact is near an eclipse		
		<ul> <li>Verify transmitter OFF from 30 minutes before eclipse start through 30 minutes after eclipse end.</li> </ul>		
		<ul><li>b. If additional transmitter constraints exist, they will be captured in Ryan's recommendations.</li></ul>		
ļ ļ	6.	If an APL contact is being used for an SSR Dump, the data rate should be at least 160 ksps & the SSR		
ļ	0.	DUMP_NEW command should be included in the contact commands. Commands in Orange should only		
ļ ļ		be sent if the SSR pointers need to be reset this perigee. These commands should be separated by 2s and		
ļ ļ		occur 2s after the SSR_DUMP_NEW command.		
ļ		SetRelay stx,on		
		SetDownlink2K		
		SetBilevelOutputControlReg STXMODE_Strobe,ON		
		SetBilevelOutputControlReg COHERENT,ON		
		SetDownlink320K		
		SSR_DUMP_NEW		
ļ		SSR_SET_RD_PTR 6500		
		SSR_SET_WRT_PTR 6500		
		SetRelay stx,off		
SC State	1.	Transition to Science state will be first command of each ATS (at 14 Re).	01/16/2017	CLR
Science:		SetScState science 01:28:05:25		
arc a	2.	Lo science mode will be the next command (at 14 Re).		
ļ		• LO_SCIENCE_MODE NORMAL		
ļ	3.	Verify no transition to Science again at the end of the ATS. The ATS commands go from 14 Re		
ļ	,	to 14 Re in each orbit.		
ļ	4.	Verify the transition to Science commands for this orbit are not part of the previous ATS using		
ļ	5.	http://ibex.unh.edu/cgi-bin/ats.cgi.  Verify that the beginning of this ATS does not overlap with the end of the previous orbit's ATS		
ļ	٥.	using http://ibex.unh.edu/cgi-bin/ats.cgi.		
	1.	Verify w/ Crossing Times report that it occurs about 15Re ascending. The arc a ASCENDING		
Payload		commands can start any time at or above 15Re ascending.	01/16/2017	CLR
Mode	2.	Verify commanding takes ~ 24 minutes.		
HVSCI: arc a		• ASCENDING_PL1 01:28:06:57		
aica		ASCENDING_HI		
		SET_PARAMETER 1, TLM_RATE_SOH		
ļ ļ		SET_PARAMETER 4, HV_STEP_DWELL		
ļ ļ		SET_PARAMETER 3, HV_STEP_FRAC		
		HI_COL_NEG_LVL 1400 – not during ISN season pointing		
		CEU_HI_CEM_1_LVL 1780		
		CEU_HI_CEM_2_LVL 1780		
		CEU_HI_CEM_3_LVL 1780		
		CEU_HI_CEM_4_LVL 1900		
		SET_PARAMETER 0, TLM_RATE_SOH		
		ASCENDING_PL2		
		ASCENDING_PL1		
		ASCENDING_LO		
		• ASCENDING_PL2 01:28:07:20		

Payload Mode		<ol> <li>Payload DESCENDING commands end 1.5h before thruster enable.</li> <li>DESCENDING PL1 01:31:21:07</li> </ol>	01/16/2017	CLR
HVSTANDBY		DESCENDING_I ET 01:31:21:07      DESCENDING_IO		
: arc a		ASCENDING_PL2		
		DESCENDING PL1		
		DESCENDING_FET     DESCENDING HI		
	1.	DESCENDING_PL2 01:31:21:30  Spacecraft Housekeeping command occurs 1h before thruster enable.	+	
SC State HK	١.	SetScState housekeeping 01:31:22:03	01/16/2017	CLR
: arc a				
Inertial	1.		01/16/2017	CLR
Maneuver :		Precession Maneuver : Apogee' sequence below.	01/10/2017	OLIX
Apogee	2.	Verify Thruster enable command occurs within STF maneuver window.		
		Verify no eclipse occurs from cat bed heater on through set FC mode Mission.		
	4.	Verify cat bed heaters come on 55 min before burn.		
	5.	<ul> <li>CATBED_5N_HTR,ON 01:31:22:08</li> <li>Verify Kalman Filter input select is ground command &amp; estimator update is disabled.</li> </ul>		
	٥.	SetKFInputSelect GND_CMD, 0, 0, 0, 0		
		SetEstUpdateEnables ENABLE, DISABLE		
	6.	Verify in FC mode Burn.		
	0.	SetFcMode burn		
	7.	Compare SetInrDir in ATS with pointing as defined in the Forecast STF & verify the vectors match.		
		• SetInrDir 0.684435,-0.665305,-0.298191		
		<ul><li>targetX:0.68443500000000002 targetY:-</li></ul>		
		0.6653050000000004   targetZ:-0.2981909999999998		
	8.	Verify inertial maneuver chosen.		
		SetLrTarget ACS_INERTIAL		
	9.	Verify thrust time set to 11 min.		
		SetThrustTime 660		
	10.	Verify thruster enable command matches RepointingManeuverStart time in OEF.		
		SetThrustEnable ENABLE 01:31:23:03		
		RepointingManeuverStart 01-31T23:03		
	11.	Verify 10 minutes after thrusters enabled: thrusters disabled, cat bed heaters off, thrust time set		
		to 0.		
		SetThrustEnable DISABLE 01:31:23:13		
		SetHTRCmd CATBED_5N_HTR,OFF		
	40	SetThrustTime 0		
	12.	Verify 25 min after thrusters enabled: Static Z rate set, outage %valid set, FC mode Mission.		
		SetStaticZrate ESTIMATOR, 0.418 01:31:23:29		
		<ul> <li>SetKFInputSelect STA_PCT_VALID, 43,28,33,48</li> </ul>		
		SetFcMode Mission		

			1	
Sun	1.	Use this command sequence in the event of an apogee Sun maneuver.	N/A	N/A
Precession	2.	Verify Thruster enable command occurs within STF maneuver window.		
Maneuver		Verify no eclipse occurs from cat bed heater on through set FC mode Mission.		
: Apogee	4.	Verify cat bed heaters powered on 55 min before thruster enable.		
		CATBED_5N_HTR,ON		
	5.	Verify in FC mode Burn and Sun target.		
		SetFcMode burn		
		SetLrTarget ACS_SUN		
	6.	Verify thrust time set to 16 min.		
	Ο.	SetThrustTime 960		
	7.	Verify thruster enable command matches SunMvrBegin time in OEF.		
	١.	SetThrustEnable ENABLE		
		• SunMvrBegin		
	8.	Verify 15 minutes after thrusters enabled: thrusters disabled, cat bed heaters off, thrust time set		
		to 0, FC mode Mission.		
		SetThrustEnable DISABLE		
		SetHTRCmd CATBED_5N_HTR,OFF		
		SetThrustTime 0		
		SetFcMode Mission		
22.5	1.	Spacecraft Science commands occur ~1h after thruster Disable.		a
SC State		SetScState science 01-31T23:03	01/16/2017	CLR
Science :		SCIENCE_MODE NORMAL		
arc b				
Payload	1.	Verify payload ASCENDING commands begin at least 1.5 hours after thruster DISABLE.	01/16/2017	CLR
Mode	2.	Verify commands take ~24 minutes to execute.	01/10/2017	CLIN
HVSCI:		<ul> <li>ASCENDING_PL1 02:01:00:49</li> </ul>		
arc b		ASCENDING_HI		
alcb		SET PARAMETER 1, TLM RATE SOH		
		SET_PARAMETER 4, HV_STEP_DWELL		
		SET_PARAMETER 3, HV_STEP_FRAC  HL COL NEG 174 1400 - mot during ISN pointing.		
		HI_COL_NEG_LVL 1400 – not during ISN pointing		
		CEU_HI_CEM_1_LVL 1780		
		CEU_HI_CEM_2_LVL 1780		
		CEU_HI_CEM_3_LVL 1780		
		CEU_HI_CEM_4_LVL 1900		
		SET PARAMETER 0, TLM RATE SOH		
		ASCENDING_PL2		
		ASCENDING PL1		
		ASCENDING_LO     ASCENDING_DIA_02-01-01-12		
_		• ASCENDING_PL2 02:01:01:12		
Payload	1.	Verify w/ Crossing Times report that it occurs about 15 Re descending. The arc b DESCENDING	01/16/2017	CLR
Mode		commands can complete any time at or above 15Re descending.		
HVSTANDBY	2.	Verify commands take ~23 minutes to execute.		
: arc b		• DESCENDING_PL1 02:05:11:02		
		DESCENDING_LO		
		ASCENDING_PL2		
		DESCENDING PL1		
		DESCENDING_HI		
		DESCENDING_TIL     DESCENDING PL2 02:05:11:25		
		• DE3CEMDIMO_LES 05:03:TT:53		
SC State HK	1.	Verify with Crossing Times report that Transition to Housekeeping state occurs at 14 Re desc (or	01/16/2017	CLR
: arc b		an hour before the maneuver if the maneuver occurs less than 1 hour after 14 Re desc).		
		SetScState housekeeping 02:05:12:31		
		1 0	1	

1. Use this command sequence if a perige is nertial maneuver is used, otherwise skip to the 'Sun Pricession' American' Periges		1		1	Ī
Maneuver: Perigee  Procession Maneuver: Perige Verify to colipse occurs from cate bed heater on through set FC mode Mission. 3. Verify cat bed heaters come on 55 min before burn.  **CATRED_SN_FITICON_02.05.12.38* 4. Verify in Housekeeping state. 5. Verify Kalman Filler imput select is ground command & estimator update is disabled. 5. Settifripudsect on 02.000, 0, 0, 0, 0  **Setsubjate reables Exhault_DISABLE 7. Verify in FC mode Burn.  **SetTranspate Col. (MDD, 0, 0, 0, 0)  **Setsubjate reables Exhault_DISABLE 7. Verify in FC mode Burn.  **SetTranspate Col. (METR).  **SetTranspate Col. (ME	Inertial	1.	Use this command sequence if a perigee inertial maneuver is used, otherwise skip to the 'Sun	01/16/2017	CLR
3. Verify cat bed heaters come on 55 min before burn.  - CATED_SRL_TIR_ON D.02-05-1238 4. Verify in Housekeeping state. 5. Verify in Housekeeping state. 6. SettSringutSeted GND_CMD, 0, 0, 0, 0  - SettStingutSeted State Sta		_		0 1, 10, 20 11	0
3. Verify cat bern feeters come on os nin before burn.  CATRED SN_HTR,ON 02:05:12:38 4. Verify in Housekaeping state. 5. Verify Kalman Filter input select is ground command & estimator update is disabled. 5. Sett/inputSelect GND_CND_0_0_0_0  SettSupdatenables CND_CND_0_0_0_0  SettSupdatenables CNBLE_DISABLE 7. Verify in FC mode Burn.  Setf-Mode burn  Setf-Mode burn  Setf-Mode Burn.  Setf-Mode B	Perigee				
4. Verify in Housekeeping state. 5. Verify Kalman Filter input select is ground command & estimator update is disabled. 6. SettRinputSelect GND_CMD_0_0_0_0  8. SettStinputSelect GND_CMD_0_0_0_0_0  8. SettStinputSelect GND_CMD_0_0_0_0_0  8. Compare SetInrDir in ATS with target vector in the Forecast STF & verify the vectors match.  8. SetFrode burn  8. Compare SetInrDir in ATS with target vector in the Forecast STF & verify the vectors match.  8. SetTrode To .738917_000000000005 largetty-0.5734939999999999999999999999999999999999		3.			
5. Verify Kalman Filter input select is ground command & estimator update is disabled.  6. SetEstupdatechables ENABLE, DISABLE  7. Verify in FC mode Burn.  8. Compare SetInOrbin in ATS with target vector in the Forecast STF & verify the vectors match.  • SetInCMode burn  8. Compare SetInOrbin in ATS with target vector in the Forecast STF & verify the vectors match.  • SetInCMODE Staget 10-033817,00-033703  • Inagrack 738817000000000 Itaget*10-05.73493999999995 [target2-0.3537099999999999999999999999999999999999					
6. SettEnputSelect GND_CMD_0_0_0_0  8. SettEndode burn  8. SetFonde Burn.  9. SetFonde Burn.  8. SetFonde Burn.  9. SetFonde Burn.  9. SetFonde Burn.  10. Verify in First ime set to 11 min.  10. Verify in the set to 11 min.  10. Verify thrust time set to 11 min.  10. Verify thrust time set to 11 min.  11. Verify thrust time set to 11 min.  12. Verify thrust threade Burner anable command matches RepointingManeuverStart time in OEF.  9. SetThrustTime 60  11. Verify thrust manual burner set anabled: thrusters disabled, cat bed heaters off, thrust time set to 0.  9. SetThrustTime 60  11. Verify 25 min after thrusters enabled: thrusters disabled, cat bed heaters off, thrust time set to 0.  9. SetThrustTime 0  13. Verify 25 min after thrusters enabled: Static Z rate set, outage 9valid set, FC mode Mission.  9. SetSetSetCarte ESTIMATIOR, 0.418 02.05.1358  9. SetErinputSelect 57a PCT_VAILD, 43.28,33,48  9. SetErinputSelect 57a PCT_VAILD, 40.28,53,48  9. SetErinputSe					
* SetEstUpdateEnables ENABLE, DISABLE 7. Verify in For Mode Burn. 8. Compare SetInDr in ATS with target vector in the Forecast STF & verify the vectors match.  * SetInDr in ATS with target vector in the Forecast STF & verify the vectors match.  * SetInDr in ATS with target vector in the Forecast STF & verify the vectors match.  * SetInDr in ATS with target vector in the Forecast STF & verify the vectors match.  * SetInDr in ATS with target vector in the Forecast STF & verify the vectors match.  * SetInDr in ATS with target vector in the Forecast STF & verify the vectors match.  * SetInDr in ATS with target vector in the Forecast STF & verify the vectors match.  * SetInDr in ATS with target vector in the Forecast STF & verify the vectors match.  * SetInDr in ATS with target vector in the Forecast STF & verify the vector in ATS with target vector in the Forecast STF & verify 10 minutes after thrusters enabled: thrusters disabled, cat bed heaters off, thrust time set to 0.  * SetIndr in ATS with in ATS with target vector in the very start in the very start with a set in the very start in the very					
7. Verify in FC mode Burn. SetFcMode burn 8. Compare SetInrDir in ATS with target vector in the Forecast STF & verify the vectors match. SetIncivic 0. 738917.0.573494.0.353703 +   targetX0.738917.0573494.0.353703 9. Verify inertial maneuver chosen. SetInvastriane Sto 11 min. SetInvastriane Sto 12.05.13.33 RepointingManeuverStart 12. Verify thruster enable command matches RepointingManeuverStart time in OEF. SetThrustriane Sto 12.05.13.33 SetInvastriane Sto 12.05.13.33 SetInvastriane Sto 13.343 CATECD_SN_HTR.OFF SetThrustriane Sto 13.433 SetStaticzrate ESTIMATOR, 0.418.02.05.13.58 SetS		6.	SetKFInputSelect GND_CMD, 0, 0, 0, 0		
* SetEndOde burn  8. Compare SetInDF in ATS with target vector in the Forecast STF & verify the vectors match.  * SetInDF in C738917-0.0573494-0.053703   **LargetACO_SINDERIA*  10. Verify inertial maneuver chosen.  * SetTraget ACS_INERTIA*  10. Verify thrust time set to 11 min.  * SetTraget ACS_INERTIA*  11. Verify thruster enable command matches RepointingManeuverStart time in OEF.  * SetTraustinable ENABLE 02:05:13:33  * RepointingManeuverStart*  12. Verify 10 minutes after thrusters enabled: thrusters disabled, cat bed heaters off, thrust time set to 0.  * SetTraustinable DISABLE 02:05:13:43  * CATEED_SN_HTR_OFF  * SetTraustination in after thrusters enabled: Static Z rate set, outage %valid set, FC mode Mission.  * SetStaticZrate ESTIMATOR, 0.418, 02:05:13:58  * SetStaticZrate ESTIMA					
8. Compare SettinDir in ATS with target vector in the Forecast STF & verify the vectors match.  SettinDir 0.738917, 0.353703  LargetXc7381700000000000000000000000000000000000		7.	Verify in FC mode Burn.		
Settribric 0.738917, 0.573494, 0.353703  Integeted 7389170000000005 hargety* 0.673493999999995   target2-0.353702999999999999999999999999999999999999					
largetXo.7389/1700000000005   targetY-0.573493999999995   targetZ-0.353702999999999999999999999999999999999999		8.	Compare SetInrDir in ATS with target vector in the Forecast STF & verify the vectors match.		
9. Verify inertial maneuver chosen.  • SettTrustTime 60  11. Verify thrust time set to 11 min.  • SetThrustTime 600  11. Verify thrust time set to 11 min.  • SetThrustTime 600  11. Verify thruster enable command matches RepointingManeuverStart time in OEF.  • SetTrustEnable ENABLE 02:05-13:33  • RepointingManeuverStart  12. Verify 10 minutes after thrusters enabled: thrusters disabled, cat bed heaters off, thrust time set to 0.  • SetTrustEnable DISABLE 02:05:13:43  • CATRED_5N_HTR.OF  • SetTrustTime 0  13. Verify 2 min after thrusters enabled: Static Z rate set, outage %valid set, FC mode Mission.  • SetStaticZrate ESTIMATOR, 0.418 02:05:13:58  • SetKinputSelect STA_PCT_VALID, 43,22,33,48  • SetEMode Mission  1. Use this command sequence in the event of a perigee Sun maneuver.  Verify 10 recommand occurs within STF maneuver window.  3. Verify no eclipse occurs from cat bed heater on through set FC Mode Mission.  • CATRED_5N_HTR.ON  5. Verify in FC mode Burn and Sun target.  • SetTrustEnable ENABLE  • SetTrustTime 960  7. Verify thrust time set to 16 min.  • SetTrustEnable ENABLE  • SentPrustTime 50  7. Verify 15 minutes after thrusters enabled: thrusters disabled, cat bed heaters off, thrust time set to 0, FC mode Mission.  • SetTrustEnable ENABLE  • SentPrustTime 50  7. Verify thrust missed to 16 min.  • SetTrustEnable ENABLE  • SentPrustTime 50  7. Verify the first command matches SunMvrBegin time in OEF.  • SetTrustTime 50  8. SetTrustTime 50  7. Verify the first command sets the long eclipse flag=TRUE) is 90 minutes long.  8. Verify the first command sets the long eclipse flag to TRUE, the second command sets the flag to FALSE.  4. Verify 12 is in HVSTANDBY or HVENG.  5. Verify no charging cycle within 1 bour of Maneuver.			• SetInrDir 0.738917,-0.573494,-0.353703		
* SettTrustTime 640  10. Verify thrust time set to 11 min.     * SetThrustTime 660  11. Verify thruster enable command matches RepointingManeuverStart time in OEF.     * SetTrustTambe ENABLE 02:05:13:33     * RepointingManeuverStart  12. Verify 10 minutes after thrusters enabled: thrusters disabled, cat bed heaters off, thrust time set to 0.     * SetTrustTambe DISABLE 02:05:13:43     * CATBED_SN_HTR,OFF     * SETTRUSTER 0  13. Verify 25 min after thrusters enabled: Static Z rate set, outage %valid set, FC mode Mission.     * SetStaticZrate ESTIMATOR, 0.418 02:05:13:58     * SetStingLost estimator, 0.418 02:05:13:13:18     * SetStingLost estimator, 0.418 02:05:13:18     * SetStingLost estimato			<ul><li> targetX:0.73891700000000005 targetY:-0.5734939999999995 targetZ:-0.3537029999999999</li></ul>		
10. Verify thrust time set to 11 min.  SetThrustTime 60  11. Verify thruster enable command matches RepointingManeuverStart time in OEF.  SetThrustEnable ENABLE 02:05:13:33  RepointingManeuverStart  12. Verify 10 minutes after thrusters enabled: thrusters disabled, cat bed heaters off, thrust time set to 0.  SetThrustEnable DISABLE 02:05:13:43  CATBED_SN_HTR,OFF  SetThrustTime 0  13. Verify 25 min after thrusters enabled: Static Z rate set, outage %valid set, FC mode Mission.  SetStaticZrate ESTIMATOR, 0.418 02:05:13:58  SetKFInputSelect STA_PCT_VALID, 43,28,33,48  SetFCMode Mission  1. Use this command sequence in the event of a perigee Sun maneuver.  Verify Thruster enable command occurs within STF maneuver window.  Verify cat bed heaters come on 55 min before burn.  CATBED_SN_HTR,ON  Verify in FC mode Burn and Sun target.  SettCMode Miss  Verify thrust time set to 16 min.  SettTrustTime 90  Verify thruster enable command matches SunMvrBegin time in OEF.  SetTrustTime 0  Se		9.	Verify inertial maneuver chosen.		
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SetHTRCmd CATBED_5N_HTR,OFF SetThrustTime 0 SetFcMode Mission  1. There will be battery cell balancing every 2 out of 3 orbits. Battery cell balancing this orbit? Y/N Pone — eclipse ops  Verify charging cycle (Long eclipse flag=TRUE) is 90 minutes long.  Verify the first command sets the long eclipse flag to TRUE, the second command sets the flag to FALSE.  Verify P/L is in HVSTANDBY or HVENG.  Verify no charging cycle within 2 hours of ASCENDING or DESCENDING macro execution.  Verify no charging cycle within 1 hour of maneuver.					
SetThrustTime 0 SetFcMode Mission  Battery Cell Balancing  1. There will be battery cell balancing every 2 out of 3 orbits. Battery cell balancing this orbit? Y/N 2. Verify charging cycle (Long eclipse flag=TRUE) is 90 minutes long.  3. Verify the first command sets the long eclipse flag to TRUE, the second command sets the flag to FALSE.  4. Verify P/L is in HVSTANDBY or HVENG.  5. Verify no charging cycle within 2 hours of ASCENDING or DESCENDING macro execution.  6. Verify no charging cycle within 1 hour of maneuver.					
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<ul><li>5. Verify no charging cycle within 2 hours of ASCENDING or DESCENDING macro execution.</li><li>6. Verify no charging cycle within 1 hour of maneuver.</li></ul>		1			
6. Verify no charging cycle within 1 hour of maneuver.					
7. Verify no charging cycle during an eclipse.	1	6.	Verity no charging cycle within 1 hour of maneuver.		
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## IBEX Command Approval Checklist C. Reno

Rev 16b Last update 06/08/2016

Cmd Violation	1.	Review CCVR. If you have any questions Reply All to the ATS Approval email and ask the team.	01/16/2017	CLR
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Activity	Anomaly Response : Non-nominal burn	Date Completed	Completed By
•	If the maneuver has not occurred or the spacecraft pointing as designated by either the star tracker or coarse Sun sensor is off by more than 2 degrees from the expected pointing, an anomaly has occurred.  • If the spacecraft is in Contingency state all stored commands are flushed from the command queue. Follow standard anomaly process.  • If the Sun maneuver did not occur and the spacecraft is in either Science or Housekeeping state follow the steps below.  • If a partial Sun maneuver has occurred and the spacecraft is in either Science or		
•	Housekeeping state follow the steps below.  Please note that there is no anticipated hardware damage associated with exceeding the 12.5 degree constraint; this constraint is in place because we should not exceed the largest pointing achieved thus far in the mission.		
1.	If the payload is in HVSTANDBY, LVENG or OFF, and there are no commands loaded to bring it to HVSCI voltages, no operational pointing constraints will be violated. Follow		
2.	standard anomaly process.  If the payload in HVSCI mode or there are uploaded commands to bring the payload to HVSCI mode,  a. Determine current off Sun pointing. If the off Sun angle has already exceeded 12.5 degrees, the MOC should notify the MOM and immediately send the DESCENDING command suite in real-time, as described below. If this cannot be done in the contact where the pointing anomaly was discovered, another contact will be planned as soon as possible to execute these commands.  @CEU_MACRO_EXEC DESCENDING_PL1 (<1 min)  @CEU_MACRO_EXEC DESCENDING_HI (~8 min)  @CEU_MACRO_EXEC DESCENDING_HI (~8 min)  @CEU_MACRO_EXEC DESCENDING_HI (~8 min)  Please note: The only scenario where hitting 12.5 degrees is expected is when a perigee Sun precession maneuver is completely missed after an inertial apogee maneuver which occurs late in the maneuver window (near apogee + 10 hours).  b. If current Sun pointing is below 12.5 degrees, the ISOC should input ST Sunpointing angle into ibex_rotate to determine the Sun angle at the time of DESCENDING.  Sun-Angle at payload DESCENDING_  c. If 12.5 degrees is not exceeded by the time of DESCENDING, no payload-specific action is needed for this arc. Follow standard anomaly response process.  d. If 12.5 degrees is exceeded by the time of DESCENDING, a new command set should be sent.  i. The ISOC will generate the new STF which has the DESCENDING commands executing early such that 12.5 degrees is not exceeded while the payload is in HVSCI.  ii. The MOC will create an associated ATS.  iii.Approval is needed by the MOM, MOC & ISOC prior to upload.  iv. The MOC will assess whether an additional pass is needed in order to upload the commands prior to exceeding the 12.5 degree constraint. The onboard DESCENDING commands do not need to be deleted.		