CCR Number: 0028	CRITICALITY: ROUTINE	DUE:02/03/99

DISTRIBUTION SHEET
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NEW MILLENNIUM PROJECT CONFIGURATION CHANGE REQUEST

PROGRAM EO-1
CCR NO. 0028
DATE INITIATED 02/03/99

TITLE CHANGES TO EO-1 ALI ICD-18 (A)
ORIGINATOR R. Welsh/GSFC
ORIGINATOR'S CHG. NO.
SPONSOR/CODE R. WELSH/EO-1ALI PHONE x9774

EFFECTIVITY
ITEM: ALI
S / N
ITEM:
S / N
ITEM:
S / N

CHANGE CLASS

	I	II
PRELIMINARY	☐	☐
FORMAL	☐	☐

TYPE OF CHANGE

MILESTONE	☐	INTERFACE	☒	SOFTWARE	☐
DOCUMENT	☒	POWER	☐	OTHER	☐
COST ____	☐	WEIGHT	☐	____	☐

DOCUMENTS OR SOFTWARE AFFECTED
EO-1 ICD-018 (A)

PROBLEM
The attached Preliminary Interface Revision Notice (PIRN) to EO-1 ICD-018 (A), EO-1 S/C to Advanced Land Imager (ALI) Interface Control Document (ICD) provides for changes to the Interface document. This PIRN includes suggested changes that will be incorporated as an Interface revision and will be officially documented as such. The PIRN will become an official Interface change once the EO-1 project Configuration Control Board (CCB) chairman signs this CCR and the attached PIRN.

PROPOSED SOLUTION
Approve the attached PIRN 003 to EO-1 ICD-0018 (A) by the EO-1 Level II Configuration Control Board (CCB). The signed off PIRN will serve as the official approval of changes to this ICD. Future changes will be initiated by submittal of Configuration Change Requests (CCRs) and Preliminary Interface Revision Notices (PIRNs) for CCB approval. This document is maintained by the EO-1 Configuration Management Office (CMO).

BOARD ACTION

APPROVE	☑
APPROVE WITH CHANGE	☑
DISAPPROVE	☐
WITHDRAW	☐

APPROVAL LEVEL REQUIRED

LEVEL I HQS	☐
LEVEL II GSFC	☒
LEVEL III	☐

CRITICALITY LEVEL

EMERGENCY	☐
URGENT	☐
ROUTINE	☒

PROCUREMENT CHANGE ORDER CLASSIFICATION

ROUTINE		URGENT		EMERGENCY	
OPTION 1	☐	OPTION 1	☐		
OPTION 2	☐	OPTION 2	☐		

COMMENTS
Approve to incorporate PIRN 003 into ICD-18

CHAIRPERSON [signature] DATE MARCH 15, 1999

3/28/96

GODDARD SPACE FLIGHT CENTER		1. PAGE 1 OF 22
PRELIMINARY SPECIFICATION CHANGE NOTICE (PSCN) No._____ or **PRELIMINARY INTERFACE REVISION NOTICE (PIRN) No. 003**		2. INIT. DATE: 2/3/99 3. CONTRACT NUMBER
4. ASSOCIATED CONTROL NUMBERS: **EO-1CCR 0028**	5. CI'S AFFECTED: ALI ICD-18 (A)	6. DOCUMENT NUMBER: REVISION:

7. DESCRIPTION OF CHANGE:

1.Change Section 2.1 Applicable Documents:

From: ALI Integration and Test Plan

To: **SAI-PLAN-293** **EO-1 Advanced Land Imager** Integration Plan ✓

From: WARP TO ALI ICD

To: **EO-1 ICD-056** **EO-1 Spacecraft ALI to Spacecraft RS-422 Data Interface Control Document** ✓

Add: **EWR 127-1** **EO-1 Project Safety Document** ✓

2.Change Section 2.2 Referenced Documents:

From: ALI Integration and Test Plan

To: **SAI-PLAN-293** **EO-1 Advanced Land Imager** Integration Plan ✓

3.Change Section 3.1.1.1 Spacecraft Interface Functions:

From: c. Provision of mounting interface for ALI telescope to spacecraft

To: c. Provision of mounting interface for ALI ~~**telescope**~~ **instrument** to spacecraft ✓

4. Change Section 3.1.1.2 ALI Interface Funtions:

From: a. Transmission of wideband (image) data to the Fiber Optic Data Bus (FODB) instrument terminal

PREPARED BY: S.Schneider/EO-1 CM	**ORIGINATING:**	**ORGANIZATION:** **DATE:**
HST CCB ACTION **APPROVED:** X **DISAPPROVED:**	**SIGNATURE:**	**DATE:** 3/15/99

4. con't: To: a. Transmission of wideband (image) data to the ~~Fiber Optic Data Bus (FODB) instrument terminal~~ **WARP/I/F.**

4. Change Section 3.1.1.2 ALI Interface Functions:

From: c. Provision of mounting interface for ALI telescope to spacecraft

To: c. Provision of mounting interface for ALI ~~telescope~~ **instrument** to spacecraft

5. Change Section 3.2 Mechanical Interface Requirements:

From: The ALI instrument consists of the telescope, telescope shroud and two electronic units, and internal interface cabling. MIT/LL shall also deliver an RS 422 harness from the focal plane electronics (FPE) to the FODB instrument terminal. The instrument assemblies are mounted on an instrument pallet, which is mounted to the nadir –facing deck of the spacecraft. Figure 3-1 is a drawing of the spacecraft.

To: The ALI instrument consists of the ~~telescope, telescope~~ **sensor assembly** shroud and two electronic units, and internal interface cabling. ~~MIT/LL shall also deliver an RS 422 harness from the focal plane electronics (FPE) to the FODB instrument terminal~~. **MIT/LL shall furnish material to Swales for fabrication of appropriate harness for RS-422 connection from the ALI FPE to the WARP.** The instrument assemblies are mounted on an instrument pallet, which is mounted to the nadir –facing deck of the spacecraft. Figure 3-1 is a drawing of the spacecraft.

6.Change Section 3.2.1.2 Fields of View

From: The ALI telescope shall be located on the spacecraft in accordance with the following field of view (FOV) requirements:

a. The ALI telescope aperture shall have a clear field of view of 2.26 degrees x 15.5 degrees as shown in ALI Interface Control Drawing A0750.

b. The Telescope's physical entrance port is located in the telescope's tope enclosure plate. The plate is perpendicular to the Z axis and sits approximately 26 inches along the Z axis from the the spacecraft/ALI interface.

c. The desired keep-out zone is the volume beyond a constant –Z plane that lies parallel to and Intersects the surface of the telescope shroud.

To: The ALI ~~telescope shall be located on the spacecraft in accordance with the following field of view (FOV) requirements~~ **FOV (volume of ray paths) is shown in the ALI Interface Control Drawing A0750. The FOV intrusions from the addition of the Hyperion instrument have been investigated by MIT/LL as glint sources (Hyperion solar baffle, and relocated S-band antenna) with the result that they are considered to be unlikely to cause degraded ALI performance.**

~~a. The ALI telescope aperture shall have a clear field of view of 2.26 degrees x 15.5 degrees as shown in ALI Interface Control Drawing A0750.~~

~~b. The Telescope's physical entrance port is located in the telescope's tope enclosure plate. The plate is perpendicular to the Z axis and sits approximately 26 inches along the Z axis from the the spacecraft/ALI interface.~~

~~c. The desired keep-out zone is the volume beyond a constant –Z plane that lies parallel to and Intersects the surface of the telescope shroud.~~

7.Change Section 3.2.2.1.1 ALI MASS

From: The mass of the ALO is without the RS-422 harness from the FPE to the FODB instrument terminal. The mass of the ALO shall be 93 kg or less.

To: The mass of the ALO is without the RS-422 harness from the FPE to the ~~FODB instrument terminal~~. **WARP I/F.** The mass of the ALO shall be 93 kg or less.

Change Section 3.2.2.1.2 RS-422 Mass

From: The mass of the RS-422 harness from the FPE to the FODB instrument terminal shall be 7 kg or less.

To: The mass of the RS-422 harness from the FPE to the ~~FODB~~ **WARP/IF** instrument terminal shall be 7 kg or less.

9. Change Section 3.2.4 Thermal

From: The instrument pallet and shroud shall be thermally coupled to the pallet. The instrument electronics boxes shall be thermally isolated from the pallet. The spacecraft is cold biased, using heaters, passive radiators, selective thermal control coatings, and multilayer insulating (MLI) blankets. The AKI pallet shall contact the spacecraft nadir deck at 18 points with no insulation between the nadir deck and the ALI pallet. The spacecraft nadir deck will be held between 0 and 30 degrees C.

To: The instrument pallet ~~and shroud~~ shall be thermally coupled to the **S/C Nadir deck** ~~pallet~~. The **ALICE** instrument electronics box~~es~~ shall be thermally ~~isolated~~ **coupled to the pallet and the Focal Plane Electronics box shall be thermally isolated** from the pallet. The spacecraft is cold biased, using heaters, passive radiators, selective thermal control coatings, and multilayer insulating (MLI) blankets. The AKI pallet shall contact the spacecraft nadir deck at 18 points with no insulation between the nadir deck and the ALI pallet. The spacecraft nadir deck will be held between 0 and 30 degrees C.

10. Change Section 3.2.4.1 Heat Input to Instrument Radiators (TBR)

From: The radiative heat flux from the spacecraft to the focal-plane radiator shall be between 0 and 4 W with 2 W as a goal. The focal plane array (FPA) radiator is sized assuming no direct solar heat input. The conductive heat flux from the instrument electronics boxes and radiators shall be between 0 and 5 W. The radiators are sized assuming hot environment and end of life degraded thermal coating properties. The radiators are sized with enough margin to accommodate partial obstruction of the FOV by spacecraft components such as the X-band antenna boom.

To: The radiative heat flux from the spacecraft to the focal-plane radiator shall be between 0 and 4 W with 2 W as a goal. The focal plane array (FPA) radiator is sized assuming no direct solar heat input. The conductive heat flux from the **FPE** ~~instrument~~ electronic~~s~~ box~~es~~ and radiator~~s~~ shall be between 0 and 5 W. **The ALICE electronic box shall be thermally coupled to the instrument pallet. Thermally model details of the ALICE mounting arrangement shall be transmitted to the spacecraft contractor.** The radiators are sized assuming hot environment and end of life degraded thermal coating properties. The radiators are sized with enough margin to accommodate partial obstruction of the FOV by spacecraft components such as the X-band antenna boom.

11. Change the last sentence in Section 3.2.4.3 Thermal Blankets

From:. . . . The instrument MLI shall extend 7 cm beyond the pallet with 3/4/inch velcro (hooks) attached to the side facing the spacecraft.

To: . . . The instrument MLI shall extend ~~7 cm~~ **1.5 inches** beyond the pallet with 3/4/inch velcro (hooks) attached to the side facing the spacecraft. **MIT/LL will transmit ALI thermal blanket template information to Swales as appropriate.**

12.Change Section 3.2.4.5 Survival Heaters

From: The two electronics boxes shall have redundant, thermostatically controlled heaters to keep the boxes above survival temperature. MIT/LL will attach the thermostats and heaters to the electronics in the location specified by the spacecraft thermal analysts. The power connection for the heaters will be at the RS-422 interface plate.

Figure 3-4 shows the heater redundancy concept for each of the two electronics boxes.

MIT/LL is responsible for determining the specific location of the heaters and thermostats for each electronics box. The maximum current limit is specified in Section 3.3.4.2 (See Table 3-4)

To: The ~~two~~ **Focal Plane** electronics box~~es~~ shall have redundant, thermostatically controlled heaters to keep the boxes above survival temperature. ~~MIT/LL will attach the thermostats and heaters to the electronics in the location specified by the spacecraft thermal analysts.~~ The power connection for the heaters will be at the ~~RS-422 interface plate~~. **Survival heater power connector bracket.**

Figure 3-4 shows the heater redundancy ~~concept~~ **design** for each of the two electronics boxes.

MIT/LL is responsible for determining the specific location of the heaters and thermostats for ~~each~~ **the Focal Plane** electronics box. ~~The maximum current limit is specified in Section 3.3.4.2 (See Table 3-4)~~

13.Change Figure 3-4 text Survival Heater Redundancy ~~Concept~~**Design**

From: Primary: Close @ -3 degrees C, Open @ 3 degrees C

Secondary: Close @ -12 degrees C, Open @ -6 degrees C

To: Primary: Close @ ~~-3~~ **-1** degrees C, Open @ ~~3~~ **6** degrees C

Secondary: Close @ ~~-12~~ **-10** degrees C, Open @ ~~-6~~ **-3** degrees C

14: Change Section 3.2.6.5 Solar Calibration:

From: The spacecraft shall be able to point the ALI boresight toward the Sun with an offset of TBR degrees, in the range between 0 and 7 degrees in the +Y direction.

To: The spacecraft shall be able to point the ALI boresight toward the Sun with an offset of ~~TBR degrees, in the range between 0 and 7~~ **7.02** degrees in the +Y direction.

15. Change Section 3.2.6.7: Safe Mode:

From: The spacecraft shall provide power to survival heaters for the ALICE and FPE boxes and, if necessary, a heater for the FPAs (mainand grating).

To: The spacecraft shall provide power to survival heaters for the ALICE and FPE boxes**.** ~~and, if necessary, a heater for the FPAs (maintained grating).~~

16. Change Section 3.2.7.1 Handling Operations:

From: The ALI integration and Test (I&T) document includes the handling and installation procedures for the ALI.

To: The ALI integration and Test (I&T) ~~document~~ **plan** includes**, by reference,** the handling and installation procedures for the ALI.

17. Change Section 3.2.7.2 Lift Points:

From: The maximum allowable manual lift weight during spacecraft integration is 10 kgs. Ali Interface Control Drawing A0750 shows the lift points of the ALI. MIT/LL shall provide the ALI lifting slings which shall be designed such that the bottom of the pallet can clear the top deck of the spacecraft, which will be 90 inches below the lifting hook.

To: ~~The maximum allowable manual lift weight during spacecraft integration is 10 kgs~~. Ali Interface Control Drawing A0750 shows the lift points of the ALI. MIT/LL shall provide the ALI lifting slings**.** ~~which shall be designed such that the bottom of the pallet can clear the top deck of the spacecraft, which will be 90 inches below the lifting hook.~~

18. Change Section 3.2.8 Access Requirements

From: Access requirements to the ALI shall be as defined in the ALI I&T plan.

To: Access requirements to the ALI shall be as defined in the ~~ALI I&T~~ **MIT/LL** plan.

19. Change Section 3.2.10 Nitrogen Purge

From: A clean, dry, oil free, boil off or MIL-P_27401C Type 1 Grade B nitrogen purge will be maintained to the telescope assembly (A1) at all times up to 4 hours before launch rocket ignition. The flow rate is 0.1-1 lt/min during I&T launch-site operations. The purge may be interrupted for no longer than 2 hours. MIT/LL will provide a portable nitrogen purge cart, which will be connected to the instrument through up to 100 feet of purge hose. MIT/LL will supply sufficient liquid nitrogen per day to replenish the boil off from the cart up to transport to the launch pad. MIT/LL will supply the purge cart and interface requirements.

The spacecraft shipping container will accommodate the ALI purge requirements.

To: Gaseous nitrogen purge will be maintained to the ALI at all times up to 4 hours before liftoff. During I&T and launch-site operations, the purge may be interrupted for no longer than 2 hours.

MIT/LL will provide a portable nitrogen purge cart, which will be connected to the ALI through up to 100 feet of purge hose whenever the instrument is accessible or in its own shipping container. The satellite shipping container will accommodate the ALI purge requirements. The purge cart will be supplied from liquid nitrogen boil-off. Provision of liquid nitrogen supply, and maintenance of the purge cart (change out of MIT/LL supplied filters) will be the responsibility of Swales after the ALI is delivered.

20. Change Section 3.3.1 Electrical Interfaces (TBR)

From: An RS-422 Science data interface connector panel will be located on the instrument pallet near the –X, -Y corner of the pallet, as shown in ALI Interface Control Drawing A0750. Power and 1773 connections are at the ALICE electronics box. The power connection for the electronic box survival heaters is also at the interface panel. Figure 3-5 is an electrical block diagram of the ALI.

To: ~~An RS-422 Science data interface connector panel will be located on the instrument pallet near the –X, -Y corner of the pallet, as shown in ALI Interface Control Drawing A0750~~. **ALI RS-422 Science data will be transmitted via a dedicated harness which connects the ALI FPE directly to the WARP This harness will be fabricated at MIT/LL and then provided to Swales for completion. (dressing and termination at the WARP end.)** Power and 1773 connections are at the ALICE electronics box. The power connection for the electronic box survival heaters is also **at the survival hearter connector panel.** ~~at the interface panel~~. Figure 3-5 is an electrical block diagram of the ALI.

21. Change Section 3.3.2.2.1 Power Distribution

From: The total ALI power allocation (including heaters) is as follows:

Nominal operation , orbit average <75 W
ALI power off (survival) <35 W (heater power supplied by spacecraft) (TBR)
Peak instrument power 180 W for 3 minutes

To:

The ALI power consumption is given in the following table. Values are derived from measurements of flight hardware.

22. Add: The following table at the end of Section 3.3.2.2.1 Power Distribution

Table 3.3-1 ALI Power Distribution

Unit	Standby at 40C (Watts)	Data Collect* at 40C (Watts)	Standby at 30C (Watts)	Data Collect* at 30C (Watts)	Standby at -10C (Watts)	Data Collect* at –10C (Watts)
FPE	8.4	26.5	8.4	26.5	8.4	26.5
ALICE	18.8	18.8	18.8	18.8	18.8	18.8
FPA** radiator	4.8	4.8	7.8	7.8	15.4	15.4
FPA** conductor bar	1.8	1.8	1.8	1.8	1.8	1.8
Truss Heater	3	3	2.5	2.5	0	0
Total	36.8	54.9	39.3	57.4	44.4	62.5

con't

Table 3.3-1 ALI Power Distribution

Unit	Standby at 40C (Watts)	Data Collect* at 40C (Watts)	Standby at 30C (Watts)	Data Collect* at 30C (Watts)	Standby at -10C (Watts)	Data Collect* at –10C (Watts)
FPE	8.4	26.5	8.4	26.5	8.4	26.5
ALICE	18.8	18.8	18.8	18.8	18.8	18.8
FPA** radiator	4.8	4.8	7.8	7.8	15.4	15.4
FPA** conductor bar	1.8	1.8	1.8	1.8	1.8	1.8
Truss Heater	3	3	2.5	2.5	0	0
Total	36.8	54.9	39.3	57.4	44.4	62.5
Mechanism	Operation Duration (Seconds)			Power (Watts)		
Floodlamps	16			15.4		
Aperture Selector	16, Deploy 16, Stow			11.2		
Calibration Diffuser	5, Deploy 5, Stow			11.2		
Aperture Cover	12, Open 12, Close			25.2		

*Approximately 5 watts dissipated in the science data cable's resistor terminations.
** FPA at 220K.

23. Change Section 3.3.2.2.3 Load Profile:

From: The typical load profile of the instrument is illustrated in Figure 3-6.

To: The typical load profile of the instrument is ~~illustrated~~ **given** in **Table 3.2.3** ~~Figure 3-6~~.

24.Change Section 3.3.3 Command and Telemetry Requirements

From: All ALI commands and housekeeping telemetry are received from and sent to the spacecraft via the 1773 interface. Details are described in the command and telemetry handbook.

To: All ALI commands and housekeeping telemetry are received from and sent to the spacecraft via the 1773 interface. Details are described in the ~~command and telemetry handbook.~~ **EGSE-2 and 3 SW Database.**

25. Add: Table 3.3 – 2 ALI Typical Power Profile (After Section 3.3.3.2.2)

Table 3.3 - 2 ALI Typical Power Profile

Time	Condition/Event	Power (Watts)
Equatorial plane crossing (time = To)	Standby at 30C	39.3
To + 80 minutes	Enable Data Collect Mode for 10 minutes	57.4
To + 88 minutes, 50 seconds	Open aperture cover (12 Sec.)	82.6
To +89 minutes, 2 seconds	Collect data (30 Sec.)	57.4
To + 89 minutes, 32 seconds	Floodlamp calibration (16 Sec.)	72.8
To +89 minutes, 48 seconds	Close aperture cover (12 Sec.)	82.6
To + 90 minutes	Return to Standby at 30C	39.3
To + 100 minutes	Equatorial plane crossing	39.3

Typical Data Collect orbit timeline and power load profile for 30C spacecraft interface temperature
Average orbital power = {90 x 60 x 39.3 +(8 x 60 + 50 + 30) x 57.4 +24 x 82.6 + 16 x 72.8}/6000 = 41.3 Watts

26. Delete: Figure 3-6 Typical ALI Power Profile During an Observation

27. Delete the following from Section 3.3.3.3.2 Thermal Monitors:

The ALI provides no interface other than providing a mounting point on all external monitors.

28. Change Section 3.3.4.1 Description

From: The instrument provider will fabricate, qualify, and provide to the spacecraft integrator all instrument interconnecting flight harness. The spacecraft will supply harnessing up to the electrical interface plate and up to the ALICE box (1773 and power)

To: The instrument provider will fabricate, qualify, and provide to the spacecraft integrator all instrument interconnecting flight harness. The spacecraft will supply harnessing up to the **FPE** ~~electrical interface plate and~~ up to the ALICE box (1773 and power) **and to the survival heater power connector bracket.**

29. Move the following text in Section 3.3.4.1 Description to Section 3.3.4.2 Connectors (after AM149-0020(155).

Table ~~3-3~~ **A-1** (a and **d** ~~b~~) delineates the **J Numbers,** connectors, pin assignments, and wiring interfaces for the ~~power connection~~ **ALI electrical interfaces.**

30. Delete the following text from Section 3.3.4.1 Description

The instrument provider shall supply to the spacecraft integrator three complete sets of flight interface connectors, pins, and backshells.

31. Add: The following text at the end of Section 3.3.4.2 Connectors

Connector Specifications are shown on Swales drawings A5014A EO-1 ALI/ALICE Heater Interface Bracket and A8068 EO-1 WARP to ALI Science Data.

32. Delete: Table 3-3a ALI Power Interface Connectors and Pin Assignments

33. Delete: Table 3-3b ALI Survival Heater Connector

34. Change Section 3.3.4.3 Connector Mounting Configuration

From: The configuration drawings in Section3.2 (see Figure 3-2) shoe the connector location and orientation on the instrument electronics box and for the interface plate.

To: The configuration drawings in Section3.2 (see Figure 3-2) shoe the connector location and orientation on the instrument electronics box and for the ~~interface plate.~~ **survival heater power connector bracket.**

35. Add: at the end of Section 3.3.5.3 Grounding

The instrument ground point is shown on the ICD drawing A0750. After delivery, ALI operations, procedures and plans shall be in compliance with ESD Control Requirements given in NHB5300.4 (3L). MIT/LL may provide a comparable reference for ESD control for pre-delivery ALI operations at their disretion.

36. Delete: Table 3-4 ALI EMC Testing Plan

37. Add the following to Section 3.6.4 Safety:

The ALI shall comply (after delivery) with the requirements of the EO-1 Project Safety document EWR 127-1 as applicable.

38. Change Table 3-6 Random Vibration Tests Levels

From: Protoflight

0.01 g^2/HZ
+3 dB/octave
0.02g^2/HZ
-3 dB/octave
0.01g^2/HZ
5.77 grms

To:

~~0.01~~ **0.02**g^2/HZ
+3 dB/octave
~~0.02~~ **0.04**g^2/HZ
-3 dB/octave
~~0.01~~ **0.02**g^2/HZ
5.77 **11.54**grms

39. Change Section 4 Deliverables

From:

4.0 DELIVERABLES

Item	Delivered By	Delivered To	Need Date	Comment
Loads	Swales	MIT/LL	3/1/97	Delivered
ASIST	GSFC	MIT/LL	4/15/97	Delivered
Flight unit ESN	GSFC	MIT/LL	5/31/97	Delivered
Specification of thermal properties of nadir deck MLI	MIT/LL	Swales	6/1/97	Delivered
RSN Operating System	GSFC	MIT/LL	8/1/97	Delivered
ALI Thermal Models	MIT/LL	Swales	8/15/97	Delivered
Drill Template	MIT/LL	Swales	1/1/98	
Focal-Plane Simulator (EGSE-4)	MIT/LL	GSFC	2/1/98	
ALI STM Unit	MIT/LL	Swales	8/1/98	
ALI Flight Unit	MIT/LL	Swales	12/8/98	Must be unpacked & ready to mount on S/C by 12/15/98
Test procedures	MIT/LL	Swales	12/15/98	
Science Data Acquisition System (EGSE-1)	MIT/LL	Swales	12/15/98	
Command & Telemetry Processing (EGSE 2 & 3)	MIT/LL	Swales	12/15/98	
Functional test processing S/W	MIT/LL	Swales	12/15/98	
Radiometric Correction Algorithm S/W	MIT/LL	GSFC	3/31/99	

Item	Delivered By	Delivered To	Need Date	Comment
Loads	Swales	MIT/LL	3/1/97	Delivered
ASIST	GSFC	MIT/LL	4/15/97	Delivered
Flight unit ESN	GSFC	MIT/LL	5/31/97	Delivered
Specification of thermal properties of nadir deck MLI	MIT/LL	Swales	6/1/97	Delivered
RSN Operating System	GSFC	MIT/LL	8/1/97	Delivered
ALI Thermal Models	MIT/LL	Swales	8/15/97	Delivered
Drill Template	MIT/LL	Swales	1/1/98	**Delivered**
Focal-Plane Simulator (EGSE-4)	MIT/LL	GSFC	2/1/98	**Delivered**
ALI STM Unit	MIT/LL	~~Swales~~ **Swales**	~~8/1/98~~ **12/16/98**	**Magnetics Test**
ALI Flight Unit	MIT/LL	Swale**/GSFC**	~~12/8/98~~ **2/12/99**	~~Must be unpacked & ready to mount on S/C by 12/15/98~~
ALI Handling Procedures	**MIT/LL**	**SWALES**	**01/01/99**	
Test procedures	MIT/LL	Swales/ **GSFC**	~~12/15/98~~ **3 weeks before test**	**Installation/ access requirements, functional test &purge procedures & requirements & procedures for satellite optics tests**
Science Data Acquisition System (EGSE-1)	MIT/LL	Swales	~~12/15/98~~ **2/12/99**	**Available for tests, but not a deliverable**
Command & Telemetry Processing **S/W Database**(EGSE 2 & 3)	MIT/LL	Swales	~~12/15/98~~ **1/29/99**	
Functional test processing S/W	MIT/LL	Swales	~~12/15/98~~ **1/29/99**	**Used during tests, but not a deliverable**
Radiometric ~~Correction~~ **pipeline Cal** ~~Algorithm~~ S/W	MIT/LL	GSFC	~~3/31/99~~ **5/30/99**	

40. Add: The following Appendix Tables

Appendix A Electrical Connection Description

Table A - 1a ALICE J1 5 pin Power Connector Description

Connector part # 311P405-10P-B-12

Pin #	Signal
1	Side A 28V input
2	Side B 28V input
3	nc
4	Side A 28V return
5	Side B 28V return

Table A - 1b ALI J2 9 pin Heater Power Connector Description

Connector part # 311P409-1P-B-12

Pin #	Signal
1	Side A, Heater BX-1 28V input
2	Side A, Heater BX-2 28V input
3	Side B, Heater BX-1 28V input
4	Side B, Heater BX-2 28V input
5	nc
6	Side A, Heater BX-1 28V return
7	Side A, Heater BX-2 28V return
8	Side B, Heater BX-1 28V return
9	Side B, Heater BX-2 28V return

Primary (side A) and redundant (side B) heaters are limited to 1 amp maximum current.

Table A - 1c ALICE 1773 Connector Descriptions

Connector Designation	Signal
J1	Side B 1773 Receive
J2	Side B 1773 Transmit
J3	Side A 1773 Receive
J4	Side A 1773 Transmit

Table A - 1d ALI FPE J1 100 pin RS-422 Connector Description

Connector part # MDM100SBA174

Pin #	Signal
1	nc
2	Data Bit 00P
3	Data Bit 01P
4	Data Bit 02P
5	Data Bit 03P
6	Data Bit 04P
7	Data Bit 05P
8	Data Bit 06P
9	Data Bit 07P
10	Data Bit 08P
11	Data Bit 09P
12	Data Bit 10P
13	Data Bit 11P
14	Data Bit 12P
15	Data Bit 13P
16	Data Bit 14P
17	Data Bit 15P
18	Data Bit 16P
19	Data Bit 17P
20	Data Bit 18P
21	Data Bit 19P
22	Data Bit 20P
23	Data Bit 21P
24	Data Bit 22P
25	nc
26	nc
27	nc
28	Data Bit 00N
29	Data Bit 01N
30	Data Bit 02N
31	Data Bit 03N

32	Data Bit 04N
33	Data Bit 05N
34	Data Bit 06N
35	Data Bit 07N
36	Data Bit 08N
37	Data Bit 09N
38	Data Bit 10N
39	Data Bit 11N
40	Data Bit 12N
41	Data Bit 13N
42	Data Bit 14N
43	Data Bit 15N
44	Data Bit 16N
45	Data Bit 17N
46	Data Bit 18N
47	Data Bit 19N
48	Data Bit 20N
49	Data Bit 21N
50	Data Bit 22N
51	nc
52	nc
53	nc
54	nc
55	nc
56	nc
57	nc
58	nc
59	nc
60	nc
61	nc
62	nc
63	nc
64	nc
65	nc
66	Data Bit 23P

67	Data Bit 24P
68	Data Bit 25P
69	Data Bit 26P
70	Data Bit 27P
71	Data Bit 28P
72	Data Bit 29P
73	Data Bit 30P
74	Data Bit 31P
75	nc
76	nc
77	nc
78	nc
79	nc
80	Port Clock P
81	Port Clock N
82	nc
83	nc
84	nc
85	nc
86	nc
87	nc
88	nc
89	nc
90	nc
91	Data Bit 23N
92	Data Bit 24N
93	Data Bit 25N
94	Data Bit 26N
95	Data Bit 27N
96	Data Bit 28N
97	Data Bit 29N
98	Data Bit 30N
99	Data Bit 31N
100	Shield

*41. Change Figure 3-1 EO-1 Configuration

*42. Change Figure 3-3 Deployed Spacecraft with coordinate system

* See following pages for “from” “to” changes.

EO-1 PIRN 003
ICD-18(A)
EO-1 CCR 0028
17 of 22

FROM

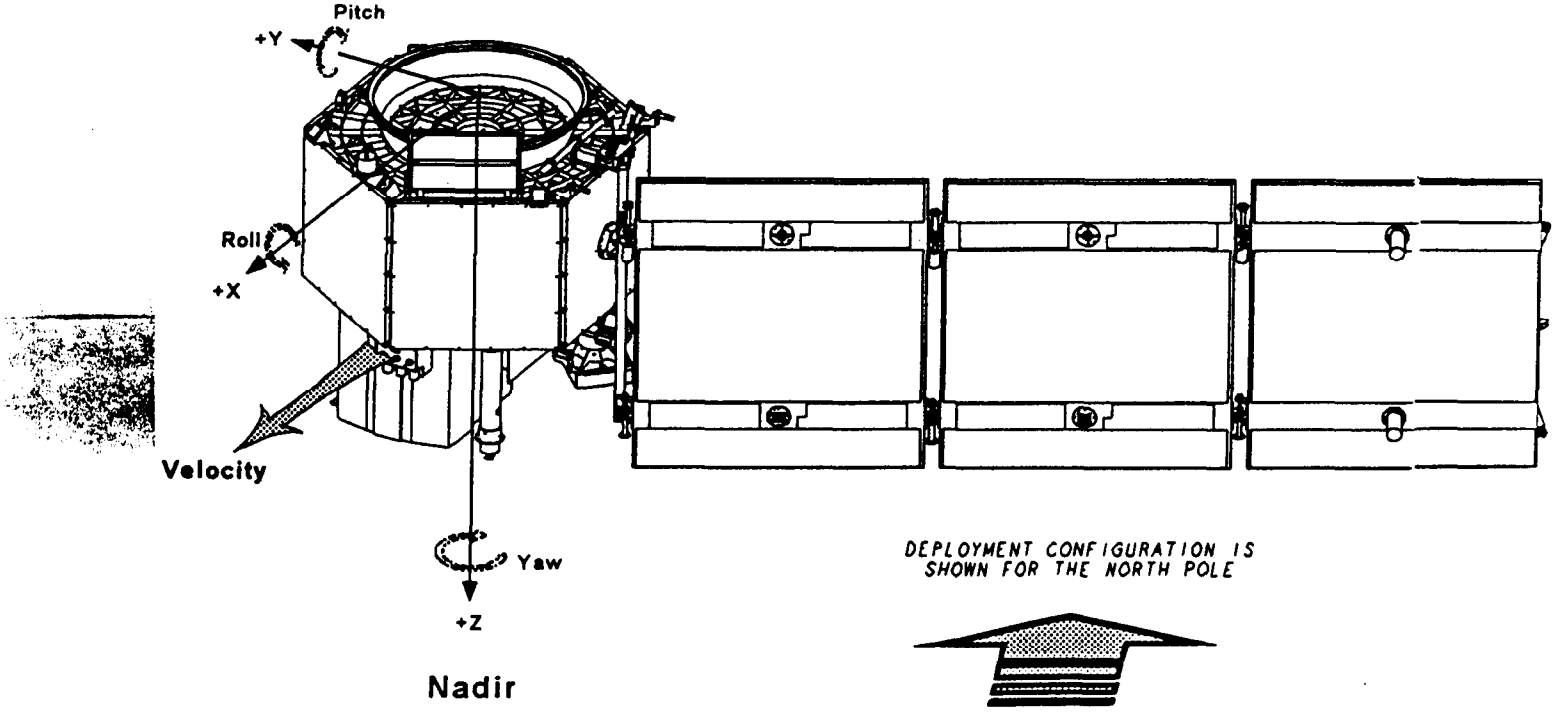

Figure 3-3. Deployed Spacecraft With Coordinate System (Sun is Normal to the Page)

To:

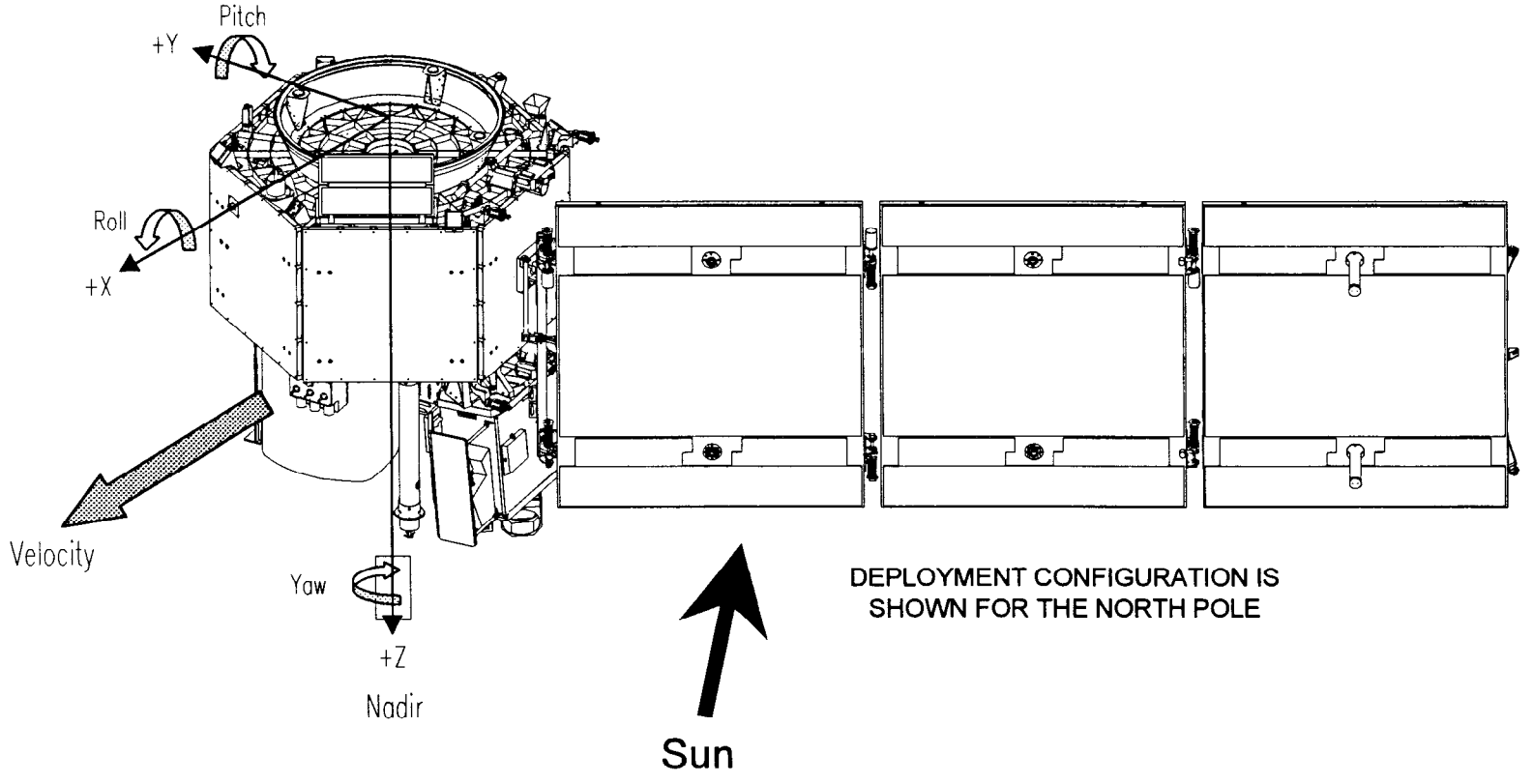

FIG 3-3 Deployed Spacecraft with Coordinate System

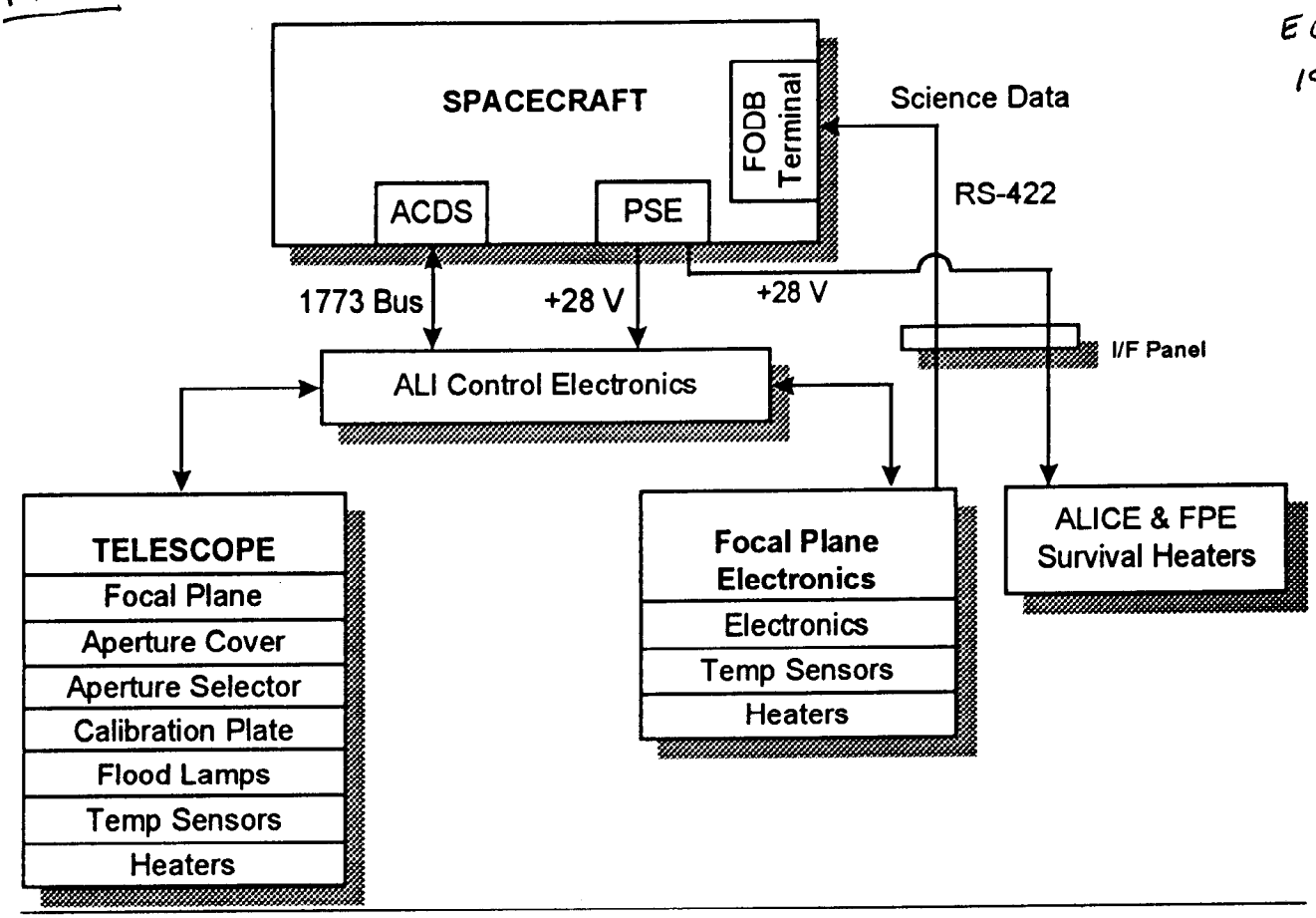

Figure 3-5. Instrument Electrical Block Diagram

EO-1 PIRN 003
ICO-18(A)
EO-1 CCR 0028
20 OF 22

To:

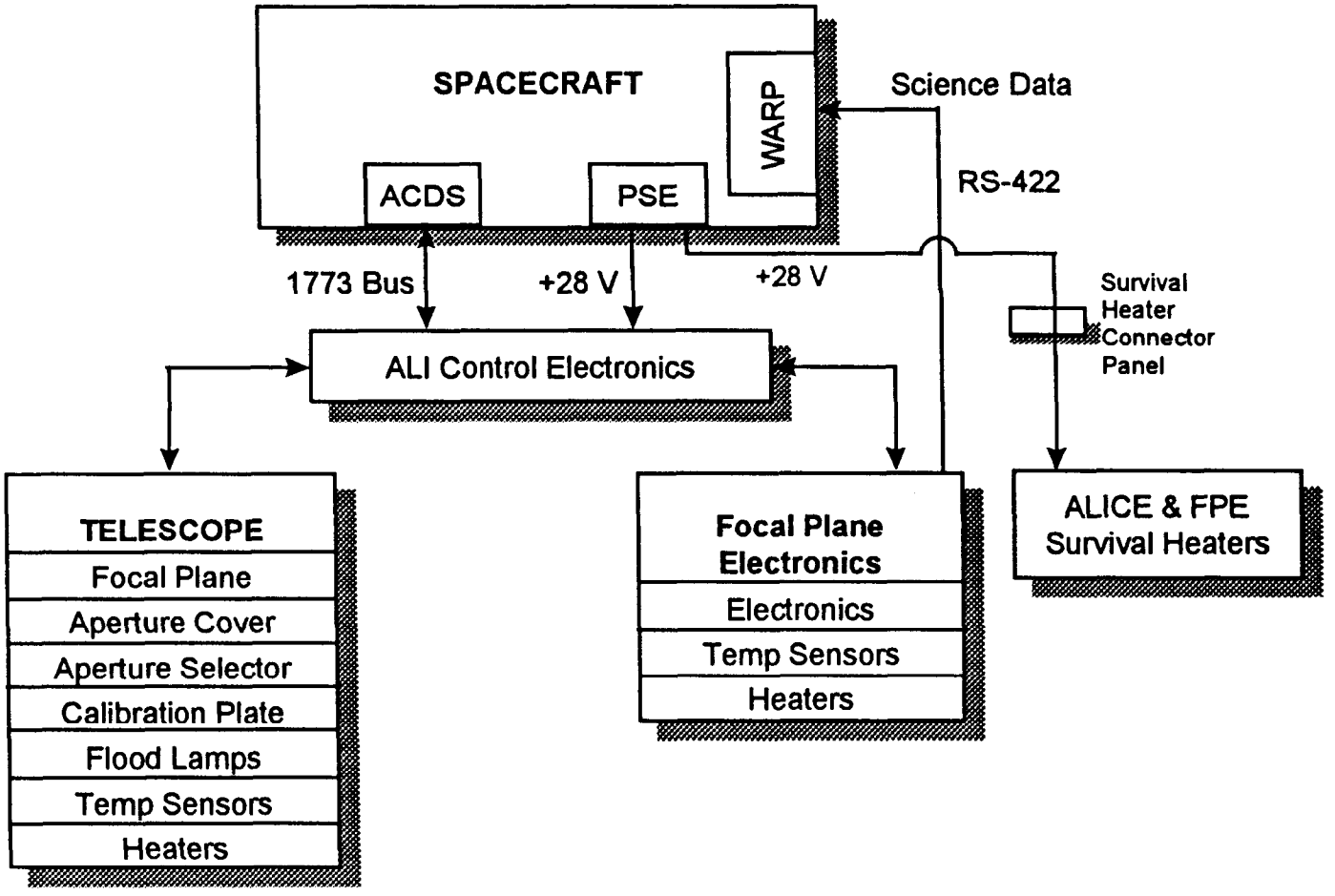

FIG 3-5 INSTRUMENT ELECTRICAL BLOCK DIAGRAM

FROM:

EO-1 PIRN 003
EO-1 ICD-018
Rev. A
EO-1 CCR 0028
21 OF 22

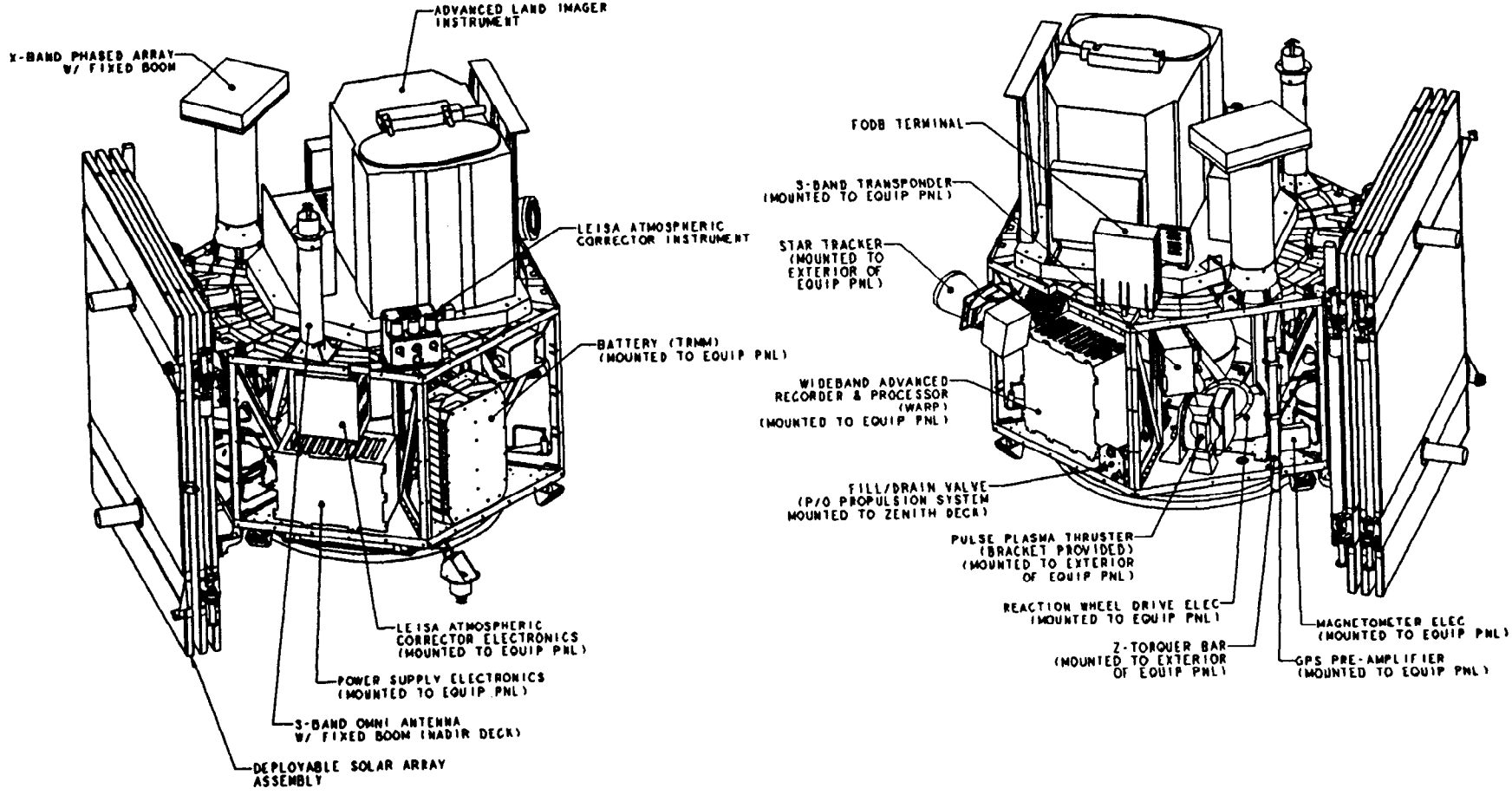

Figure 3-1. EO-1 Configuration (Outer Panels Not Shown)

EO-1 PIRN 003
ICD-18 (A)
EO-1 CCR 0028
22 OF 22

To:

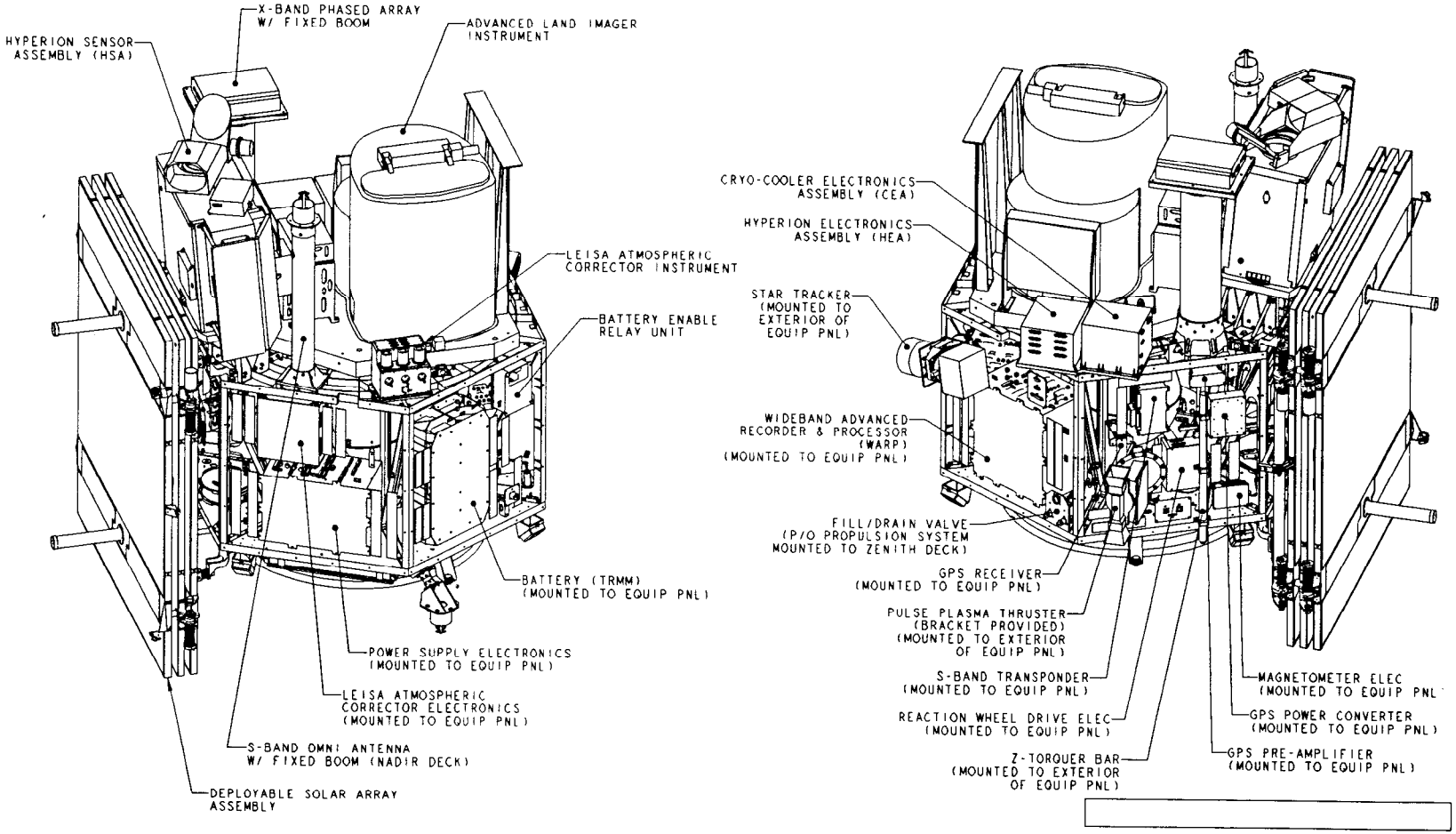

FIG 3.1 EO-1 Configuration

Date: Mon, 08 Feb 1999 17:53:11 -0500 (Eastern Standard Time)
From: Administrator <administrator@hst-nic.hst.nasa.gov>
Reply-to: (Mark Perry)
Subject: CCR:0028 - DUE: 02/24/99   ROUTINE
  Level-2
 Mark Perr WWW-COMMENTS

USER :   (Mark Perry) sent the following comments on :

Date: 8 Feb 99
CCR Number: 0028
Sponsor: R. WELSH/EO-1ALI
Due Date: 02/24/99

CCR Title: CHANGES TO EO-1 ALI ICD-18 (A)

Remote host: 209.49.96.12 Email Address:

APPROVAL STATUS: APPROVED
Note:

COMMENTS:

Date: Tue, 16 Feb 1999 14:02:30 -0500 (Eastern Standard Time)
From: Administrator <administrator@hst-nic.hst.nasa.gov>
Reply-to: (Pete Spidaliere)
Subject: CCR:0028 - DUE: 02/24/99   ROUTINE Level-2 Pete Spidalier WWW-COMMENTS

USER :   (Pete Spidaliere) sent the following comments on :

Date: 16 feb 99
CCR Number: 0028
Sponsor: R. WELSH/EO-1ALI
Due Date: 02/24/99

CCR Title: CHANGES TO EO-1 ALI ICD-18 (A)

Remote host: 128.183.213.112 Email Address:

APPROVAL STATUS: APPROVED WITH COMMENTS
Note:

COMMENTS: Tim/Ralph,

Please update this to reflect the FPRadiator heaters. If this change impledes the approval of this change then put in a separate one.

Pete

Date: Wed, 24 Feb 1999 11:14:16 -0500 (Eastern Standard Time)
From: Administrator <administrator@hst-nic.hst.nasa.gov>
Reply-to: (Ralph D. Welsh, Jr/740.2/426)
Subject: CCR:0028 - DUE: 02/24/99   ROUTINE Level-2 Ralph D. Welsh, Jr/740.2/42 WWW-COMMENTS

USER :   (Ralph D. Welsh, Jr/740.2/426) sent the following comments on :

Date: 2/24/99
CCR Number: 0028
Sponsor: R. WELSH/EO-1ALI
Due Date: 02/24/99

CCR Title: CHANGES TO EO-1 ALI ICD-18 (A)

Remote host: 128.183.213.120 Email Address: Ralph.D.Welsh.1@gsfc.nasa.gov
---
APPROVAL STATUS: APPROVED WITH COMMENTS
Note:

COMMENTS: Comments from Ralph Welsh/301-286-9774
1. Change 4: Subparagraph a add "To: a. Transmission of wideband (image) data to the WARP I/F."
2. Change 7: change "ALO" to "ALI" in 4 places.
3. Change 7: change "AKI" to "ALI" in 2 places.
4. Change 17: change "AKI" to "ALi" in 2 places.
5. Change 19 To: paragraph, 3rd from last line: insert after "purge cart will be supplied from": "clean, dry, oil free"
6. Change 22: Top of table is shown on bottom of page 6 and top of page 7. delete top of table 3.3-1 on bottom of page 6.
7. Change 22: Add after table title "ALI Power Distribution": "at 28V"
8. Change 22: Add additional table:
"ALI Power Distribution During Outgas Mode at 28V (Watts)"

Outgas heater	22
Radiator heater	24
FPA Rail heater	5
Truss heater	10
FPE (Standby)	8.4
ALICE	18.8
Total	88.2

9. Change 39 To table:Change in "ALI STM Unit/Delivered to" Box to "GSFC"
10. Change 39 To: table: Add in "ALI STM Unit/Comment" Box "Delivered"
11. Change 39 To: Table: Change in Swale "ALI Flight Unit/Delivered to" box to "Swales"
12. Change 39 To: Table: Change 2/12/99 in "ALI Flight Unit/Need Date" Box to "3/99".
13. Change 39 To: Table: Add in "ALI Flight Unit/Comment" Box "Meet GSFC/Swales I&T schedule.

CCR SPONSOR RECOMMENDATION FORM

CCR NUMBER: 0028
CCR TITLE: Changes to EO-1 ALI ICD-18 (A)

CCR SPONSOR: Ralph Welsh/GSFC/740.2/426

SUMMARY OF COMMENTS RECEIVED: (list Level 4 CCB and internal reviewers who had comments and address those comments)

1.) Pete Spidaliere: Tim/Ralph, Please update this to reflect the FP Radiator heaters. If this change impledes the approval of this change then put in a separate one.

Sponsor Response: **Agree.** Will be adding Table of power consumption in outgas mode. (See sponsor comments No. 8.)

2.) Ralph Welsh additional changes/comments: Change 4: Subparagraph a add "To: a. Transmission of wideband (image) data to the WARP I/F."
2. Change 7: change "ALO" to "ALI" in 4 places.
3. Change 7: change "AKI" to "ALI" in 2 places.
4. Change 17: change "AKI" to "ALi" in 2 places.
5. Change 19 To: paragraph, 3rd from last line: insert after "purge cart will be supplied from": "clean, dry, oil free"
6. Change 22: Top of table is shown on bottom of page 6 and top of page 7. delete top of table 3.3-1 on bottom of page 6.
7. Change 22: Add after table title "ALI Power Distribution": "at 28V"
8. Change 22: Add additional table:

"ALI Power Distribution During Outgas Mode at 28V (Watts)"

Outgas heater	22
Radiator heater	24
FPA Rail heater	5
Truss heater	10
FPE (Standby)	8.4
ALICE	18.8
Total	88.2

9. Change 39 To table:Change in "ALI STM Unit/Delivered to" Box to "GSFC"
10. Change 39 To: table: Add in "ALI STM Unit/Comment" Box "Delivered"
11. Change 39 To: Table: Change in Swale "ALI Flight Unit/Delivered to" box to "Swales"
12. Change 39 To: Table: Change 2/12/99 in "ALI Flight Unit/Need Date" Box to "3/99".
13. Change 39 To: Table: Add in "ALI Flight Unit/Comment" Box "Meet GSFC/Swales I&T schedule.
14. Change Figure 3-2 ALI Co-ordinate System: (See attached “From” “To”)

SPONSOR/ORGANIZATION: Ralph Welsh
DATE: 3/15/99