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SMART-1

*A*dvanced *M*oon micro-*I*mager *E*xperiment

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	Name	Function	Date	Signature
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5.1.0 DOCUMENT CONTROL

5.1.0.1 Configuration Control

5.1.0.1.1 CIDL of the embedded documents

5.1.0.1.2 Change record

Issue	Date	Change Description
1.0	04.05.01	Initial Issue
1.1	16.05.01	UM-DRD introduced
2.0	30.06.02	All paragraphs updated
2.1	30.01.03	Updated 5.1.9 – Data Operations Handbook

5.1.0.2 Table of contents

5.1.1 INSTRUMENT DESCRIPTION

5.1.1.1 Science and Technology objectives

AMIE is an imaging system build upon a tele-objective with a 5.3° x 5.3° field of view and an imaging sensor of 1024x1024 pixels. The parts of the sensors are covered with filters.
The capabilities and characteristics of AMIE have been originally defined for an asteroid fly-by. However, these characteristics make it an outstanding instrument for lunar science.

The main scientific objectives of AMIE are:

- Lunar South Pole Imaging (Aitken basin)
- Permanent Shadow Imaging (Ice deposits)
- Eternal Light Imaging (crater rims)
- Mapping of high latitudes regions (south) mainly at far side
- Public Outreach

The main technical objectives are:

- Laserlink Experiment
- Flight demonstration of new technology
- Navigation aid (feasibility study)

5.1.1.2 Science and technology performance summary

Key parameters of the instrument:

- 5.3° x 5.3° FOV --> Images 45 km x 45 km at 500 km
- CCD 1024 x 1024 --> resolution 45 m / pixel with 10 bits/pixel

- Powerful Image Compression Unit -> high data compression rate
- Power Supply I/F Board (PSIF)
- System Control Unit (SCU): µP Board, buffer memory...
- Total Mass ~2.1 Kg

5.1.1.3 Instrument description

5.1.1.3.1 Functional description

The AMIE Imaging System is composed of 2 units: the AMIE Micro-Imager or Unit 1 (OPTH) and the AMIE Electronics or Unit 2 (RMEL). The Unit 1 is placed on the –X panel of the S/C on the external side and the Unit 2 is on the same panel but on the internal side. The main functions of the system are:

- To take images with spectral information
- To keep image data in a memory buffer
- To achieve images processing (data compression, image subtraction)
- To allow the downloading of the images by the On Board Computer (OBC).

The AMIE Imaging System has three electrical interfaces. The functions of these interfaces are described below:

- The serial and power interface connects the two units together. It is composed of one cable supporting the serial full duplex digital link at 10 Mbit/s and the power supply from the Unit 2 to the Unit 1.
- The CAN Bus interface handles the data between the On Board Computer and the AMIE Imaging System.
- The Power Bus Interface is used to power the AMIE Imaging System with a Regulated 50 VDC.

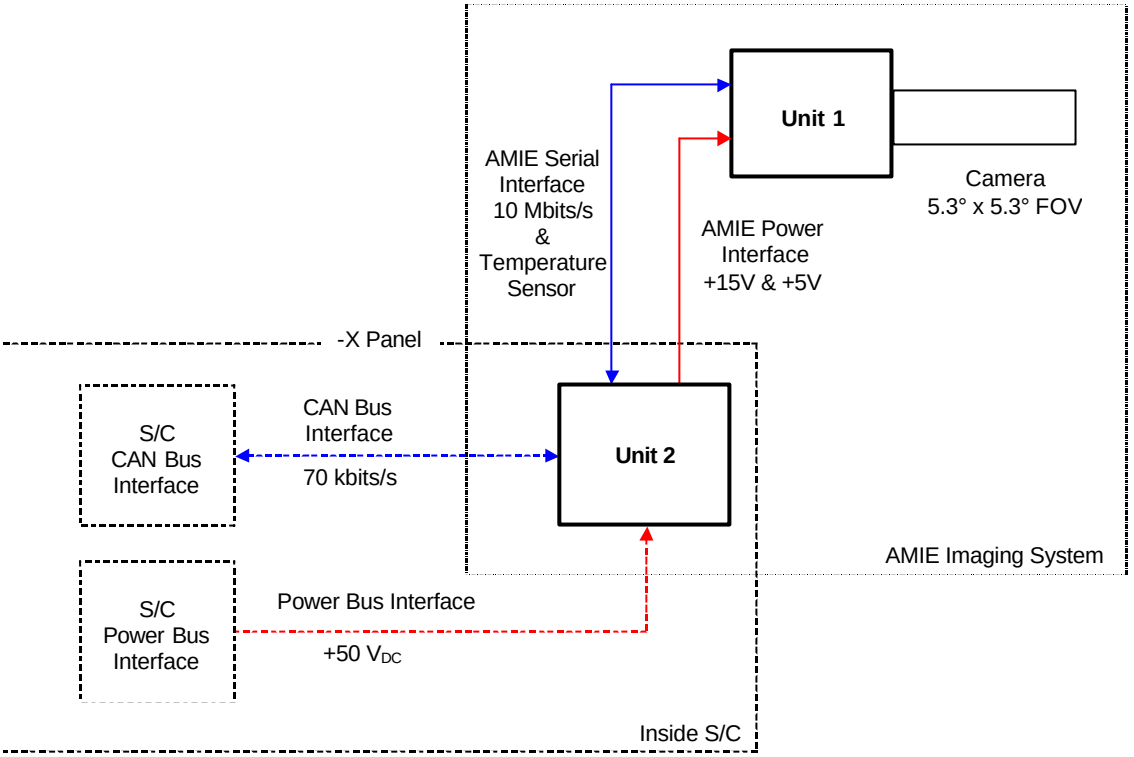


Figure 1: *AMIE Imaging System - I/O Diagram*

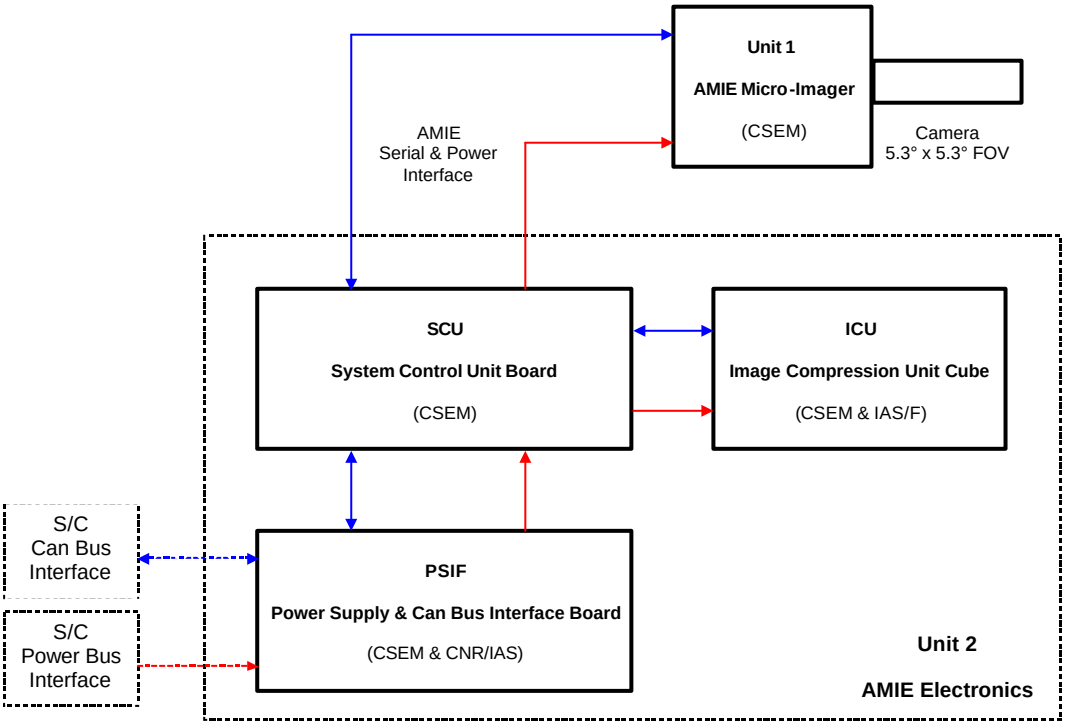


Figure 2: *AMIE Imaging System - Main Hardware Functions*

5.1.1.3.2 Hardware description

AMIE Unit 1 (OPTH) is a micro-camera equipped with a tele-objective, as shown below. It comprises a micro-camera head with an opto-mechanical interface to attach the objective. The micro-camera head is radiation-protected by a 4 mm thick anodised black aluminium shielding all around it with a 7 mm top cover (for the side facing the S/C, the thickness is reduced to 1 mm). It is screwed directly to the aluminium holding bracket and has neither mechanical nor electrical interaction with the camera.

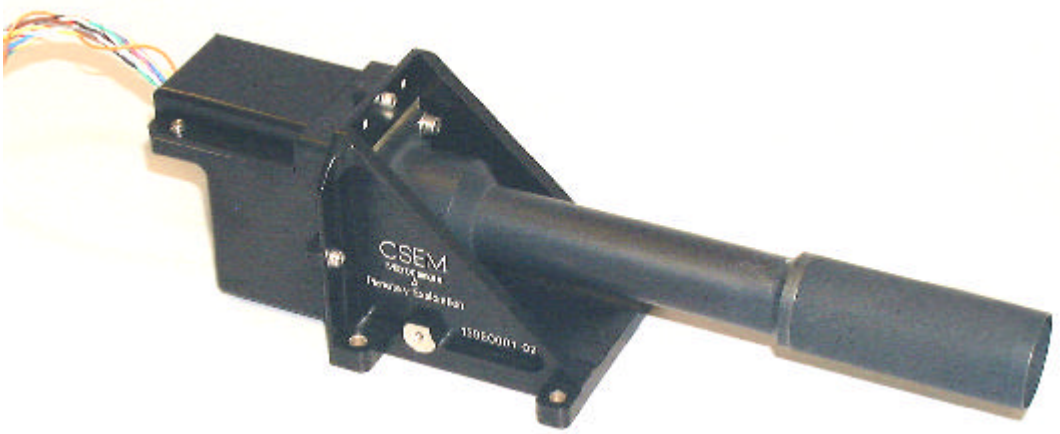


Figure 3: *AMIE Unit 1*

The electrical interface between Unit 1 and Unit 2 is given below.

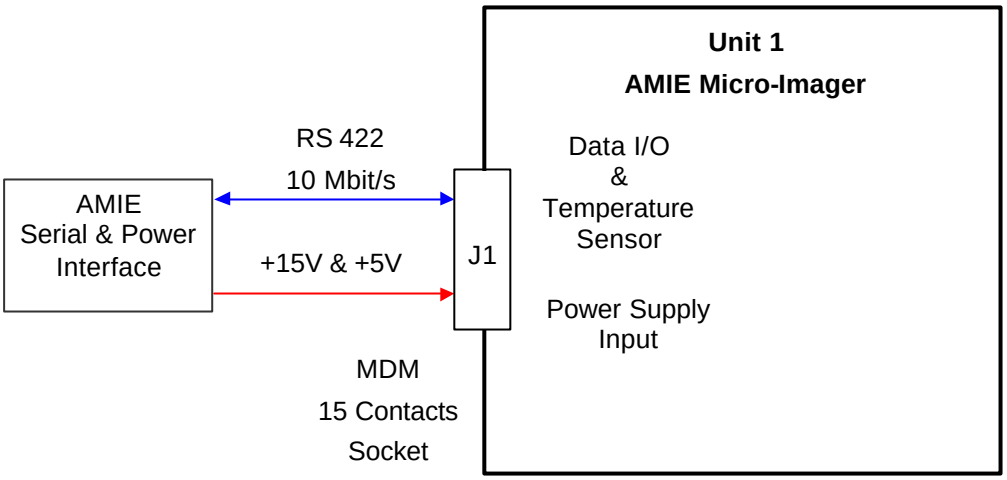


Figure 4: *Unit 1 Interface Description*

The main electrical functions of Unit 1 are given hereafter.

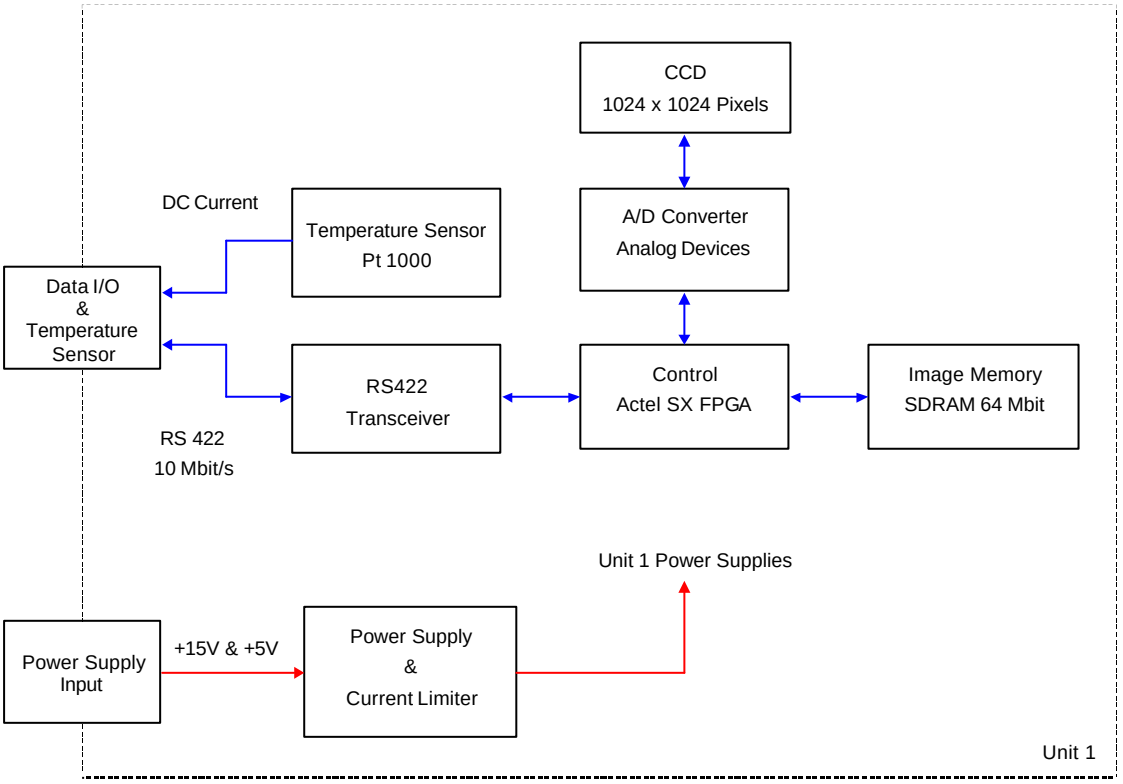


Figure 5: *Unit 1 Electrical Design Description*

A set of filters is placed in front of the CCD; their specifications are given in the figure below.

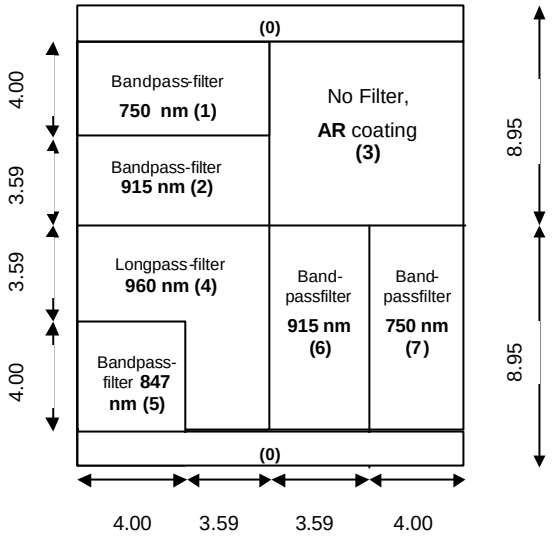


Figure 6: *Filters in front of the CCD*

AMIE Unit 2 (RMEL) is composed of a Power Supply and InterFace board (PSIF), a System Control Unit board (SCU) and a compression module (Image compression Unit (ICU)). These components are integrated in an aluminium box with Alodine 1200S treatment, acting also as a radiation shielding (3 mm thick box with 5 mm thick cover).

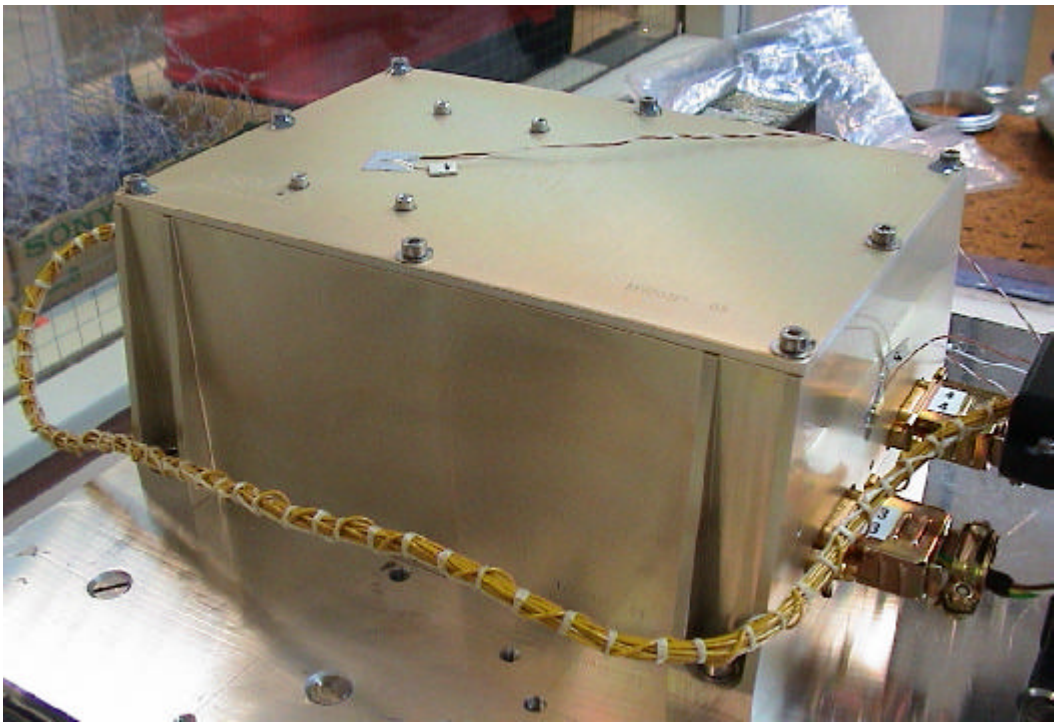


Figure 7: *AMIE Unit 2*

The electrical interface between Unit 1, Unit 2 and OBC is given below.

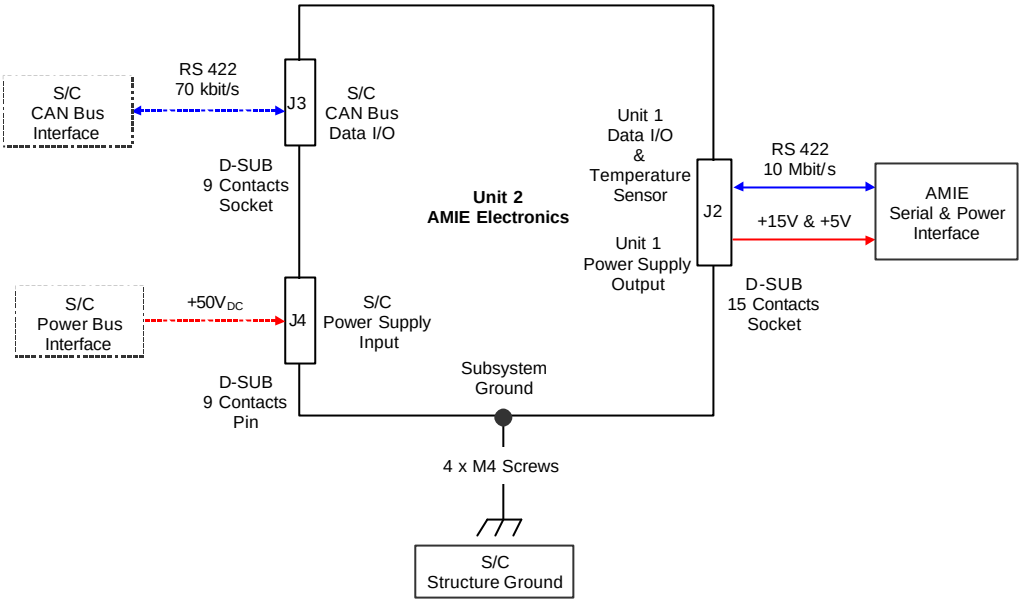


Figure 8: *Unit 2 Interface Description*

The different parts of Unit 2 with their interconnections are shown below.

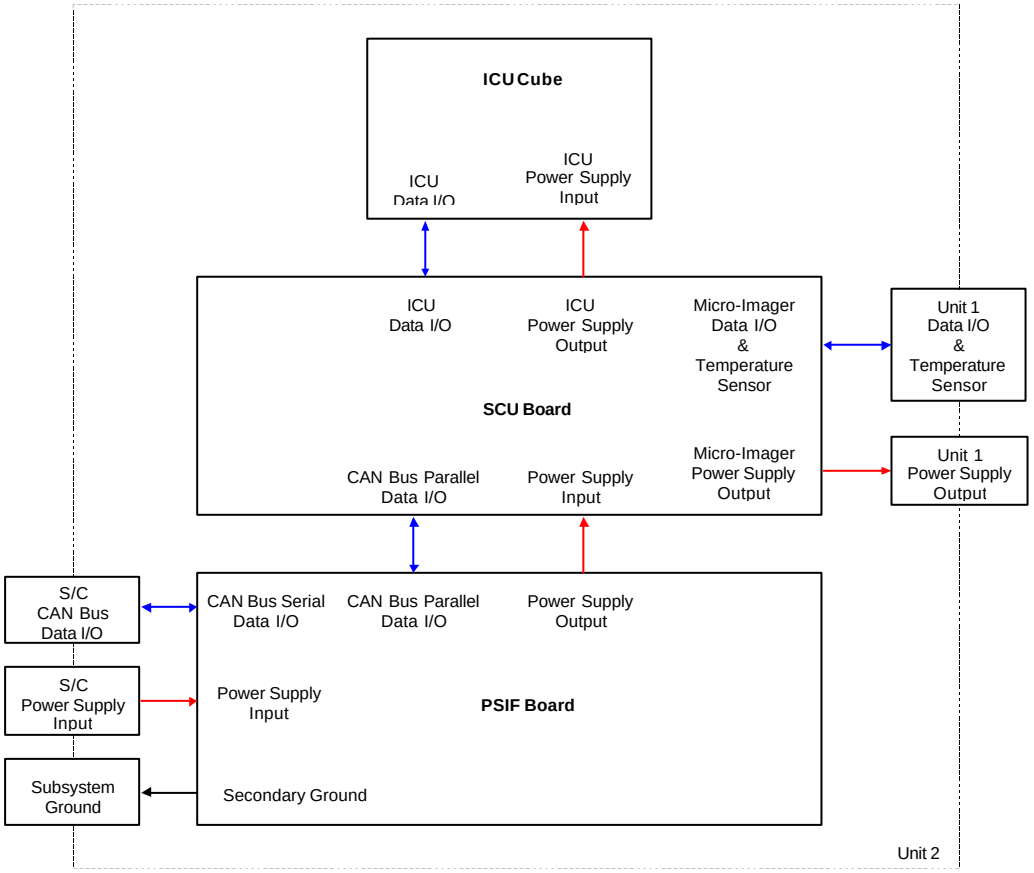


Figure 9: *Unit 2 main parts*

The PSIF board is a two layers europe-format PCB (160x100 mm) as shown below.

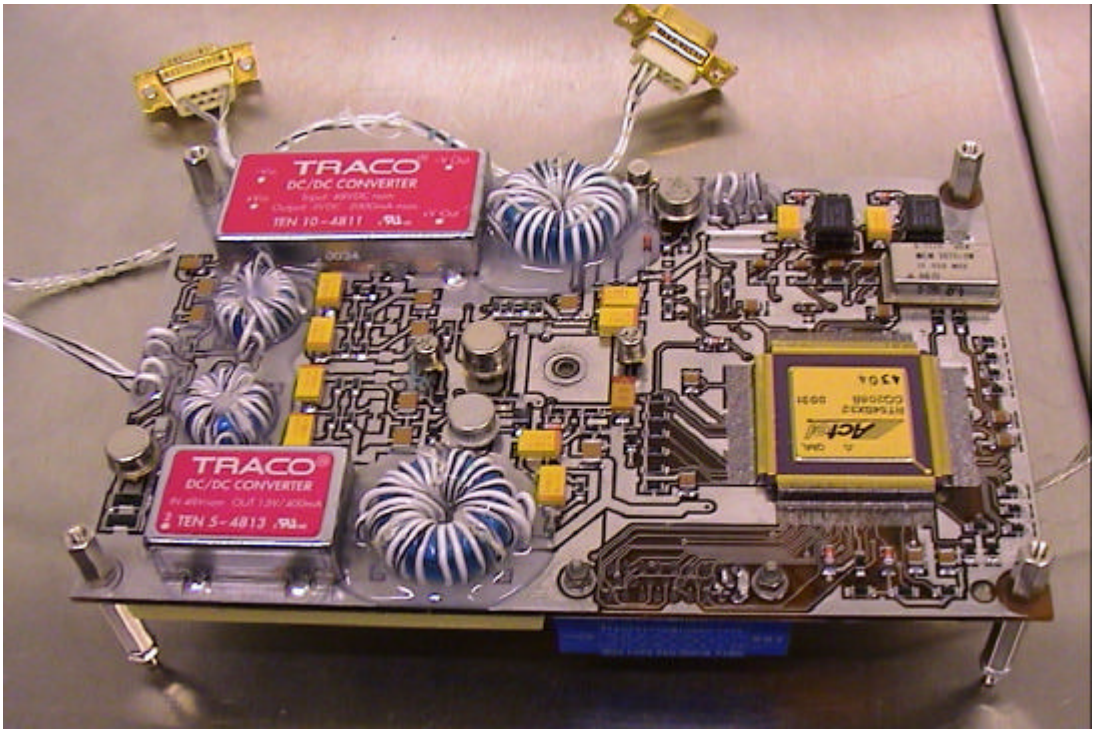


Figure 10: *PSIF board*

The PSIF board insures the correct powering of AMIE and the communication interface with the Spacecraft. Its main functions are given below.

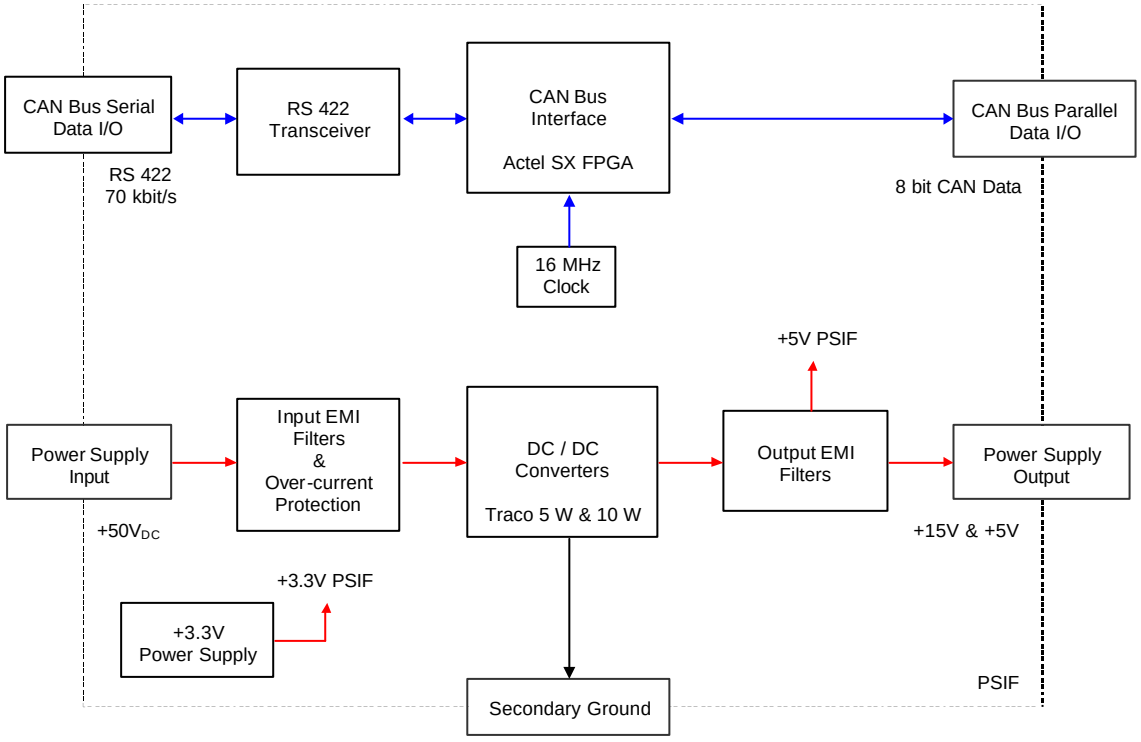


Figure 11: *Electrical Design Description of PSIF Board*

The SCU board is a 8 layers europe-format PCB (160x100 mm) as shown below.

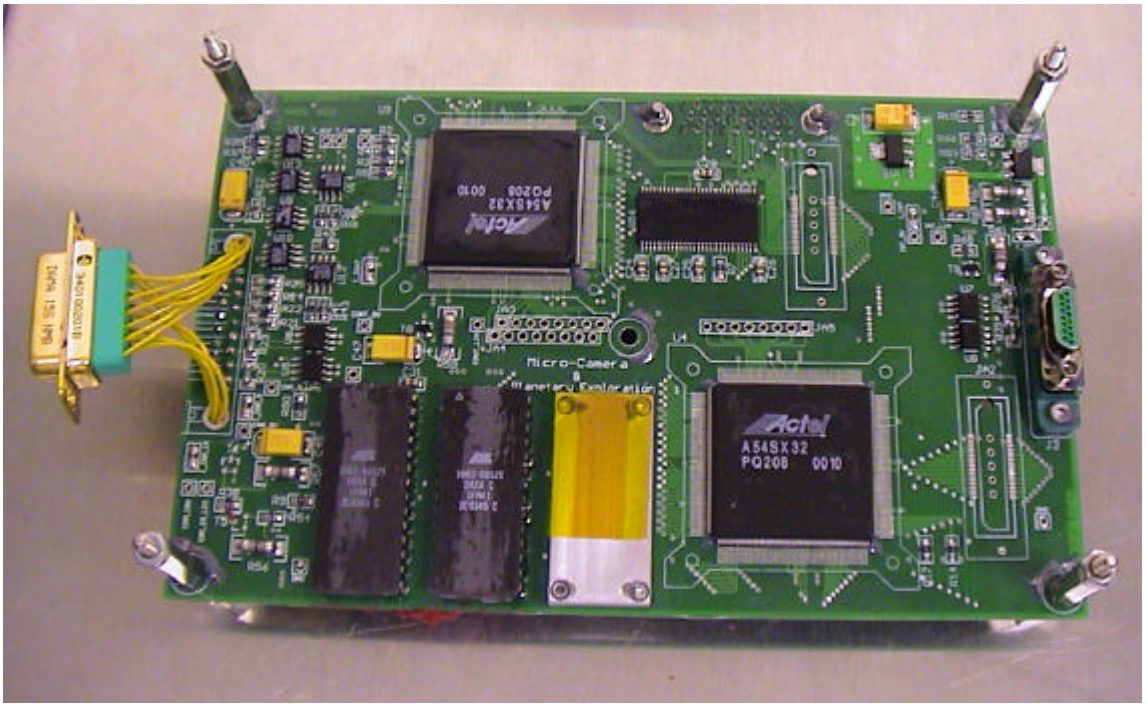


Figure 12: *SCU board*

The SCU board insures the following functions:

- Management of instruments commands
- Command and control of Unit 1
- Data acquisition of Unit 1
- Command and control of ICU
- Data storage in mass memory
- Communication with PSIF
- Power control of Unit 1 and ICU
- Temperature measurement of Unit 1 and SCU

Its main functions are shown in the diagram below.

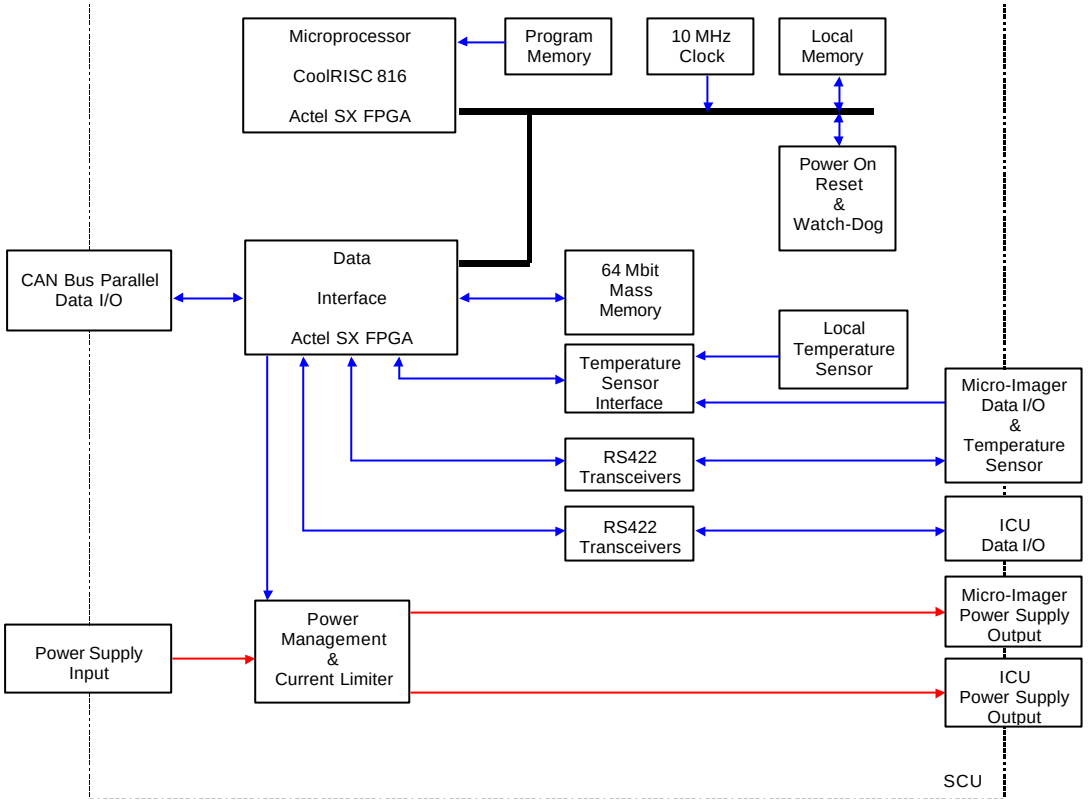


Figure 13: *SCU Functional Diagram*

Data interface and power management functions are described below.

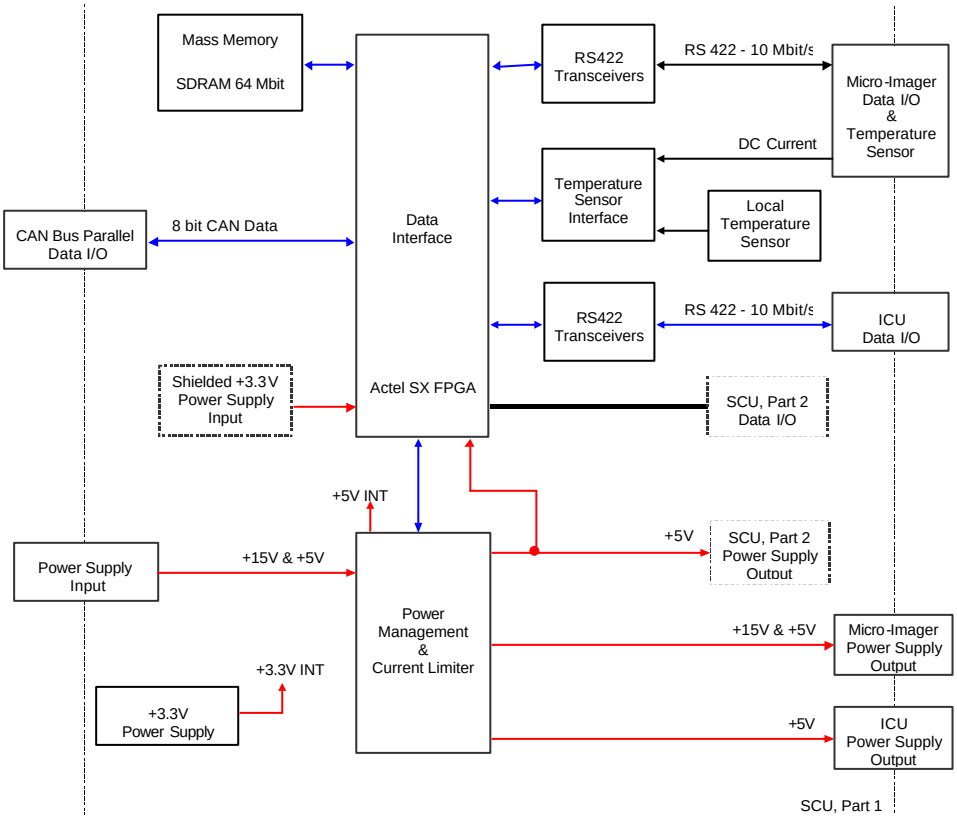


Figure 14: *Electrical Design Description of SCU – Data Interface & Power Management*

System management (management of instruments commands) functions are described below.

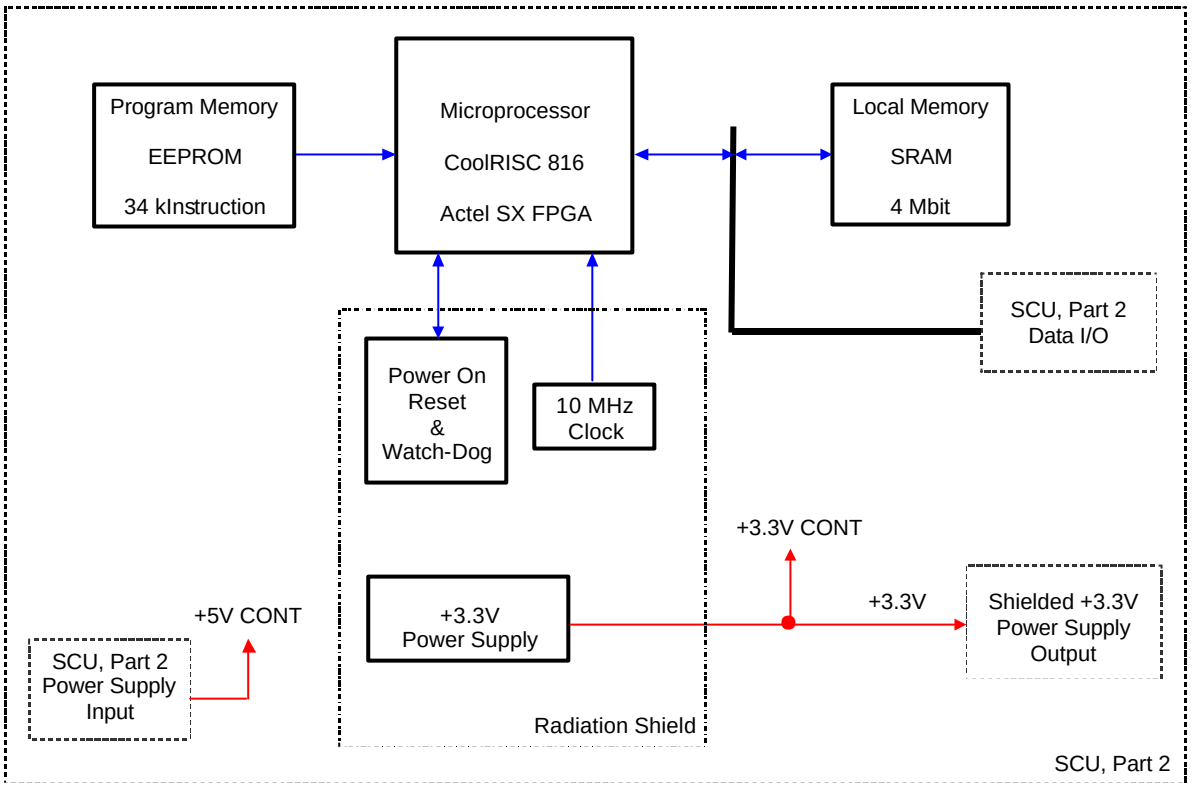


Figure 15: *Electrical Design Description of SCU Board*
System management

The ICU is composed of a MCM-V cube (52x52x35 mm) soldered on an interconnection PCB (70x75 mm), as shown below. It is mechanically attached to the cover of Unit 2 box thanks to an aluminium bracket.

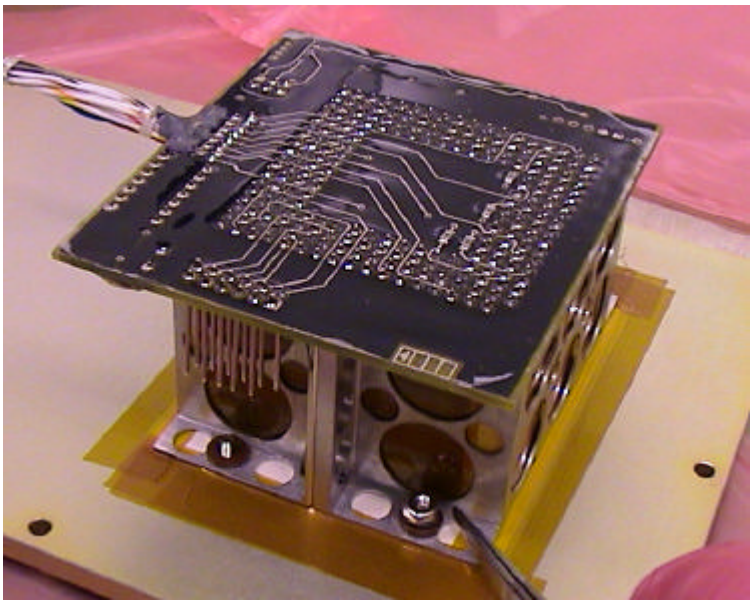


Figure 16: *Image Compression Unit*

The diagram below shows the architecture of the ICU.

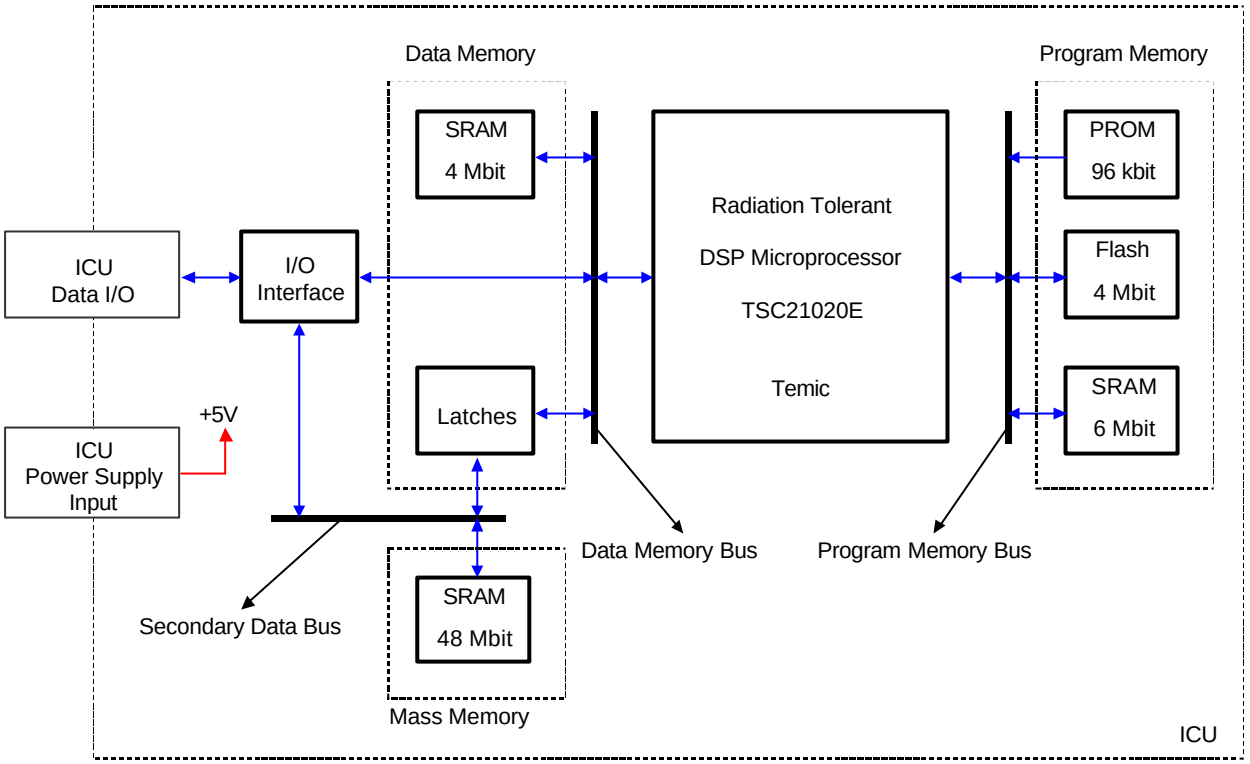


Figure 17: *Electrical Design Description of Image Compression Unit Cube*

The Unit 2 has been designed with a radiation tolerance strategy, as shown in the picture below. Critical parts are radiation protected either thanks to current limiters or over-current protection, either by radiation shield (extra aluminium cover).

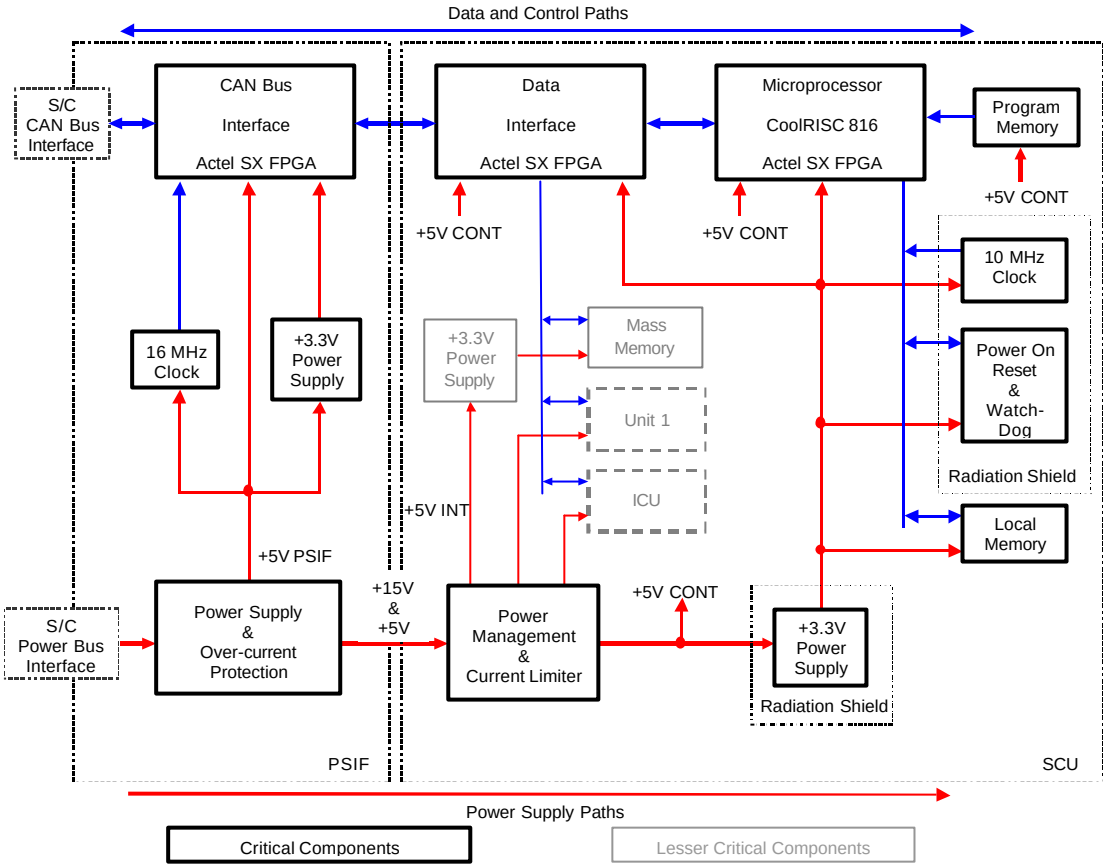


Figure 18: *Radiation Tolerance Strategy with Respect to Analysis of Possible Failures*

5.1.1.3.3 Software description

The information given hereafter describes the basic concepts of the firmware and software of AMIE. The complete reference is given in the Data Handling ICD.

The firmware is located in 3 anti-fused Actel SX FPGAs in Unit 2:

1. The CAN Bus Controller FPGA to manage the communication between AMIE and OBC.
2. The Interface FPGA to manage data transfers between internal parts of AMIE.
3. The Control FPGA, composed of an 8-bit RISC processor (CoolRISC 816), to manage the instrument operation.

The software is located in 3 EEPROMs in Unit 2.

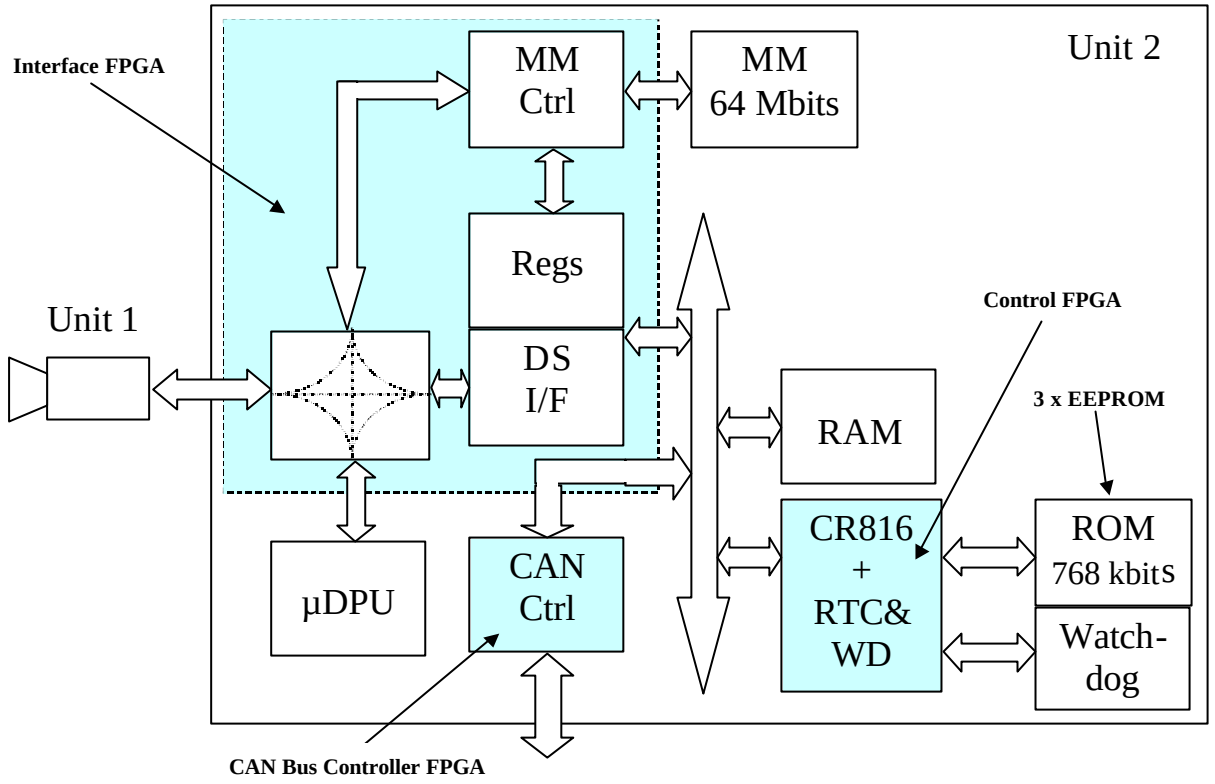


Figure 19: *Unit 2 structure*

The software is split in 3 levels:

1. The lower level: it includes the interfacing with the CAN controller, the Control FPGA and the timers (Watchdog counter and Real Time Clock).
2. The intermediate level: it is mainly used to segment/reassembly the TM/TC packets sent/received.
3. The higher level: this is the application layer.

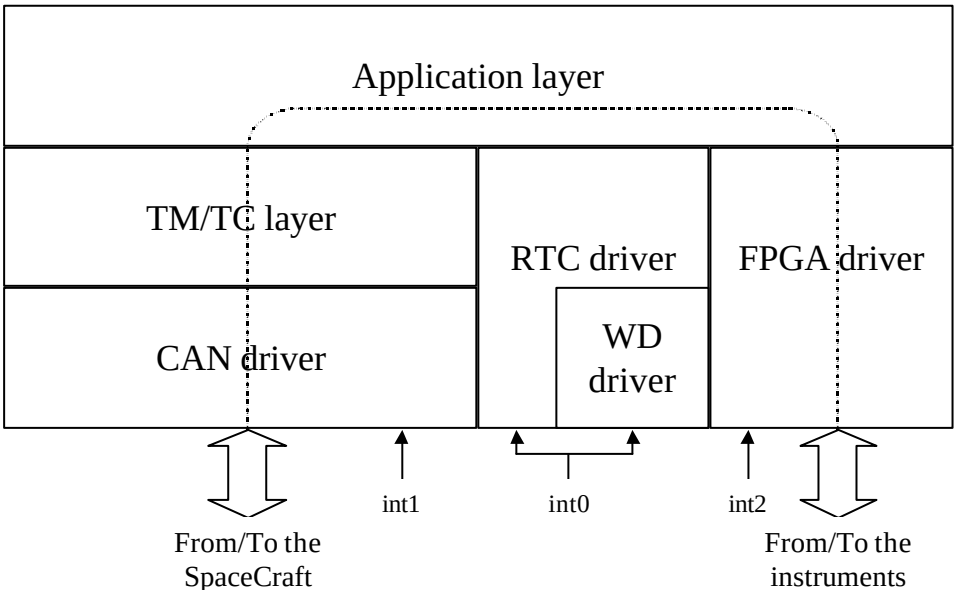


Figure 20: *Software architecture*

The main functionality of the software is to place the received commands in an action table or to maintain the real time clock aligned with the other equipment of the spacecraft.

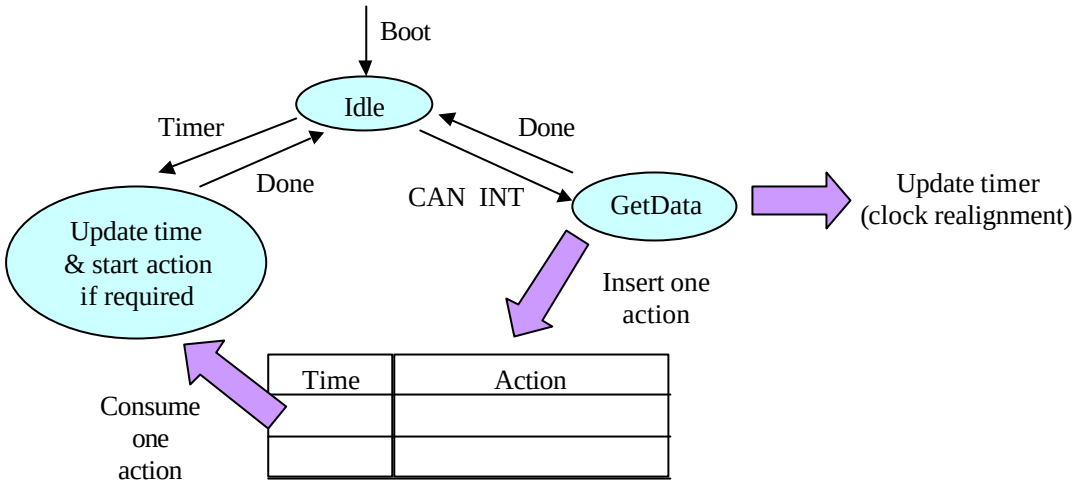


Figure 21: *Software basic functionality*

CAN driver layer

The CAN driver provides the software interface to the CAN bus controller. This driver is event driven through the interrupt line *int1*. Moreover, it could be called from the TM/TC layer when a packet has to be sent out to the CAN bus.

Four types of CAN messages can be received from the CAN controller:

1. TimeSync (message type 8)
2. TimeDist (message type 9)
3. PacketStart (message type 95)
4. PacketData (message type 96)
5. PacketEnd (message type 97)

The parity is checked in the 4 cases. If a PacketData or a PacketEnd present a bad parity status, the complete reassembled packet will be discarded. When a valid packet is reassembled (after PacketEnd is received), it is sent to the TM/TC layer.

The TimeSync and TimeDist event are notified to the RTC driver.

The driver can also be called from the TMTC layer. The necessary numbers of CAN messages are generated to send the encapsulated TMTC packet. At the end, a CanDone message is notified to the TMTC layer.

Watch-Dog (WD) driver

In order to prevent software deadlocks where the CoolRISC could fall, a watchdog (external component) is used. This external component has to receive a pulse periodically from the CoolRISC, to attest a healthy state from this processor. This is the responsibility of the WD driver, with the WD counter (included in the glue logic around the CoolRISC) to send this pulse. In case, this pulse isn't received in the expected time period of 500 ms, the watchdog will reboot the CoolRISC software by actionning its *resetn* pin.

The WD counter, counts down from 32679 to 0 each 1/ 65359 of second. When the value of zero is reached, the counter activates the interrupt line *int0* of the CoolRISC. The WD driver is started by this interrupt. The expected reaction is to reload the WD counter. At each reload, the WD counter sends the pulse to the watchdog and the interrupt is reset.

The WD driver must not modify any register used by other modules. So, it has to save the flags, the accumulator and the registers it could possibly use and restore them before the return (RTI: return from interrupt).

The WD driver by essence is simple and short and has a very good reaction time. It will be completely coded in assembler.

Due to the limitation of the 3 interrupt lines of the CoolRISC, *int0* is shared between the WD and the RTC drivers. Both sources of interrupts are ORed. It is the responsibility of the driver to check what was the interrupt source (WD or RTC). So, to deactivate *int0*, it could be necessary to treat both interrupt sources in case the two events arrived together.

The priority will then be given by software to the RTC (a short added delay to the WD present less drawback than a RTC inaccuracy).

To be sure that this driver doesn't only reply in standalone, when the rest of the software is lost in a deadlock, it has to interact with other software modules, to check their healthiness.

RTC driver

The RTC driver is the software interface to the Real Time Clock (RTC), which is a component included in the glue logic of the CoolRISC. The RTC driver is used to load a value to trigger. When the RTC component reaches the corresponding trigger condition, the interrupt line int0 is activated (through the ORed line with the WD counter).

The RTC driver notifies to the application, that an RTC event occurred. The application has then to execute the corresponding current command.

For simulation reasons, the SDL specification merges the functionality of the RTC hardware and software. The real function splitting is the following:

- Hardware: the RTC component generates an interrupt when a RTC trigger condition occurs. It holds the following 13 registers:

Register	Address	Meaning
io_timer_control	0x80	Timer control register: Bit7: dist, load time (dist+cur-saved) Bit6: sync, save current time Bit5: reset RTC int Bit4: activate trigger Bit3: load WD and reset WD int
io_rtc_trig_frac0	0x81	RTC Trigger fraction 0
io_rtc_trig_frac1	0x82	RTC Trigger fraction 1
io_rtc_trig_int0	0x83	RTC Trigger second 0
io_rtc_trig_int1	0x84	RTC Trigger second 1
io_rtc_trig_int2	0x85	RTC Trigger second 2
io_rtc_trig_int3	0x86	RTC Trigger second 3
io_rtc_dist_frac0	0x87	RTC Dist fraction 0
io_rtc_dist_frac1	0x88	RTC Dist fraction 1
io_rtc_dist_int0	0x89	RTC Dist second 0
io_rtc_dist_int1	0x8a	RTC Dist second 1
io_rtc_dist_int2	0x8b	RTC Dist second 2
io_rtc_dist_int3	0x8c	RTC Dist second 3

- Software: it accesses to these registers according to the CAN bus messages associated to the time and to the application requests to place a trigger condition. It notifies the application when an interrupt occurred.

TM/TC layer

When the TM/TC layer receives messages from the CAN driver, it checks the header field validity.

All correct TM/TC messages are forwarded to the application.

When the TM/TC layer receives an application message, it resets the corresponding ApId Sequence Count for the first received packet of the application. It encapsulates the application message in the TM packet, form the header.

The resulting TM packet is sent to the CAN driver.

Application layer

All application commands are using a 16 bytes format.

Time gives the instant for the command to be executed. Since time (Sec3=0, Sec2=0, Sec1=0, Sec0=0, Frac1=0, Frac0=0) is already gone, this special value is used to trigger a command immediately.

Command (1 byte) allows the definition of up to 256 different commands. For each one, the next two bytes used for the value have a different meaning.

The mass memory of 64 Mbytes is split in 256 segments. Hence a segment is 256 Kbytes long.

The application is responsible to store and execute the incoming commands. A command can either be immediate (not stored) or triggered at a later time. The commands are received from the TM/TC layer. The first command to trigger is placed in the RTC. The next commands are placed in a FIFO. The commands are supposed to be sorted by time. The application **does not** sort commands by time.

A CAN, a RTC or a WD interrupt is able to interrupt a command execution. However, a command cannot be inserted during a command. For example, it is not possible to measure the temperature in the middle of an image download.

The application maintains a table of the taken images and their memory position. Images are numbered in the same order they are taken (image #1, #2, ...). A ClearImages command resets the image counter and new taken images are re-numbered from 1.

When the application download an image or a portion of memory, it will not store the full image or the complete portion of memory if it doen't fit in a TM packet. The application will only store one TM packet (limited RAM ressource).

Control FPGA driver

The Control FPGA driver is the software interface for the CoolRISC software to the Control FPGA. This driver initiates the FPGA to transfer data between the following locations:

Camera – Mass Memory - µDPU – CoolRISC

A single application command sent to the Control FPGA driver can either constitute a single or multiple Control FPGA driver commands. The table below summarises it:

Application Command	Triggered sub-commands	Single/Multiple
SetCamera	SetCamera	Single
SetuDpu	SetuDpu	Single
TakePicture	TakePicture	Single

CompressImage	CompressImage	Single
DownloadImage	GetSubMemory, ...	Multiple
GetTemperature	GetTemperature	Single
GetMemory	GetSubMemory, ...	Multiple

The returned value of the triggered sub-command is:

Triggered sub-commands	Parameter	Returned value
SetCamera	On=1/Off=0	None
SetuDpu	On=1/Off=0	None
TakePicture	Image Start	Image End
CompressImage	Image Start, Image End	Image End
GetSubMemory, ...	Image Start, Image End	Memory sub-zone in sub-page of 16 bytes
GetTemperature	None	Temperature

5.1.1.3.4 On-board calibration

In the commissioning phase for the camera, several images of star fields at long exposure times shall be taken to verify the correct functioning of the camera. Imaging a star field allows to verify:

- the geometrical distortion (by looking at a number of star fields with a sufficient number of stars)
- the combination flat field/dark current (by removing the stars)
- the radiometric response (by looking at standard stars)
- straylight problems

Two calibration sessions are proposed, one shortly after launch, the other one just before Moon orbit insertion. A time slot of about 3 working days is estimated for each session. The spacecraft will be required to point the AMIE boresight to different directions in intertial space, specified by right ascension and declination. The total number of expected images is 40 (6 different pointing directions, 6 different exposure times).

5.1.1.4 Summary of Instrument operation

The following table presents the experiment modes and operations. More details concerning instrument operation can be found in the STDP document ref. S1-AMI-PL-3001.

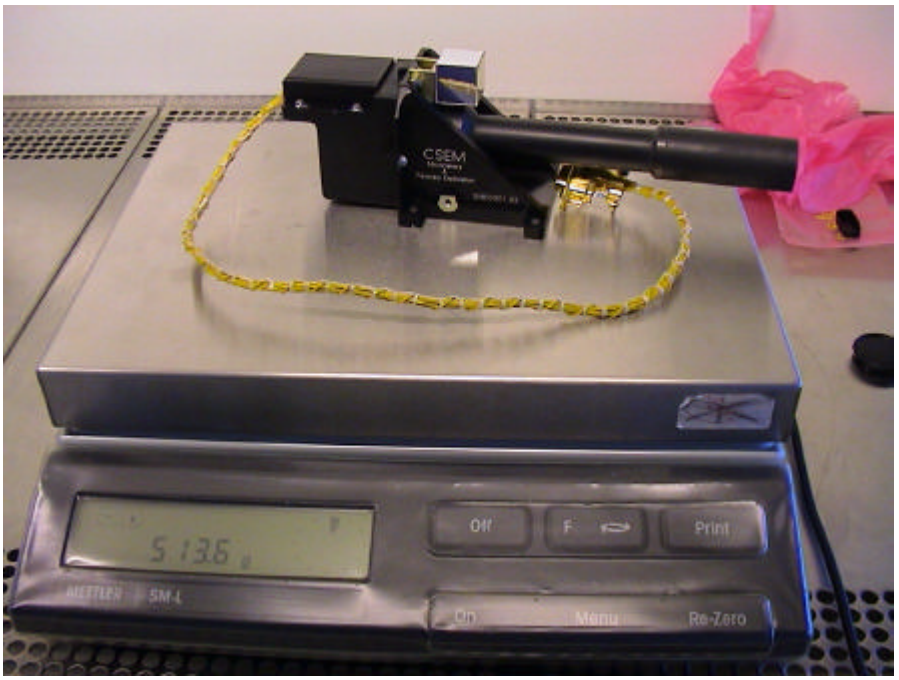
Mission phase	Experiment	Remarks
Launch	AMIE OFF	
Escape phase, in radiation belts	AMIE OFF	
Escape phase, outside of radiation belts	Earth views for public outreach	To be taken as soon as possible
	Laser link experiment	OGS in dark (night) region first
	Laser link experiment	Evaluate S/N ratio for OGS in illuminated area
	Navigation aid	Aiming at bright stars
Lunar approach	Moon views for public outreach	
Equatorial moon regions	View of lunar regions already imaged by Clementine	Calibration of exposure times, comparison of results
	View of dedicated regions of the moon	Mapping of specific features of the moon with the different filters
	RSIS support	
South pole imaging	Eternal light/permanent shadow/ ice deposits	Repeated imaging of same regions with different illuminations and exposure times

5.1.2 SYSTEM CHARACTERISTICS AND CONSTRAINTS

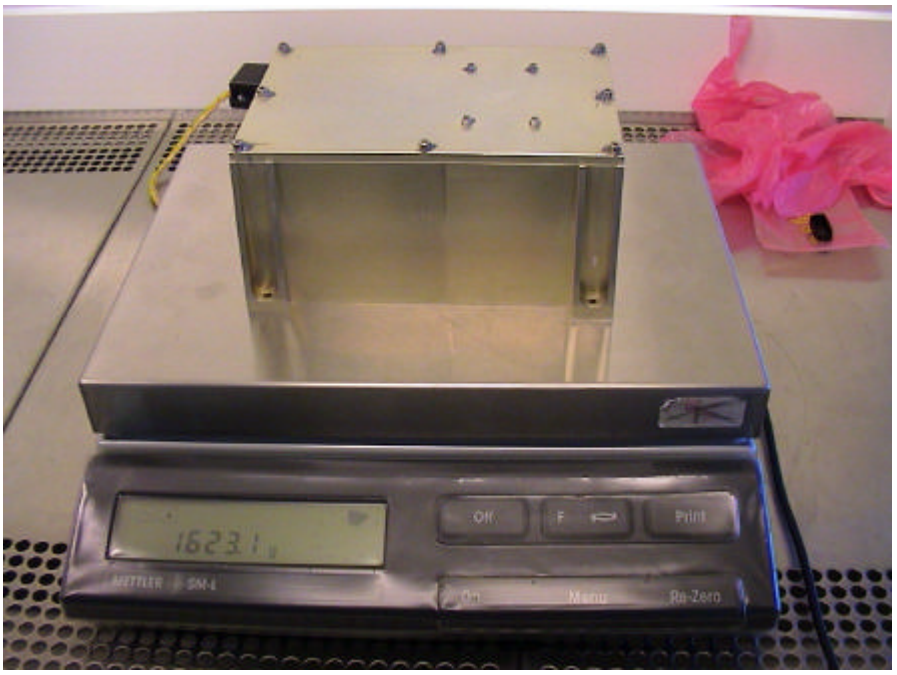
5.1.2.1 Instrument System Budgets

5.1.2.1.1 Mass budget

Unit 1: Mass including interconnection cable and alignment cube: 513.6g



Unit 2: Mass: 1623.1g



5.1.2.1.2 Power budget

The next table gives the AMIE Micro-Imager (Unit 1) power consumption values:

AMIE Mode	State		Unit 1 Power	Comments
	Unit 1	Unit 2		
AMIE OFF	OFF	OFF	0 W	AMIE Switched-off
AMIE ON	OFF	ON	0.08 W	CAN Bus Operations, no image taking or compression
Image Taking	ON	ON	1.6 W	Between 1 and 10 s per image
Compression	OFF	ON	0.08 W	5 s per image
Image Taking + Compression	ON	ON	1.6 W	Between 5 and 15 s per image
Max Peak Power	*ON*	*ON*	*2.3 W*	*Image Transfer in CCD Memory, 40 ms per image*

The next table gives the AMIE Electronics (Unit 2) power consumption values:

AMIE Mode	State		Unit 2 Power	Comments
	Unit 1	Unit 2		
AMIE OFF	OFF	OFF	0 W	AMIE Switched-off
AMIE ON	OFF	ON	2.0 W	CAN Bus Operations, no image taking or compression
Image Taking	ON	ON	2.6 W	Between 1 and 10 s per image
Compression	OFF	ON	6.5 W	5 s per image
Image Taking + Compression	ON	ON	7.2 W	Between 5 and 15 s per image
Max Peak Power	*ON*	*ON*	*7.7 W*	*Possible occurrence only in the Image Taking + Compression Mode, 40 ms per image*

The next table describes the AMIE Imaging System (Unit 1 and Unit 2) power consumption values:

AMIE Mode	State		AMIE Power	Comments
	Unit 1	Unit 2		
AMIE OFF	OFF	OFF	**0 W**	AMIE Switched-off
AMIE ON	OFF	ON	**2.1 W**	CAN Bus Operations, no image taking or compression
Image Taking	ON	ON	**4.2 W**	Between 1 and 10 s per image
Compression	OFF	ON	**6.6 W**	5 s per image
Image Taking + Compression	ON	ON	**8.8 W**	Between 5 and 15 s per image
Max Peak Power	*ON*	*ON*	***10.0 W***	*Possible occurrence only in the Image Taking + Compression Mode, 40 ms per image*

The power budget per mission phase is defined in the STDP.

5.1.2.1.3 Data Handling budgets

Required Tele-commands (TLC) per mode and observation; TLC estimated size:

See Data Handling ICD. Budgets will be defined after Ground Operation definition and coordination between AMIE, STOC and ESOC.

5.1.2.1.4 Pointing and alignment budgets

The alignment specifications are compatible with the needs of AMIE. Because AMIE may be used as an additional means of interpreting the images taken by SIR, it can be useful to correctly align SIR so that it points within the zone covered by AMIE using the same spectral range (950nm filter). This zone is 256x256 pixels, i.e. 1.32°x1.32°. The available accuracy is therefore sufficient to correctly position SIR w.r.t. AMIE.

Finally, alignment for Laser Link experiment is considered. A 256 x 256 pixel zone of the CCD will be covered with a narrow bandpass filter centred around the laser wavelength, corresponding to 1.32°x1.32°. The absolute pointing error specified on the X and Y axes is 15', i.e. 50 pixels. The available accuracy is therefore sufficient to correctly position AMIE for the Laser Link Experiment and to ensure that the Earth-based laser appears within the field of view.

See EID-B for additional information section 3.2.

5.1.2.2 Instrument Characteristics

Functional requirements

See STDP.

Key-performance table

Characteristic	Value
FOV	5.3°x5.3°
CCD	1024x1024 pixels
Resolution	0.005176°/pixel
Pixels size	14µm x 14µm
Electronic shutter	1 ms
Saturation	300’000 electrons
Spectral response	650 nm, 50% at 500nm and 800nm
Efficiency	>15% at 640 nm
Dynamic	80 dB

Calibration

The following calibrations have been performed on Unit 1:

- Dark current
- Flat Fields
- Spectral Flat Fields
- Focus

- Straylight
- Distortion
- MTF
- Alignment cube

The calibration procedures are given in the document S1-AMI-PL-3004 Test and Calibration Plan.

From the numerous images acquired during the calibration campaign, the following evaluations will be performed:

- dark current versus temperature
- straylight versus angle with respect to light source
- flat field versus wavelength
- bad pixels versus temperature
- geometrical distortion

Software routines will be written to allow performing the complete calibration of the AMIE raw data.

Pointing and stability analysis and budgets

See EIDB Section 3.2.

Radiation susceptibility

See Radiation Test Report.

Lifetime limited items (list)

N/A

5.1.3 INTERFACE DEFINITION

5.1.3.1 Mechanical interfaces

5.1.3.1.1 Mechanical ICD

See annexed mechanical drawings.

5.1.3.1.2 Mechanisms design

N/A

5.1.3.1.3 Alignment and stability analysis

See EIDB Section 3.2.

5.1.3.1.4 SMM

N/A

5.1.3.2 Thermal interfaces

5.1.3.2.1 Thermal ICD

See Thermal ICD ref. S1-AMI-ICD-3001.

5.1.3.2.2 TMM (Thermal Mathematical Model)

A reduced thermal mathematical model has been made by ESA: G. Colangelo (TOS-MCT), Doc. Reference TOS-MCT/2810/GC dated: 10 December 1999.

5.1.3.3 Electrical interfaces

5.1.3.3.1 Electrical ICD

See Electrical ICD ref. S1-AMI-ICD-3002.

5.1.3.3.2 EMC Summary results

Reference documents:

[1] S1-SES-RCD-2001 (P-SMT-SPC-5001-SE) 09-03-2001 Issue 3

[2] S1-SES-RCD-2001 (P-SMT-SPC-5001-SE DD) 24-08-2001 Issue 4

[3] S1-SES-PL-2001 EMC Verification Program Plan Issue 4

[4] “EMC Test report” ref. S1-AMI-TR-3002 Issue 1.0 (ref. Flextronics: RPT-EMC-231-20-07-2001)

[5] “EMC Facility Data Report for: AMIE” ref. ETS/REP/EMC/449 Issue 1 (13.05.02)

The following tests have been performed:

Description of operation	Required / Nominal	Measured	Remarks/Comments	Pass/ Fail
Conducted Emission Frequency Domain (CEP-2 CEP-3)	§ 5.2 of [1]	§ 6.1 of [4]	Power and Can Bus harness shielded	P
Radiated Emission E-Field (REE-1)	§ 5.2 of [1]	§ 6.2 of [4]	Power and Can Bus harness shielded	P
Radiated Emission H-Field (REH-1)	§ 5.2 of [1]	§ 6.3 of [4]	Power and Can Bus harness shielded	P
Radiated Susceptibility E-Field (RSE-1)	§ 5.2 of [1]	§ 6.4 of [4]	Power and Can Bus harness shielded	P
Susceptibility to electrostatic discharge (ESD-1)	§ 5.2 of [1]	§ 6.5 of [4]	Power and Can Bus harness shielded	P
Conducted Emission CEP-1	Ripple < 250 mVpp	100 mVpp		P
Conducted Emission CEP-4	Transient < 2.5 Vp	0.6 Vp		P
Conducted Emission CEP-5	Transient < 5 Vp	0.5 Vp		P
Conducted Emission CES-1	Ripple < 1 Vpp	0.22 Vpp		P
Conducted Emission CES-2	Transient < 290 mVpp	10 mVpp		P
Radiated Emission E-Field		§ 7.5 of [5]	no cable shields	F
Radiated Emission E-Field		§ 7.5 of [5]	Power line shielded	F
Radiated Emission E-Field		§ 7.5 of [5]	Power line and Can Bus shielded	F
Radiated Emission E-Field		§ 7.5 of [5]	Power line, Can Bus and Camera cable shielded	P*
Conducted Emission FD		§ 7.6 of [5]		P

*out-of-spec emissions are reduced to max. of 10 dB in a small range from 250 to 350 MHz

5.1.3.4 Data Handling interfaces

5.1.3.4.1 Data Handling ICD

See Data Handling ICD ref. S1-AMI-ICD-3004.

5.1.3.5 GSE interfaces

5.1.3.5.1 MGSE

N/A

5.1.3.5.2 EGSE

For testing and calibration purposes of Unit 1, a specific EGSE has been used (cf. figure below).

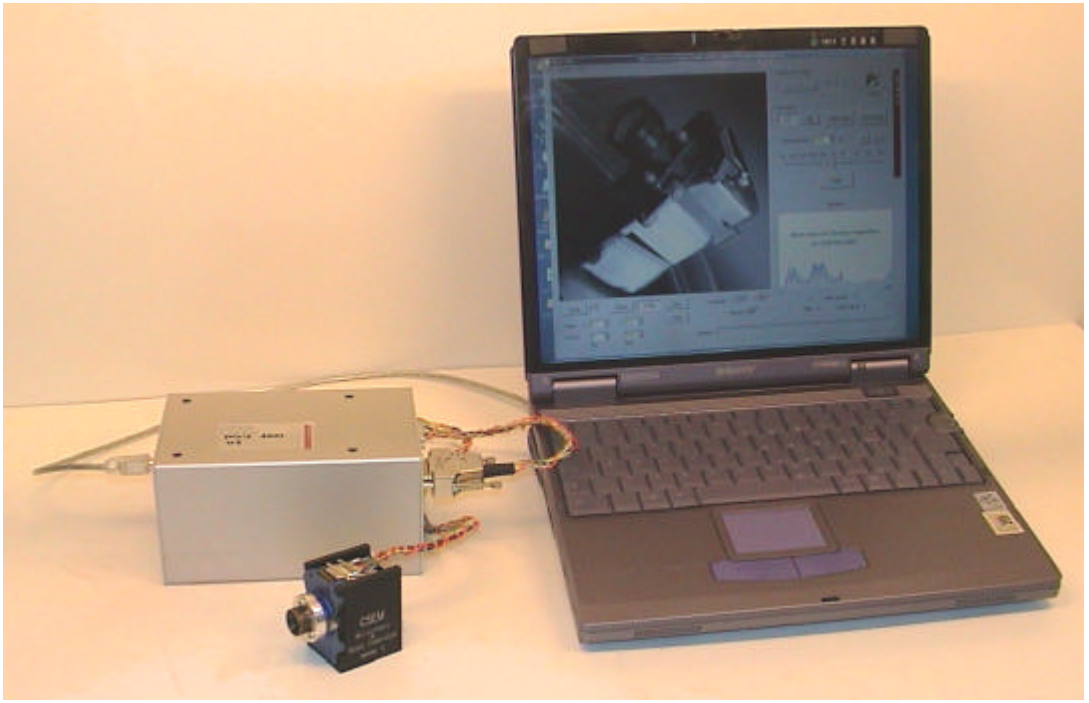


Figure 22 : *AMIE Unit 1 EGSE*

For the complete instrument (Unit 1 and Unit 2), a Spacecraft Interface Simulator provided by SSC has been used as EGSE.

5.1.3.5.3 Fluid interfaces (if any)

N/A

5.1.4 INSTRUMENT HANDLING INSTRUCTIONS

5.1.4.1 Instruction for Unpacking and Visual Inspection

5.1.4.1.1 Packing and Cleanliness State

The packaging of each unit is made individually and in the following order:

- First, the unit is packaged in an antistatic bag to ensure ESD protection and to allow safe handling of the unit. This operation is made in a clean room environment (cleanliness level of about 10'000).

- The fixation screws and washers for the unit are packaged in a separate bag. This operation is made in a clean room environment (cleanliness level of about 10'000).
- The 3 connector savers are packaged in a separate bag. This operation is made in a clean room environment (cleanliness level of about 10'000).
- A shock protection is put around both unit and screws bag to prevent any risk during transportation. This operation is made in a standard laboratory environment.

Note:

- The interconnection cable from Unit 1 to Unit 2 is already screwed on the Unit 1. It is packed with the Unit 1 in the antistatic bag.

A cleanliness certificate has been issued (document ref. S1-AMI-CER-3001 Certificate of Cleanliness).

5.1.4.1.2 Instructions for Unpacking

The shock protections can be unpacked without special precautions, but the two units shall be left in their antistatic bags to be brought until the AIV/AIT work area. To unpack the units of their antistatic bags, follow the instructions given in the handling procedure.

5.1.4.1.3 Packing List

The list of contents and the registry of the two delivered parts are given below:

- Unit 1

Reference	Quantity	Description
159E0001-03	1	AMIE Micro-Imager (OPTH)
S1-AMI-DRW-3205	1	Interconnection cable (already screwed on Unit 1)
P0509	4	M4 x 14 fixation screws
P0510	4	M4 washers

- Unit 2

Reference	Quantity	Description
159G0017-03	1	AMIE Electronics Box (RMEL)
159P0121-04	1	AMIE Electronics Box Cover
P0509	4	M4 x 14 fixation screws
P0510	4	M4 washers
DEBMA-09-PS011-NMB	2	Connector saver D-SUB 9 for J3 and J4
DABMA-15-PS011-NMB	1	Connector saver D-SUB 15 for J2

5.1.4.2 Handling

While the units are packaged in their antistatic bags, there is no particular precaution to handle the units. On the other hand, the following precautions shall be observed after unpacking the units:

- Have a work area equipped with the standard ESD protections and located in a clean room environment (cleanliness level of about 10'000).
- Have gloves to handle the units

Notes:

- The Unit 1 shall always be handled by the interface bracket and never by any other part (especially not the optics).
- The two units shall be put back in their antistatic bags when carried out of the work area.

- The plastic black cover of the objective should not be removed except for optical testing of Unit 1. **THIS COVER MUST BE REMOVED BEFORE LAUNCH**.

The Unit 1 is delivered with the interconnection cable from Unit 1 to Unit 2 already screwed on it. This cable should not be removed from Unit 1.

5.1.4.3 Integration on the S/C

5.1.4.3.1 Screwing on the S/C

The fixation of the Units shall be achieved by using the delivered M4 fixations screws and washers. There are 4 fixation points by unit. The nominal torque that shall be applied on the fixation screws is given in the table below.

Unit	Unit fixation screws Torque
Unit 1	1.8 Nm
Unit 2	1.6 Nm

5.1.4.3.2 Care to be taken before launch

Unit 1 Teleobjective cover

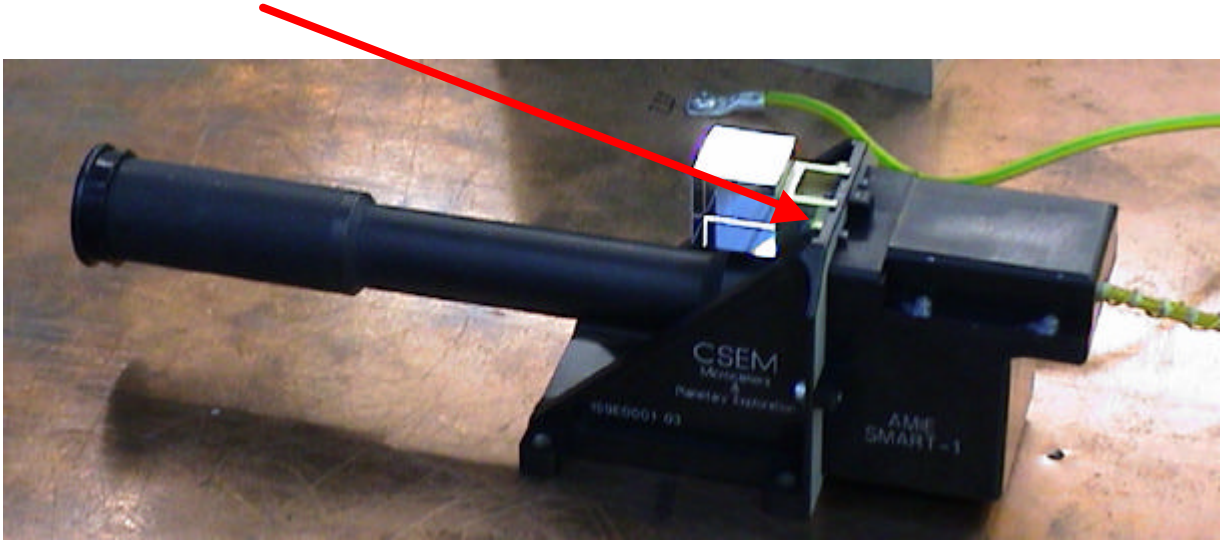
THE BLACK PLASTIC COVER OF THE OBJECTIVE OF UNIT 1 (CAMERA) MUST BE REMOVED BEFORE LAUNCH.

Unit 1 with plastic cover

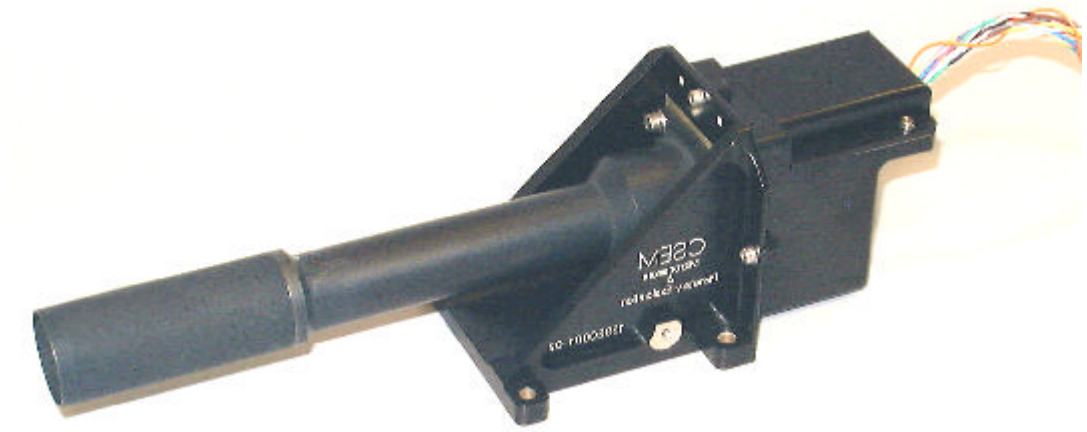
Unit 1 with plastic cover removed

Unit 1 Alignment cube

The alignment cube with its support of Unit 1 (camera) must be removed before launch by unscrewing the support.



Unit 1 with Alignment cube



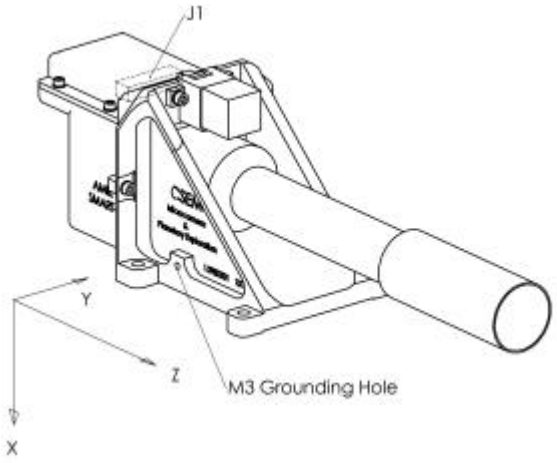
Unit 1 with Alignment cube removed

Unit 2 Connector savers

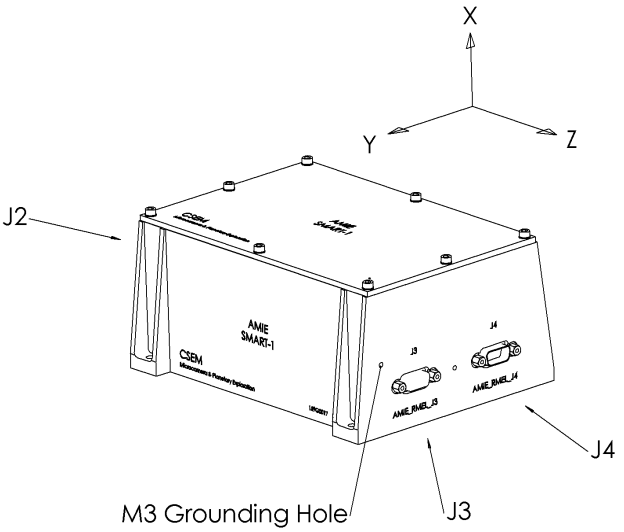
The 3 connector savers of Unit 2 have to be removed.

5.1.4.4 Electrical Integration Procedure

The figures below show Unit 1 and Unit 2 with the position of the different connectors and grounding holes.



Unit 1



Unit 2

AMIE being screwed on the spacecraft, the procedure to perform electrical integration of Unit 1 and Unit 2 on the spacecraft is the following:

1. Switch off the power supply foreseen for AMIE.
2. Screw the ground connection on the two units (see below).
3. Connect and screw the Power Bus cable to J4 (see below).
4. Connect and screw the CAN Bus cable to J3 (see below).
5. Connect and screw the interconnection cable to J2 (see below).
6. AMIE ready to be powered.

To dismount AMIE of the S/C, switch off the power supply and follow the above procedure, in the reverse order, from the point 5 to the point 2.

5.1.4.4.1 Grounding

A M3 grounding thread hole has been made on each unit allowing the S/C structure ground connection. The location of these grounding holes is shown in the figures above. The M3 screws and washers to fix the ground connections are not delivered with the units. The maximal length and nominal torque of the 2 grounding threads are given in the table below.

Unit 1 and Unit 2	Maximal length	Nominal torque
M3 Grounding thread	10 mm	0.80 Nm

5.1.4.4.2 Connecting

There is only one connector on Unit 1, named J1 (AMIE_OPTH_J1). The location of this connector is given in the figures above. As the Unit 1 is delivered with the interconnection cable from Unit 1 to Unit 2 already connected to J1, no operation is necessary to make the electrical connection to Unit 1. As J1 is located under the radiation cover, it is not possible to see it in the nominal configuration of Unit 1.

There are 3 connectors on Unit 2, named J2 (AMIE_RMEL_J2), J3 (AMIE_RMEL_J3) and J4 (AMIE_RMEL_J4). The location of these connectors is given in the figures above. J2 is used to connect the interconnection cable from the Unit 1, J3 to connect the CAN Bus and J4 to connect the Power Bus. Only the interconnection cable from Unit 1 to Unit 2 is delivered because the cables for the CAN Bus and the Power Bus are provided by the S/C.

Unit 2	Nominal torque
J2, J3, J4	0.32 Nm

5.1.4.4.3 Switch on or off

As soon as the power supply is switched on, AMIE is powered and the following sequences occurs:

1. A power on reset of the Unit 2 electronics during max. 500 ms.
2. A power on test lasting a few milliseconds. A *PowerOn TM packet* is sent by AMIE at the end of this test.

After the power on, AMIE is ready to receive a TC packet from the CAN Bus. The maximal value of the power bus current shall not exceed 60 mA.

There is no particular precaution to be observed when switching the power bus off because AMIE can always be switched off in any of its operating modes.

5.1.5 INSTRUMENT OPERATIONS

5.1.5.1 Overview of Operating Principles

TBD in coordination with ESTEC and STOC.

5.1.5.2 Nominal Experiment Operational Plans

TBD in coordination with ESTEC and STOC.

5.1.5.2.1 Ground Operational Plan

5.1.5.2.2 In-orbit Commissioning Plans

5.1.5.2.3 Flight Operations Plans by Mission Phase

5.1.5.3 Failure Detection and Recovery Strategy

Failure Detection and Recovery Strategy will be defined during Ground Segment implementation and restricted by experiment planning system limitations.

See Failure Modes Effects and Criticality Analysis ref. S1-AMI-TN-3007.

5.1.6 MODES DESCRIPTION

5.1.6.1 Summary of all nominal and back-up modes

There is no back-up mode.

5.1.6.2 Mode transition diagram

There are no mode transitions.

5.1.6.3 Detailed mode description

Mode and mode transitions are not representative of AMIE physical behavior. Fonctional modes and mode transitions will be defined for usage of the experiment planning system in coordination with STOC and ESOC.

5.1.7 NOMINAL AND CONTINGENCY OPERATIONS PROCEDURES

All procedures are TBD, pending Ground Segment implementation and restrictions and constraints identification.

5.1.7.1 First Commissioning Procedures

The first commissioning of AMIE is planned to be at launch + 3 months.

Different operations are planned:

a) a « diagnostic » command (check all AMIE subsystems)

b) Earth - Moon Observations (with integration time of 5,10, 20ms for the moon and for the earth)

c) Bright Stars Imaging (long time exposure, check pointing, absolute calibration…)

System diagnostics

Step	Delay to next step (s)	Description	Command
	10	Power On	Y00111ZA
	20	Short Diag, No delay	Y90201ZA
	10	System Reset	Y90001ZA
	20	Short Diag, 250ms delay	Y90701ZA
	10	System Reset	Y90001ZA
	20	Short Diag, 500ms delay	Y90801ZA
	10	System Reset	Y90001ZA
	20	Short Diag, 750ms delay	Y90901ZA

	10	System Reset	Y90001ZA
	650	Long Diag, No Delay	Y90301ZA
	10	System Reset	Y90001ZA
	650	Long Diag, 250ms Delay	Y90401ZA
	10	System Reset	Y90001ZA
	650	Long Diag, 500ms Delay	Y90501ZA
	10	System Reset	Y90001ZA
	650	Long Diag, 750ms Delay	Y90601ZA
	10	System Reset	Y90001ZA
		AMIE Off	Y00112ZA

System functionality

Step	Delay to next step (s)	Description	Command
	10	AMIE On	Y00111ZA
	10	CAMERA On	Y50001ZA
	10	ICU on	Y50101ZA
	10	Image 0 it = 1 ms	Y31001ZA Y300M = 1
	1	Get temperatures	Y90101ZA
	10	Image 1 it = 1 ms	Y31101ZA Y300M = 1
	1	Get temperatures	Y90101ZA
	10	Image 2 it = 1 s	Y31201ZA Y300M = 1000
	1	Get temperatures	Y90101ZA
	20	Image 3 it = 10 s	Y31301ZA Y300M = 10000
	1	Get temperatures	Y90101ZA
	15	Compress 0	Y32001ZA
	15	Compress 1	Y32101ZA
	15	Compress 2	Y32201ZA
	15	Compress 3	Y32301ZA
	30	Download 0	Y33001ZA
	30	Download 1	Y33101ZA
	30	Download 2	Y33201ZA

	30	Download 3	Y33301ZA
	200	Download uncompressed 0	Y34001ZA
		AMIE Off	Y00112ZA

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5.1.7.2 In-flight Calibration

Science objective: In-flight calibration of AMIE

Priority experiments: n/a

Maximum duration: don't know

General comments: Needs to be coordinated with other experiments

Targets

No.	Target type	Coord. system	Longitude or Right Ascension	Latitude or Declination	dist. to CoG	Name	Comments	*Observation number*
1	star	Epoch J2000	14h15m40.4s	+ 19° 11' 14''	-	a Bootes (Arcturus) HIPP # 69673	VIS+IR (NOT UV)	
2	star	Epoch J2000	18h36m56s	+ 38° 46' 53''	-	a Lyra (Vega) HIPP # 91262	Visible channel co-aligment (+IR ?)	
3	star	Epoch J2000	11h36m41s	-09°48'08"	-	Theta Crater HIP 56633	4 mag standard star	
4	Star field	Epoch J2000	Tbd	tbd	-	Plejades (M 45)	Distortion	
5	Planet		Variable	variable	-	Moon	Extended object	
6	Planet	-	variable	variable	-	*Earth*	Extended object, PR	

Observation overview:

This document describes the pointing requirements as a result of the in-flight calibration of AMIE. We propose to perform the following observations during several occasions:

- as soon as possible after launch
- just before the beginning of orbital science phase
- additionally during the cruise say every 6 months to verify the proper functioning of the instrument and to monitor the stability of its performance.

Observation 1: Target 1 (Arcturus, bright red star), each filter, four different exposure times each – absolute calibration, focus check, point spread function. Read out full frames in the beginning to determine alignment with Star Trackers

Observation 2: Target 2 (Vega, bright blue star), each filter, four different exposure times each – absolute calibration, focus check, point spread function

Observation 3: Target 3 (Theta Crater, medium brightness), each filter, four different exposure times each – absolut calibration, focus check, point spread function

Observation 4: Target 4 (M45, star field). Point at center and four corner locations (+/- 1.5 deg off-pointing). Four different exposures each. – geometrical distortion, “flat field”

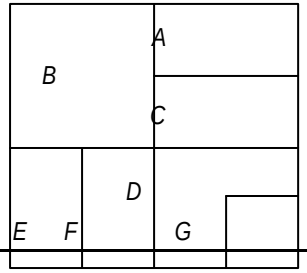
Observation 5: Target 5 (Moon) – extended object, science demonstration, public relations.

Observation 6: Target 6 (Earth) – PR

Observation 7: Target 5 (Moon) – science demonstration, simulate slew as in lunar orbit.

Observation No: 1

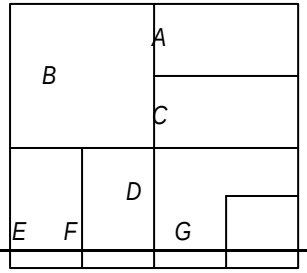
Description: Arcturus staring in all filters – done for absolute calibration, focus check, point spread function

Target No. or Name: Arcturus			
Slewing or raster scan requirements around the target			
Name	**Min**	**Max**	**Comments (give underlying requirement)**
Total size of slewing/scan area	5 deg	5 deg	
Position of target in slewing/scan area			See sketch
Distance between slewing tracks/raster points	Varies, see sketch	Varies, see sketch	
Direction of y-axis	No constraints	No constraints	
Slewing speed	No constraints	No constraints	
Dwell time on raster point	2 min (tbc)		
Sketch of the scan geometry	 *Go to all filters,* e.g. *A, B, … G.*		

Operations overview		
Experiment name	Verbal description of operations	TC Sequences or Flight Control Procedures to be called
AMIE	At each position A, B, … G: Acquire a sequence of four images with different exposure times 50 ms, 100 ms, 500 ms, 2000 ms (exposure times tbc)	

Observation No: 2

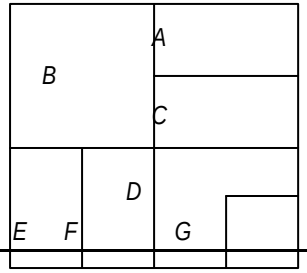
Description: Staring observation at Vega

Target No. or Name: Vega			
Slewing or raster scan requirements around the target			
Name	**Min**	**Max**	**Comments (give underlying requirement)**
Total size of slewing/scan area	5 deg	5 deg	
Position of target in slewing/scan area			See sketch
Distance between slewing tracks/raster points	Varies, see sketch	Varies, see sketch	
Direction of y-axis	No constraints	No constraints	
Slewing speed	No constraints	No constraints	
Dwell time on raster point	2 min (tbc)		
Sketch of the scan geometry	 *Go to all filters,* e.g. *A, B, … G.*		

Operations overview		
Experiment name	Verbal description of operations	TC Sequences or Flight Control Procedures to be called
AMIE	At each position A, B, … G: Acquire a sequence of four images with different exposure times 50 ms, 100 ms, 500 ms, 2000 ms (exposure times tbc)	

Observation No: 3

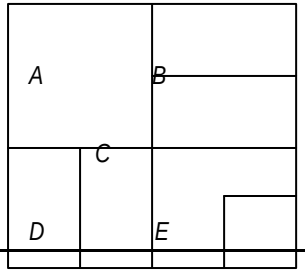
Description: Staring observation at Theta Crater – done for absolute calibration, focus check, point spread function

Target No. or Name: Theta Crater			
Slewing or raster scan requirements around the target			
Name	**Min**	**Max**	**Comments (give underlying requirement)**
Total size of slewing/scan area	5 deg	5 deg	
Position of target in slewing/scan area			See sketch
Distance between slewing tracks/raster points	See sketch	See sketch	
Direction of y-axis	No constraints	No constraints	
Slewing speed	No constraints	No constraints	
Dwell time on raster point	2 min		
Sketch of the scan geometry	 *Go to all filters,* e.g. *A, B, … G.*		

Operations overview		
Experiment name	Verbal description of operations	TC Sequences or Flight Control Procedures to be called
AMIE	At each position A, B, … G: Acquire a sequence of four images with different exposure times 50 ms, 100 ms, 500 ms, 2000 ms (exposure times tbc)	

Observation No: 4

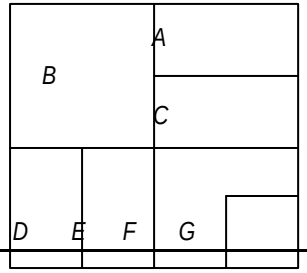
Description: Put the Plejades (M45) in 5 different positions in the field of view – used for geometrical distortion and 'flat field' by taking the median

Target No. or Name: M45			
Slewing or raster scan requirements around the target			
Name	**Min**	**Max**	**Comments (give underlying requirement)**
Total size of slewing/scan area	5 deg	5 deg	
Position of target in slewing/scan area			See sketch
Distance between slewing tracks/raster points	1.5 deg	1.6 deg	
Direction of y-axis	No constraints	No constraints	
Slewing speed	No constraints	No constraints	
Dwell time on raster point	2 min		
Sketch of the scan geometry	 *Go to five different positions in the field of view, A, B, C, D, E.*		

Operations overview		
Experiment name	Verbal description of operations	TC Sequences or Flight Control Procedures to be called
AMIE	At each position A, B, … E: Acquire a sequence of four images with different exposure times 50 ms, 100 ms, 500 ms, 2000 ms (exposure times tbc)	

Observation No: 5

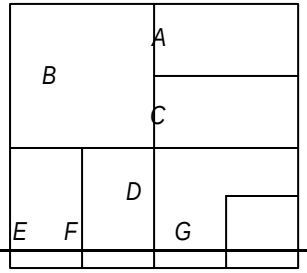
Description: Staring observations of the Moon, all filters – extended target and first science verification

Target No. or Name: Moon			
Slewing or raster scan requirements around the target			
Name	**Min**	**Max**	**Comments (give underlying requirement)**
Total size of slewing/scan area	5 deg	5 deg	
Position of target in slewing/scan area			See sketch
Distance between slewing tracks/raster points	Varies, see sketch	Varies, see sketch	
Direction of y-axis	No constraints	No constraints	
Slewing speed	No constraints	No constraints	
Dwell time on raster point	2 min (tbc)		
Sketch of the scan geometry	 *Go to all filters. First do B, then do a scan from D, E, F, (G)* *To simulate what we'll be doing in lunar orbit.*		

Operations overview		
Experiment name	Verbal description of operations	TC Sequences or Flight Control Procedures to be called
AMIE	At each position A, B, … G: Acquire a sequence of four images with different exposure times 50 ms, 100 ms, 500 ms, 2000 ms (exposure times tbc). NOTE: Pos. E and F can be omitted	

Observation No: 6

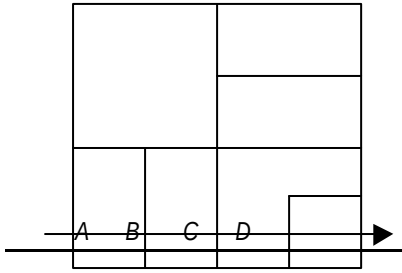
Description: Staring observation at the Earth, each filter – used to produce 'color' image, public relations

Target No. or Name: Earth			
Slewing or raster scan requirements around the target			
Name	**Min**	**Max**	**Comments (give underlying requirement)**
Total size of slewing/scan area	5 deg	5 deg	
Position of target in slewing/scan area			See sketch
Distance between slewing tracks/raster points	Varies, see sketch	Varies, see sketch	
Direction of y-axis	No constraints	No constraints	
Slewing speed	No constraints	No constraints	
Dwell time on raster point	2 min (tbc)		
Sketch of the scan geometry	 *Go to all filters,* e.g. *A, B, … G.*		

Operations overview		
Experiment name	Verbal description of operations	TC Sequences or Flight Control Procedures to be called
AMIE	At each position A, B, … G: Acquire a sequence of four images with different exposure times 50 ms, 100 ms, 500 ms, 2000 ms (exposure times tbc). NOTE: Pos. E and F can be omitted	

Observation No: 7

Description: Slew over the Moon, simulate color imaging in lunar orbit.

Target No. or Name: Moon			
Slewing or raster scan requirements around the target			
Name	**Min**	**Max**	**Comments (give underlying requirement)**
Total size of slewing/scan area	5 deg	5 deg	
Position of target in slewing/scan area			See sketch
Distance between slewing tracks/raster points	Varies, see sketch	Varies, see sketch	
Direction of y-axis	No constraints	No constraints	
Slewing speed	No constraints	No constraints	
Dwell time on raster point	2 min (tbc)		
Sketch of the scan geometry			

Operations overview		
Experiment name	Verbal description of operations	TC Sequences or Flight Control Procedures to be called
AMIE	At each position A, B, C, D: Acquire one (tbc) images. Do this three times with different slewing speeds.	

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5.1.7.3 Second Commissioning In Lunar Orbit

5.1.7.4 Contingency Recovery

5.1.8 SUMMARY OF TELEMETRY AND TELECOMMAND DATA

This chapter describes the telecommands accepted by AMIE. It does not describe the commands defined in the command database.

The detailed description of the telecommands can be found in the Data Handling Interface Control Document S1-AMI-ICD-3004. Latest version at time of print is Issue 3.2.

5.1.8.1 List of dangerous commands

There is no dangerous command.

5.1.8.2 Summary of Telemetry and Telecommand packets

Telemetry packets

The different type of packets are identified by the first byte in the Packet Data Field:

Name	*Value*	*Description*
TCAck	0x00	This frame is send each time a valid TC command is received. Bad TC commands do not generate return TM frames.
CommandAck	0x01	This frame is send each time a command has been requested to acknowledge completion (by setting the most significant bit of the command byte) or when an error occurs during TC execution.
ImageData	0x02 0x82	This frame contains the downloaded image data. The Msbit is set to '1' for the first packet of an image.
TemperatureData	0x03	This frame contains the value read on both the camera and the unit 2 temperature sensors.
PowerOn	0x04	This frame reports diagnostics at power-on.
DiagData	0x05	This frame reports diagnostics and health test data.
CompressedData	0x06 0x86	This frame contains the downloaded compressed image data. The Msbit is set to '1' for the first packet of an image.
MicroData	0x7F	This frame reports responses from microcommands. (No used in this implementation)

Telecommand packets

Command Name	*Value*	
TakePicture	0x00	This instruction turns the camera on, takes a picture with the selected integration time, places the image in the selected memory bank and turns the camera off. The duration of this process is 3.5s + integration time. A CCD cleaning before the image taking, useful after power-on may be requested (adds 1.5s) and the camera may be left on for the next image taking (subtracts 0.5s during next image taking). For precise an image to be take at a precise time, the camera should already be turned on and cleaned by sending a TakePicture a few seconds before the actual image time.
CompressImage	0x01	This instruction turn the ICU on, sends the image from the selected memory bank to the ICU, the ICU compresses the image, the image is sent back to the same memory bank and the ICU is turned off. The duration of this process is 8s. The ICU may be left on for the next compression (subtracts 2s during next compression).
DownloadImage	0x02	Downloads the selected image to the spacecraft.
GetTemperature	0x03	Reads the temperature from the temperature sensors.
Diagnostics	0x04	Executes a diagnostics sequence to help assess the health of the system
InternalTest	0x05	This command is not within the scope of this document
PowerTest	0x06	Worst case power test with 300 images taken every 3 seconds
RateTest	0x07	ImageData TM packets are sent at the maximum data rate during 5 minutes
DownloadCompressed	0x08	Download the selected compressed image to the spacecraft using ICU packet information.
SetICUParameter	0x09	This command turns the ICU on if it is off and sends the parameters to the ICU. The duration of this process is 0.5s if the ICU is already on and 2.5s if the ICU is off.
Reset	0x55	This command triggers a hard-reset of AMIE by blocking the watchdog.

5.1.8.3 Summary of Telemetry and Telecommand parameters

Telemetry parameters

- TCAck data field

The TCAck packet data field is always 11 bytes long. Including the frame identification byte, the following bytes are returned:

Name	*Location in Packet Data Field*	*Description*
Frame Id Byte	Byte 0	0x00
Time of reception	Bytes 1 to 6	
Incoming Sequence	Bytes 7 to 8	This contains the Sequence Count of the incoming TC frame.
Incoming Length	Bytes 9 to 10	This contains the length of the incoming TC frame.

- CommandAck data field

The CommandAck packet data field is always 8 bytes long. Including the frame identification byte, the following bytes are returned:

Name	*Location in Packet Data Field*	*Description*
Frame Id Byte	Byte 0	0x01
Time of execution	Bytes 1 to 6	This is the time when the command has finished its execution.
Command Sequence	Bytes 7	This contains the Sequence Count of the executed command.
Status	Byte 8	Error status: 0 – no error, ?0 – internal step of the command where the error occurred.

- ImageData data field

The ImageData packet data field is 497 bytes long, or less. Including the frame identification byte, the following bytes are returned:

Name	*Location in Packet Data Field*	*Description*
Frame Id Byte	Byte 0	0x02 or 0x82
Image Data	Bytes 1 to 496 max	Image Data

No additional sequence or synchronisation mechanism is added to detect the start and the end of an image. It is supposed that the sequence count mechanism and the acknowledgement mechanisms of AMIE commands and TC frames is sufficient for that purpose.

Image data will be dumped in blocks of 496 bytes. Only the last transmitted data block may have less than 496 bytes.

- TemperatureData data field

The TemperatureData packet data field is 3 bytes long. Including the frame identification byte, the following bytes are returned:

Name	*Location in Packet Data Field*	*Description*
Frame Id Byte	Byte 0	0x03
Camera Temperature	Byte 1	
Unit 2 Temperature	Byte 2	

- PowerOn data field

The PowerOn data field is 2 bytes long. Including the frame identification byte, the following byte is returned:

Name	***Location in Packet Data Field***	***Description***
Frame Id Byte	Byte 0	0x04
	Byte 1	0x00 – No error 0x01 – Processor error 0x02 – Local memory error

- DiagData data field

The DiagData data field is between 1 and 512 bytes long. If no particular condition is reported, the diagnostics data field is empty. Including the frame identification byte, the following bytes are returned:

Name	***Location in Packet Data Field***	***Description***
Frame Id Byte	Byte 0	0x05
	Bytes 1 to 4	Number of bad local memory bytes bank 1
	Bytes 5 to 8	Number of bad local memory bytes bank 2
	Bytes 9 to 12	Number of bad local memory bytes bank 3
	Bytes 13 to 16	Number of bad local memory bytes bank 4
	Bytes 17 to 20	Number of bad mass memory bytes bank 1
	Bytes 21 to 24	Number of bad mass memory bytes bank 2
	Bytes 25 to 28	Number of bad mass memory bytes bank 3
	Bytes 29 to 32	Number of bad mass memory bytes bank 4
	Byte 33	Unit 1 temperature
	Byte 34	SCU temperature
	Byte 35	Unit 1 TakePicture status (0 – ok, 1 – error)
	Bytes 36 to 39	Start address of received image from unit 1
	Bytes 40 to 43	End address of received image from unit 1
	Byte 44	Unit 1 SendPicture status (0 – ok, 1 – error)
	Bytes 45 to 48	Start address of received frame from ICU
	Bytes 49 to 52	End address of received frame from ICU
	Byte 53	ICU status (0 – ok, 1 – error)

Telecommand parameters

The command parameters are listed hereafter:

Command Name	***Number***	***Parameters***
TakePicture	0x00	Byte 8: MSB of integration time in ms Byte 9: LSB of integration time in ms Byte 10: Memory bank number (0x00 to 0x03) Byte 11: 0x01 = leave camera on after image taking, 0x00 = turn camera off Byte 12: 0x01 = CCD cleaning before image taking, 0x00 = no cleaning
CompressImage	0x01	Byte 8: Memory bank number (0x00 to 0x03) Byte 9: 0x01 = leave ICU on after compression, 0x00 = turn ICU off
DownloadImage	0x02	Byte 8: Memory bank number (0x00 to 0x03)
GetTemperature	0x03	No parameters.
Diagnostics	0x04	Byte 8: 0x01 = standard test and short mass memory test (15s), 0x00 = standard test and full mass memory test (10mn)
InternalTest	0x05	Byte 8: 0x01 = fill memory with stripes 0x00 = fill memory with continuous values (mod 65536)
MaxPower	0x06	No parameters.
MaxDataRate	0x07	No parameters.
Download Compressed	0x08	Byte 8: Memory bank number (0x00 to 0x03)
SetICUParameter	0x09	Byte 8 to byte 15: Command to send to ICU
Reset	0x55	No parameters.
ExecuteMicroCode	0x7F	Byte 8 to byte 15: Micro-code instruction

5.1.8.4 Summary of Software parameters

See above.

5.1.9 DATA OPERATIONS HANDBOOK

This chapter describes the Telecommands as defined in the Command Database. It does not describe the Telecommands accepted by AMIE. The structure of the Experiment Planning System and the constraints of the Spacecraft limit the commands that can be sent to AMIE in this context. The commands present in the command database are therefore a subset of the commands that AMIE accepts.

The detailed description of the command database telecommands can be found in the AMIE Command Database Technical Note S1-AMI-TN-3013. Latest version at time of print is Issue 1.5.

5.1.9.1 Telecommand Function Definitions

The telecommands are described in the following table:

Name	Content	Description
Y016C	Y016M	
Y032C	Y032M	
Y048C	Y048M	
Y064C	Y064M	
Y080C	Y080M	
Y096C	Y096M	
Y112C	Y112M	
Y128C	Y128M	
Y144C	Y144M	
Y160C	Y160M	
Y176C	Y176M	
Y192C	Y192M	
Y208C	Y208M	
Y224C	Y224M	
Y310C	Y402M = 10FFFFFFFFFFF80 Y300M Y401M = 000100000000	Take a picture in bank 0. Duration: 3s + integration time. Camera must be ON.
Y311C	Y402M = 11FFFFFFFFFFF80 Y300M Y401M = 010100000000	Take a picture in bank 1. Duration: 3s + integration time. Camera must be ON.
Y312C	Y402M = 12FFFFFFFFFFF80 Y300M Y401M = 020100000000	Take a picture in bank 2. Duration: 3s + integration time. Camera must be ON.

Y313C	Y402M = 13FFFFFFFFFFF80 Y300M Y401M = 030100000000	Take a picture in bank 3. Duration: 3s + integration time. Camera must be ON.
Y320C	Y402M = 20FFFFFFFFFFF7F Y402M = 00400A0000000000 Y402M = 21FFFFFFFFFFF7F Y402M = F70200000013FFFF Y402M = 22FFFFFFFFFFF7F Y402M = 0200000002000000 Y402M = 23FFFFFFFFFFF7F Y402M = 05FFFF0000010000 Y402M = 24FFFFFFFFFFF7F Y402M = 0001030000000000 Y402M = 25FFFFFFFFFFF7F Y402M = F701000000000000 Y402M = 26FFFFFFFFFFF7F Y402M = 0001030000000000 Y402M = 27FFFFFFFFFFF7F Y402M = 000D030000000000 Y402M = 28FFFFFFFFFFF7F Y402M = 0200000010000001 Y402M = 29FFFFFFFFFFF7F Y402M = 05FFFF0000010000 Y402M = 2AFFFFFFFFFFF7F Y402M = 07027D0000000000	Compress and select areas of picture in bank 0. Duration: 8 s Micro-code steps: 20 – Set SBM 21 – Send DS (SDRAM send) 22 – Set Timeout 23 – Wait 24 – Set SBM 25 – Send DS (SDRAM receive) 26 – Set SBM 27 – Set SBM 28 – Set Timeout 29 – Wait 2A – Call Func (canceltimeout)
Y321C	Y402M = 20FFFFFFFFFFF7F Y402M = 00400A0000000000 Y402M = 21FFFFFFFFFFF7F Y402M = F70220000033FFFF Y402M = 22FFFFFFFFFFF7F Y402M = 0200000002000000 Y402M = 23FFFFFFFFFFF7F Y402M = 05FFFF0000010000 Y402M = 24FFFFFFFFFFF7F Y402M = 0001030000000000 Y402M = 25FFFFFFFFFFF7F Y402M = F701200000000000 Y402M = 26FFFFFFFFFFF7F Y402M = 0001030000000000	Compress and select areas of picture in bank 1. Duration: 8 s

	Y402M = 27FFFFFFFFFFF7F Y402M = 000D030000000000 Y402M = 28FFFFFFFFFFF7F Y402M = 0200000010000001 Y402M = 29FFFFFFFFFFF7F Y402M = 05FFFF0000010000 Y402M = 2AFFFFFFFFFFF7F Y402M = 07027D0000000000	
Y322C	Y402M = 20FFFFFFFFFFF7F Y402M = 00400A0000000000 Y402M = 21FFFFFFFFFFF7F Y402M = F70240000053FFFF Y402M = 22FFFFFFFFFFF7F Y402M = 0200000002000000 Y402M = 23FFFFFFFFFFF7F Y402M = 05FFFF0000010000 Y402M = 24FFFFFFFFFFF7F Y402M = 0001030000000000 Y402M = 25FFFFFFFFFFF7F Y402M = F701400000000000 Y402M = 26FFFFFFFFFFF7F Y402M = 0001030000000000 Y402M = 27FFFFFFFFFFF7F Y402M = 000D030000000000 Y402M = 28FFFFFFFFFFF7F Y402M = 0200000010000001 Y402M = 29FFFFFFFFFFF7F Y402M = 05FFFF0000010000 Y402M = 2AFFFFFFFFFFF7F Y402M = 07027D0000000000	Compress and select areas of picture in bank 2. Duration: 8 s
Y323C	Y402M = 20FFFFFFFFFFF7F Y402M = 00400A0000000000 Y402M = 21FFFFFFFFFFF7F Y402M = F70260000073FFFF Y402M = 22FFFFFFFFFFF7F Y402M = 0200000002000000 Y402M = 23FFFFFFFFFFF7F Y402M = 05FFFF0000010000 Y402M = 24FFFFFFFFFFF7F	Compress and select areas of picture in bank 3. Duration: 8 s

	Y402M = 0001030000000000 Y402M = 25FFFFFFFFFFF7F Y402M = F701600000000000 Y402M = 26FFFFFFFFFFF7F Y402M = 0001030000000000 Y402M = 27FFFFFFFFFFF7F Y402M = 000D030000000000 Y402M = 28FFFFFFFFFFF7F Y402M = 0200000010000001 Y402M = 29FFFFFFFFFFF7F Y402M = 05FFFF0000010000 Y402M = 2AFFFFFFFFFFF7F Y402M = 07027D0000000000	
Y330C	Y402M = 30FFFFFFFFFFF7F Y402M = 0811300000000000 Y402M = 31FFFFFFFFFFF7F Y402M = 0811310300000000 Y402M = 32FFFFFFFFFFF7F Y402M = 0811320000000000 Y402M = 33FFFFFFFFFFF7F Y402M = 0811330000000000 Y402M = 34FFFFFFFFFFF7F Y402M = 0800390000000000 Y402M = 35FFFFFFFFFFF08 Y402M = 0000000000000000 Y402M = 36FFFFFFFFFFF7F Y402M = 0800390100000000	Download compressed picture in bank 0.
Y331C	Y402M = 30FFFFFFFFFFF7F Y402M = 0811340000000000 Y402M = 31FFFFFFFFFFF7F Y402M = 0811352300000000 Y402M = 32FFFFFFFFFFF7F Y402M = 0811360000000000 Y402M = 33FFFFFFFFFFF7F Y402M = 0811370000000000 Y402M = 34FFFFFFFFFFF7F Y402M = 0800390000000000 Y402M = 35FFFFFFFFFFF08 Y402M = 0100000000000000	Download compressed picture in bank 1.

	Y402M = 36FFFFFFFFFFF7F Y402M = 0800390100000000	
Y332C	Y402M = 30FFFFFFFFFFF7F Y402M = 0811380000000000 Y402M = 31FFFFFFFFFFF7F Y402M = 0811394300000000 Y402M = 32FFFFFFFFFFF7F Y402M = 08113A0000000000 Y402M = 33FFFFFFFFFFF7F Y402M = 08113B0000000000 Y402M = 34FFFFFFFFFFF7F Y402M = 0800390000000000 Y402M = 35FFFFFFFFFFF08 Y402M = 0200000000000000 Y402M = 36FFFFFFFFFFF7F Y402M = 0800390100000000	Download compressed picture in bank 2.
Y333C	Y402M = 30FFFFFFFFFFF7F Y402M = 08113C0000000000 Y402M = 31FFFFFFFFFFF7F Y402M = 08113D6300000000 Y402M = 32FFFFFFFFFFF7F Y402M = 08113E0000000000 Y402M = 33FFFFFFFFFFF7F Y402M = 08113F0000000000 Y402M = 34FFFFFFFFFFF7F Y402M = 0800390000000000 Y402M = 35FFFFFFFFFFF08 Y402M = 0300000000000000 Y402M = 36FFFFFFFFFFF7F Y402M = 0800390100000000	Download compressed picture in bank 3.
Y340C	Y402M = 40FFFFFFFFFFF82 Y402M = 0000000000000000	Download the uncompressed picture stored in bank 0. Duration: 190 s
Y341C	Y402M = 41FFFFFFFFFFF82 Y402M = 0100000000000000	Download the uncompressed picture stored in bank 1. Duration: 190 s
Y342C	Y402M = 42FFFFFFFFFFF82 Y402M = 0200000000000000	Download the uncompressed picture stored in bank 2. Duration: 190 s
Y343C	Y402M = 43FFFFFFFFFFF82	Download the uncompressed picture

	Y402M = 0300000000000000	stored in bank 3. Duration: 190 s
Y500C	Y402M = 50FFFFFFFFFFF7F Y402M = 0301000000000000	Turn camera on.
Y501C	Y402M = 51FFFFFFFFFFF7F Y402M = 0401000000000000	Turn ICU on.
Y600C	Y402M = 60FFFFFFFFFFF7F Y402M = 0300000000000000	Turn camera off.
Y601C	Y402M = 61FFFFFFFFFFF7F Y402M = 0400000000000000	Turn ICU off.
Y700C	Y402M = 70FFFFFFFFFFF80 Y402M = 000A000101000000	CCD cleaning using bank 0.
Y800C	Y402M = 80FFFFFFFFFFF89 Y402M = 000000F1FF0F0000	Select full image with 1bit/pixel compression ratio
Y801C	Y402M = 81FFFFFFFFFFF89 Y402M = 0000001100000000	Select FOV_LASER_LINK with 1bit/pixel compression ratio
Y802C	Y402M = 82FFFFFFFFFFF89 Y402M = 00000001000F0000	Select FOV_UNFILTERED with 1bit/pixel compression ratio
Y803C	Y402M = 83FFFFFFFFFFF89 Y402M = 000000A100000000	Select FOV_X_960nm with 1bit/pixel compression ratio
Y804C	Y402M = 84FFFFFFFFFFF89 Y402M = 0000000130000000	Select FOV_X_915nm with 1bit/pixel compression ratio
Y805C	Y402M = 85FFFFFFFFFFF89 Y402M = 00000001C0000000	Select FOV_X_750 with 1bit/pixel compression ratio
Y806C	Y402M = 86FFFFFFFFFFF89 Y402M = 000000C100000000	Select FOV_Y_960nm with 1bit/pixel compression ratio
Y807C	Y402M = 87FFFFFFFFFFF89 Y402M = 0000000103000000	Select FOV_Y_915nm with 1bit/pixel compression ratio
Y808C	Y402M = 88FFFFFFFFFFF89 Y402M = 000000010C000000	Select FOV_Y_750 with 1bit/pixel compression ratio
Y900C	Y402M = F0FFFFFFFFFFF55	System reset

	Y402M = 0000000000000000	
Y901C	Y402M = F1FFFFFFFFFFF03 Y402M = 0000000000000000	Get temperatures.
Y902C	Y402M = F2FFFFFFFFFFF04 Y402M = 0100000000000000	Diagnostics short Duration: 14 s Turns Camera and ICU off.
Y903C	Y402M = F2FFFFFFFFFFF04 Y402M = 0000000000000000	Diagnostics full Duration 600 s Turns Camera and ICU off.
Y904C	Y402M = F4FFFFFFFFFFF7F Y402M = 0200000000400000 Y402M = F5FFFFFFFFFFF7F Y402M = 05FFFF0000010000 Y402M = F6FFFFFFFFFFF04 Y402M = 0000000000000000	Diagnostics full Duration 600 s, with 250ms delay Turns Camera and ICU off.
Y905C	Y402M = F4FFFFFFFFFFF7F Y402M = 0200000000800000 Y402M = F5FFFFFFFFFFF7F Y402M = 05FFFF0000010000 Y402M = F6FFFFFFFFFFF04 Y402M = 0000000000000000	Diagnostics full Duration 600 s, with 500ms delay Turns Camera and ICU off.
Y906C	Y402M = F4FFFFFFFFFFF7F Y402M = 0200000000C00000 Y402M = F5FFFFFFFFFFF7F Y402M = 05FFFF0000010000 Y402M = F6FFFFFFFFFFF04 Y402M = 0000000000000000	Diagnostics full Duration 600 s, with 750ms delay Turns Camera and ICU off.

5.1.9.2 Telecommand Parameter Definitions

The parameters are described in the following table:

Name	Type	
Y016M	16 byte character string	
Y032M	32 byte character string	
Y048M	48 byte character string	
Y064M	64 byte character string	
Y080M	80 byte character string	
Y096M	96 byte character string	
Y112M	112 byte character string	
Y128M	128 byte character string	
Y144M	144 byte character string	
Y160M	160 byte character string	
Y176M	176 byte character string	
Y192M	192 byte character string	
Y208M	208 byte character string	
Y224M	224 byte character string	
Y300M	16 bit unsigned integer	Integration time in milliseconds: valid values range from 0 to 65535.
Y401M	6 byte character string	
Y402M	8 byte character string	

5.1.9.3 Telemetry Packet Definitions (minimum details to be required):

See Data Handling ICD.

5.1.9.4 Telemetry Parameter Definitions

See Data Handling ICD.

5.1.9.5 Software Parameters

N/A

5.1.9.6 Flight Control Procedure

These are just empty placeholders for the TC sequences that, in turn, just contain one command each.

Procedure ID	***FC-PL-016.01-Y***				
Procedure Name	**AMIE :** Send 16 byte string parameter **(**`Y01601ZA`**)**				
Procedure Type	*Nominal*				
Subsystem	*Payload:* ***AMIE***				
Version:	*1.1*	Last modified:	*17.02.2003*	Author:	*EOF*

5.1 <AMIE Experiment: Send 16 byte string parameter>

5.1.0 Purpose

Send 16 byte string parameter Y016M

5.1.1 Description

See table below

5.1.2 Precondition

EPDP switched OFF

5.1.3 Constraints

N/A

5.1.4 Ground Computations

Verify that Engineering values are converted into HEX values.

5.1.5 TM/TC List

See below

5.1.6 Final state of the system/subsystem after Procedure execution

5.1.7 Contingency Cases

None required

5.1.8 Relationships to other Procedures

Procedures called by this Procedure	
Procedure ID	Procedure Name

Procedures calling this Procedure	
Procedure ID	Procedure Name

5.1.9 Comments

5.1.10 Step-by-Step Description (information according to TN-3015 file)

Step Step	Substep/Time/ /Time	Description	Activity	Parameter	
				Name	Value
			Wait/ TM/ TC/ Ground Computation/Verify/ Event		
1	+00:00:00	*Send 16 byte string parameter*	Y016C	Y016M	

Procedure ID	***FC-PL-032.01-Y***				
Procedure Name	**AMIE :** Send 32 byte string parameter **(**`Y03201ZA`**)**				
Procedure Type	*Nominal*				
Subsystem	*Payload:* ***AMIE***				
Version:	*1.1*	Last modified:	*17.02.2003*	Author:	*EOF*

5.2 <AMIE Experiment: Send 32 byte string parameter>

5.2.0 Purpose

Send 32 byte string parameter Y032M

5.2.1 Description

See table below

5.2.2 Precondition

EPDP switched OFF

5.2.3 Constraints

N/A

5.2.4 Ground Computations

Verify that Engineering values are converted into HEX values.

5.2.5 TM/TC List

See below

5.2.6 Final state of the system/subsystem after Procedure execution

5.2.7 Contingency Cases

None required

5.2.8 Relationships to other Procedures

Procedures called by this Procedure	
Procedure ID	Procedure Name

Procedures calling this Procedure	
Procedure ID	Procedure Name

5.2.9 Comments

5.2.10 Step-by-Step Description (information according to TN-3015 file)

Step Step	Substep/Time/ /Time	Description	Activity	Parameter	
				Name	Value
			Wait/ TM/ TC/ Ground Computation/Verify/ Event		
1	+00:00:00	*Send 32 byte string parameter*	Y032C	Y032M	

Procedure ID	***FC-PL-048.01-Y***				
Procedure Name	**AMIE :** Send 48 byte string parameter **(**`Y04801ZA`**)**				
Procedure Type	*Nominal*				
Subsystem	*Payload:* ***AMIE***				
Version:	*1.1*	Last modified:	*17.02.2003*	Author:	*EOF*

5.3 <AMIE Experiment: Send 48 byte string parameter>

5.3.0 Purpose

Send 48 byte string parameter Y048M

5.3.1 Description

See table below

5.3.2 Precondition

EPDP switched OFF

5.3.3 Constraints

N/A

5.3.4 Ground Computations

Verify that Engineering values are converted into HEX values.

5.3.5 TM/TC List

See below

5.3.6 Final state of the system/subsystem after Procedure execution

5.3.7 Contingency Cases

None required

5.3.8 Relationships to other Procedures

Procedures called by this Procedure	
Procedure ID	Procedure Name

Procedures calling this Procedure	
Procedure ID	Procedure Name

5.3.9 Comments

5.3.10 Step-by-Step Description (information according to TN-3015 file)

Step Step	Substep/Time/ /Time	Description	Activity	Parameter	
				Name	Value
			Wait/ TM/ TC/ Ground Computation/Verify/ Event		
1	+00:00:00	*Send 48 byte string parameter*	Y048C	Y048M	

Procedure ID	***FC-PL-064.01-Y***				
Procedure Name	**AMIE :** Send 64 byte string parameter **(**`Y06401ZA`**)**				
Procedure Type	*Nominal*				
Subsystem	*Payload:* ***AMIE***				
Version:	*1.1*	Last modified:	*17.02.2003*	Author:	*EOF*

5.4 <AMIE Experiment: Send 64 byte string parameter>

5.4.0 Purpose

Send 64 byte string parameter Y064M

5.4.1 Description

See table below

5.4.2 Precondition

EPDP switched OFF

5.4.3 Constraints

N/A

5.4.4 Ground Computations

Verify that Engineering values are converted into HEX values.

5.4.5 TM/TC List

See below

5.4.6 Final state of the system/subsystem after Procedure execution

5.4.7 Contingency Cases

None required

5.4.8 Relationships to other Procedures

Procedures called by this Procedure	
Procedure ID	Procedure Name

Procedures calling this Procedure	
Procedure ID	Procedure Name

5.4.9 Comments

5.4.10 Step-by-Step Description (information according to TN-3015 file)

Step Step	Substep/Time/ /Time	Description	Activity	Parameter	
				Name	Value
			Wait/ TM/ TC/ Ground Computation/Verify/ Event		
1	+00:00:00	*Send 64 byte string parameter*	Y064C	Y064M	

Procedure ID	***FC-PL-080.01-Y***				
Procedure Name	**AMIE :** Send 80 byte string parameter **(**`Y08001ZA`**)**				
Procedure Type	*Nominal*				
Subsystem	*Payload:* ***AMIE***				
Version:	*1.1*	Last modified:	*17.02.2003*	Author:	*EOF*

5.5 <AMIE Experiment: Send 80 byte string parameter>

5.5.0 Purpose

Send 80 byte string parameter Y080M

5.5.1 Description

See table below

5.5.2 Precondition

EPDP switched OFF

5.5.3 Constraints

N/A

5.5.4 Ground Computations

Verify that Engineering values are converted into HEX values.

5.5.5 TM/TC List

See below

5.5.6 Final state of the system/subsystem after Procedure execution

5.5.7 Contingency Cases

None required

5.5.8 Relationships to other Procedures

Procedures called by this Procedure	
Procedure ID	Procedure Name

Procedures calling this Procedure	
Procedure ID	Procedure Name

5.5.9 Comments

5.5.10 Step-by-Step Description (information according to TN-3015 file)

Step Step	Substep/Time/ /Time	Description	Activity	Parameter	
				Name	Value
			Wait/ TM/ TC/ Ground Computation/Verify/ Event		
1	+00:00:00	*Send 80 byte string parameter*	Y080C	Y080M	

Procedure ID	***FC-PL-096.01-Y***				
Procedure Name	**AMIE :** Send 96 byte string parameter **(**`Y09601ZA`**)**				
Procedure Type	*Nominal*				
Subsystem	*Payload:* ***AMIE***				
Version:	*1.1*	Last modified:	*17.02.2003*	Author:	*EOF*

5.6 <AMIE Experiment: Send 96 byte string parameter>

5.6.0 Purpose

Send 96 byte string parameter Y096M

5.6.1 Description

See table below

5.6.2 Precondition

EPDP switched OFF

5.6.3 Constraints

N/A

5.6.4 Ground Computations

Verify that Engineering values are converted into HEX values.

5.6.5 TM/TC List

See below

5.6.6 Final state of the system/subsystem after Procedure execution

5.6.7 Contingency Cases

None required

5.6.8 Relationships to other Procedures

Procedures called by this Procedure	
Procedure ID	Procedure Name

Procedures calling this Procedure	
Procedure ID	Procedure Name

5.6.9 Comments

5.6.10 Step-by-Step Description (information according to TN-3015 file)

Step Step	Substep/Time/ /Time	Description	Activity	Parameter	
				Name	Value
			Wait/ TM/ TC/ Ground Computation/Verify/ Event		
1	+00:00:00	*Send 96 byte string parameter*	Y096C	Y096M	

Procedure ID	***FC-PL-112.01-Y***				
Procedure Name	**AMIE :** Send 112 byte string parameter **(**`Y11201ZA`**)**				
Procedure Type	*Nominal*				
Subsystem	*Payload:* ***AMIE***				
Version:	*1.1*	Last modified:	*17.02.2003*	Author:	*EOF*

5.7 <AMIE Experiment: Send 112 byte string parameter>

5.7.0 Purpose

Send 112 byte string parameter Y112M

5.7.1 Description

See table below

5.7.2 Precondition

EPDP switched OFF

5.7.3 Constraints

N/A

5.7.4 Ground Computations

Verify that Engineering values are converted into HEX values.

5.7.5 TM/TC List

See below

5.7.6 Final state of the system/subsystem after Procedure execution

5.7.7 Contingency Cases

None required

5.7.8 Relationships to other Procedures

Procedures called by this Procedure	
Procedure ID	Procedure Name

Procedures calling this Procedure	
Procedure ID	Procedure Name

5.7.9 Comments

5.7.10 Step-by-Step Description (information according to TN-3015 file)

Step Step	Substep/Time/ /Time	Description	Activity	Parameter	
				Name	Value
			Wait/ TM/ TC/ Ground Computation/Verify/ Event		
1	+00:00:00	*Send 112 byte string parameter*	Y112C	Y112M	

Procedure ID	***FC-PL-128.01-Y***				
Procedure Name	**AMIE :** Send 128 byte string parameter **(**`Y12801ZA`**)**				
Procedure Type	*Nominal*				
Subsystem	*Payload:* ***AMIE***				
Version:	*1.1*	Last modified:	*17.02.2003*	Author:	*EOF*

5.8 <AMIE Experiment: Send 128 byte string parameter>

5.8.0 Purpose

Send 128 byte string parameter Y128M

5.8.1 Description

See table below

5.8.2 Precondition

EPDP switched OFF

5.8.3 Constraints

N/A

5.8.4 Ground Computations

Verify that Engineering values are converted into HEX values.

5.8.5 TM/TC List

See below

5.8.6 Final state of the system/subsystem after Procedure execution

5.8.7 Contingency Cases

None required

5.8.8 Relationships to other Procedures

Procedures called by this Procedure	
Procedure ID	Procedure Name

Procedures calling this Procedure	
Procedure ID	Procedure Name

5.8.9 Comments

5.8.10 Step-by-Step Description (information according to TN-3015 file)

Step Step	Substep/Time/ /Time	Description	Activity	Parameter	
				Name	Value
			Wait/ TM/ TC/ Ground Computation/Verify/ Event		
1	+00:00:00	*Send 128 byte string parameter*	Y128C	Y128M	

Procedure ID	***FC-PL-144.01-Y***				
Procedure Name	**AMIE :** Send 144 byte string parameter **(**`Y14401ZA`**)**				
Procedure Type	*Nominal*				
Subsystem	*Payload:* ***AMIE***				
Version:	*1.1*	Last modified:	*17.02.2003*	Author:	*EOF*

5.9 <AMIE Experiment: Send 144 byte string parameter>

5.9.0 Purpose

Send 144 byte string parameter Y144M

5.9.1 Description

See table below

5.9.2 Precondition

EPDP switched OFF

5.9.3 Constraints

N/A

5.9.4 Ground Computations

Verify that Engineering values are converted into HEX values.

5.9.5 TM/TC List

See below

5.9.6 Final state of the system/subsystem after Procedure execution

5.9.7 Contingency Cases

None required

5.9.8 Relationships to other Procedures

Procedures called by this Procedure	
Procedure ID	Procedure Name

Procedures calling this Procedure	
Procedure ID	Procedure Name

5.9.9 Comments

5.9.10 Step-by-Step Description (information according to TN-3015 file)

Step Step	Substep/Time/ /Time	Description	Activity	Parameter	
				Name	Value
			Wait/ TM/ TC/ Ground Computation/Verify/ Event		
1	+00:00:00	*Send 144 byte string parameter*	Y144C	Y144M	

Procedure ID	***FC-PL-160.01-Y***				
Procedure Name	**AMIE :** Send 160 byte string parameter **(**`Y16001ZA`**)**				
Procedure Type	*Nominal*				
Subsystem	*Payload:* ***AMIE***				
Version:	*1.1*	Last modified:	*17.02.2003*	Author:	*EOF*

5.10 <AMIE Experiment: Send 160 byte string parameter>

5.10.0 Purpose

Send 160 byte string parameter Y160M

5.10.1 Description

See table below

5.10.2 Precondition

EPDP switched OFF

5.10.3 Constraints

N/A

5.10.4 Ground Computations

Verify that Engineering values are converted into HEX values.

5.10.5 TM/TC List

See below

5.10.6 Final state of the system/subsystem after Procedure execution

5.10.7 Contingency Cases

None required

5.10.8 Relationships to other Procedures

Procedures called by this Procedure	
Procedure ID	Procedure Name

Procedures calling this Procedure	
Procedure ID	Procedure Name

5.10.9 Comments

5.10.10 Step-by-Step Description (information according to TN-3015 file)

Step Step	Substep/Time/ /Time	Description	Activity	Parameter	
				Name	Value
			Wait/ TM/ TC/ Ground Computation/Verify/ Event		
1	+00:00:00	*Send 160 byte string parameter*	Y160C	Y160M	

Procedure ID	***FC-PL-0176.01-Y***				
Procedure Name	**AMIE :** Send 176 byte string parameter **(**`Y17601ZA`**)**				
Procedure Type	*Nominal*				
Subsystem	*Payload:* ***AMIE***				
Version:	*1.1*	Last modified:	*17.02.2003*	Author:	*EOF*

5.11 <AMIE Experiment: Send 176 byte string parameter>

5.11.0 Purpose

Send 176 byte string parameter Y176M

5.11.1 Description

See table below

5.11.2 Precondition

EPDP switched OFF

5.11.3 Constraints

N/A

5.11.4 Ground Computations

Verify that Engineering values are converted into HEX values.

5.11.5 TM/TC List

See below

5.11.6 Final state of the system/subsystem after Procedure execution

5.11.7 Contingency Cases

None required

5.11.8 Relationships to other Procedures

Procedures called by this Procedure	
Procedure ID	Procedure Name

Procedures calling this Procedure	
Procedure ID	Procedure Name

5.11.9 Comments

5.11.10 Step-by-Step Description (information according to TN-3015 file)

Step Step	Substep/Time/ /Time	Description	Activity	Parameter	
				Name	Value
			Wait/ TM/ TC/ Ground Computation/Verify/ Event		
1	+00:00:00	*Send 176 byte string parameter*	Y176C	Y176M	

Procedure ID	***FC-PL-192.01-Y***				
Procedure Name	**AMIE :** Send 192 byte string parameter **(**`Y19201ZA`**)**				
Procedure Type	*Nominal*				
Subsystem	*Payload:* ***AMIE***				
Version:	*1.1*	Last modified:	*17.02.2003*	Author:	*EOF*

5.12 <AMIE Experiment: Send 192 byte string parameter>

5.12.0 Purpose

Send 192 byte string parameter Y192M

5.12.1 Description

See table below

5.12.2 Precondition

EPDP switched OFF

5.12.3 Constraints

N/A

5.12.4 Ground Computations

Verify that Engineering values are converted into HEX values.

5.12.5 TM/TC List

See below

5.12.6 Final state of the system/subsystem after Procedure execution

5.12.7 Contingency Cases

None required

5.12.8 Relationships to other Procedures

Procedures called by this Procedure	
Procedure ID	Procedure Name

Procedures calling this Procedure	
Procedure ID	Procedure Name

5.12.9 Comments

5.12.10 Step-by-Step Description (information according to TN-3015 file)

Step Step	Substep/Time/ /Time	Description	Activity	Parameter	
				Name	Value
			Wait/ TM/ TC/ Ground Computation/Verify/ Event		
1	+00:00:00	*Send 192 byte string parameter*	Y192C	Y192M	

Procedure ID	***FC-PL-208.01-Y***				
Procedure Name	**AMIE :** Send 208 byte string parameter **(**`Y20801ZA`**)**				
Procedure Type	*Nominal*				
Subsystem	*Payload:* ***AMIE***				
Version:	*1.1*	Last modified:	*17.02.2003*	Author:	*EOF*

5.13 <AMIE Experiment: Send 208 byte string parameter>

5.13.0 Purpose

Send 208 byte string parameter Y208M

5.13.1 Description

See table below

5.13.2 Precondition

EPDP switched OFF

5.13.3 Constraints

N/A

5.13.4 Ground Computations

Verify that Engineering values are converted into HEX values.

5.13.5 TM/TC List

See below

5.13.6 Final state of the system/subsystem after Procedure execution

5.13.7 Contingency Cases

None required

5.13.8 Relationships to other Procedures

Procedures called by this Procedure	
Procedure ID	Procedure Name

Procedures calling this Procedure	
Procedure ID	Procedure Name

5.13.9 Comments

5.13.10 Step-by-Step Description (information according to TN-3015 file)

Step Step	Substep/Time/ /Time	Description	Activity	Parameter	
				Name	Value
			Wait/ TM/ TC/ Ground Computation/Verify/ Event		
1	+00:00:00	*Send 208 byte string parameter*	Y208C	Y208M	

Procedure ID	***FC-PL-224.01-Y***				
Procedure Name	**AMIE :** Send 224 byte string parameter **(**`Y22401ZA`**)**				
Procedure Type	*Nominal*				
Subsystem	*Payload:* ***AMIE***				
Version:	*1.1*	Last modified:	*17.02.2003*	Author:	*EOF*

5.14 <AMIE Experiment: Send 224 byte string parameter>

5.14.0 Purpose

Send 224 byte string parameter Y224M

5.14.1 Description

See table below

5.14.2 Precondition

EPDP switched OFF

5.14.3 Constraints

N/A

5.14.4 Ground Computations

Verify that Engineering values are converted into HEX values.

5.14.5 TM/TC List

See below

5.14.6 Final state of the system/subsystem after Procedure execution

5.14.7 Contingency Cases

None required

5.14.8 Relationships to other Procedures

Procedures called by this Procedure	
Procedure ID	Procedure Name

Procedures calling this Procedure	
Procedure ID	Procedure Name

5.14.9 Comments

5.14.10 Step-by-Step Description (information according to TN-3015 file)

Step Step	Substep/Time/ /Time	Description	Activity	Parameter	
				Name	Value
			Wait/ TM/ TC/ Ground Computation/Verify/ Event		
1	+00:00:00	*Send 224 byte string parameter*	Y224C	Y224M	

Procedure ID	***FC-PL-310.01-Y***				
Procedure Name	**AMIE :** Take a picture in Bank 0 **(**`Y31001ZA`**)**				
Procedure Type	*Nominal*				
Subsystem	*Payload:* ***AMIE***				
Version:	*1.1*	Last modified:	*17.02.2003*	Author:	*EOF*

5.15 <AMIE Experiment: Take a picture in Bank 0>

5.15.0 Purpose

Take a picture in Bank 0

5.15.1 Description

See table below

5.15.2 Precondition

EPDP switched OFF

5.15.3 Constraints

N/A

5.15.4 Ground Computations

Verify that Engineering values are converted into HEX values.

5.15.5 TM/TC List

See below

5.15.6 Final state of the system/subsystem after Procedure execution

5.15.7 Contingency Cases

None required

5.15.8 Relationships to other Procedures

Procedures called by this Procedure	
Procedure ID	Procedure Name

Procedures calling this Procedure	
Procedure ID	Procedure Name

5.15.9 Comments

5.15.10 Step-by-Step Description (information according to TN-3015 file)

Step Step	Substep/Time/ /Time	Description	Activity	Parameter	
				Name	Value
			Wait/ TM/ TC/ Ground Computation/Verify/ Event		
1	+00:00:00	*Take a picture in Bank 0*	Y310C	Y300M	

Procedure ID	***FC-PL-311.01-Y***				
Procedure Name	**AMIE :** Take a picture in Bank 1 **(**`Y31101ZA`**)**				
Procedure Type	*Nominal*				
Subsystem	*Payload:* ***AMIE***				
Version:	*1.1*	Last modified:	*17.02.2003*	Author:	*EOF*

5.16 <AMIE Experiment: Take a picture in Bank 1>

5.16.0 Purpose

Take a picture in Bank 1

5.16.1 Description

See table below

5.16.2 Precondition

EPDP switched OFF

5.16.3 Constraints

N/A

5.16.4 Ground Computations

Verify that Engineering values are converted into HEX values.

5.16.5 TM/TC List

See below

5.16.6 Final state of the system/subsystem after Procedure execution

5.16.7 Contingency Cases

None required

5.16.8 Relationships to other Procedures

Procedures called by this Procedure	
Procedure ID	Procedure Name

Procedures calling this Procedure	
Procedure ID	Procedure Name

5.16.9 Comments

5.16.10 Step-by-Step Description (information according to TN-3015 file)

Step Step	Substep/Time/ /Time	Description	Activity	Parameter	
				Name	Value
			Wait/ TM/ TC/ Ground Computation/Verify/ Event		
1	+00:00:00	*Take a picture in Bank 1*	Y311C	Y300M	

Procedure ID	***FC-PL-312.01-Y***				
Procedure Name	**AMIE :** Take a picture in Bank 2 **(**`Y31201ZA`**)**				
Procedure Type	*Nominal*				
Subsystem	*Payload:* ***AMIE***				
Version:	*1.1*	Last modified:	*17.02.2003*	Author:	*EOF*

5.17 <AMIE Experiment: Take a picture in Bank 2>

5.17.0 Purpose

Take a picture in Bank 2

5.17.1 Description

See table below

5.17.2 Precondition

EPDP switched OFF

5.17.3 Constraints

N/A

5.17.4 Ground Computations

Verify that Engineering values are converted into HEX values.

5.17.5 TM/TC List

See below

5.17.6 Final state of the system/subsystem after Procedure execution

5.17.7 Contingency Cases

None required

5.17.8 Relationships to other Procedures

Procedures called by this Procedure	
Procedure ID	Procedure Name

Procedures calling this Procedure	
Procedure ID	Procedure Name

5.17.9 Comments

5.17.10 Step-by-Step Description (information according to TN-3015 file)

Step Step	Substep/Time/ /Time	Description	Activity	Parameter	
				Name	Value
			Wait/ TM/ TC/ Ground Computation/Verify/ Event		
1	+00:00:00	*Take a picture in Bank 2*	Y312C	Y300M	

Procedure ID	***FC-PL-313.01-Y***				
Procedure Name	**AMIE :** Take a picture in Bank 3 **(**`Y31301ZA`**)**				
Procedure Type	*Nominal*				
Subsystem	*Payload:* ***AMIE***				
Version:	*1.1*	Last modified:	*17.02.2003*	Author:	*EOF*

5.18 <AMIE Experiment: Take a picture in Bank 3>

5.18.0 Purpose

Take a picture in Bank 3

5.18.1 Description

See table below

5.18.2 Precondition

EPDP switched OFF

5.18.3 Constraints

N/A

5.18.4 Ground Computations

Verify that Engineering values are converted into HEX values.

5.18.5 TM/TC List

See below

5.18.6 Final state of the system/subsystem after Procedure execution

5.18.7 Contingency Cases

None required

5.18.8 Relationships to other Procedures

Procedures called by this Procedure	
Procedure ID	Procedure Name

Procedures calling this Procedure	
Procedure ID	Procedure Name

5.18.9 Comments

5.18.10 Step-by-Step Description (information according to TN-3015 file)

Step Step	Substep/Time/ /Time	Description	Activity	Parameter	
				Name	Value
			Wait/ TM/ TC/ Ground Computation/Verify/ Event		
1	+00:00:00	*Take a picture in Bank 3*	Y313C	Y300M	

Procedure ID	***FC-PL-320.01-Y***				
Procedure Name	**AMIE :** Compress and select areas of picture in Bank 0 **(**`Y32001ZA`**)**				
Procedure Type	*Nominal*				
Subsystem	*Payload:* ***AMIE***				
Version:	*1.1*	Last modified:	*17.02.2003*	Author:	*EOF*

5.19 <AMIE Experiment: Compress and select areas of picture in Bank 0>

5.19.0 Purpose

Compress and select areas of picture in Bank 0

5.19.1 Description

See table below

5.19.2 Precondition

EPDP switched OFF

5.19.3 Constraints

N/A

5.19.4 Ground Computations

Verify that Engineering values are converted into HEX values.

5.19.5 TM/TC List

See below

5.19.6 Final state of the system/subsystem after Procedure execution

5.19.7 Contingency Cases

None required

5.19.8 Relationships to other Procedures

Procedures called by this Procedure	
Procedure ID	Procedure Name

Procedures calling this Procedure	
Procedure ID	Procedure Name

5.19.9 Comments

5.19.10 Step-by-Step Description (information according to TN-3015 file)

Step Step	Substep/Time/ /Time	Description	Activity	Parameter	
				Name	Value
			Wait/ TM/ TC/ Ground Computation/Verify/ Event		
1	+00:00:00	*Compress and select areas of picture in Bank 0*	Y320C		

Procedure ID	***FC-PL-321.01-Y***				
Procedure Name	**AMIE :** Compress and select areas of picture in Bank 1 **(**`Y32101ZA`**)**				
Procedure Type	*Nominal*				
Subsystem	*Payload:* ***AMIE***				
Version:	*1.1*	Last modified:	*17.02.2003*	Author:	*EOF*

5.20 <AMIE Experiment: Compress and select areas of picture in Bank 1>

5.20.0 Purpose

Compress and select areas of picture in Bank 1

5.20.1 Description

See table below

5.20.2 Precondition

EPDP switched OFF

5.20.3 Constraints

N/A

5.20.4 Ground Computations

Verify that Engineering values are converted into HEX values.

5.20.5 TM/TC List

See below

5.20.6 Final state of the system/subsystem after Procedure execution

5.20.7 Contingency Cases

None required

5.20.8 Relationships to other Procedures

Procedures called by this Procedure	
Procedure ID	Procedure Name

Procedures calling this Procedure	
Procedure ID	Procedure Name

5.20.9 Comments

5.20.10 Step-by-Step Description (information according to TN-3015 file)

Step Step	Substep/Time/ /Time	Description	Activity	Parameter	
				Name	Value
			Wait/ TM/ TC/ Ground Computation/Verify/ Event		
1	+00:00:00	*Compress and select areas of picture in Bank 1*	Y321C		

Procedure ID	***FC-PL-322.01-Y***				
Procedure Name	**AMIE :** Compress and select areas of picture in Bank 2 **(**`Y32201ZA`**)**				
Procedure Type	*Nominal*				
Subsystem	*Payload:* ***AMIE***				
Version:	*1.1*	Last modified:	*17.02.2003*	Author:	*EOF*

5.21 <AMIE Experiment: Compress and select areas of picture in Bank 2>

5.21.0 Purpose

Compress and select areas of picture in Bank 2

5.21.1 Description

See table below

5.21.2 Precondition

EPDP switched OFF

5.21.3 Constraints

N/A

5.21.4 Ground Computations

Verify that Engineering values are converted into HEX values.

5.21.5 TM/TC List

See below

5.21.6 Final state of the system/subsystem after Procedure execution

5.21.7 Contingency Cases

None required

5.21.8 Relationships to other Procedures

Procedures called by this Procedure	
Procedure ID	Procedure Name

Procedures calling this Procedure	
Procedure ID	Procedure Name

5.21.9 Comments

5.21.10 Step-by-Step Description (information according to TN-3015 file)

Step Step	Substep/Time/ /Time	Description	Activity	Parameter	
				Name	Value
			Wait/ TM/ TC/ Ground Computation/Verify/ Event		
1	+00:00:00	*Compress and select areas of picture in Bank 2*	Y322C		

Procedure ID	***FC-PL-323.01-Y***				
Procedure Name	**AMIE :** Compress and select areas of picture in Bank 3 **(**`Y32301ZA`**)**				
Procedure Type	*Nominal*				
Subsystem	*Payload:* ***AMIE***				
Version:	*1.1*	Last modified:	*17.02.2003*	Author:	*EOF*

5.22 <AMIE Experiment: Compress and select areas of picture in Bank 3>

5.22.0 Purpose

Compress and select areas of picture in Bank 3

5.22.1 Description

See table below

5.22.2 Precondition

EPDP switched OFF

5.22.3 Constraints

N/A

5.22.4 Ground Computations

Verify that Engineering values are converted into HEX values.

5.22.5 TM/TC List

See below

5.22.6 Final state of the system/subsystem after Procedure execution

5.22.7 Contingency Cases

None required

5.22.8 Relationships to other Procedures

Procedures called by this Procedure	
Procedure ID	Procedure Name

Procedures calling this Procedure	
Procedure ID	Procedure Name

5.22.9 Comments

5.22.10 Step-by-Step Description (information according to TN-3015 file)

Step Step	Substep/Time/ /Time	Description	Activity	Parameter	
				Name	Value
			Wait/ TM/ TC/ Ground Computation/Verify/ Event		
1	+00:00:00	*Compress and select areas of picture in Bank 3*	Y323C		

Procedure ID	***FC-PL-330.01-Y***				
Procedure Name	**AMIE :** Download compressed picture in Bank 0 **(**`Y33001ZA`**)**				
Procedure Type	*Nominal*				
Subsystem	*Payload:* ***AMIE***				
Version:	*1.1*	Last modified:	*17.02.2003*	Author:	*EOF*

5.23 <AMIE Experiment: Download compressed picture in Bank 0>

5.23.0 Purpose

Download compressed picture in Bank 0

5.23.1 Description

See table below

5.23.2 Precondition

EPDP switched OFF

5.23.3 Constraints

N/A

5.23.4 Ground Computations

Verify that Engineering values are converted into HEX values.

5.23.5 TM/TC List

See below

5.23.6 Final state of the system/subsystem after Procedure execution

5.23.7 Contingency Cases

None required

5.23.8 Relationships to other Procedures

Procedures called by this Procedure	
Procedure ID	Procedure Name

Procedures calling this Procedure	
Procedure ID	Procedure Name

5.23.9 Comments

5.23.10 Step-by-Step Description (information according to TN-3015 file)

Step Step	Substep/Time/ /Time	Description	Activity	Parameter	
				Name	Value
			Wait/ TM/ TC/ Ground Computation/Verify/ Event		
1	+00:00:00	*Download compressed picture in Bank 0*	Y330C		

Procedure ID	***FC-PL-331.01-Y***				
Procedure Name	**AMIE :** Download compressed picture in Bank 1 **(**`Y33101ZA`**)**				
Procedure Type	*Nominal*				
Subsystem	*Payload:* ***AMIE***				
Version:	*1.1*	Last modified:	*17.02.2003*	Author:	*EOF*

5.24 <AMIE Experiment: Download compressed picture in Bank 1>

5.24.0 Purpose

Download compressed picture in Bank 1

5.24.1 Description

See table below

5.24.2 Precondition

EPDP switched OFF

5.24.3 Constraints

N/A

5.24.4 Ground Computations

Verify that Engineering values are converted into HEX values.

5.24.5 TM/TC List

See below

5.24.6 Final state of the system/subsystem after Procedure execution

5.24.7 Contingency Cases

None required

5.24.8 Relationships to other Procedures

Procedures called by this Procedure	
Procedure ID	Procedure Name

Procedures calling this Procedure	
Procedure ID	Procedure Name

5.24.9 Comments

5.24.10 Step-by-Step Description (information according to TN-3015 file)

Step Step	Substep/Time/ /Time	Description	Activity	Parameter	
				Name	Value
			Wait/ TM/ TC/ Ground Computation/Verify/ Event		
1	+00:00:00	*Download compressed picture in Bank 1*	Y331C		

Procedure ID	***FC-PL-332.01-Y***				
Procedure Name	**AMIE :** Download compressed picture in Bank 2 **(**`Y33201ZA`**)**				
Procedure Type	*Nominal*				
Subsystem	*Payload:* ***AMIE***				
Version:	*1.1*	Last modified:	*17.02.2003*	Author:	*EOF*

5.25 <AMIE Experiment: Download compressed picture in Bank 2>

5.25.0 Purpose

Download compressed picture in Bank 2

5.25.1 Description

See table below

5.25.2 Precondition

EPDP switched OFF

5.25.3 Constraints

N/A

5.25.4 Ground Computations

Verify that Engineering values are converted into HEX values.

5.25.5 TM/TC List

See below

5.25.6 Final state of the system/subsystem after Procedure execution

5.25.7 Contingency Cases

None required

5.25.8 Relationships to other Procedures

Procedures called by this Procedure	
Procedure ID	Procedure Name

Procedures calling this Procedure	
Procedure ID	Procedure Name

5.25.9 Comments

5.25.10 Step-by-Step Description (information according to TN-3015 file)

Step Step	Substep/Time/ /Time	Description	Activity	Parameter	
				Name	Value
			Wait/ TM/ TC/ Ground Computation/Verify/ Event		
1	+00:00:00	*Download compressed picture in Bank 2*	Y332C		

Procedure ID	***FC-PL-333.01-Y***				
Procedure Name	**AMIE :** Download compressed picture in Bank 3 **(**`Y33301ZA`**)**				
Procedure Type	*Nominal*				
Subsystem	*Payload:* ***AMIE***				
Version:	*1.1*	Last modified:	*17.02.2003*	Author:	*EOF*

5.26 <AMIE Experiment: Download compressed picture in Bank 3>

5.26.0 Purpose

Download compressed picture in Bank 3

5.26.1 Description

See table below

5.26.2 Precondition

EPDP switched OFF

5.26.3 Constraints

N/A

5.26.4 Ground Computations

Verify that Engineering values are converted into HEX values.

5.26.5 TM/TC List

See below

5.26.6 Final state of the system/subsystem after Procedure execution

5.26.7 Contingency Cases

None required

5.26.8 Relationships to other Procedures

Procedures called by this Procedure	
Procedure ID	Procedure Name

Procedures calling this Procedure	
Procedure ID	Procedure Name

5.26.9 Comments

5.26.10 Step-by-Step Description (information according to TN-3015 file)

Step Step	Substep/Time/ /Time	Description	Activity	Parameter	
				Name	Value
			Wait/ TM/ TC/ Ground Computation/Verify/ Event		
1	+00:00:00	*Download compressed picture in Bank 3*	Y333C		

Procedure ID	***FC-PL-340.01-Y***				
Procedure Name	**AMIE :** Download the uncompressed picture stored in Bank0 **(**`Y34001ZA`**)**				
Procedure Type	*Nominal*				
Subsystem	*Payload:* ***AMIE***				
Version:	*1.1*	Last modified:	*17.02.2003*	Author:	*EOF*

5.27 <AMIE Experiment: Download the uncompressed picture stored in Bank 0>

5.27.0 Purpose

Download the uncompressed picture stored in Bank 0

5.27.1 Description

See table below

5.27.2 Precondition

EPDP switched OFF

5.27.3 Constraints

N/A

5.27.4 Ground Computations

Verify that Engineering values are converted into HEX values.

5.27.5 TM/TC List

See below

5.27.6 Final state of the system/subsystem after Procedure execution

5.27.7 Contingency Cases

None required

5.27.8 Relationships to other Procedures

Procedures called by this Procedure	
Procedure ID	Procedure Name

Procedures calling this Procedure	
Procedure ID	Procedure Name

5.27.9 Comments

5.27.10 Step-by-Step Description (information according to TN-3015 file)

Step Step	Substep/Time/ /Time	Description	Activity	Parameter	
				Name	Value
			Wait/ TM/ TC/ Ground Computation/Verify/ Event		
1	+00:00:00	*Download the uncompressed picture stored in Bank 0*	Y340C		

Procedure ID	***FC-PL-341.01-Y***				
Procedure Name	**AMIE :** Download the uncompressed picture stored in Bank1 **(**`Y34101ZA`**)**				
Procedure Type	*Nominal*				
Subsystem	*Payload:* ***AMIE***				
Version:	*1.1*	Last modified:	*17.02.2003*	Author:	*EOF*

5.28 <AMIE Experiment: Download the uncompressed picture stored in Bank 1>

5.28.0 Purpose

Download the uncompressed picture stored in Bank 1

5.28.1 Description

See table below

5.28.2 Precondition

EPDP switched OFF

5.28.3 Constraints

N/A

5.28.4 Ground Computations

Verify that Engineering values are converted into HEX values.

5.28.5 TM/TC List

See below

5.28.6 Final state of the system/subsystem after Procedure execution

5.28.7 Contingency Cases

None required

5.28.8 Relationships to other Procedures

Procedures called by this Procedure	
Procedure ID	Procedure Name

Procedures calling this Procedure	
Procedure ID	Procedure Name

5.28.9 Comments

5.28.10 Step-by-Step Description (information according to TN-3015 file)

Step Step	Substep/Time/ /Time	Description	Activity	Parameter	
				Name	Value
			Wait/ TM/ TC/ Ground Computation/Verify/ Event		
1	+00:00:00	*Download the uncompressed picture stored in Bank 1*	Y341C		

Procedure ID	***FC-PL-342.01-Y***				
Procedure Name	**AMIE :** Download the uncompressed picture stored in Bank2 **(**Y34201ZA**)**				
Procedure Type	*Nominal*				
Subsystem	*Payload: **AMIE***				
Version:	*1.1*	Last modified:	*17.02.2003*	Author:	*EOF*

5.29 <AMIE Experiment: Download the uncompressed picture stored in Bank 2>

5.29.0 Purpose

Download the uncompressed picture stored in Bank 2

5.29.1 Description

See table below

5.29.2 Precondition

EPDP switched OFF

5.29.3 Constraints

N/A

5.29.4 Ground Computations

Verify that Engineering values are converted into HEX values.

5.29.5 TM/TC List

See below

5.29.6 Final state of the system/subsystem after Procedure execution

5.29.7 Contingency Cases

None required

5.29.8 Relationships to other Procedures

Procedures called by this Procedure	
Procedure ID	Procedure Name

Procedures calling this Procedure	
Procedure ID	Procedure Name

5.29.9 Comments

5.29.10 Step-by-Step Description (information according to TN-3015 file)

Step Step	Substep/Time/ /Time	Description	Activity	Parameter	
				Name	Value
			Wait/ TM/ TC/ Ground Computation/Verify/ Event		
1	+00:00:00	*Download the uncompressed picture stored in Bank 2*	Y342C		

Procedure ID	***FC-PL-343.01-Y***				
Procedure Name	**AMIE :** Download the uncompressed picture stored in Bank3 **(**Y34301ZA**)**				
Procedure Type	*Nominal*				
Subsystem	*Payload: **AMIE***				
Version:	*1.1*	Last modified:	*17.02.2003*	Author:	*EOF*

5.30 <AMIE Experiment: Download the uncompressed picture stored in Bank 3>

5.30.0 Purpose

Download the uncompressed picture stored in Bank 3

5.30.1 Description

See table below

5.30.2 Precondition

EPDP switched OFF

5.30.3 Constraints

N/A

5.30.4 Ground Computations

Verify that Engineering values are converted into HEX values.

5.30.5 TM/TC List

See below

5.30.6 Final state of the system/subsystem after Procedure execution

5.30.7 Contingency Cases

None required

5.30.8 Relationships to other Procedures

Procedures called by this Procedure	
Procedure ID	Procedure Name

Procedures calling this Procedure	
Procedure ID	Procedure Name

5.30.9 Comments

5.30.10 Step-by-Step Description (information according to TN-3015 file)

Step Step	Substep/Time/ /Time	Description	Activity	Parameter	
				Name	Value
			Wait/ TM/ TC/ Ground Computation/Verify/ Event		
1	+00:00:00	*Download the uncompressed picture stored in Bank 3*	Y343C		

Procedure ID	***FC-PL-500.01-Y***				
Procedure Name	**AMIE :** Turn camera on **(**`Y50001ZA`**)**				
Procedure Type	*Nominal*				
Subsystem	*Payload:* ***AMIE***				
Version:	*1.1*	Last modified:	*17.02.2003*	Author:	*EOF*

5.31 <AMIE Experiment: Turn camera on >

5.31.0 Purpose

Turn camera on

5.31.1 Description

See table below

5.31.2 Precondition

EPDP switched OFF

5.31.3 Constraints

N/A

5.31.4 Ground Computations

Verify that Engineering values are converted into HEX values.

5.31.5 TM/TC List

See below

5.31.6 Final state of the system/subsystem after Procedure execution

5.31.7 Contingency Cases

None required

5.31.8 Relationships to other Procedures

Procedures called by this Procedure	
Procedure ID	Procedure Name

Procedures calling this Procedure	
Procedure ID	Procedure Name

5.31.9 Comments

5.31.10 Step-by-Step Description (information according to TN-3015 file)

Step Step	Substep/Time/ /Time	Description	Activity	Parameter	
				Name	Value
			Wait/ TM/ TC/ Ground Computation/Verify/ Event		
1	+00:00:00	*Turn camera on*	Y500C		

Procedure ID	***FC-PL-501.01-Y***				
Procedure Name	**AMIE :** Turn ICU on (`Y50101ZA`)				
Procedure Type	*Nominal*				
Subsystem	*Payload:* ***AMIE***				
Version:	*1.1*	Last modified:	*17.02.2003*	Author:	*EOF*

5.32 <AMIE Experiment: Turn ICU on >

5.32.0 Purpose

Turn ICU on

5.32.1 Description

See table below

5.32.2 Precondition

EPDP switched OFF

5.32.3 Constraints

N/A

5.32.4 Ground Computations

Verify that Engineering values are converted into HEX values.

5.32.5 TM/TC List

See below

5.32.6 Final state of the system/subsystem after Procedure execution

5.32.7 Contingency Cases

None required

5.32.8 Relationships to other Procedures

Procedures called by this Procedure	
Procedure ID	Procedure Name

Procedures calling this Procedure	
Procedure ID	Procedure Name

5.32.9 Comments

5.32.10 Step-by-Step Description (information according to TN-3015 file)

Step Step	Substep/Time/ /Time	Description	Activity	Parameter	
				Name	Value
			Wait/ TM/ TC/ Ground Computation/Verify/ Event		
1	+00:00:00	*Turn ICU on*	Y501C		

Procedure ID	***FC-PL-600.01-Y***				
Procedure Name	**AMIE :** Turn camera off**(**`Y60001ZA`**)**				
Procedure Type	*Nominal*				
Subsystem	*Payload:* ***AMIE***				
Version:	*1.1*	Last modified:	*17.02.2003*	Author:	*EOF*

5.33 <AMIE Experiment: Turn camera off>

5.33.0 Purpose

Turn camera off

5.33.1 Description

See table below

5.33.2 Precondition

EPDP switched OFF

5.33.3 Constraints

N/A

5.33.4 Ground Computations

Verify that Engineering values are converted into HEX values.

5.33.5 TM/TC List

See below

5.33.6 Final state of the system/subsystem after Procedure execution

5.33.7 Contingency Cases

None required

5.33.8 Relationships to other Procedures

Procedures called by this Procedure	
Procedure ID	Procedure Name

Procedures calling this Procedure	
Procedure ID	Procedure Name

5.33.9 Comments

5.33.10 Step-by-Step Description (information according to TN-3015 file)

Step Step	Substep/Time/ /Time	Description	Activity	Parameter	
				Name	Value
			Wait/ TM/ TC/ Ground Computation/Verify/ Event		
1	+00:00:00	*Turn camera off*	Y600C		

Procedure ID	***FC-PL-601.01-Y***				
Procedure Name	**AMIE :** Turn ICU off**(**`Y60101ZA`**)**				
Procedure Type	*Nominal*				
Subsystem	*Payload:* ***AMIE***				
Version:	*1.1*	Last modified:	*17.02.2003*	Author:	*EOF*

5.34 <AMIE Experiment: Turn ICU off>

5.34.0 Purpose

Turn ICU off

5.34.1 Description

See table below

5.34.2 Precondition

EPDP switched OFF

5.34.3 Constraints

N/A

5.34.4 Ground Computations

Verify that Engineering values are converted into HEX values.

5.34.5 TM/TC List

See below

5.34.6 Final state of the system/subsystem after Procedure execution

5.34.7 Contingency Cases

None required

5.34.8 Relationships to other Procedures

Procedures called by this Procedure	
Procedure ID	Procedure Name

Procedures calling this Procedure	
Procedure ID	Procedure Name

5.34.9 Comments

5.34.10 Step-by-Step Description (information according to TN-3015 file)

Step Step	Substep/Time/ /Time	Description	Activity	Parameter	
				Name	Value
			Wait/ TM/ TC/ Ground Computation/Verify/ Event		
1	+00:00:00	*Turn ICU off*	Y601C		

Procedure ID	***FC-PL-700.01-Y***				
Procedure Name	**AMIE :** CCD cleaning using Bank 0 **(**`Y70001ZA`**)**				
Procedure Type	*Nominal*				
Subsystem	*Payload:* ***AMIE***				
Version:	*1.1*	Last modified:	*17.02.2003*	Author:	*EOF*

5.35 <AMIE Experiment: CCD cleaning using Bank 0>

5.35.0 Purpose

CCD cleaning using Bank 0

5.35.1 Description

See table below

5.35.2 Precondition

EPDP switched OFF

5.35.3 Constraints

N/A

5.35.4 Ground Computations

Verify that Engineering values are converted into HEX values.

5.35.5 TM/TC List

See below

5.35.6 Final state of the system/subsystem after Procedure execution

5.35.7 Contingency Cases

None required

5.35.8 Relationships to other Procedures

Procedures called by this Procedure	
Procedure ID	Procedure Name

Procedures calling this Procedure	
Procedure ID	Procedure Name

5.35.9 Comments

5.35.10 Step-by-Step Description (information according to TN-3015 file)

Step Step	Substep/Time/ /Time	Description	Activity	Parameter	
				Name	Value
			Wait/ TM/ TC/ Ground Computation/Verify/ Event		
1	+00:00:00	*CCD cleaning using Bank 0*	Y700C		

Procedure ID	***FC-PL-800.01-Y***				
Procedure Name	**AMIE :** Select full image with 1 bit/pixel compression ratio **(**`Y80001ZA`**)**				
Procedure Type	*Nominal*				
Subsystem	*Payload:* ***AMIE***				
Version:	*1.1*	Last modified:	*17.02.2003*	Author:	*EOF*

5.36 <AMIE Experiment: Select full image with 1bit/pixel compression ratio>

5.36.0 Purpose

Select full image with 1bit/pixel compression ratio

5.36.1 Description

See table below

5.36.2 Precondition

EPDP switched OFF

5.36.3 Constraints

N/A

5.36.4 Ground Computations

Verify that Engineering values are converted into HEX values.

5.36.5 TM/TC List

See below

5.36.6 Final state of the system/subsystem after Procedure execution

5.36.7 Contingency Cases

None required

5.36.8 Relationships to other Procedures

Procedures called by this Procedure	
Procedure ID	Procedure Name

Procedures calling this Procedure	
Procedure ID	Procedure Name

5.36.9 Comments

5.36.10 Step-by-Step Description (information according to TN-3015 file)

Step Step	Substep/Time/ /Time	Description	Activity	Parameter	
				Name	Value
			Wait/ TM/ TC/ Ground Computation/Verify/ Event		
1	+00:00:00	*Select full image with 1bit/pixel compression ratio*	Y800C		

Procedure ID	***FC-PL-801.01-Y***				
Procedure Name	**AMIE :** Select FOV_LASER_LINK with 1 bit/pixel compression ratio **(**`Y80101ZA`**)**				
Procedure Type	*Nominal*				
Subsystem	*Payload:* ***AMIE***				
Version:	*1.1*	Last modified:	*17.02.2003*	Author:	*EOF*

5.37 <AMIE Experiment: Select FOV_LASER_LINK with 1bit/pixel compression ratio>

5.37.0 Purpose

Select FOV_LASER_LINK with 1bit/pixel compression ratio

5.37.1 Description

See table below

5.37.2 Precondition

EPDP switched OFF

5.37.3 Constraints

N/A

5.37.4 Ground Computations

Verify that Engineering values are converted into HEX values.

5.37.5 TM/TC List

See below

5.37.6 Final state of the system/subsystem after Procedure execution

5.37.7 Contingency Cases

None required

5.37.8 Relationships to other Procedures

Procedures called by this Procedure	
Procedure ID	Procedure Name

Procedures calling this Procedure	
Procedure ID	Procedure Name

5.37.9 Comments

5.37.10 Step-by-Step Description (information according to TN-3015 file)

Step Step	Substep/Time/ /Time	Description	Activity	Parameter	
				Name	Value
			Wait/ TM/ TC/ Ground Computation/Verify/ Event		
1	+00:00:00	*Select FOV_LASER_LINK with 1bit/pixelcompression ratio*	Y801C		

Procedure ID	***FC-PL-802.01-Y***				
Procedure Name	**AMIE :** Select FOV_UNFILTERED with 1 bit/pixel compression ratio **(**Y80201ZA**)**				
Procedure Type	*Nominal*				
Subsystem	*Payload:* ***AMIE***				
Version:	*1.1*	Last modified:	*17.02.2003*	Author:	*EOF*

5.38 <AMIE Experiment: Select FOV_UNFILTERED with 1bit/pixel compression ratio>

5.38.0 Purpose

Select FOV_UNFILTERED with 1bit/pixel compression ratio

5.38.1 Description

See table below

5.38.2 Precondition

EPDP switched OFF

5.38.3 Constraints

N/A

5.38.4 Ground Computations

Verify that Engineering values are converted into HEX values.

5.38.5 TM/TC List

See below

5.38.6 Final state of the system/subsystem after Procedure execution

5.38.7 Contingency Cases

None required

5.38.8 Relationships to other Procedures

Procedures called by this Procedure	
Procedure ID	Procedure Name

Procedures calling this Procedure	
Procedure ID	Procedure Name

5.38.9 Comments

5.38.10 Step-by-Step Description (information according to TN-3015 file)

Step Step	Substep/Time/ /Time	Description	Activity	Parameter	
				Name	Value
			Wait/ TM/ TC/ Ground Computation/Verify/ Event		
1	+00:00:00	*Select FOV_UNFILTERED with 1bit/pixelcompression ratio*	Y802C		

Procedure ID	***FC-PL-803.01-Y***				
Procedure Name	**AMIE :** Select FOV_X_960nm with 1 bit/pixel compression ratio **(**Y80301ZA**)**				
Procedure Type	*Nominal*				
Subsystem	*Payload: **AMIE***				
Version:	*1.1*	Last modified:	*17.02.2003*	Author:	*EOF*

5.39 <AMIE Experiment: Select FOV_X-960nm with 1bit/pixel compression ratio>

5.39.0 Purpose

Select FOV_X_960nm with 1bit/pixel compression ratio

5.39.1 Description

See table below

5.39.2 Precondition

EPDP switched OFF

5.39.3 Constraints

N/A

5.39.4 Ground Computations

Verify that Engineering values are converted into HEX values.

5.39.5 TM/TC List

See below

5.39.6 Final state of the system/subsystem after Procedure execution

5.39.7 Contingency Cases

None required

5.39.8 Relationships to other Procedures

Procedures called by this Procedure	
Procedure ID	Procedure Name

Procedures calling this Procedure	
Procedure ID	Procedure Name

5.39.9 Comments

5.39.10 Step-by-Step Description (information according to TN-3015 file)

Step Step	Substep/Time/ /Time	Description	Activity	Parameter	
				Name	Value
			Wait/ TM/ TC/ Ground Computation/Verify/ Event		
1	+00:00:00	*Select FOV_X_960nm with 1bit/pixelcompression ratio*	Y803C		

Procedure ID	***FC-PL-804.01-Y***				
Procedure Name	**AMIE :** Select FOV_X_915nm with 1 bit/pixel compression ratio **(**Y80401ZA**)**				
Procedure Type	*Nominal*				
Subsystem	*Payload: **AMIE***				
Version:	*1.1*	Last modified:	*17.02.2003*	Author:	*EOF*

5.40 <AMIE Experiment: Select FOV_X_915nm with 1bit/pixel compression ratio>

5.40.0 Purpose

Select FOV_X_915nm with 1bit/pixel compression ratio

5.40.1 Description

See table below

5.40.2 Precondition

EPDP switched OFF

5.40.3 Constraints

N/A

5.40.4 Ground Computations

Verify that Engineering values are converted into HEX values.

5.40.5 TM/TC List

See below

5.40.6 Final state of the system/subsystem after Procedure execution

5.40.7 Contingency Cases

None required

5.40.8 Relationships to other Procedures

Procedures called by this Procedure	
Procedure ID	Procedure Name

Procedures calling this Procedure	
Procedure ID	Procedure Name

5.40.9 Comments

5.40.10 Step-by-Step Description (information according to TN-3015 file)

Step Step	Substep/Time/ /Time	Description	Activity	Parameter	
				Name	Value
			Wait/ TM/ TC/ Ground Computation/Verify/ Event		
1	+00:00:00	*Select FOV_X_915nm with 1bit/pixelcompression ratio*	Y804C		

Procedure ID	***FC-PL-805.01-Y***				
Procedure Name	**AMIE :** Select FOV_X_750nm with 1 bit/pixel compression ratio **(**`Y80501ZA`**)**				
Procedure Type	*Nominal*				
Subsystem	*Payload:* ***AMIE***				
Version:	*1.1*	Last modified:	*17.02.2003*	Author:	*EOF*

5.41 <AMIE Experiment: Select FOV_X_750nm with 1bit/pixel compression ratio>

5.41.0 Purpose

Select FOV_X_750nm with 1bit/pixel compression ratio

5.41.1 Description

See table below

5.41.2 Precondition

EPDP switched OFF

5.41.3 Constraints

N/A

5.41.4 Ground Computations

Verify that Engineering values are converted into HEX values.

5.41.5 TM/TC List

See below

5.41.6 Final state of the system/subsystem after Procedure execution

5.41.7 Contingency Cases

None required

5.41.8 Relationships to other Procedures

Procedures called by this Procedure	
Procedure ID	Procedure Name

Procedures calling this Procedure	
Procedure ID	Procedure Name

5.41.9 Comments

5.41.10 Step-by-Step Description (information according to TN-3015 file)

Step Step	Substep/Time/ /Time	Description	Activity	Parameter	
				Name	Value
			Wait/ TM/ TC/ Ground Computation/Verify/ Event		
1	+00:00:00	*Select FOV_X_750nm with 1bit/pixelcompression ratio*	Y805C		

Procedure ID	***FC-PL-806.01-Y***				
Procedure Name	**AMIE :** Select FOV_Y_960nm with 1 bit/pixel compression ratio **(**`Y80601ZA`**)**				
Procedure Type	*Nominal*				
Subsystem	*Payload:* ***AMIE***				
Version:	*1.1*	Last modified:	*17.02.2003*	Author:	*EOF*

5.42 <AMIE Experiment: Select FOV_Y_960nm with 1bit/pixel compression ratio>

5.42.0 Purpose

Select FOV_Y_960nm with 1bit/pixel compression ratio

5.42.1 Description

See table below

5.42.2 Precondition

EPDP switched OFF

5.42.3 Constraints

N/A

5.42.4 Ground Computations

Verify that Engineering values are converted into HEX values.

5.42.5 TM/TC List

See below

5.42.6 Final state of the system/subsystem after Procedure execution

5.42.7 Contingency Cases

None required

5.42.8 Relationships to other Procedures

Procedures called by this Procedure	
Procedure ID	Procedure Name

Procedures calling this Procedure	
Procedure ID	Procedure Name

5.42.9 Comments

5.42.10 Step-by-Step Description (information according to TN-3015 file)

Step Step	Substep/Time/ /Time	Description	Activity	Parameter	
				Name	Value
			Wait/ TM/ TC/ Ground Computation/Verify/ Event		
1	+00:00:00	*Select FOV_Y_960nm with 1bit/pixelcompression ratio*	Y806C		

Procedure ID	***FC-PL-807.01-Y***				
Procedure Name	**AMIE :** Select FOV_Y_915nm with 1 bit/pixel compression ratio **(**`Y80701ZA`**)**				
Procedure Type	*Nominal*				
Subsystem	*Payload:* ***AMIE***				
Version:	*1.1*	Last modified:	*17.02.2003*	Author:	*EOF*

5.43 <AMIE Experiment: Select FOV_Y_915nm with 1bit/pixel compression ratio>

5.43.0 Purpose

Select FOV_Y_915nm with 1bit/pixel compression ratio

5.43.1 Description

See table below

5.43.2 Precondition

EPDP switched OFF

5.43.3 Constraints

N/A

5.43.4 Ground Computations

Verify that Engineering values are converted into HEX values.

5.43.5 TM/TC List

See below

5.43.6 Final state of the system/subsystem after Procedure execution

5.43.7 Contingency Cases

None required

5.43.8 Relationships to other Procedures

Procedures called by this Procedure	
Procedure ID	Procedure Name

Procedures calling this Procedure	
Procedure ID	Procedure Name

5.43.9 Comments

5.43.10 Step-by-Step Description (information according to TN-3015 file)

Step Step	Substep/Time/ /Time	Description	Activity	Parameter	
				Name	Value
			Wait/ TM/ TC/ Ground Computation/Verify/ Event		
1	+00:00:00	*Select FOV_Y_915nm with 1bit/pixelcompression ratio*	Y807C		

Procedure ID	***FC-PL-808.01-Y***				
Procedure Name	**AMIE :** Select FOV_Y_750nm with 1 bit/pixel compression ratio **(**`Y80801ZA`**)**				
Procedure Type	*Nominal*				
Subsystem	*Payload:* ***AMIE***				
Version:	*1.1*	Last modified:	*17.02.2003*	Author:	*EOF*

5.44 <AMIE Experiment: Select FOV_Y_750nm with 1bit/pixel compression ratio>

5.44.0 Purpose

Select FOV_Y_750nm with 1bit/pixel compression ratio

5.44.1 Description

See table below

5.44.2 Precondition

EPDP switched OFF

5.44.3 Constraints

N/A

5.44.4 Ground Computations

Verify that Engineering values are converted into HEX values.

5.44.5 TM/TC List

See below

5.44.6 Final state of the system/subsystem after Procedure execution

5.44.7 Contingency Cases

None required

5.44.8 Relationships to other Procedures

Procedures called by this Procedure

Procedure ID	Procedure Name

Procedures calling this Procedure	
Procedure ID	Procedure Name

5.44.9 Comments

5.44.10 Step-by-Step Description (information according to TN-3015 file)

Step Step	Substep/Time/ /Time	Description	Activity	Parameter	
				Name	Value
			Wait/ TM/ TC/ Ground Computation/Verify/ Event		
1	+00:00:00	*Select FOV_Y_750nm with 1bit/pixelcompression ratio*	Y808C		

Procedure ID	***FC-PL-900.01-Y***				
Procedure Name	**AMIE :** System reset **(**`Y90001ZA`**)**				
Procedure Type	*Nominal*				
Subsystem	*Payload:* ***AMIE***				
Version:	*1.1*	Last modified:	*17.02.2003*	Author:	*EOF*

5.45 <AMIE Experiment: System reset>

5.45.0 Purpose

System reset

5.45.1 Description

See table below

5.45.2 Precondition

EPDP switched OFF

5.45.3 Constraints

N/A

5.45.4 Ground Computations

Verify that Engineering values are converted into HEX values.

5.45.5 TM/TC List

See below

5.45.6 Final state of the system/subsystem after Procedure execution

5.45.7 Contingency Cases

None required

5.45.8 Relationships to other Procedures

Procedures called by this Procedure	
Procedure ID	Procedure Name

Procedures calling this Procedure	
Procedure ID	Procedure Name

5.45.9 Comments

5.45.10 Step-by-Step Description (information according to TN-3015 file)

Step Step	Substep/Time/ /Time	Description	Activity	Parameter	
				Name	Value
			Wait/ TM/ TC/ Ground Computation/Verify/ Event		
1	+00:00:00	*System reset*	Y900C		

Procedure ID	***FC-PL-901.01-Y***				
Procedure Name	**AMIE :** Get temperature**(**`Y90101ZA`**)**				
Procedure Type	*Nominal*				
Subsystem	*Payload:* ***AMIE***				
Version:	*1.1*	Last modified:	*17.02.2003*	Author:	*EOF*

5.46 <AMIE Experiment: Get temperature>

5.46.0 Purpose

Get Temperature

5.46.1 Description

See table below

5.46.2 Precondition

EPDP switched OFF

5.46.3 Constraints

N/A

5.46.4 Ground Computations

Verify that Engineering values are converted into HEX values.

5.46.5 TM/TC List

See below

5.46.6 Final state of the system/subsystem after Procedure execution

5.46.7 Contingency Cases

None required

5.46.8 Relationships to other Procedures

Procedures called by this Procedure	
Procedure ID	Procedure Name

Procedures calling this Procedure	
Procedure ID	Procedure Name

5.46.9 Comments

5.46.10 Step-by-Step Description (information according to TN-3015 file)

Step Step	Substep/Time/ /Time	Description	Activity	Parameter	
				Name	Value
			Wait/ TM/ TC/ Ground Computation/Verify/ Event		
1	+00:00:00	*Get temperature*	Y901C		

Procedure ID	***FC-PL-902.01-Y***				
Procedure Name	**AMIE :** Short Diagnostics **(**Y90201ZA**)**				
Procedure Type	*Nominal*				
Subsystem	*Payload: **AMIE***				
Version:	*1.1*	Last modified:	*17.02.2003*	Author:	*EOF*

5.47

5.47.0 Purpose

Short Diagnostics

5.47.1 Description

See table below

5.47.2 Precondition

EPDP switched OFF

5.47.3 Constraints

N/A

5.47.4 Ground Computations

Verify that Engineering values are converted into HEX values.

5.47.5 TM/TC List

See below

5.47.6 Final state of the system/subsystem after Procedure execution

5.47.7 Contingency Cases

None required

5.47.8 Relationships to other Procedures

Procedures called by this Procedure	
Procedure ID	Procedure Name

Procedures calling this Procedure	
Procedure ID	Procedure Name

5.47.9 Comments

5.47.10 Step-by-Step Description (information according to TN-3015 file)

Step Step	Substep/Time/ /Time	Description	Activity	Parameter	
				Name	Value
			Wait/ TM/ TC/ Ground Computation/Verify/ Event		
1	+00:00:00	*Short Diagnostics*	Y902C		

Procedure ID	***FC-PL-903.01-Y***				
Procedure Name	**AMIE :** Full Diagnostics **(**`Y90301ZA`**)**				
Procedure Type	*Nominal*				
Subsystem	*Payload:* ***AMIE***				
Version:	*1.1*	Last modified:	*17.02.2003*	Author:	*EOF*

5.48

5.48.0 Purpose

Full Diagnostics

5.48.1 Description

See table below

5.48.2 Precondition

EPDP switched OFF

5.48.3 Constraints

N/A

5.48.4 Ground Computations

Verify that Engineering values are converted into HEX values.

5.48.5 TM/TC List

See below

5.48.6 Final state of the system/subsystem after Procedure execution

5.48.7 Contingency Cases

None required

5.48.8 Relationships to other Procedures

Procedures called by this Procedure	
Procedure ID	Procedure Name

Procedures calling this Procedure	
Procedure ID	Procedure Name

5.48.9 Comments

5.48.10 Step-by-Step Description (information according to TN-3015 file)

Step Step	Substep/Time/ /Time	Description	Activity	Parameter	
				Name	Value
			Wait/ TM/ TC/ Ground Computation/Verify/ Event		
1	+00:00:00	*Full Diagnostics*	Y903C		

Procedure ID	***FC-PL-904.01-Y***				
Procedure Name	**AMIE :** Full Diagnostics **(**Y90401ZA**) 250ms delay**				
Procedure Type	*Nominal*				
Subsystem	*Payload:* ***AMIE***				
Version:	*1.1*	Last modified:	*17.02.2003*	Author:	*EOF*

5.49

5.49.0 Purpose

Full Diagnostics

5.49.1 Description

See table below

5.49.2 Precondition

EPDP switched OFF

5.49.3 Constraints

N/A

5.49.4 Ground Computations

Verify that Engineering values are converted into HEX values.

5.49.5 TM/TC List

See below

5.49.6 Final state of the system/subsystem after Procedure execution

5.49.7 Contingency Cases

None required

5.49.8 Relationships to other Procedures

Procedures called by this Procedure	
Procedure ID	Procedure Name

Procedures calling this Procedure	
Procedure ID	Procedure Name

5.49.9 Comments

5.49.10 Step-by-Step Description (information according to TN-3015 file)

Step Step	Substep/Time/ /Time	Description	Activity	Parameter	
				Name	Value
			Wait/ TM/ TC/ Ground Computation/Verify/ Event		
1	+00:00:00	*Full Diagnostics 250ms*	Y904C		

Procedure ID	***FC-PL-905.01-Y***				
Procedure Name	**AMIE :** Full Diagnostics **(**Y90501ZA**) 500ms delay**				
Procedure Type	*Nominal*				
Subsystem	*Payload:* ***AMIE***				
Version:	*1.1*	Last modified:	*17.02.2003*	Author:	*EOF*

5.50

5.50.0 Purpose

Full Diagnostics

5.50.1 Description

See table below

5.50.2 Precondition

EPDP switched OFF

5.50.3 Constraints

N/A

5.50.4 Ground Computations

Verify that Engineering values are converted into HEX values.

5.50.5 TM/TC List

See below

5.50.6 Final state of the system/subsystem after Procedure execution

5.50.7 Contingency Cases

None required

5.50.8 Relationships to other Procedures

Procedures called by this Procedure	
Procedure ID	Procedure Name

Procedures calling this Procedure	
Procedure ID	Procedure Name

5.50.9 Comments

5.50.10 Step-by-Step Description (information according to TN-3015 file)

Step Step	Substep/Time/ /Time	Description	Activity	Parameter	
				Name	Value
			Wait/ TM/ TC/ Ground Computation/Verify/ Event		
1	+00:00:00	*Full Diagnostics 500ms*	Y905C		

Procedure ID	***FC-PL-906.01-Y***				
Procedure Name	**AMIE :** Full Diagnostics **(**Y90601ZA**) 750ms delay**				
Procedure Type	*Nominal*				
Subsystem	*Payload:* ***AMIE***				
Version:	*1.1*	Last modified:	*17.02.2003*	Author:	*EOF*

5.51

5.51.0 Purpose

Full Diagnostics

5.51.1 Description

See table below

5.51.2 Precondition

EPDP switched OFF

5.51.3 Constraints

N/A

5.51.4 Ground Computations

Verify that Engineering values are converted into HEX values.

5.51.5 TM/TC List

See below

5.51.6 Final state of the system/subsystem after Procedure execution

5.51.7 Contingency Cases

None required

5.51.8 Relationships to other Procedures

Procedures called by this Procedure	
Procedure ID	Procedure Name

Procedures calling this Procedure	
Procedure ID	Procedure Name

5.51.9 Comments

5.51.10 Step-by-Step Description (information according to TN-3015 file)

Step Step	Substep/Time/ /Time	Description	Activity	Parameter	
				Name	Value
			Wait/ TM/ TC/ Ground Computation/Verify/ Event		
1	+00:00:00	*Full Diagnostics 750ms*	Y906C		

ANNEXES:

Annex A: Mathematical models

N/A

Annex B: Pointing and special requirements

See EID-B section 3.2.

Annex C: Auxiliary processing Data Requirements

No special data is needed to process raw data. S/C attitude and environmental characteristics will be needed for science processing.

Annex D: Mechanical Drawings

Annex E: List of Abbreviations

µP	Microprocessor
AMIE	Advanced Moon micro-Imaging Experiment
CCD	Charge Coupled Device
Co-I	Co-Investigator
CTE	Charge Transfer Efficiency
DN	Digital Number (a value from 0 to 2^{10} – 1 for AMIE)
DPU	Digital Processing Unit
DSP	Digital Signal Processor
EEM	Electrical Engineering Model
EGSE	Electrical Ground Support Equipment
EM	Engineering Model
ESA	European Space Agency
FOV	Field of View
FPGA	Field Programmable Gate-Array
GSE	Ground Support Equipment
I/F	Interface
LED	Light Emitting Diode
LN2	Liquid Nitrogen
MTF	Modular Transfer Function
N/A	Not Applicable
OBC	On Board Computer
PCB	Printed Circuit Board
PFM	Proto-Flight Model
PI	Principal Investigator
PRNU	Pixel Response Non-Uniformity
PSF	Point Spread Function
PSIF	Power Supply Interface Board
QE	Quantum Efficiency
RTC	Real Time Clock
S/C	Spacecraft
S/W	Software
SCU	System Control Unit
SSC	Swedish Space Corporation
SSD	Space Science Department
STM	Structural and Thermal Model
TBC	To be confirmed
TBD	To be defined
VHDL	VHSIC Hardware Description Language
WD	Watch-Dog

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