eROSITA routine flight operations

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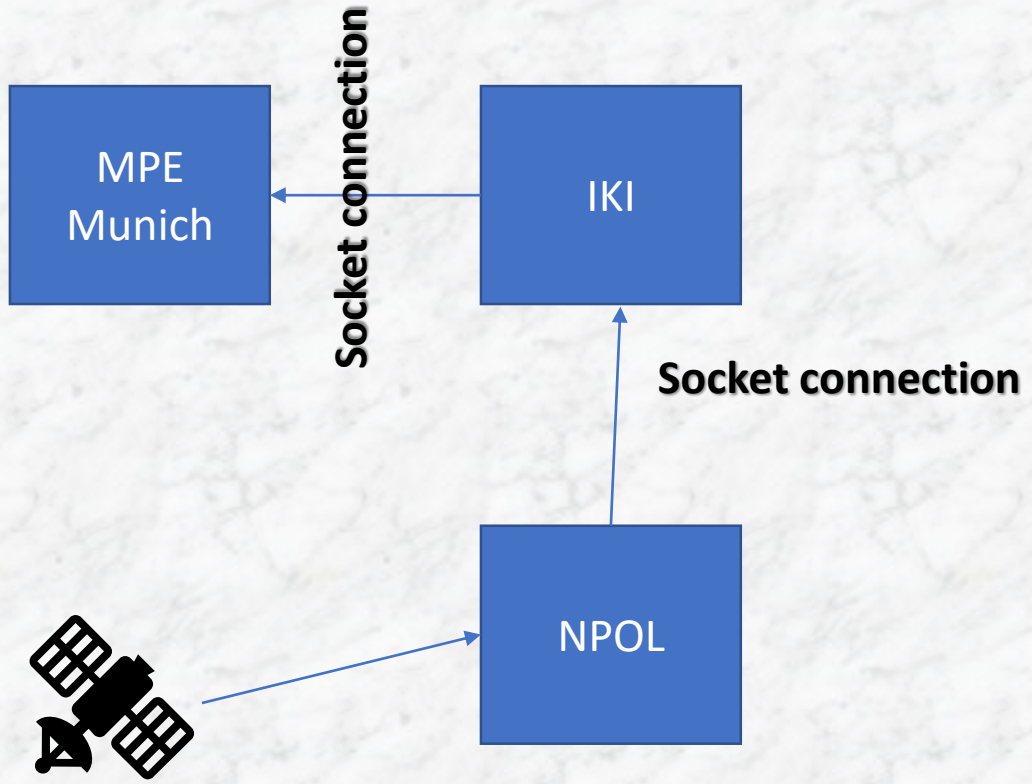
Ringberg, Oct. 24 – 26, 2018

Introduction

- 6 years of mission life time
- Daily contacts with spacecraft
- Daily commands to be uploaded
- Daily housekeeping and health to be monitored
- MPE is the only party that knows how to operate eROSITA

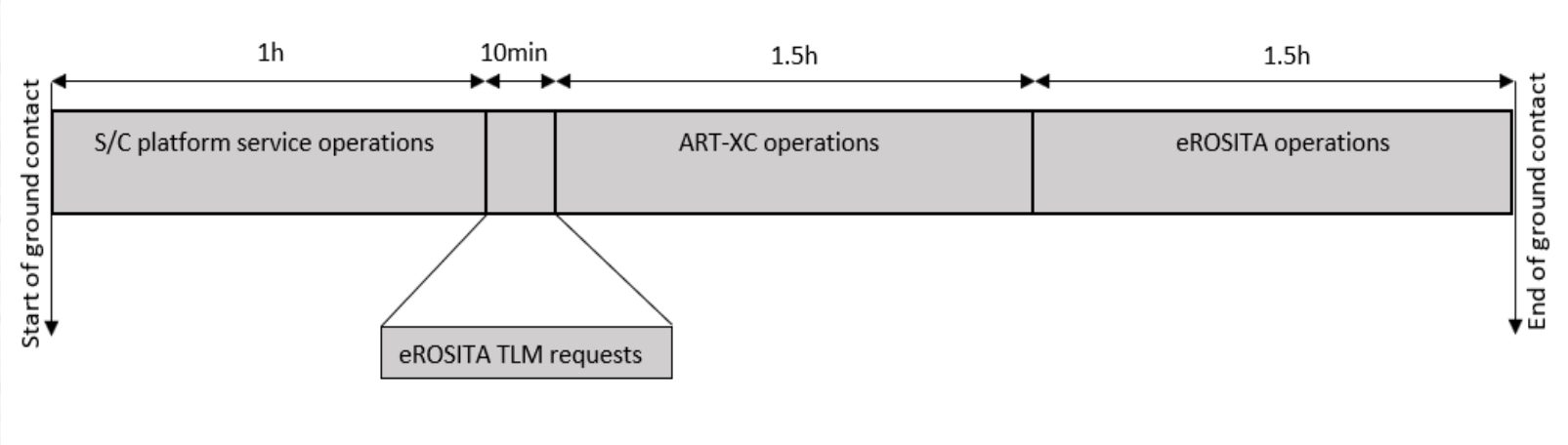
What is planned

- One room will be located at MPE
  - eROSITA operations
  - EGSE receiving eROSITA telemetry
  - Command preparation software
  - Socket connection to IKI



Organization – Ground contact

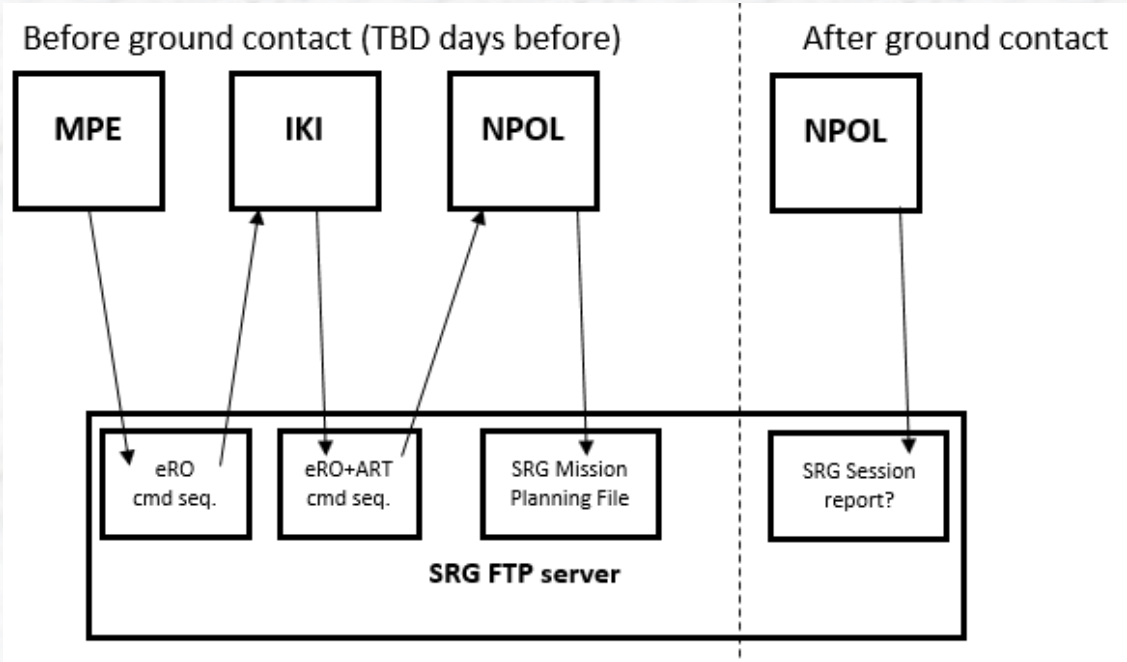
- Typical ground contact will be organized in the following sequence:

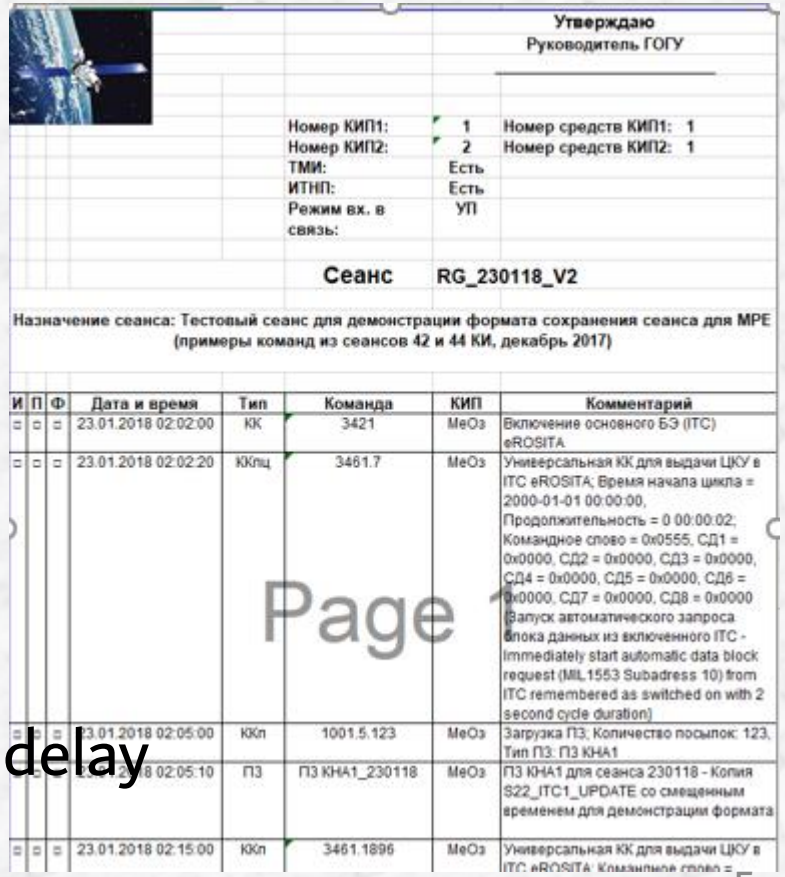


- During this phase operations will be planned on a day to day basis.
- Command sequences for eROSITA operations will be delivered to IKI over FTP server, as defined per MPE/IKI ICD.

Organization – Telecommanding

- MPE instrument team responsible for generating daily command sequences to operate eROSITA.





Утверждаю
Руководитель ГОГУ

Номер КИП1:	1	Номер средств КИП1:	1
Номер КИП2:	2	Номер средств КИП2:	1
ТМИ:	Есть		
ИТНП:	Есть		
Режим вх. в связь:	УП		

Сеанс RG_230118_V2

Назначение сеанса: Тестовый сеанс для демонстрации формата сохранения сеанса для МРЕ (примеры команд из сеансов 42 и 44 КИ, декабрь 2017)

И	П	Ф	Дата и время	Тип	Команда	КИП	Комментарий
□	□	□	23.01.2018 02:02:00	КК	3421	МеОз	Включение основного БЭ (ITC) eROSITA
□	□	□	23.01.2018 02:02:20	ККпц	3461.7	МеОз	Универсальная КК для выдачи ЦКУ в ITC eROSITA; Время начала цикла = 2000-01-01 00:00:00, Продолжительность = 0 00:00:02; Командное слово = 0x0555, СД1 = 0x0000, СД2 = 0x0000, СД3 = 0x0000, СД4 = 0x0000, СД5 = 0x0000, СД6 = 0x0000, СД7 = 0x0000, СД8 = 0x0000 (Запуск автоматического запроса блока данных из включенного ITC - Immediately start automatic data block request (MIL1553 Subadress 10) from ITC remembered as switched on with 2 second cycle duration)
□	□	□	23.01.2018 02:05:00	ККп	1001.5.123	МеОз	Загрузка ПЗ; Количество посылок: 123, Тип ПЗ: ПЗ КНА1
□	□	□	23.01.2018 02:05:10	ПЗ	ПЗ КНА1_230118	МеОз	ПЗ КНА1 для сеанса 230118 - Копия S22_ITC1_UPDATE со смещенным временем для демонстрации формата
□	□	□	23.01.2018 02:15:00	ККп	3461.1896	МеОз	Универсальная КК для выдачи ЦКУ в ITC eROSITA; Командное слово =

- Unplanned commands during session -> 10mins delay

Organization – Telecommanding

eROSITA Command Translator

File Edit

```
ITCON NOM
DELAY 60
DATREQSTART
//
// Thermal system functional
ITCSETTEMP 1,6B
ITCSETTEMP 2,6B
ITCSETTEMP 3,6B
ITCSETTEMP 4,6B
ITCSETTEMP 5,6B
ITCSETTEMP 6,6B
ITCSETTEMP 7,6B
ITCSETTEMP 8,6B
ITCSETTEMP 9,6B
ITCSETTEMP A,6B
ITCSETTEMP B,6B
ITCSETTEMP C,E1
//
//Prepare radiocomplex reques
IRCMODE* 2
ISELRCA
IENACEALL
```

```
21.11.2014 03:00:00  ERO  SEANCE  KK=3421 // Nominal ITC On Relay command
// 60 seconds delay
21.11.2014 03:01:00  ERO  SEANCE  KK=3461.7 // Start Data Request over SubAddr 10
//
// Thermal system functional test
21.11.2014 03:01:10  ERO  SEANCE  KK=3461,B068,0021,0003,0001,0002,006B,004A,0000,0000 // ITCSETTEMP 1,6B
21.11.2014 03:01:20  ERO  SEANCE  KK=346
21.11.2014 03:01:30  ERO  SEANCE  KK=346
21.11.2014 03:01:40  ERO  SEANCE  KK=346
21.11.2014 03:01:50  ERO  SEANCE  KK=346
21.11.2014 03:02:00  ERO  SEANCE  KK=346
21.11.2014 03:02:10  ERO  SEANCE  KK=346
21.11.2014 03:02:20  ERO  SEANCE  KK=346
21.11.2014 03:02:30  ERO  SEANCE  KK=346
21.11.2014 03:02:40  ERO  SEANCE  KK=346
21.11.2014 03:02:50  ERO  SEANCE  KK=346
21.11.2014 03:03:00  ERO  SEANCE  KK=346
//
//Prepare radiocomplex requests over Cha
21.11.2014 03:03:10  ERO  SEANCE  KK=346
21.11.2014 03:03:20  ERO  SEANCE  KK=346
21.11.2014 03:03:30  ERO  SEANCE  KK=346
```

RG_SEANCE_23_NOM_2014-11-21_v03.txt - Notepad

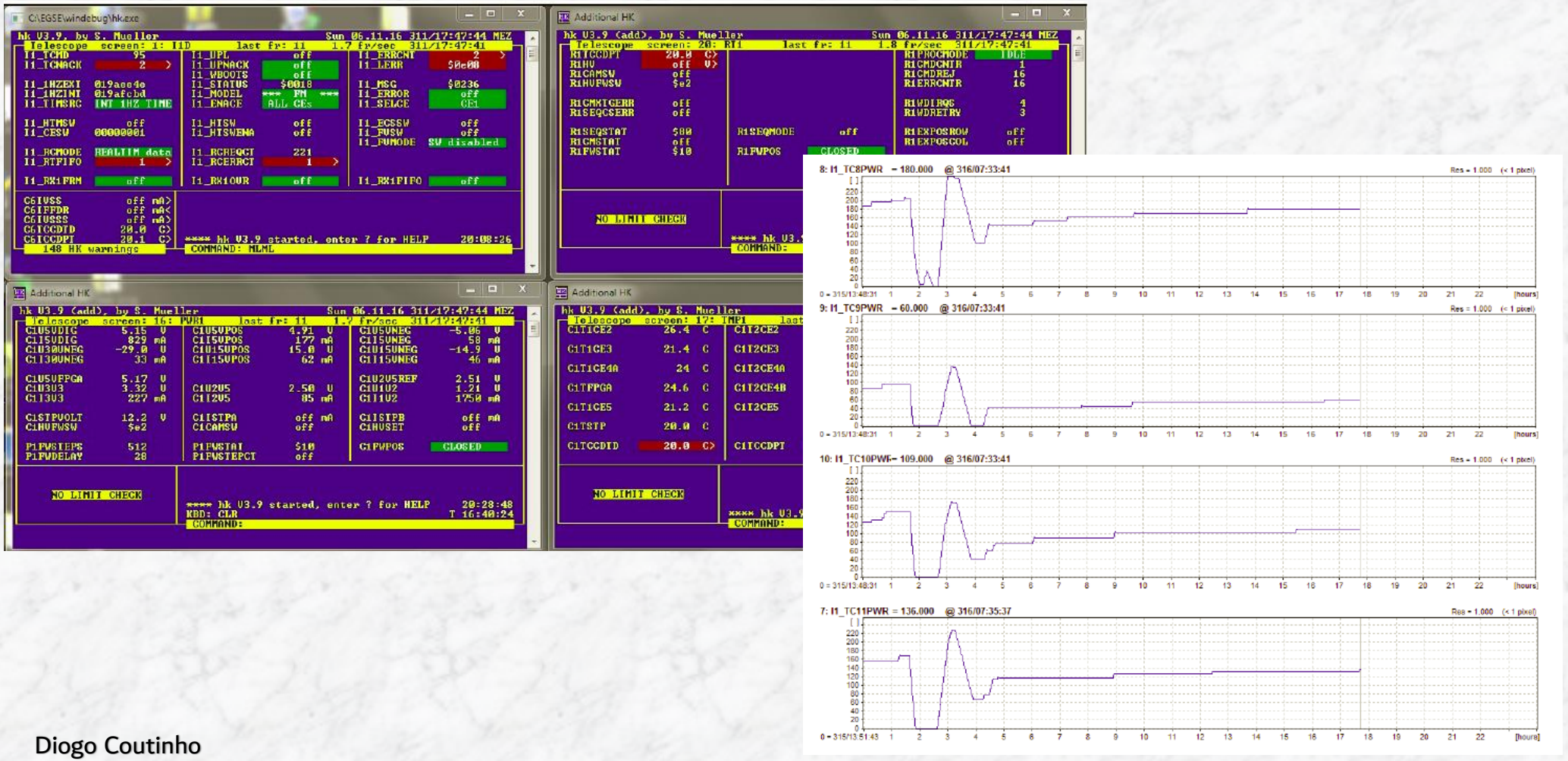
File Edit Format View Help

```
// Cyclogram for eROSITA SEANCE23 (NOM ITC)
// Issuance during SEANCE23 ground testing
//
// File generated on:
// 11 OCTOBER 2018
//
// Cyclogram as described in eRO-MPE-PR-15-10
//
// BEGIN
21.11.2014 03:00:00  ERO  SEANCE  KK=3421 // Nominal ITC On Relay command
// 60 seconds delay
21.11.2014 03:01:00  ERO  SEANCE  KK=3461.7 // Start Data Request over SubAddr 10
//
// Thermal system functional test
21.11.2014 03:01:10  ERO  SEANCE  KK=3461,B068,0021,0003,0001,0002,006B,004A,0000,0000 // ITCSETTEMP 1,6B
21.11.2014 03:01:20  ERO  SEANCE  KK=3461,B068,0021,0003,0002,0002,006B,0049,0000,0000 // ITCSETTEMP 2,6B
21.11.2014 03:01:30  ERO  SEANCE  KK=3461,B068,0021,0003,0003,0002,006B,0048,0000,0000 // ITCSETTEMP 3,6B
21.11.2014 03:01:40  ERO  SEANCE  KK=3461,B068,0021,0003,0004,0002,006B,004F,0000,0000 // ITCSETTEMP 4,6B
21.11.2014 03:01:50  ERO  SEANCE  KK=3461,B068,0021,0003,0005,0002,006B,004E,0000,0000 // ITCSETTEMP 5,6B
21.11.2014 03:02:00  ERO  SEANCE  KK=3461,B068,0021,0003,0006,0002,006B,004D,0000,0000 // ITCSETTEMP 6,6B
21.11.2014 03:02:10  ERO  SEANCE  KK=3461,B068,0021,0003,0007,0002,006B,004C,0000,0000 // ITCSETTEMP 7,6B
21.11.2014 03:02:20  ERO  SEANCE  KK=3461,B068,0021,0003,0008,0002,006B,0043,0000,0000 // ITCSETTEMP 8,6B
21.11.2014 03:02:30  ERO  SEANCE  KK=3461,B068,0021,0003,0009,0002,006B,0042,0000,0000 // ITCSETTEMP 9,6B
21.11.2014 03:02:40  ERO  SEANCE  KK=3461,B068,0021,0003,000A,0002,006B,0041,0000,0000 // ITCSETTEMP A,6B
21.11.2014 03:02:50  ERO  SEANCE  KK=3461,B068,0021,0003,000B,0002,006B,0040,0000,0000 // ITCSETTEMP B,6B
21.11.2014 03:03:00  ERO  SEANCE  KK=3461,B068,0021,0003,000C,0002,00E1,00CD,0000,0000 // ITCSETTEMP C,E1
//
//Prepare radiocomplex requests over Channel 1
21.11.2014 03:03:10  ERO  SEANCE  KK=3461,B068,001C,0001,0002,001F,0000,0000,0000,0000 // *1 ON DEMAND; IRCMODE 2
21.11.2014 03:03:20  ERO  SEANCE  KK=3461,B068,0012,0001,0000,0013,0000,0000,0000,0000 // ISELRCA
21.11.2014 03:03:30  ERO  SEANCE  KK=3461,B068,001A,0001,007F,0064,0000,0000,0000,0000 // IENACEALL
```

Organization – Telemetry

- Near real time data stream is supplied by NPOL to eROSITA EGSE.
  - Diagnostic temperature sensors
  - Telemetry over MIL1553 interface
  - Radiocomplex interface
- Interface from NPOL telemetry ground system to eROSITA EGSE is still under development (socket connection).
  - This interface should be tested during the next ground test campaigns (SEANCE 58?)
- NRTA software developed by Bamberg
  - Problem, at MPE it has not been used before

Organization – Telemetry



Routine operations – open points

- How many people do we need for 6 years of daily operation?
- How much of IKI's tools can we use?
  - Training or getting used to these tools
- Responsibility chain at MPE:
  - Coordination between Science objectives, pointing, commanding
  - What is the chain of decision making, e.g in case of emergency
  - How much dedication from Instrument team will be needed for this phase?
  - Regular meetings / reports?
- Is the software we currently have enough for complete mission?
  - E.g alerts when housekeeping values

Thank you for your attention.

Questions?

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