Juno
JIRAM

Report JM0560

JIR-IAPS-SY-003-2024
Version 1.0

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1 INTRODUCTION

This document describes the activities that JIRAM performed during the activity period JM0560 (PJ056), with particular attention to the comparison between the expected and returned data, keeping track of the instrument configuration with the commanding file (SASF).

2 REFERENCES

Adriani A., M.L. Moriconi, A. Mura, F. Tosi, G. Sindoni, R. Noschese, A. Cicchetti, G. Filacchione (2016), Juno's Earth flyby: the Jovian infrared Auroral Mapper preliminary results, 2016. Astrophys. Space Sci. https://doi.org/10.1007/s10509-016-2842-9

Adriani, A., Filacchione, G., Di Iorio, T., Turrini, D., Noschese, R., Cicchetti, A., Grassi, D., Mura, A., Sindoni, G., Zambelli, M., Piccioni, G., Capria, M. T., Tosi, F., Orosei, R., Dinelli, B. M., Moriconi, M. L., Roncon, E., Lunine, J. I., Becker, H. N., Bini, A., Barbis, A., Calamai, L., Pasqui, C., Nencioni, S., Rossi, M., Lastri, M., Formaro, R., Olivieri, A., 2017. JIRAM, the Jovian Infrared Auroral Mapper.
Space Sci. Rev. 213, 1–4, pp 393-446. https://doi.org/10.1007/s11214-014-0094-y.

Becker, H.N., Alexander, J.W., Adriani, A., Mura, A., Cicchetti, A., Noschese, R., Jørgensen, J.L, Denver, T., Sushkova, J., Jørgensen, A., Benn, M., Connerney, J.E.P. , Bolton, S.J., the Selex Galileo Juno SRU Team, Allison, J., Watts, S., Adumitroaie, V., Manor-Chapman, E.A., Daubar, I.J., Lee, C., Kang, S., McAlpine, W.J., Di Iorio, T., Pasqui, C., Barbis, A., Lawton, P., Spalsbury, L., Loftin, S., Sun, J., 2017. The Juno Radiation Monitoring (RM) Investigation.
Space Sci. Rev. 213, 1-4, pp 507-545. https://10.1007/s11214-017-0345-9.

R. Noschese, A. Cicchetti, R. Sordini, M.Cartacci, S. Brooks, M. Lastri, A. Adriani, A.Mura, G. Fil acchione, H. Becker, A. Bini, C.Pasqui, A. Migliorini, M.L. Moriconi, D.Grassi, F. Altieri, B.M. Di nelli, G. Piccioni, F. Tosi, D. Turrini, G. Sindoni, A. Olivieri, C.Plainaki. Juno/JIRAM: planning and commanding activities.
Adv. Space Res. (2019) https://doi.org/10.1016/j.asr.2019.09.052

3 ACTIVITY DESCRIPTION

During the PJ056 pass, JIRAM performed observations of the cyclones of the South Pole (see fig. 1 and fig. 2). Note that there is a spectral observation corresponding to each observation taken with the imager. Details about imager/spectrometer coupling and more in general about the instrument and its performance can be found in Adriani et al. (2017), Noschese et al. (2019).
Due to an uncertainty in the actual pointing of the JIRAM frame (which is affected by the position of the despinning mirror at the time of the observation), the JIRAM team found that the precision of the reconstruction of the geometry of both IMG and SPE pixels should be revised by a value of no

less than 0.1 degrees. We want to underline that this issue was only discovered during JM0131, when we started to do systematic limb observations near perijove (PJ) and we could compare the calculated position of the planet's limb, using the reconstructed kernels, with respect to its actual position in the image we collected with our instrument.
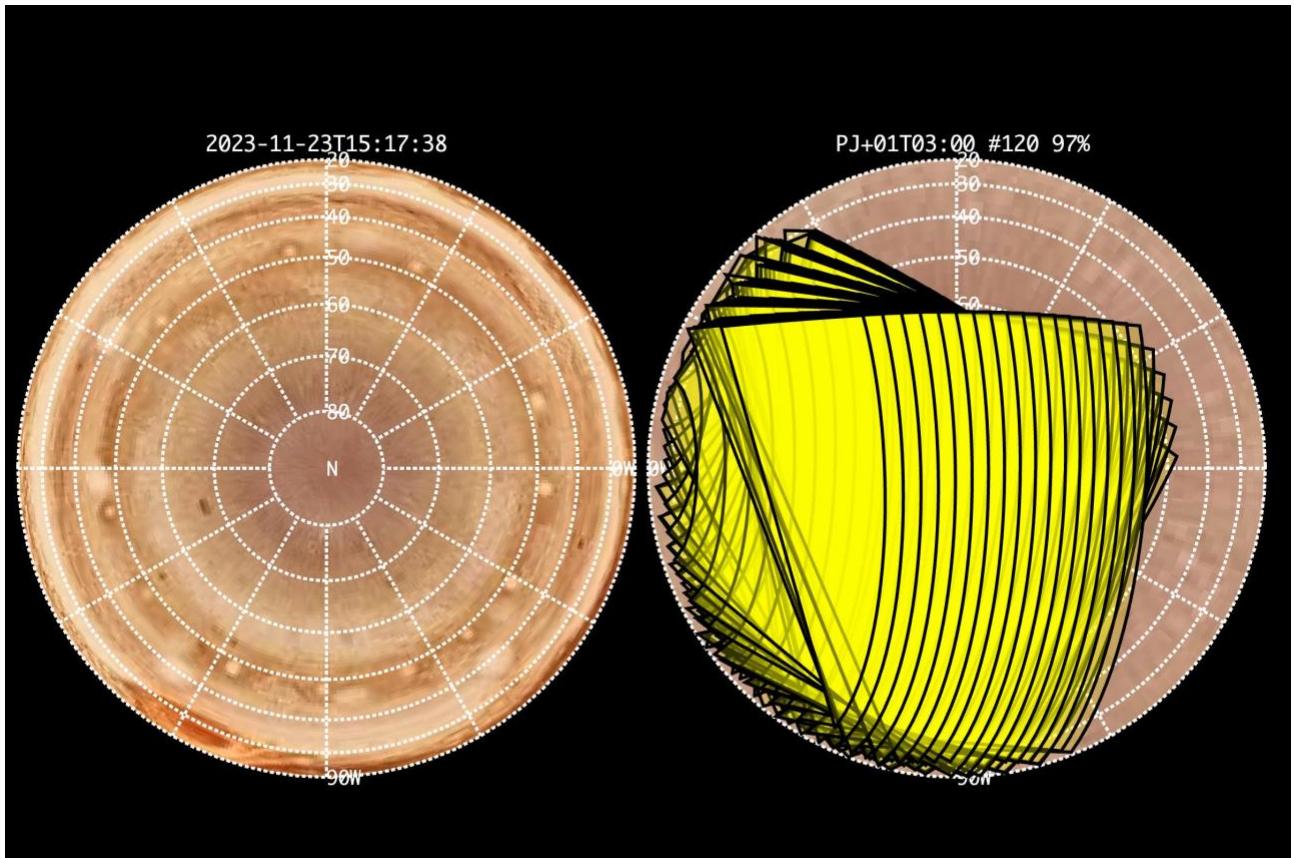
Figure 1: **Simulation with JSPT (JIRAM Software Planning Tool), coverage of the South Pole with filter M. The overlapping yellow strips represent the predicted FOVs.**
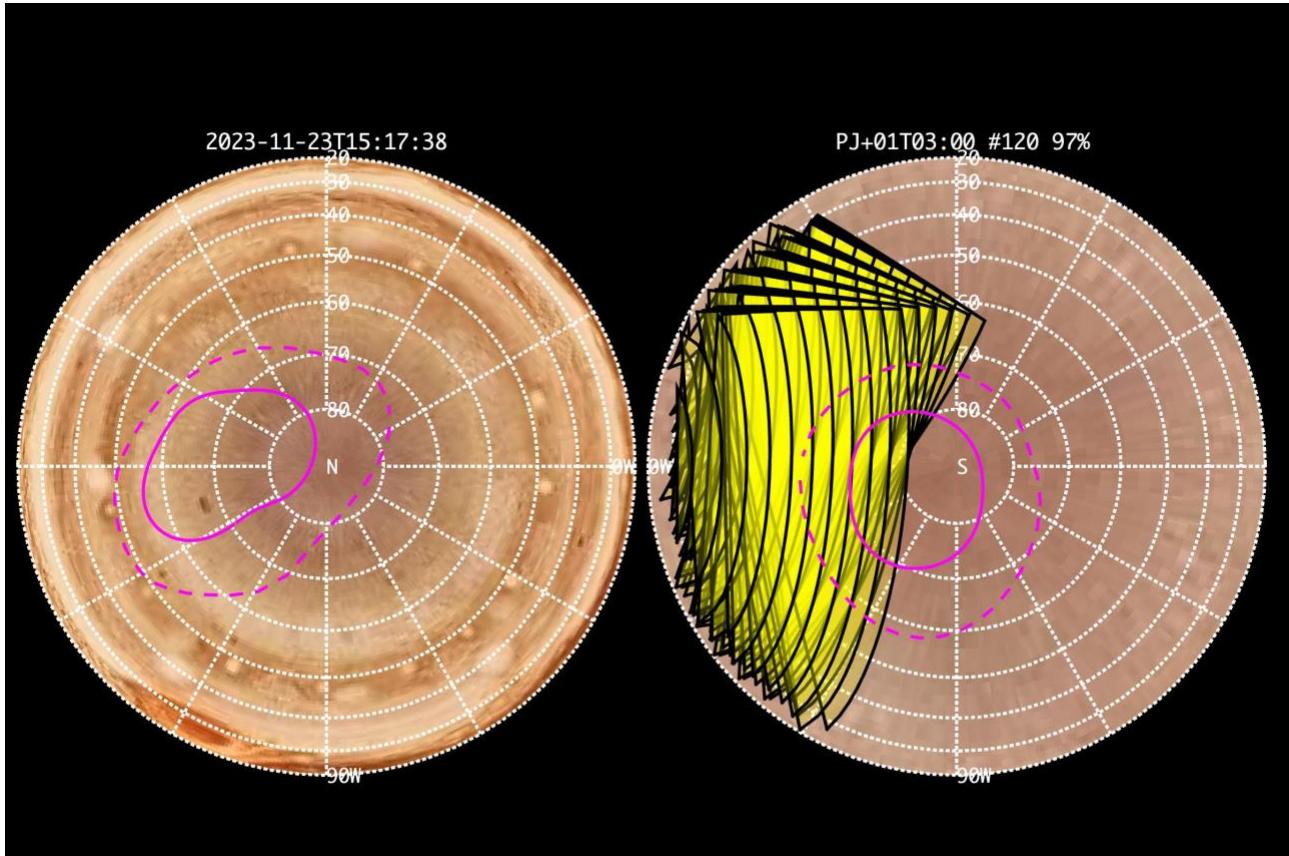
Figure 2: Simulation with JSPT. Coverage of the South Pole with filter L, the magenta line represents the theoretical position of the main auroral oval.

4 RADIATION SEQUENCES

N/A

5 SCIENTIFIC GOALS

Below is a table that describes for each science block in the commanding file the relative operational mode and the scientific objectives. The files relating to the various science blocks are shown in the file "JIR_STATUS_EDR_2023327T141704_V01.CSV" in the INDEX directory.

JRM (sasf)	Operational Mode	Goals
JRM_004	SCI_I1_S1	SOUTH POLE
JRM_005	SCI_I1_S1	SOUTH POLE
JRM_006	SCI_I1_S1	SOUTH POLE

JRM_007	SCI_I1_S1	SOUTH POLE
JRM_008	SCI_I1_S1	SOUTH POLE
JRM_009	SCI_I1_S1	SOUTH POLE

Table 1: Scientific Goals.

6 DATA COLLECTION OVERVIEW

Below is a table that gives an overview of the data collected during the activity period JM0560. The table describes, for each science block in the commanding file, the programmed operational modes and the data actually collected.

JRM (sasf)	Operational Mode	Observations	Packets Retrieved	Packets Expected	Missing Observations SPE	Missing Observations IMG
JRM_004	SCI_I1_S1	20 SPE 20 IMG	240	240	0	0
JRM_005	SCI_I1_S1	18 SPE 18 IMG	216	216	0	0
JRM_006	SCI_I1_S1	18 SPE 18 IMG	216	216	0	0
JRM_007	SCI_I1_S1	18 SPE 18 IMG	216	216	0	0
JRM_008	SCI_I1_S1	18 SPE 18 IMG	216	216	0	0
JRM_009	SCI_I1_S1	18 SPE 18 IMG	216	216	0	0

Table 2: Data Overview.

A.1 Commanding file (SASF)

```
*************************************************************
*************************************************************
CCSD3ZF0000100000001NJPL3KS0L015$$MARK$$;
MISSION_NAME = JUNO;
SPACECRAFT_NAME = JUNO;
DATA_SET_ID = SPACECRAFT_ACTIVITY_SEQUENCE_JRM;
FILE_NAME = jm0560_JRMa.sasf;
APPLICABLE_START_TIME = 2023-325T12:00:00.000;
APPLICABLE_STOP_TIME = 2023-363T12:00:00.000;
PRODUCT_CREATION_TIME = 2023-297T13:36:36.000;
PRODUCER_ID = JRMTEAM;
SEQ_ID = jm0560_JRMa;
HOST_ID = JRM_CMD_560_560_V01.jrm;
CCSD3RE00000$$MARK$$NJPL3IF0M01300000001;
$$JNO          SPACECRAFT ACTIVITY SEQUENCE FILE
*************************************************************
*PROJECT     JNO
*SPACECRAFT  61
*OPERATOR    JRMTEAM
*FILE_CMPLT  TRUE
*DATE        Tue Oct 24 13:36:36 2023
*BEGIN       2023-325T12:00:00.000
*CUTOFF      2023-363T12:00:00.000
*TITLE       jm0560_JRMa
*EPOCHS_DEF
*jm0560_JRM,      2023-325T12:00:00.000
*EPOCHS_END
*Input files used:
*File Type  Last modified            File name
*PACKETS_NUMBER  1320
*************************************************************
$$EOH
$$EOD
request(JRM_Sequence_Management_Request,
              START_TIME,2023-325T12:00:00.000,
              TITLE, "JRM_MAINTENANCE",
              REQUESTOR, "JRMTEAM",
              PROCESSOR, "VC2",
              KEY, "No_Key")

activity(1,
       SCHEDULED_TIME,\00:00:00\,FROM_REQUEST_START,
              SEQTRAN_directive
              (VML_START,2001-001T00:00:00.000,2030-
001T00:00:00.000,"ABSLTE","jm0560_JRM","jm0560_JRM.abs","d:/seq")
          ),
     command(2,
              SCHEDULED_TIME,\00:00:30\,FROM_PREVIOUS_START,
              FILE_DELETE("d:/seq/jm0560_JRM.abs")
          ),
     command(3,
              SCHEDULED_TIME,\037T23:59:58\,FROM_REQUEST_START,
              VM_LOAD(20,"d:/seq/jm0570_JRM.abs")
          ),
 end;

request(JRM_001,
              START_TIME,2023-327T08:52:33.000,
              TITLE, "jm0560_JRM_Heater_Op",
              REQUESTOR, "JRMTEAM",
              PROCESSOR, "VC2",
              KEY, "No_Key")
     command(1,
              SCHEDULED_TIME,\00:00:00\,FROM_REQUEST_START,
              THRM_SET_PT_SEL("JIRAM_OH","OPERATIONAL")
          ),
     command(2,
```

```
                    SCHEDULED_TIME,\00:00:01\,FROM_PREVIOUS_START,
                    THRM_SET_PT_SEL("JIRAM_DECON","OPERATIONAL")
         ),
         command(3,
                    SCHEDULED_TIME,\03:10:00\,FROM_PREVIOUS_START,
                    THRM_SET_PT_SEL("JIRAM_ELECT_BP","OPERATIONAL")
         ),
            note(1,
                    SCHEDULED_TIME,\00:00:04\,FROM_PREVIOUS_START,
                    TEXT,\"NaN"\
            ),
 end;

request(JRM_002,
                    START_TIME,2023-327T14:13:33.000,
                    TITLE, "jm0560_JRM-POWER_ON",
                    REQUESTOR, "JRMTEAM",
                    PROCESSOR, "VC2",
                    KEY, "No_Key")
            spawn(1,
                    SCHEDULED_TIME,\00:00:00\,FROM_REQUEST_START,
                    REQ_ENGINE_ID,21,RT_on_board_block(jiram_pwr_on)
            ),
            note(1,
                    SCHEDULED_TIME,\00:00:04\,FROM_PREVIOUS_START,
                    TEXT,\"NaN"\
            ),
 end;

request(JRM_003,
                    START_TIME,2023-327T14:16:16.000,
                    TITLE, "jm0560_JRM_StandBy",
                    REQUESTOR, "JRMTEAM",
                    PROCESSOR, "VC2",
                    KEY, "No_Key")
         command(1,
                    SCHEDULED_TIME,\00:00:00\,FROM_REQUEST_START,
                    JRM_SET_PAR(111,2)
         ),
         command(2,
                    SCHEDULED_TIME,\00:00:04\,FROM_PREVIOUS_START,
                    JRM_STANDBY("ON","ON","OFF")
         ),
         command(3,
                    SCHEDULED_TIME,\00:00:04\,FROM_PREVIOUS_START,

JRM_SCI_PAR("SCI_I2_S3",120,1,10,"IDIS_SDIS","HSSL","ENABLE","DARK","DISABLE",0,956,2,150,"LOW","LOW
","POINT",-57343,2,150,"LOW","LOW","SPIN",2294,"NO_SUMMED_SCI")
         ),
            note(1,
                    SCHEDULED_TIME,\00:00:04\,FROM_PREVIOUS_START,
                    TEXT,\"NaN"\
            ),
 end;

request(JRM_004,
                    START_TIME,2023-327T14:16:28.000,
                    TITLE, "jm0560_JRM_Science",
                    REQUESTOR, "JRMTEAM",
                    PROCESSOR, "VC2",
                    KEY, "No_Key")
         command(1,
                    SCHEDULED_TIME,\00:00:00\,FROM_REQUEST_START,
                    JRM_SET_PAR(74,2490)
         ),
         command(2,
                    SCHEDULED_TIME,\00:00:02\,FROM_PREVIOUS_START,

JRM_SCI_PAR("SCI_I1_S1",20,1,0,"IDIS_SDIS","HSSL","ENABLE","DARK","DISABLE",0,34,20,5000,"LOW","LOW
","POINT",-57343,20,5000,"LOW","LOW","SPIN",2588,"NO_SUMMED_SCI")
         ),
         command(3,
                    SCHEDULED_TIME,\00:00:02\,FROM_PREVIOUS_START,
```

```
                                JRM_START_HS_REC()
            ),
        command(4,
                SCHEDULED_TIME,\00:00:02\,FROM_PREVIOUS_START,
                JRM_SCIENCE()
            ),
        command(5,
                SCHEDULED_TIME,\00:10:50\,FROM_PREVIOUS_START,
                JRM_ERROR_LOG()
            ),
        command(6,
                SCHEDULED_TIME,\00:00:02\,FROM_PREVIOUS_START,
                JRM_STOP_HS_REC()
            ),
            note(1,
                SCHEDULED_TIME,\00:00:04\,FROM_PREVIOUS_START,
                TEXT,\"South Pole"\
            ),
 end;

request(JRM_005,
                START_TIME,2023-327T14:27:39.000,
                TITLE, "jm0560_JRM_Science",
                REQUESTOR, "JRMTEAM",
                PROCESSOR, "VC2",
                KEY, "No_Key")
        command(1,
                SCHEDULED_TIME,\00:00:00\,FROM_REQUEST_START,
                JRM_SET_PAR(74,2490)
            ),
        command(2,
                SCHEDULED_TIME,\00:00:02\,FROM_PREVIOUS_START,

JRM_SCI_PAR("SCI_I1_S1",18,1,0,"IDIS_SDIS","HSSL","ENABLE","DARK","DISABLE",0,38,20,5000,"LOW","LOW"
,"POINT",-57343,20,5000,"LOW","LOW","SPIN",2588,"NO_SUMMED_SCI")
            ),
        command(3,
                SCHEDULED_TIME,\00:00:02\,FROM_PREVIOUS_START,
                JRM_START_HS_REC()
            ),
        command(4,
                SCHEDULED_TIME,\00:00:02\,FROM_PREVIOUS_START,
                JRM_SCIENCE()
            ),
        command(5,
                SCHEDULED_TIME,\00:09:49\,FROM_PREVIOUS_START,
                JRM_ERROR_LOG()
            ),
        command(6,
                SCHEDULED_TIME,\00:00:02\,FROM_PREVIOUS_START,
                JRM_STOP_HS_REC()
            ),
            note(1,
                SCHEDULED_TIME,\00:00:04\,FROM_PREVIOUS_START,
                TEXT,\"South Pole"\
            ),
 end;

request(JRM_006,
                START_TIME,2023-327T14:37:49.000,
                TITLE, "jm0560_JRM_Science",
                REQUESTOR, "JRMTEAM",
                PROCESSOR, "VC2",
                KEY, "No_Key")
        command(1,
                SCHEDULED_TIME,\00:00:00\,FROM_REQUEST_START,
                JRM_SET_PAR(74,2490)
            ),
        command(2,
                SCHEDULED_TIME,\00:00:02\,FROM_PREVIOUS_START,

JRM_SCI_PAR("SCI_I1_S1",18,1,0,"IDIS_SDIS","HSSL","ENABLE","DARK","DISABLE",0,38,20,5000,"LOW","LOW"
,"POINT",-57343,20,5000,"LOW","LOW","SPIN",2587,"NO_SUMMED_SCI")
```

```
        ),
      command(3,
            SCHEDULED_TIME,\00:00:02\,FROM_PREVIOUS_START,
            JRM_START_HS_REC()
        ),
      command(4,
            SCHEDULED_TIME,\00:00:02\,FROM_PREVIOUS_START,
            JRM_SCIENCE()
        ),
      command(5,
            SCHEDULED_TIME,\00:09:49\,FROM_PREVIOUS_START,
            JRM_ERROR_LOG()
        ),
      command(6,
            SCHEDULED_TIME,\00:00:02\,FROM_PREVIOUS_START,
            JRM_STOP_HS_REC()
        ),
       note(1,
            SCHEDULED_TIME,\00:00:04\,FROM_PREVIOUS_START,
            TEXT,\"South Pole"\
        ),
 end;

request(JRM_007,
            START_TIME,2023-327T14:47:59.000,
            TITLE, "jm0560_JRM_Science",
            REQUESTOR, "JRMTEAM",
            PROCESSOR, "VC2",
            KEY, "No_Key")
      command(1,
            SCHEDULED_TIME,\00:00:00\,FROM_REQUEST_START,
            JRM_SET_PAR(74,2490)
        ),
      command(2,
            SCHEDULED_TIME,\00:00:02\,FROM_PREVIOUS_START,

JRM_SCI_PAR("SCI_I1_S1",18,1,0,"IDIS_SDIS","HSSL","ENABLE","DARK","DISABLE",0,38,20,5000,"LOW","LOW"
,"POINT",-57343,20,5000,"LOW","LOW","SPIN",2586,"NO_SUMMED_SCI")
        ),
      command(3,
            SCHEDULED_TIME,\00:00:02\,FROM_PREVIOUS_START,
            JRM_START_HS_REC()
        ),
      command(4,
            SCHEDULED_TIME,\00:00:02\,FROM_PREVIOUS_START,
            JRM_SCIENCE()
        ),
      command(5,
            SCHEDULED_TIME,\00:09:49\,FROM_PREVIOUS_START,
            JRM_ERROR_LOG()
        ),
      command(6,
            SCHEDULED_TIME,\00:00:02\,FROM_PREVIOUS_START,
            JRM_STOP_HS_REC()
        ),
       note(1,
            SCHEDULED_TIME,\00:00:04\,FROM_PREVIOUS_START,
            TEXT,\"South Pole"\
        ),
 end;

request(JRM_008,
            START_TIME,2023-327T14:58:09.000,
            TITLE, "jm0560_JRM_Science",
            REQUESTOR, "JRMTEAM",
            PROCESSOR, "VC2",
            KEY, "No_Key")
      command(1,
            SCHEDULED_TIME,\00:00:00\,FROM_REQUEST_START,
            JRM_SET_PAR(74,2490)
        ),
      command(2,
            SCHEDULED_TIME,\00:00:02\,FROM_PREVIOUS_START,
```

```
JRM_SCI_PAR("SCI_I1_S1",18,1,0,"IDIS_SDIS","HSSL","ENABLE","DARK","DISABLE",0,38,20,5000,"LOW","LOW"
,"POINT",-57343,20,5000,"LOW","LOW","SPIN",2586,"NO_SUMMED_SCI")
            ),
        command(3,
                SCHEDULED_TIME,\00:00:02\,FROM_PREVIOUS_START,
                JRM_START_HS_REC()
            ),
        command(4,
                SCHEDULED_TIME,\00:00:02\,FROM_PREVIOUS_START,
                JRM_SCIENCE()
            ),
        command(5,
                SCHEDULED_TIME,\00:09:49\,FROM_PREVIOUS_START,
                JRM_ERROR_LOG()
            ),
        command(6,
                SCHEDULED_TIME,\00:00:02\,FROM_PREVIOUS_START,
                JRM_STOP_HS_REC()
            ),
          note(1,
                SCHEDULED_TIME,\00:00:04\,FROM_PREVIOUS_START,
                TEXT,\"South Pole"\
            ),
 end;

request(JRM_009,
                START_TIME,2023-327T15:08:19.000,
                TITLE, "jm0560_JRM_Science",
                REQUESTOR, "JRMTEAM",
                PROCESSOR, "VC2",
                KEY, "No_Key")
        command(1,
                SCHEDULED_TIME,\00:00:00\,FROM_REQUEST_START,
                JRM_SET_PAR(74,2490)
            ),
        command(2,
                SCHEDULED_TIME,\00:00:02\,FROM_PREVIOUS_START,

JRM_SCI_PAR("SCI_I1_S1",18,1,0,"IDIS_SDIS","HSSL","ENABLE","DARK","DISABLE",0,38,20,5000,"LOW","LOW"
,"POINT",-57343,20,5000,"LOW","LOW","SPIN",2585,"NO_SUMMED_SCI")
            ),
        command(3,
                SCHEDULED_TIME,\00:00:02\,FROM_PREVIOUS_START,
                JRM_START_HS_REC()
            ),
        command(4,
                SCHEDULED_TIME,\00:00:02\,FROM_PREVIOUS_START,
                JRM_SCIENCE()
            ),
        command(5,
                SCHEDULED_TIME,\00:09:49\,FROM_PREVIOUS_START,
                JRM_ERROR_LOG()
            ),
        command(6,
                SCHEDULED_TIME,\00:00:02\,FROM_PREVIOUS_START,
                JRM_STOP_HS_REC()
            ),
          note(1,
                SCHEDULED_TIME,\00:00:04\,FROM_PREVIOUS_START,
                TEXT,\"South Pole"\
            ),
 end;

request(JRM_010,
                START_TIME,2023-327T15:18:20.000,
                TITLE, "jm0560_JRM-POWER_OFF",
                REQUESTOR, "JRMTEAM",
                PROCESSOR, "VC2",
                KEY, "No_Key")
     command(1,
                SCHEDULED_TIME,\00:00:00\,FROM_REQUEST_START,
                VM_LOAD(21,"d:/seq/hlfp_spm_safe_jiram.mod")
```

```
            ),
        note(1,
            SCHEDULED_TIME,\00:00:04\,FROM_PREVIOUS_START,
            TEXT,\"NaN"\
        ),
 end;

request(JRM_011,
            START_TIME,2023-327T15:18:36.000,
            TITLE, "jm0560_JRM_Heater_Op",
            REQUESTOR, "JRMTEAM",
            PROCESSOR, "VC2",
            KEY, "No_Key")
    command(1,
            SCHEDULED_TIME,\00:00:00\,FROM_REQUEST_START,
            THRM_SET_PT_SEL("JIRAM_OH","NON_OPERATIONAL")
    ),
    command(2,
            SCHEDULED_TIME,\00:00:01\,FROM_PREVIOUS_START,
            THRM_SET_PT_SEL("JIRAM_DECON","NON_OPERATIONAL")
    ),
    command(3,
            SCHEDULED_TIME,\00:00:02\,FROM_PREVIOUS_START,
            THRM_SET_PT_SEL("JIRAM_ELECT_BP","NON_OPERATIONAL")
    ),
 end;

$$EOF
```