Juno
JIRAM

Report JM0322

JIR-IAPS-SY-007-2021
Version 1.0

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1   INTRODUCTION

This document describes the activities that JIRAM performed during the activity period JM0322 (PJ032), 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.

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Adv. Space Res. (2019) https://doi.org/10.1016/j.asr.2019.09.052

3   ACTIVITY DESCRIPTION

During the JM0322, JIRAM performed only observations of the Jupiter's moon Callisto. 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.

4 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_2021104T202751_V01.CSV" in the INDEX directory.

JRM (sasf)	Operational Mode	Goals
JRM_004	CAL_I1_S1	INTERNAL CALIBRATION
JRM_005	SCI_I2_S1	CALLISTO
JRM_006	SCI_I2_S1	CALLISTO
JRM_007	SCI_I2_S1	CALLISTO
JRM_008	SCI_I2_S1	CALLISTO
JRM_009	SCI_I2_S1	CALLISTO
JRM_010	CAL_I1_S1	INTERNAL CALIBRATION

Table 1: Scientific Goals

5 DATA COLLECTION OVERVIEW

Below is a table that gives an overview of the data collected during the activity period JM0322. 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	CAL_I1_S1	6 IMG 6 SPE	72	72	0	0
JRM_005	SCI_I2_S1	30 IMG 30 SPE	270	270	0	0
JRM_006	SCI_I2_S1	30 IMG 30 SPE	270	270	0	0
JRM_007	SCI_I2_S1	30 IMG 30 SPE	270	270	0	0
JRM_008	SCI_I2_S1	30 IMG 30 SPE	270	270	0	0
JRM_009	SCI_I2_S1	30 IMG 30 SPE	270	270	0	0
JRM_010	CAL_I1_S1	6 IMG 6 SPE	72	72	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 = jm0322_JRMa.sasf;
APPLICABLE_START_TIME = 2021-078T08:00:00.000;
APPLICABLE_STOP_TIME = 2021-104T23:00:00.000;
PRODUCT_CREATION_TIME = 2021-054T19:08:08.000;
PRODUCER_ID = JRMTEAM;
SEQ_ID = jm0322_JRMa;
HOST_ID = JRM_CMD_322_322_V01.jrm;
CCSD3RE00000$$MARK$$NJPL3IF0M01300000001;
$$JNO          SPACECRAFT ACTIVITY SEQUENCE FILE
*****************************************************************
*PROJECT      JNO
*SPACECRAFT  61
*OPERATOR    JRMTEAM
*FILE_CMPLT TRUE
*DATE        Tue Feb 23 19:08:08 2021
*BEGIN       2021-078T08:00:00.000
*CUTOFF      2021-104T23:00:00.000
*TITLE       jm0322_JRMa
*EPOCHS_DEF
*jm0322_JRM,     2021-078T08:00:00.000
*EPOCHS_END
*Input files used:
*File Type  Last modified            File name
*PACKETS_NUMBER  1494
*****************************************************************
$$EOH
$$EOD
request(JRM_Sequence_Management_Request,
              START_TIME,2021-078T08:00:00.000,
              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","jm0322_JRM","jm0322_JRM.abs","d:/seq")
            ),
     command(2,
              SCHEDULED_TIME,\00:00:30\,FROM_PREVIOUS_START,
              FILE_DELETE("d:/seq/jm0322_JRM.abs")
            ),
     command(3,
              SCHEDULED_TIME,\026T14:59:58\,FROM_REQUEST_START,
              VM_LOAD(20,"d:/seq/jm0331_JRM.abs")
            ),
 end;

request(JRM_001,
              START_TIME,2021-104T15:03:15.000,
              TITLE, "jm0322_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,2021-104T20:24:15.000,
                TITLE, "jm0322_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,2021-104T20:26:58.000,
                TITLE, "jm0322_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","ON")
            ),
        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",0,"NO_SUMMED_SCI")
            ),
            note(1,
                SCHEDULED_TIME,\00:00:04\,FROM_PREVIOUS_START,
                TEXT,\"NaN"\
            ),
 end;

request(JRM_004,
                START_TIME,2021-104T20:27:10.000,
                TITLE, "jm0322_JRM_Calibration",
                REQUESTOR, "JRMTEAM",
                PROCESSOR, "VC2",
                KEY, "No_Key")
        command(1,
                SCHEDULED_TIME,\00:00:00\,FROM_REQUEST_START,
                JRM_CAL_PAR(8,14,8,14,30,700,30,700,30,700,30,700,30,700,200,200,153,153)
            ),
        command(2,
                SCHEDULED_TIME,\00:00:04\,FROM_PREVIOUS_START,
                JRM_GET_PAR(6000)
            ),
        command(3,
                SCHEDULED_TIME,\00:00:04\,FROM_PREVIOUS_START,
```

```
                        JRM_START_HS_REC()
            ),
        command(4,
                SCHEDULED_TIME,\00:00:04\,FROM_PREVIOUS_START,
                JRM_CALIBRATION("CAL_I1_S1","IDIS_SDIS","DISABLE",1,"LAMP_1")
            ),
        command(5,
                SCHEDULED_TIME,\00:04:00\,FROM_PREVIOUS_START,
                JRM_STOP_HS_REC()
            ),
        command(6,
                SCHEDULED_TIME,\00:00:04\,FROM_PREVIOUS_START,
                JRM_ERROR_LOG()
            ),
         note(1,
                SCHEDULED_TIME,\00:00:04\,FROM_PREVIOUS_START,
                TEXT,\"NaN"\
            ),
 end;

request(JRM_005,
                START_TIME,2021-104T20:31:41.000,
                TITLE, "jm0322_JRM_Science",
                REQUESTOR, "JRMTEAM",
                PROCESSOR, "VC2",
                KEY, "No_Key")
        command(1,
                SCHEDULED_TIME,\00:00:00\,FROM_REQUEST_START,
                JRM_SET_PAR(74,0)
            ),
        command(2,
                SCHEDULED_TIME,\00:00:02\,FROM_PREVIOUS_START,

JRM_SCI_PAR("SCI_I2_S1",30,1,0,"IDIS_SDIS","HSSL","ENABLE","DARK","DISABLE",0,1,5000,5000,"LOW","LOW
","POINT",-57343,5000,5000,"LOW","LOW","SPIN",1302,"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,\00:15:57\,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,\"Callisto"\
            ),
 end;

request(JRM_006,
                START_TIME,2021-104T21:01:40.000,
                TITLE, "jm0322_JRM_Science",
                REQUESTOR, "JRMTEAM",
                PROCESSOR, "VC2",
                KEY, "No_Key")
        command(1,
                SCHEDULED_TIME,\00:00:00\,FROM_REQUEST_START,
                JRM_SET_PAR(74,0)
            ),
        command(2,
                SCHEDULED_TIME,\00:00:02\,FROM_PREVIOUS_START,

JRM_SCI_PAR("SCI_I2_S1",30,1,0,"IDIS_SDIS","HSSL","ENABLE","DARK","DISABLE",0,1,5000,5000,"LOW","LOW
","POINT",-57343,5000,5000,"LOW","LOW","SPIN",1271,"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,\00:15:58\,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,\"Callisto"\
        ),
 end;

request(JRM_007,
            START_TIME,2021-104T21:31:40.000,
            TITLE, "jm0322_JRM_Science",
            REQUESTOR, "JRMTEAM",
            PROCESSOR, "VC2",
            KEY, "No_Key")
      command(1,
            SCHEDULED_TIME,\00:00:00\,FROM_REQUEST_START,
            JRM_SET_PAR(74,0)
        ),
      command(2,
            SCHEDULED_TIME,\00:00:02\,FROM_PREVIOUS_START,

JRM_SCI_PAR("SCI_I2_S1",30,1,0,"IDIS_SDIS","HSSL","ENABLE","DARK","DISABLE",0,1,5000,5000,"LOW","LOW
","POINT",-57343,5000,5000,"LOW","LOW","SPIN",1238,"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,\00:15:57\,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,\"Callisto"\
        ),
 end;

request(JRM_008,
            START_TIME,2021-104T22:01:39.000,
            TITLE, "jm0322_JRM_Science",
            REQUESTOR, "JRMTEAM",
            PROCESSOR, "VC2",
            KEY, "No_Key")
      command(1,
            SCHEDULED_TIME,\00:00:00\,FROM_REQUEST_START,
            JRM_SET_PAR(74,0)
        ),
      command(2,
            SCHEDULED_TIME,\00:00:02\,FROM_PREVIOUS_START,
```

```
JRM_SCI_PAR("SCI_I2_S1",30,1,0,"IDIS_SDIS","HSSL","ENABLE","DARK","DISABLE",0,1,5000,5000,"LOW","LOW
","POINT",-57343,5000,5000,"LOW","LOW","SPIN",1204,"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,\00:15:58\,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,\"Callisto"\
            ),
 end;

request(JRM_009,
                START_TIME,2021-104T22:31:39.000,
                TITLE, "jm0322_JRM_Science",
                REQUESTOR, "JRMTEAM",
                PROCESSOR, "VC2",
                KEY, "No_Key")
        command(1,
                SCHEDULED_TIME,\00:00:00\,FROM_REQUEST_START,
                JRM_SET_PAR(74,0)
            ),
        command(2,
                SCHEDULED_TIME,\00:00:02\,FROM_PREVIOUS_START,

JRM_SCI_PAR("SCI_I2_S1",30,1,0,"IDIS_SDIS","HSSL","ENABLE","DARK","DISABLE",0,1,5000,5000,"LOW","LOW
","POINT",-57343,5000,5000,"LOW","LOW","SPIN",1167,"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,\00:15:57\,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,\"Callisto"\
            ),
 end;

request(JRM_010,
                START_TIME,2021-104T22:47:48.000,
                TITLE, "jm0322_JRM_Calibration",
                REQUESTOR, "JRMTEAM",
                PROCESSOR, "VC2",
                KEY, "No_Key")
        command(1,
                SCHEDULED_TIME,\00:00:00\,FROM_REQUEST_START,
                JRM_CAL_PAR(8,14,8,14,30,700,30,700,30,700,30,700,30,700,200,200,153,153)
```

```
        ),
        command(2,
                SCHEDULED_TIME,\00:00:04\,FROM_PREVIOUS_START,
                JRM_GET_PAR(6000)
        ),
        command(3,
                SCHEDULED_TIME,\00:00:04\,FROM_PREVIOUS_START,
                JRM_START_HS_REC()
        ),
        command(4,
                SCHEDULED_TIME,\00:00:04\,FROM_PREVIOUS_START,
                JRM_CALIBRATION("CAL_I1_S1","IDIS_SDIS","DISABLE",1,"LAMP_1")
        ),
        command(5,
                SCHEDULED_TIME,\00:04:00\,FROM_PREVIOUS_START,
                JRM_STOP_HS_REC()
        ),
        command(6,
                SCHEDULED_TIME,\00:00:04\,FROM_PREVIOUS_START,
                JRM_ERROR_LOG()
        ),
         note(1,
              SCHEDULED_TIME,\00:00:04\,FROM_PREVIOUS_START,
              TEXT,\"NaN"\
        ),
 end;

$$EOF
```