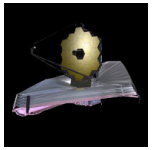

6627 - CAL-NRC-303: NIRCam Imaging and Coronagraphy Distortions and Alignment

Cycle: 3, Proposal Category: CAL/NIRCAM

INVESTIGATORS

Name	*Institution*
Dr. Armin Rest (PI)	**Space Telescope Science Institute**
Dr. Martha L. Boyer (CoI) (Contact)	Space Telescope Science Institute
Julien Girard (CoI)	Space Telescope Science Institute
Dr. Mario Gennaro (CoI)	Space Telescope Science Institute
Dr. David A. Golimowski (CoI)	Space Telescope Science Institute
Ms. Misty Cracraft (CoI)	Space Telescope Science Institute
Dr. Kevin Volk (CoI) (CSA Member)	Space Telescope Science Institute - CSA - JWST

OBSERVATIONS

Folder	*Observation*	*Label*	*Observing Template*	*Science Target*
FGS offsets				
	1	FGS2	NIRCam Engineering Imaging	(1) LMC-CAL-FIELD
	2	Lyot Wedges Astrometric Calibration	NIRCam Engineering Imaging	(1) LMC-CAL-FIELD
SIAF offsets to MIRI				
	3	All Filters	NIRCam Imaging	(1) LMC-CAL-FIELD
SIAF offsets to NIRISS				
	4	All Filters	NIRCam Imaging	(1) LMC-CAL-FIELD
Coronagraphic Template on LMC				
	5	MASK335R	NIRCam Coronagraphic Imaging	(2) 2MASS-J05220207-6930388

Folder	*Observation*	*Label*	*Observing Template*	*Science Target*
	6	Unsaturated NB CLEAR image of the Coronagraphic Star	NIRCam Engineering Imaging	(2) 2MASS-J05220207-6930388
Repeat Obs 3				
	7	All Filters	NIRCam Imaging	(1) LMC-CAL-FIELD

ABSTRACT

This activity monitors NIRCam's distortion and global alignment by visiting the LMC Calibration Field in both imaging and coronagraph imaging. The data will be used to determine the plate scale, orientation, and geometric distortion for each SCA in each NIRCam module over the full wavelength range. These observations use a combination of dithers and mosaics to overlap all SCAs onto the same location within the LMC.

We use F210M and F335M with FGS in parallel for the overall FGS SIAF alignment.

We observe all NIRCam filters with either MIRI or NIRCam in parallel, which will provide intra-instrument relative alignment.

We use a 2x2 mosaic with a large overlap and no dithers in order to observe the different filters with a minimal change of guiding for each position.

For coronagraphy we chose one of the brightest star of our previous LMC field (K mag ~10, always saturated) and the aim of Obs 5 is to observe it useing the coronagraphic template to check precisely its landing position behing the MASK335R occulter (using all other stars) against the techniques used with a single star (cross correlation with small grid dithers and a grid of PSF models).
Obs 6 is using NB filters and CLEAR pupil to acquite that star unsaturated and make sure its position is well know with respect to the other stars. For that we used the 640 subarray.

This calibration program may change in response to system developments and the final Cycle 3 science program.

OBSERVING DESCRIPTION

EXPOSURE SETUP: We use readout patterns and groups/integrations appropriate for a broad dynamic range of LMC stars, as demonstrated by Commissioning and Cycle 1&2 observations of the LMC Calibration field.

DITHERS: We include 2x2 mosaic for imaging and 9 INTRASCA 24" dithers for coronagraphy.

MOSAIC: We include mosaics that place each SCA at the same location in the LMC.

FGS is in parallel for all observations 1 & 2. MIRI and NIRISS are in parallel for observations 3 and 4, respectively.

This calibration program may change in response to system developments and the final Cycle 3 science program.

Fixed Targets

#	Name	Target Coordinates	Targ. Coord. Corrections	Miscellaneous
(1)	LMC-CAL-FIELD	RA: 05 21 57.6740 (80.4903083d) Dec: -69 29 53.36 (-69.49816d) Equinox: J2000	Proper Motion RA: 3.679973456416861E-4 sec of time/yr Proper Motion Dec: 2.29E-4 arcsec/yr Epoch of Position: 2015.5	
Comments: This object was generated by the targetselector and retrieved from the SIMBAD database. *Category=Calibration* *Description=[Astrometric, Coronagraphic, Photometric]*				
(2)	2MASS-J05220207-6930388	RA: 05 22 2.0831 (80.5086796d) Dec: -69 30 38.83 (-69.51079d) Equinox: J2000	Proper Motion RA: -4.179 mas/yr Proper Motion Dec: 6.686 mas/yr Parallax: 0.0012899" Epoch of Position: 2000	
Comments: 2MASS J05220207-6930388 *K mag of ~10 in the LMC calibration field* *Spectral type seems pretty red (K?)* *Category=Star* *Description=[K stars]* *Extended=NO*				

Observation

Proposal 6627, Observation 1: FGS2

Wed Apr 16 23:00:11 GMT 2025

Diagnostic Status: Warning

Observing Template: NIRCam Engineering Imaging

Coordinated Parallel Template(s): FGS External Calibration

Diagnostics

(Visit 1:1) Warning (Form): Overheads are provisional until the Visit Planner has been run.

(Visit 1:2) Warning (Form): Data Excess over lower threshold

(Visit 1:2) Warning (Form): Overheads are provisional until the Visit Planner has been run.

Fixed Targets

#	Name	Target Coordinates	Targ. Coord. Corrections	Miscellaneous
(1)	LMC-CAL-FIELD	RA: 05 21 57.6740 (80.4903083d) Dec: -69 29 53.36 (-69.49816d) Equinox: J2000	Proper Motion RA: 3.679973456416861E-4 sec of time/yr Proper Motion Dec: 2.29E-4 arcsec/yr Epoch of Position: 2015.5	

Comments: This object was generated by the targetselector and retrieved from the SIMBAD database.
Category=Calibration
Description=[Astrometric, Coronagraphic, Photometric]

Template

NIRCam Engineering Imaging	FGS External Calibration
Module: ALL	Target type: IMAGE
Subarray: FULL	Detector: GUIDER2
No. of Output Channels: 4	

Dithers

#	Primary Dither Type	Primary Dithers	Subpixel Dither Type	Dither Size	Subpixel Positions
1	INTRASCA	9	STANDARD	24" (LARGE)	1

Spectral Elements

NIRCam Engineering Imaging	Short Pupil	Long Pupil	Short Filter	Long Filter	Readout Pattern	Groups/Int	Integrations/Exp	Total Integrations	Total Dithers	Total Exposure Time	ETC Wkbk.Calc ID
1	CLEAR	CLEAR	F210M	F335M	BRIGHT1	5	3	27	9	2802.297	

Spectral Elements

FGS External Calibration	Readout Pattern	Groups/Int	Integrations/Exp	Total Dithers	Total Integrations	Total Exposure Time	ETC Wkbk.Calc ID
1	FGSRAPID	2	10	9	90	2898.928	

Special Requirements	
	Group Visits within 10.0 Days Visits Same PA No Parallel Attachments Guide Star in Guider 1 Group Observations 1, 2, Non-interruptible

Observation

Proposal 6627, Observation 2: Lyot Wedges Astrometric Calibration Wed Apr 16 23:00:11 GMT 2025

Diagnostic Status: Warning

Observing Template: NIRCam Engineering Imaging

Coordinated Parallel Template(s): FGS External Calibration

Diagnostics

(Visit 2:1) Warning (Form): Data Excess over lower threshold

(Visit 2:1) Warning (Form): Overheads are provisional until the Visit Planner has been run.

Fixed Targets

#	Name	Target Coordinates	Targ. Coord. Corrections	Miscellaneous
(1)	LMC-CAL-FIELD	RA: 05 21 57.6740 (80.4903083d) Dec: -69 29 53.36 (-69.49816d) Equinox: J2000	Proper Motion RA: 3.679973456416861E-4 sec of time/yr Proper Motion Dec: 2.29E-4 arcsec/yr Epoch of Position: 2015.5	

Comments: This object was generated by the targetselector and retrieved from the SIMBAD database.
Category=Calibration
Description=[Astrometric, Coronagraphic, Photometric]

Template

NIRCam Engineering Imaging	FGS External Calibration
Module: ALL	Target type: IMAGE
Subarray: FULL	Detector: GUIDER1
No. of Output Channels: 4	

Dithers

#	Primary Dither Type	Primary Dithers	Subpixel Dither Type	Dither Size	Subpixel Positions
1	INTRASCA	9	STANDARD	16" (MEDIUM)	1

Spectral Elements

NIRCam Engineering Imaging	Short Pupil	Long Pupil	Short Filter	Long Filter	Readout Pattern	Groups/Int	Integrations/Exp	Total Integrations	Total Dithers	Total Exposure Time	ETC Wkbk.Calc ID
1	CLEAR	MASKBAR	F210M	F335M	BRIGHT1	5	1	9	9	869.678	
2	CLEAR	MASKRND	F210M	F335M	BRIGHT1	5	1	9	9	869.678	
3	MASKBAR	CLEAR	F210M	F335M	BRIGHT1	5	1	9	9	869.678	
4	MASKRND	CLEAR	F210M	F335M	BRIGHT1	5	1	9	9	869.678	
5	MASKRND	MASKRND	F210M	F335M	MEDIUM8	5	2	18	9	9373.2	
6	MASKBAR	MASKBAR	F210M	F335M	MEDIUM8	5	2	18	9	9373.2	

Spectral Elements

FGS External Calibration	Readout Pattern	Groups/Int	Integrations/Exp	Total Dithers	Total Integrations	Total Exposure Time	ETC Wkbk.Calc ID
1	FGSRAPID	2	3	9	27	869.678	
2	FGSRAPID	2	3	9	27	869.678	
3	FGSRAPID	2	3	9	27	869.678	
4	FGSRAPID	2	3	9	27	869.678	
5	FGS	2	10	9	90	8696.784	
6	FGS	2	10	9	90	8696.784	

Special Requirements	
	No Parallel Attachments Guide Star in Guider 2 Group Observations 1, 2, Non-interruptible

Observation

Proposal 6627, Observation 3: All Filters Wed Apr 16 23:00:11 GMT 2025

Diagnostic Status: Warning

Observing Template: NIRCam Imaging

Coordinated Parallel Template(s): MIRI Imaging

Diagnostics

(All Filters (Obs 3)) Warning (Form): No dither offsets specified for observation

(All Filters (Obs 3)) Warning (Form): This observation is split across multiple visits using multiple filters. Not selecting the sequence option may result in execution of the visits in a non-numerical order and is not recommended.

(Visit 3:1) Warning (Form): Overheads are provisional until the Visit Planner has been run.

(Visit 3:2) Warning (Form): Overheads are provisional until the Visit Planner has been run.

Fixed Targets

#	Name	Target Coordinates	Targ. Coord. Corrections	Miscellaneous
(1)	LMC-CAL-FIELD	RA: 05 21 57.6740 (80.4903083d) Dec: -69 29 53.36 (-69.49816d) Equinox: J2000	Proper Motion RA: 3.679973456416861E-4 sec of time/yr Proper Motion Dec: 2.29E-4 arcsec/yr Epoch of Position: 2015.5	

Comments: This object was generated by the targetselector and retrieved from the SIMBAD database.
Category=Calibration
Description=[Astrometric, Coronagraphic, Photometric]

Template

NIRCam Imaging	MIRI Imaging
Module: ALL	Subarray: FULL
Subarray: FULL	
Target Placement: Module Gap	

Mosaic

Rows	Columns	Row Overlap %	Column Overlap %	Row shift (deg)	Column shift (deg)	Tile Order
2	2	60.0	60.0	0.0	0.0	DEFAULT

Dithers

#	Primary Dither Type	Primary Dithers	Dither Size	Subpixel Positions	Coordinated Parallel Subpixel Selector	Dither Direct Images Primes
1	NONE			1	NIRCam Only	NO_DITHERING

Spectral Elements

NIRCam Imaging	Short Filter	Long Filter	Readout Pattern	Groups/Int	Integrations/Exp	Total Integrations	Total Dithers	Total Exposure Time	ETC Wkbk.Calc ID
1	F070W	F277W	SHALLOW2	5	1	1	1	236.209	
2	F090W	F356W	SHALLOW2	5	1	1	1	236.209	
3	F115W	F444W	SHALLOW2	5	1	1	1	236.209	
4	F150W	F322W2	SHALLOW2	5	1	1	1	236.209	
5	F150W2	F322W2	SHALLOW2	5	1	1	1	236.209	
6	F200W	F322W2	SHALLOW2	5	1	1	1	236.209	
7	F140M	F250M	SHALLOW2	5	1	1	1	236.209	
8	F182M	F300M	SHALLOW2	5	1	1	1	236.209	
9	F210M	F335M	SHALLOW2	5	1	1	1	236.209	

Spectral Elements

MIRI Imaging	Filter	Readout Pattern	Groups/Int	Integrations/Exp	Exposures/Dith	Dither	Total Dithers	Total Integrations	Total Exposure Time	ETC Wkbk.Calc ID
1	F560W	FASTR1	27	3	1		1	3	230.328	
2	F770W	FASTR1	27	3	1		1	3	230.328	
3	F1000W	FASTR1	27	3	1		1	3	230.328	
4	F1130W	FASTR1	27	3	1		1	3	230.328	
5	F1280W	FASTR1	27	3	1		1	3	230.328	
6	F1500W	FASTR1	27	3	1		1	3	230.328	
7	F1800W	FASTR1	27	3	1		1	3	230.328	
8	F2100W	FASTR1	27	3	1		1	3	230.328	
9	F2550W	FASTR1	27	3	1		1	3	230.328	

Special Requirements

Group Visits within 53.0 Days
Visits Same PA
No Parallel Attachments

Observation

Proposal 6627, Observation 4: All Filters Wed Apr 16 23:00:11 GMT 2025

Diagnostic Status: Warning

Observing Template: NIRCam Imaging

Coordinated Parallel Template(s): NIRISS Imaging

Diagnostics

(All Filters (Obs 4)) Warning (Form): No dither offsets specified for observation

(All Filters (Obs 4)) Warning (Form): This observation is split across multiple visits using multiple filters. Not selecting the sequence option may result in execution of the visits in a non-numerical order and is not recommended.

(Visit 4:1) Warning (Form): Overheads are provisional until the Visit Planner has been run.

(Visit 4:2) Warning (Form): Overheads are provisional until the Visit Planner has been run.

Fixed Targets

#	Name	Target Coordinates	Targ. Coord. Corrections	Miscellaneous
(1)	LMC-CAL-FIELD	RA: 05 21 57.6740 (80.4903083d) Dec: -69 29 53.36 (-69.49816d) Equinox: J2000	Proper Motion RA: 3.679973456416861E-4 sec of time/yr Proper Motion Dec: 2.29E-4 arcsec/yr Epoch of Position: 2015.5	

Comments: This object was generated by the targetselector and retrieved from the SIMBAD database.
Category=Calibration
Description=[Astrometric, Coronagraphic, Photometric]

Template

NIRCam Imaging	NIRISS Imaging
Module: ALL	
Subarray: FULL	
Target Placement: Module Gap	

Mosaic

Rows	Columns	Row Overlap %	Column Overlap %	Row shift (deg)	Column shift (deg)	Tile Order
2	2	75.0	75.0	0.0	0.0	DEFAULT

Dithers

#	Primary Dither Type	Primary Dithers	Dither Size	Subpixel Positions	Coordinated Parallel Subpixel Selector	Dither Direct Images Primes
1	NONE			1	NIRCam Only	NO_DITHERING

Spectral Elements

NIRCam Imaging	Short Filter	Long Filter	Readout Pattern	Groups/Int	Integrations/Exp	Total Integrations	Total Dithers	Total Exposure Time	ETC Wkbk.Calc ID
1	F210M	F335M	SHALLOW2	5	1	1	1	236.209	
2	F070W	F277W	SHALLOW2	5	1	1	1	236.209	
3	F162M+F150W2	F360M	SHALLOW2	5	1	1	1	236.209	
4	F187N	F410M	SHALLOW2	5	1	1	1	236.209	
5	F187N	F430M	SHALLOW2	5	1	1	1	236.209	
6	F212N	F460M	SHALLOW2	5	1	1	1	236.209	
7	F212N	F480M	SHALLOW2	5	1	1	1	236.209	
8	F187N	F323N+F322W2	SHALLOW4	5	1	1	1	257.682	
9	F212N	F405N+F444W	SHALLOW4	5	1	1	1	257.682	
10	F164N+F150W2	F466N+F444W	SHALLOW4	8	1	1	1	418.734	
11	F164N+F150W2	F470N+F444W	SHALLOW4	8	1	1	1	418.734	

Spectral Elements

NIRISS Imaging	Filter	Grism	Readout Pattern	Groups/Int	Integrations/Exp	Total Dithers	Total Integrations	Total Exposure Time	ETC Wkbk.Calc ID
1	F090W		NIS	5	1	1	1	225.472	
2	F115W		NIS	5	1	1	1	225.472	
3	F150W		NIS	5	1	1	1	225.472	
4	F200W		NIS	5	1	1	1	225.472	
5	F277W		NIS	5	1	1	1	225.472	
6	F356W		NIS	5	1	1	1	225.472	
7	F444W		NIS	5	1	1	1	225.472	
8	F158M		NIS	6	1	1	1	268.419	
9	F140M		NIS	6	1	1	1	268.419	
10	F430M		NIS	9	1	1	1	397.26	
11	F380M		NIS	9	1	1	1	397.26	

Special Requirements

Group Visits within 53.0 Days
Visits Same PA
No Parallel Attachments

Observation

Proposal 6627, Observation 5: MASK335R

Wed Apr 16 23:00:11 GMT 2025

Diagnostic Status: Warning

Observing Template: NIRCam Coronagraphic Imaging

Diagnostics

(Visit 5:1) Warning (Form): Overheads are provisional until the Visit Planner has been run.

Fixed Targets

#	Name	Target Coordinates	Targ. Coord. Corrections	Miscellaneous
(2)	2MASS-J05220207-6930388	RA: 05 22 2.0831 (80.5086796d) Dec: -69 30 38.83 (-69.51079d) Equinox: J2000	Proper Motion RA: -4.179 mas/yr Proper Motion Dec: 6.686 mas/yr Parallax: 0.0012899" Epoch of Position: 2000	

Comments: 2MASS J05220207-6930388
K mag of ~10 in the LMC calibration field
Spectral type seems pretty red (K?)
Category=Star
Description=[K stars]
Extended=NO

Acquisition

#	Target	Filter	Target Brightness	Readout Pattern	Groups/Int	Integrations/Exp	Total Integrations	Total Exposure Time	ETC Wkbk.Calc ID
1	2 2MASS-J05220207-6930388	F335M	FAINT	SHALLOW4	17	1	1	4.266	193320

Template

Module	Occulting Mask	Obtain Astrometric Confirmation Images?	Subarray	Dither Pattern
A	MASK335R	true	FULL	9-POINT-CIRCLE

Confirmation

#	Conf. Readout Pattern	Conf. Groups/Int	Conf. Integrations/Exp	Conf. Total Integrations	Conf. Total Exposure Time	Conf. Total Dithers
1	RAPID	3	2	2	75.157	1

Spectral Elements

#	Short Filter	Long Filter	Readout Pattern	Groups/Int	Integrations/Exp	Total Dithers	Total Integrations	Total Exposure Time	ETC Wkbk.Calc ID
1	F210M	F335M	SHALLOW2	4	1	9	9	1642.726	193320

PSF References	Additional Justification: false

Observation

Proposal 6627, Observation 6: Unsaturated NB CLEAR image of the Coronagraphic Star

Wed Apr 16 23:00:11 GMT 2025

Diagnostic Status: Warning

Observing Template: NIRCam Engineering Imaging

Diagnostics

(Visit 6:1) Warning (Form): Overheads are provisional until the Visit Planner has been run.

Fixed Targets

#	Name	Target Coordinates	Targ. Coord. Corrections	Miscellaneous
(2)	2MASS-J05220207-6930388	RA: 05 22 2.0831 (80.5086796d) Dec: -69 30 38.83 (-69.51079d) Equinox: J2000	Proper Motion RA: -4.179 mas/yr Proper Motion Dec: 6.686 mas/yr Parallax: 0.0012899" Epoch of Position: 2000	

Comments: 2MASS J05220207-6930388
K mag of ~10 in the LMC calibration field
Spectral type seems pretty red (K?)
Category=Star
Description=[K stars]
Extended=NO

Template

Module	Subarray	No. of Output Channels
A	SUB640	1

Dithers

#	Primary Dither Type	Primary Dithers	Subpixel Dither Type	Dither Size	Subpixel Positions
1	SUBARRAY_DITHER	4	STANDARD		1

Spectral Elements

#	Short Pupil	Long Pupil	Short Filter	Long Filter	Readout Pattern	Groups/Int	Integrations/Exp	Total Integrations	Total Dithers	Total Exposure Time	ETC Wkbk.Calc ID
1	CLEAR	F323N	F212N	F322W2	RAPID	3	2	8	4	134.111	

Special Requirements

Offset 8.0 arcsec, 9.0 arcsec

Observation

Proposal 6627, Observation 7: All Filters Wed Apr 16 23:00:11 GMT 2025

Diagnostic Status: Warning

Observing Template: NIRCam Imaging

Coordinated Parallel Template(s): MIRI Imaging

Diagnostics

(All Filters (Obs 7)) Warning (Form): No dither offsets specified for observation

(All Filters (Obs 7)) Warning (Form): This observation is split across multiple visits using multiple filters. Not selecting the sequence option may result in execution of the visits in a non-numerical order and is not recommended.

(Visit 7:1) Warning (Form): Overheads are provisional until the Visit Planner has been run.

(Visit 7:2) Warning (Form): Overheads are provisional until the Visit Planner has been run.

Fixed Targets

#	Name	Target Coordinates	Targ. Coord. Corrections	Miscellaneous
(1)	LMC-CAL-FIELD	RA: 05 21 57.6740 (80.4903083d) Dec: -69 29 53.36 (-69.49816d) Equinox: J2000	Proper Motion RA: 3.679973456416861E-4 sec of time/yr Proper Motion Dec: 2.29E-4 arcsec/yr Epoch of Position: 2015.5	

Comments: This object was generated by the targetselector and retrieved from the SIMBAD database.
Category=Calibration
Description=[Astrometric, Coronagraphic, Photometric]

Template

NIRCam Imaging	MIRI Imaging
Module: ALL	Subarray: FULL
Subarray: FULL	
Target Placement: Module Gap	

Mosaic

Rows	Columns	Row Overlap %	Column Overlap %	Row shift (deg)	Column shift (deg)	Tile Order
2	2	60.0	60.0	0.0	0.0	DEFAULT

Dithers

#	Primary Dither Type	Primary Dithers	Dither Size	Subpixel Positions	Coordinated Parallel Subpixel Selector	Dither Direct Images Primes
1	NONE			1	NIRCam Only	NO_DITHERING

Spectral Elements

NIRCam Imaging	Short Filter	Long Filter	Readout Pattern	Groups/Int	Integrations/Exp	Total Integrations	Total Dithers	Total Exposure Time	ETC Wkbk.Calc ID
1	F070W	F277W	SHALLOW2	5	1	1	1	236.209	
2	F090W	F356W	SHALLOW2	5	1	1	1	236.209	
3	F115W	F444W	SHALLOW2	5	1	1	1	236.209	
4	F150W	F322W2	SHALLOW2	5	1	1	1	236.209	
5	F150W2	F322W2	SHALLOW2	5	1	1	1	236.209	
6	F200W	F322W2	SHALLOW2	5	1	1	1	236.209	
7	F140M	F250M	SHALLOW2	5	1	1	1	236.209	
8	F182M	F300M	SHALLOW2	5	1	1	1	236.209	
9	F210M	F335M	SHALLOW2	5	1	1	1	236.209	

Spectral Elements

MIRI Imaging	Filter	Readout Pattern	Groups/Int	Integrations/Exp	Exposures/Dith	Dither	Total Dithers	Total Integrations	Total Exposure Time	ETC Wkbk.Calc ID
1	F560W	FASTR1	27	3	1		1	3	230.328	
2	F770W	FASTR1	27	3	1		1	3	230.328	
3	F1000W	FASTR1	27	3	1		1	3	230.328	
4	F1130W	FASTR1	27	3	1		1	3	230.328	
5	F1280W	FASTR1	27	3	1		1	3	230.328	
6	F1500W	FASTR1	27	3	1		1	3	230.328	
7	F1800W	FASTR1	27	3	1		1	3	230.328	
8	F2100W	FASTR1	27	3	1		1	3	230.328	
9	F2550W	FASTR1	27	3	1		1	3	230.328	

Special Requirements

Group Visits within 53.0 Days
Visits Same PA
No Parallel Attachments