

MIRI Imaging Mosaics

The [imaging mode](#) for JWST's [Mid-Infrared Instrument \(MIRI\)](#) offers a mosaicking option for coverage of larger fields of view (FOV) that extend beyond a single pointing.

Mosaics for MIRI imaging mode

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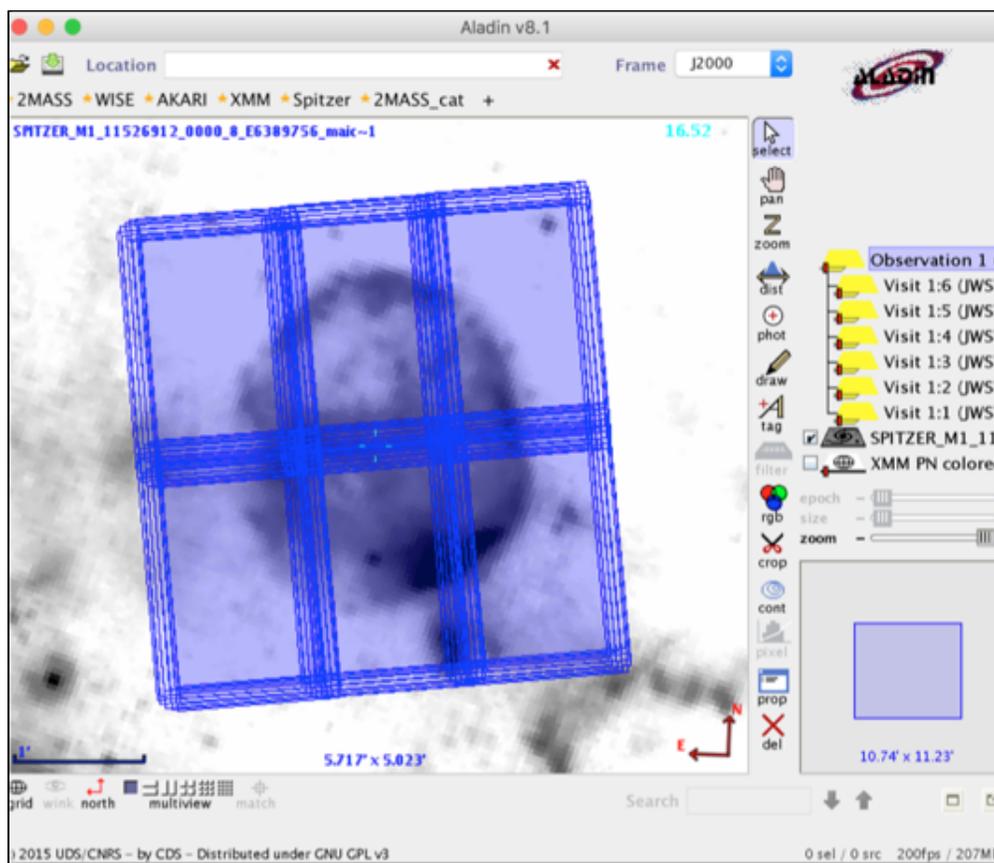
JWST mosaics allows for moves specific to [MIRI imaging](#). [Mosaics](#) for an observation can be implemented in the [Astronomer's Proposal Tool \(APT\)](#) with the [JWST APT MIRI imaging template](#). These mosaics provide coverage of larger fields of view (FOV) that extend beyond a single pointing.

As with single-pointing MIRI imaging observations, the user first selects the desired imaging [subarray](#), [dither pattern](#), [readout mode](#), and [filters](#). The parameters that define the footprint of the MIRI imaging mosaic are the center coordinates, number of rows and columns of the individual pointings (or tiles), the mosaic orientation angle, percentage of overlap region between the tiles, and the amount of row and/or column shift that can be used to skew the tiled pattern. For example, Figure 1 shows the footprint of a 2×3 mosaic of [FULL¹](#) array tiles, with a 10% tile overlap and no row and/or column shifts. Figure 2 shows the same mosaic, but with 20% overlap between tiles and a row and column shift of 10. The footprints of the 12-point [REULEAUX](#) dither pattern are evident in both panels, while the blue shading reflects the level of exposure coverage as a function of position.

Starting with the first tile in the mosaic, the exposures are carried out at each dither step, and the filter changed once the dither pattern has been completed. Once all the user-specified filters have been rotated through for a single tile, the sequence is repeated for the next tile, and so on.

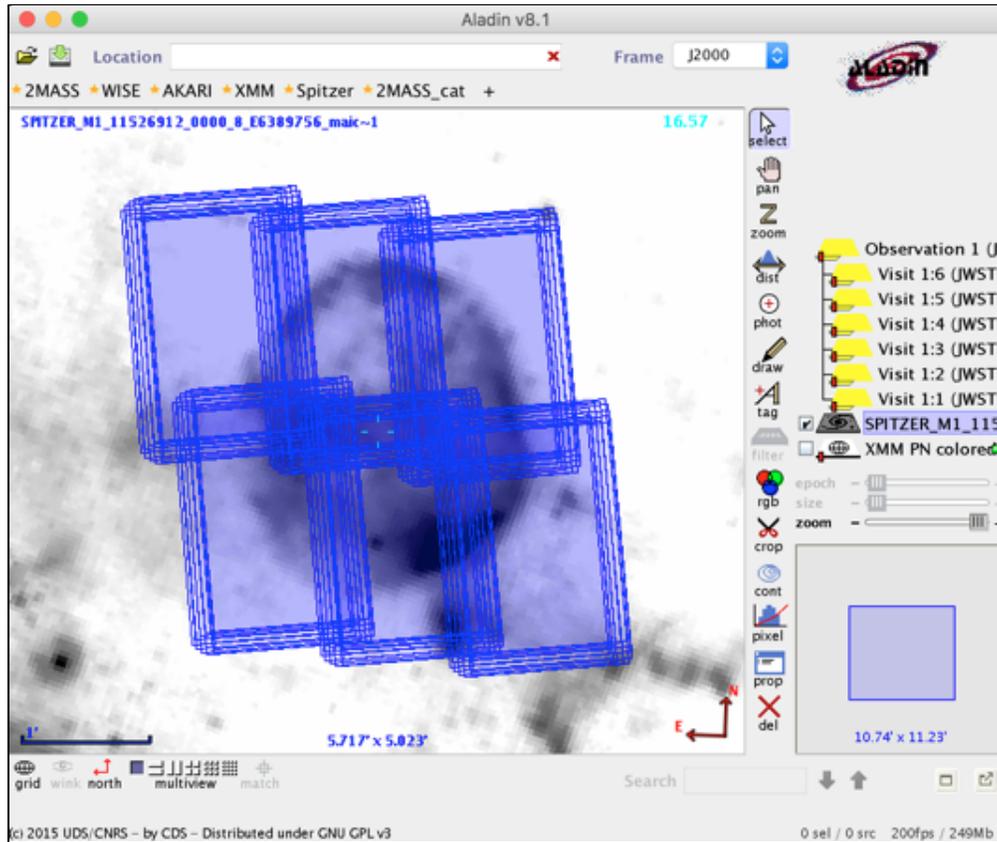
For MIRI imaging mosaics, each tile will usually be a separate visit that requires its own guide star. This depends both on the overlap region between the tiles and the [visit splitting distance](#) calculated by the APT. If the entire mosaic cannot be scheduled simultaneously due to missing guide stars, it maybe necessary to [split one or multiple tiles](#) into a separate associated observation.

Figure 1. 2×3 MIRI imaging mosaic with 10% tile overlap, no row or column shifts



Footprint of a 2×3 MIRI imaging mosaic using FULL array tiles, with a 10% tile overlap and no row and/or column shifts.

Figure 2. 2×3 MIRI imaging mosaic with 20% tile overlap, 10 pixel row and column shifts



The same mosaic as in Figure 1, but with 20% overlap between tiles, and a row and column shift of 10. The footprints of the 12-point REULEAUX dither pattern are evident in both figures, while the blue shading reflects the level of exposure time coverage.

¹ ***Bold italics*** font style is used to indicate parameters, parameter values, and/or special requirements that are set in the APT GUI.