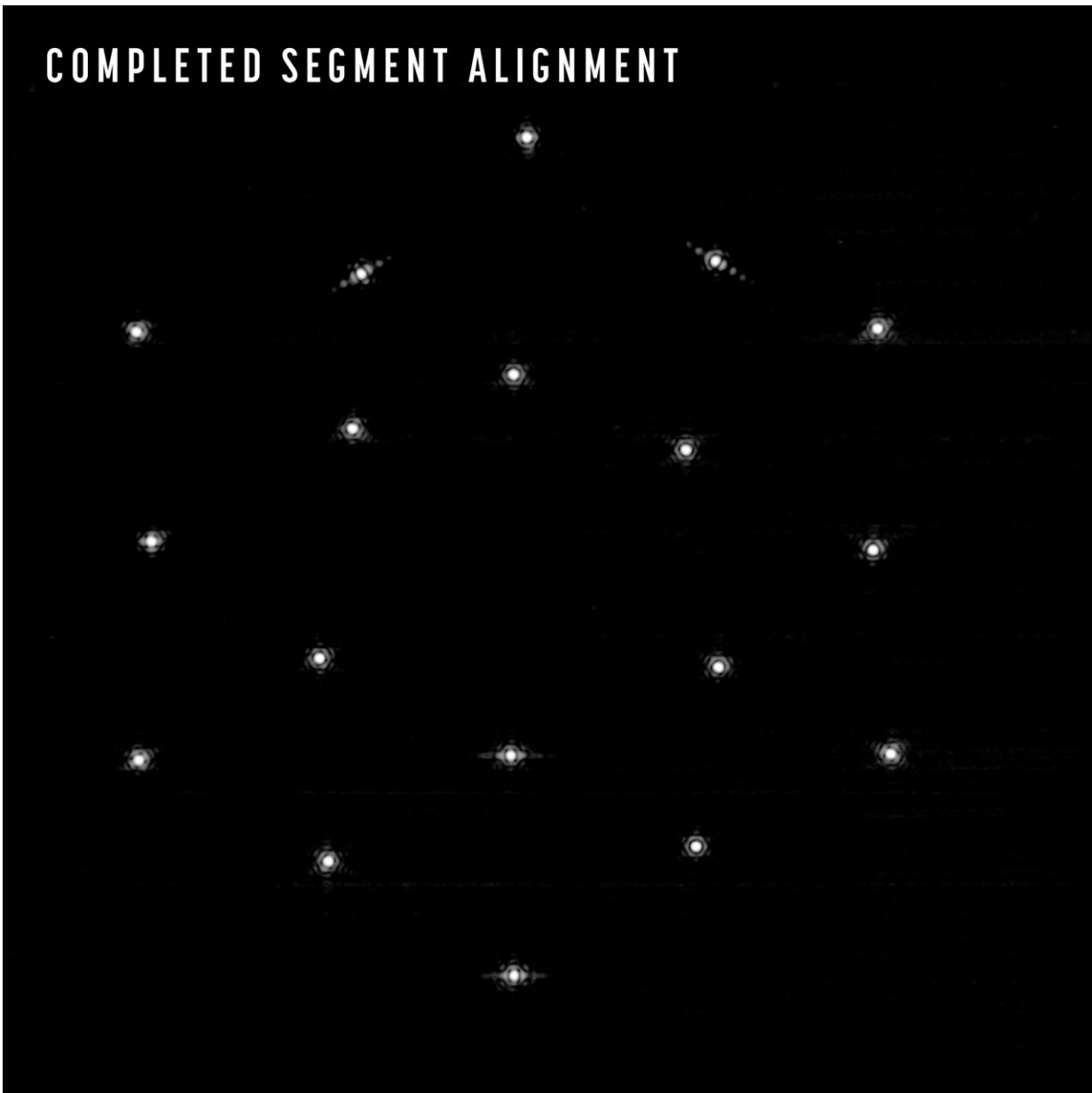


# Webb mirror alignment continues successfully

February 28 2022, by Alise Fisher

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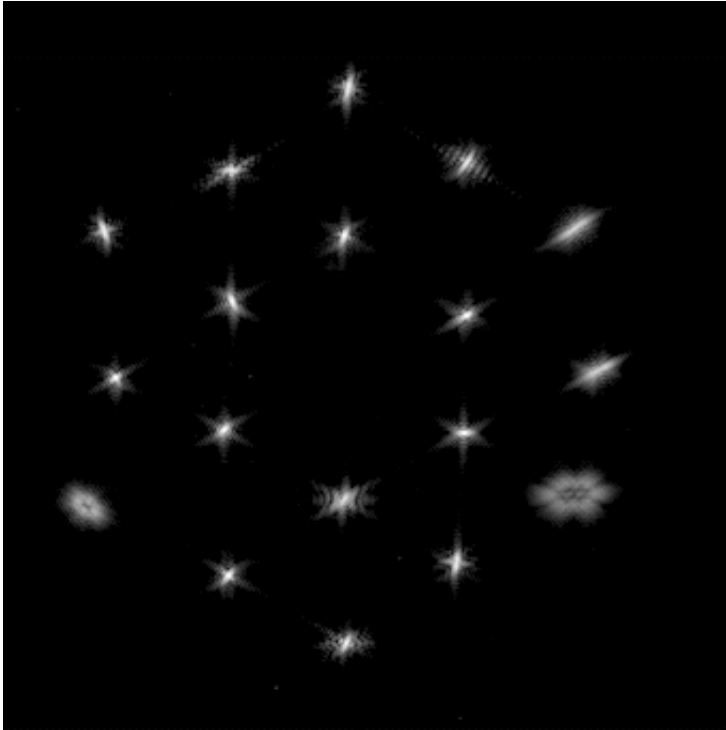


This hexagonal image array captured by the NIRC*am* instrument shows the progress made during the Segment Alignment phase, further aligning Webb's 18 primary mirror segments and secondary mirror using precise movements commanded from the ground. Credit: NASA/STScI

Webb continues on its path to becoming a focused observatory. The team has successfully worked through the second and third out of seven total phases of mirror alignment. With the completion of these phases, called Segment Alignment and Image Stacking, the team will now begin making smaller adjustments to the positions of Webb's mirrors.

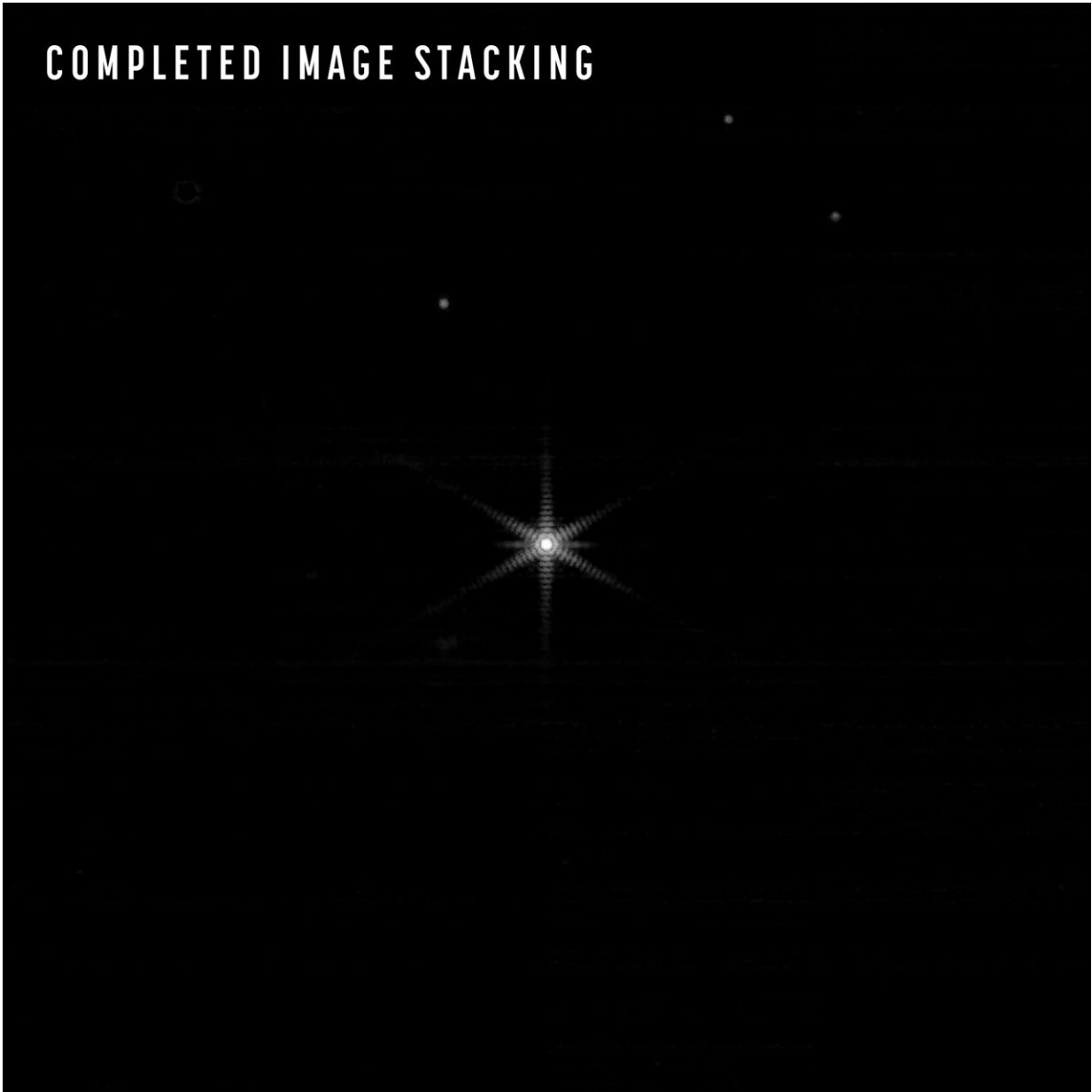
After moving what were 18 scattered dots of starlight into Webb's signature hexagonal formation, the team refined each mirror segment's image by making minor adjustments, while also changing the alignment of Webb's secondary mirror. The completion of this process, known as Segment Alignment, was a key step prior to overlapping the light from all the mirrors so that they can work in unison.

Once Segment Alignment was achieved, the focused dots reflected by each mirror were then stacked on top of each other, delivering photons of light from each segment to the same location on NIRC*am*'s sensor. During this process, called Image Stacking, the team activated sets of six mirrors at a time and commanded them to repoint their light to overlap, until all dots of starlight overlapped with each other.



This gif shows the "before" and "after" images from segment alignment, when the team corrected large positioning errors of its primary mirror segments and updated the alignment of the secondary mirror. Credit: NASA/STScI

"We still have work to do, but we are increasingly pleased with the results we're seeing," said Lee Feinberg, optical telescope element manager for Webb at NASA's Goddard Space Flight Center. "Years of planning and testing are paying dividends, and the team could not be more excited to see what the next few weeks and months bring."



During this phase of alignment known as Image Stacking, individual segment images are moved so they fall precisely at the center of the field to produce one unified image instead of 18. In this image, all 18 segments are on top of each other. After future alignment steps, the image will be even sharper. Credit: NASA/STScI

Although Image Stacking put all the light from a star in one place on NIRCam's detector, the mirror segments are still acting as 18 small telescopes rather than one big one. The segments now need to be lined up to each other with an accuracy smaller than the wavelength of the light.

The team is now starting the fourth phase of mirror alignment, known as Coarse Phasing, where NIRCam is used to capture light spectra from 20 separate pairings of mirror segments. This helps the team identify and correct vertical displacement between the mirror segments, or small differences in their heights. This will make the single dot of starlight progressively sharper and more focused in the coming weeks.

Provided by NASA

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