



The Sound of Space

EP. 13 - TECH IN SPACE - JAMES WEBB SPACE TELESCOPE (JWST)

ONE YEAR LAUNCH ANNIVERSARY DEEP DIVE

Brought to you by the University of Toronto Aerospace Team (UTAT)

00:00 Background and History

- [1] E. Howell and D. Dobrijevic, "NASA's James Webb Space Telescope: The ultimate guide," Space.com, 22-Sep-2022. [Online]. Available: <https://www.space.com/21925-james-webb-space-telescope-jwst.html#section-james-webb-space-telescope-launch-and-deployment>
- [2] "Origins of JWST," STScI.edu. [Online]. Available: <https://www.stsci.edu/jwst/about-jwst/history>.

04:58 Design Component: Optical Telescope Element (OTE)

- [3] James Webb Space Telescope, "Webb's Mirrors", NASA. [Online]. Available: <https://webb.nasa.gov/content/observatory/ote/mirrors/index.html>
- [4] James Webb Space Telescope, "The ISIM & Instruments", NASA. [Online]. Available: <https://webb.nasa.gov/content/observatory/instruments/index.html>
- [5] James Webb Space Telescope, "Optical Telescope Element (OTE)", NASA. [Online]. Available: <https://webb.nasa.gov/content/observatory/ote/index.html>

11:11 Design Component: Integrated Science Instruments Module (ISIM)

- [6] James Webb Space Telescope, "NIRCam", NASA. [Online]. Available: <https://webb.nasa.gov/content/observatory/instruments/nircam.html>
- [7] James Webb Space Telescope, "MIRI", NASA. [Online]. Available: <https://webb.nasa.gov/content/observatory/instruments/miri.html>
- [8] James Webb Space Telescope, "Cryocooler", NASA. [Online]. Available: <https://webb.nasa.gov/content/about/innovations/cryocooler.html>
- [9] James Webb Space Telescope, "NIRSpec", NASA. [Online]. Available: <https://webb.nasa.gov/content/observatory/instruments/nirspec.html>
- [10] James Webb Space Telescope, "Microshutters", NASA. [Online]. Available: <https://webb.nasa.gov/content/about/innovations/microshutters.html>
- [11] JWST User Documentation, "Near Infrared Imager and Slitless Spectrograph", Webb Space Telescope. [Online]. Available: <https://jwst-docs.stsci.edu/jwst-near-infrared-imager-and-slitless-spectrograph>

- [12] JWST User Documentation, "Fine Guidance Sensor", Webb Space Telescope. [Online]. Available: <https://jwst-docs.stsci.edu/jwst-observatory-hardware/jwst-fine-guidance-sensor>

16:00 Design Component: Spacecraft Elements (Spacecraft Bus and Sunshield)

- [13] James Webb Space Telescope, "About the Sunshield", NASA. [Online]. Available: <https://webb.nasa.gov/content/observatory/sunshield.html>
- [14] James Webb Space Telescope, "Sunshield Membrane Coatings", NASA. [Online]. Available: <https://webb.nasa.gov/content/about/innovations/coating.html>
- [15] James Webb Space Telescope, "Spacecraft Bus", NASA. [Online]. Available: <https://webb.nasa.gov/content/observatory/bus.html>

25:12 Launch/Deployment/Commissioning

- [16] "Ariane 5 - Arianespace," Arianespace. [Online]. Available: <https://www.arianespace.com/vehicle/ariane-5/>
- [17] "Ariane 5 Milestones - Arianespace," Arianespace. [Online]. Available: <https://www.arianespace.com/ariane-5-milestones/>
- [18] "The Launch - Webb/NASA," *Webb Image Release- Webb Space Telescope GSFC/NASA*. [Online]. Available: <https://webb.nasa.gov/content/about/launch.html>
- [19] "FAQ Full General Public Webb Telescope/NASA," *Webb Image Release- Webb Space Telescope GSFC/NASA*. [Online]. Available: <https://jwst.nasa.gov/content/about/faqs/faq.html#whyAriane5>
- [20] "Ariane 5 goes down in history with successful launch of Webb - Arianespace," *Arianespace*. [Online]. Available: <https://www.arianespace.com/press-release/ariane-5-successful-launch-webb-space-telescope/>
- [21] NASA's, "SVS: James Webb Space Telescope Launch and Orbit at L2," Home - NASA Scientific Visualization Studio. [Online]. Available: <https://svs.gsfc.nasa.gov/4991>
- [22] D. Dobrijevic and E. Howell, "NASA's James Webb Space Telescope: The ultimate guide | Space," *Space.com*, Sep. 22, 2022. [Online]. Available: <https://www.space.com/21925-james-webb-space-telescope-jwst.html>

33:43 Results Over Last Year

- [23] E. Howell, "NASA's James Webb Space Telescope mission: Live updates," *Space.com*, 01-Dec-2022. [Online]. Available: <https://www.space.com/news/live/james-webb-space-telescope-updates>

40:22 Future Work

- [24] R. Rao, "The James Webb Space Telescope explained in pictures | Space," *Space.com*, Jul. 08, 2022. [Online]. Available: <https://www.space.com/james-webb-space-telescope-mission-explained>

- [25] J. Foust, "Scientists, engineers push for servicing and assembly of future space observatories - SpaceNews," SpaceNews, Feb. 02, 2018. [Online]. Available: <https://spacenews.com/scientists-engineers-push-for-servicing-and-assembly-of-future-space-observatories/>
- [26] J. Schneider, "Glitch in James Webb's Mid-Infrared Camera Has Been Fixed | PetaPixel," PetaPixel, Nov. 08, 2022. [Online]. Available: <https://petapixel.com/2022/11/08/glitch-in-james-webbs-mid-infrared-camera-has-been-fixed>
- [27] M. Bartels, "NASA may unlock future James Webb Space Telescope data | Space," Space.com, Dec. 12, 2022. [Online]. Available: <https://www.space.com/james-webb-space-telescope-exclusive-data-controversy>