

Applied Research Building

Laboratory for Advanced & Additive Manufacturing

Using state-of-the-art digital fabrication techniques, here researchers will design and fabricate complex materials for applications including national security, space exploration, biomedicine, and communications.

Provides materials for **industry partners** and **prints 3D parts** for **next-generation** combat vehicles.



FUN FACT!

The first printer to create three-dimensional objects appeared in 1983, just a year after the first CD was manufactured.



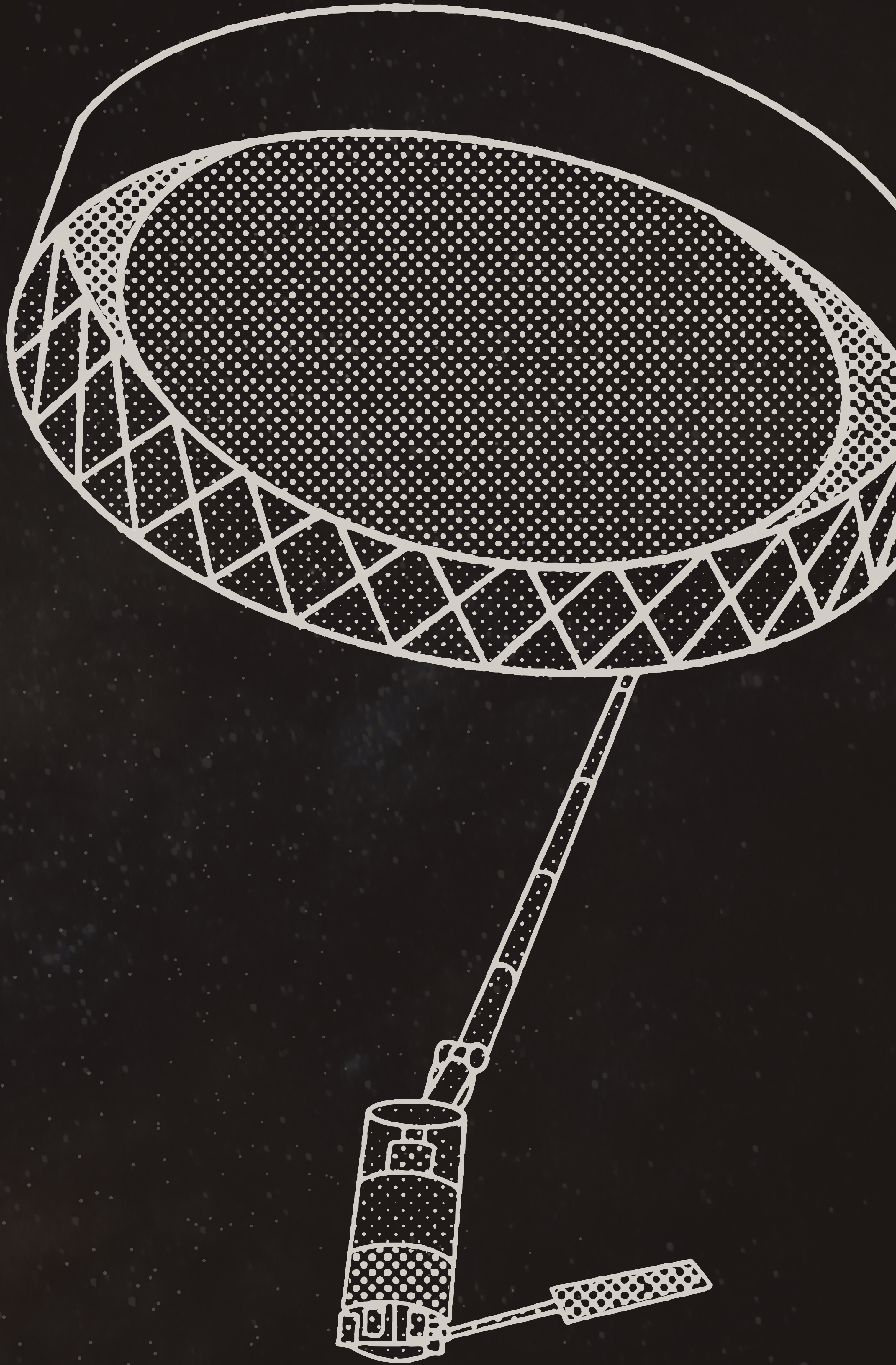
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Anechoic Chamber

Built with radio-wave-absorbing material, the properties of the anechoic chamber allow researchers to test the performance of antennae and develop new experimental designs.

The **absorptive material** lining the walls is a **carbon-filled foam** designed to **keep sound waves from bouncing**.



FUN FACT!

The quietest place on Earth is an anechoic chamber built and owned by Microsoft in which the noise level is -20.3 decibels. You can hear the sound of your own beating heart, flowing blood, and grinding bones.

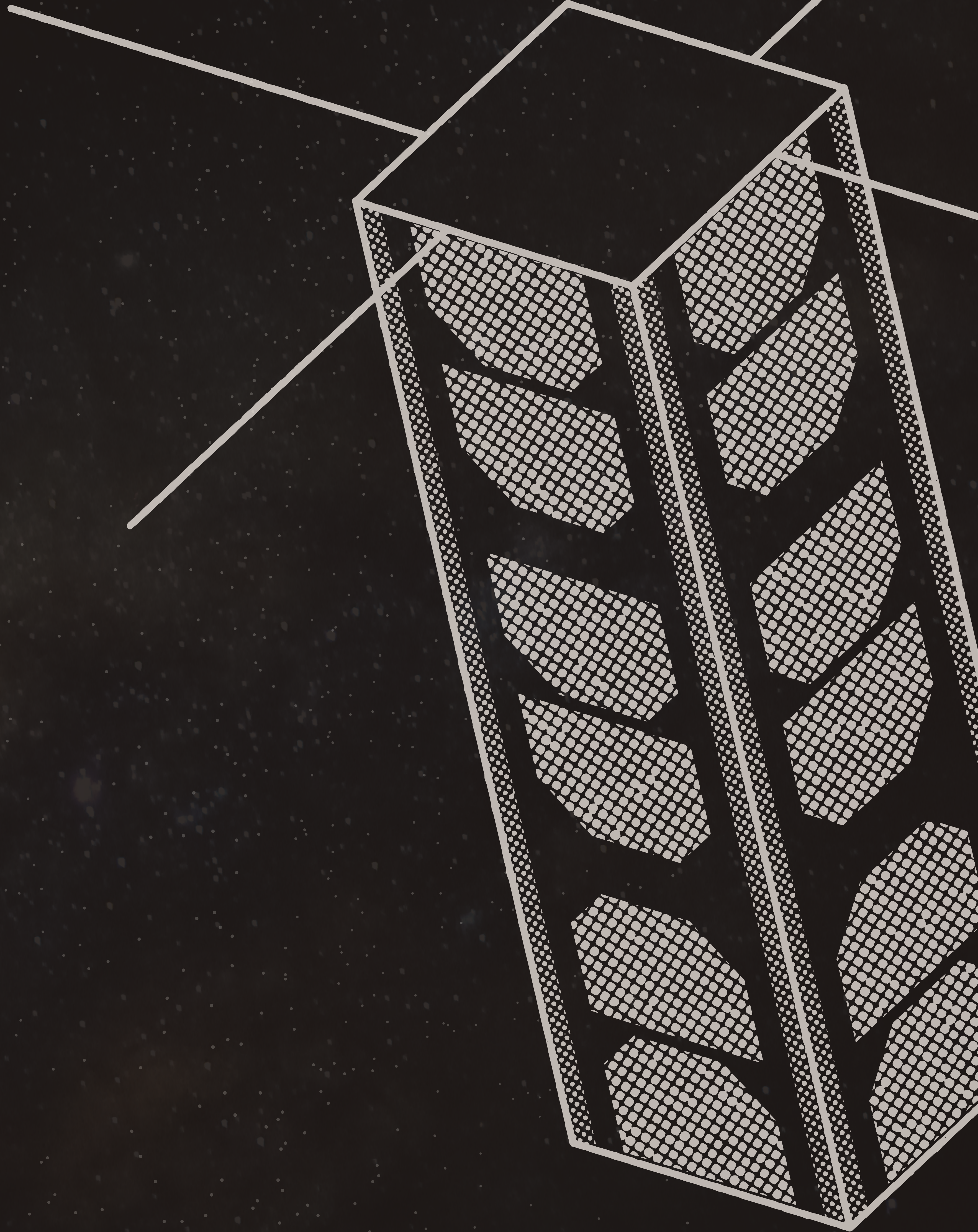


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Applied Research Building **CubeSat Laboratory**

This laboratory is a dedicated space for the fabrication of nanosatellites, often called CubeSats, and small space instruments, which represent the next generation of technology for space exploration and scientific investigation.

NASA launched its **first CubeSat**, GeneSat, in late 2006. In 2018, an \$18 million NASA mission called **Mars Cube One** launched two **CubeSats to Mars**.



FUN FACT!

A CubeSat is about the size of a cereal box, though the smallest are 4-inch cubes weighing less than 3 pounds.



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Applied Research Building **High Bay Facility**

With 40-foot ceilings, the ARB's high bay facility is a dedicated space to assemble, test, and store high-altitude stratospheric balloons such as the University of Arizona-led, NASA-funded GUSTO mission.

The ARB's high bay **facility doors** are the **nation's largest**. UArizona is home to **two high bay** facilities.



FUN FACT!

The high bay facility at the ARB is roughly as tall as the letters of the Hollywood sign overlooking Los Angeles, California.



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Applied Research Building **Imaging Technology Laboratory**

The ITL is a world-leading supplier of advanced scientific imaging sensors for visible, ultraviolet, and x-ray light detection. The most common applications for its imaging technologies are in astronomy and manufacturing.

Assists research in **astronomy**, satellite imagery,
environmental monitoring and industrial imaging.



FUN FACT!

Although UV waves are invisible to the human eye, some insects, including bumblebees, can see them.



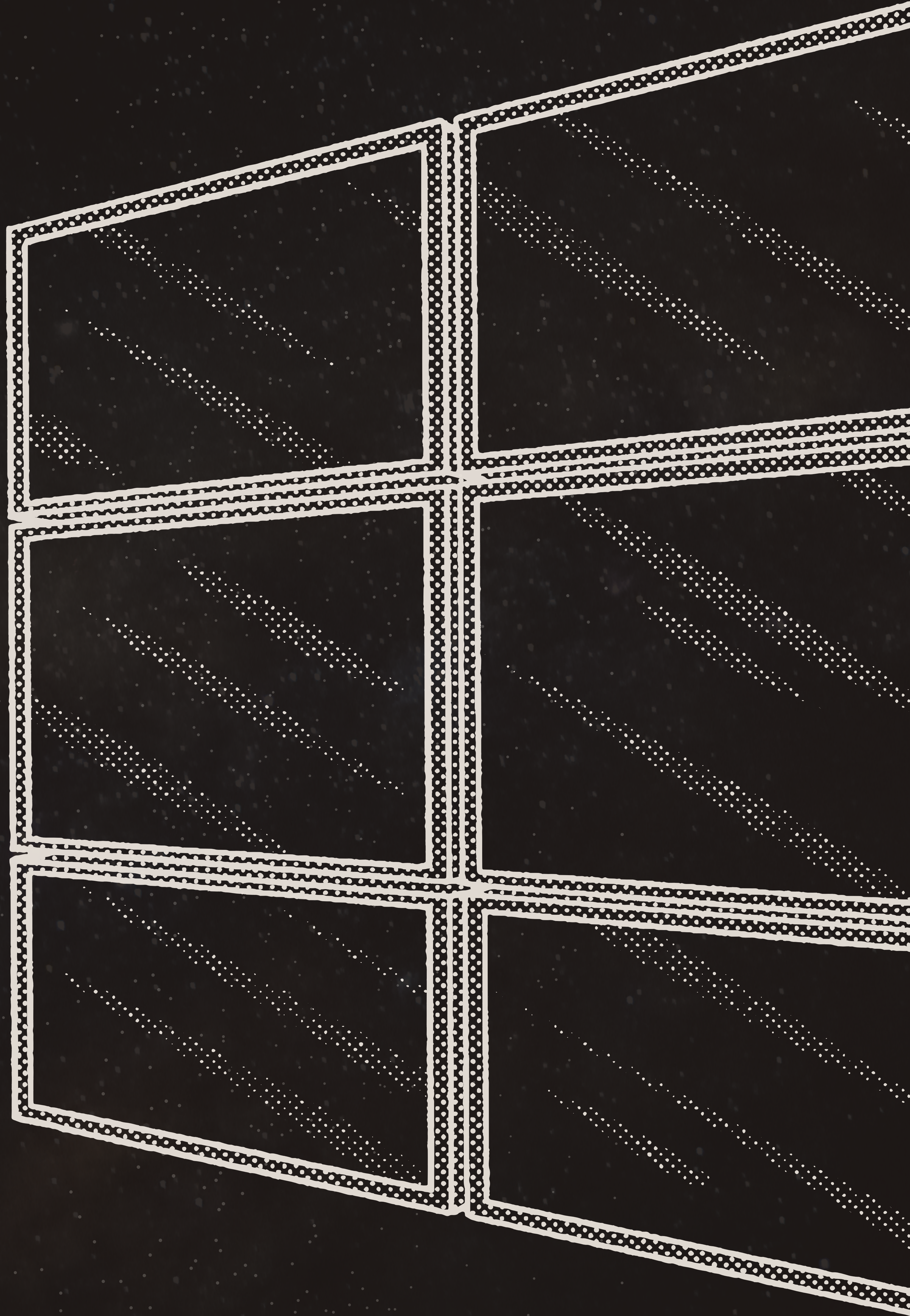
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Mission Operations Center

After launch, spacecraft and balloons must be carefully monitored and commanded from thousands, if not millions, of miles away. A mission operations center performs this work while a science operations center coordinates the distribution and processing of data. The ARB's Mission Operations Center equips us with all the computers, networks, and software needed to control missions from right here in Tucson.

The Mission Operations Center will receive **real-time information**, from **basic temperature readings** to **images captured** by cameras onboard spacecraft.



FUN FACT!

U of A is one of only a few American universities with the capability to provide mission operations support for NASA Class D missions.



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Applied Research Building **Space Materials Curation Facility**

This facility is an archive of materials used to study the spectral signatures of artificial and natural objects orbiting in the Earth-Moon system in order to monitor and enhance space traffic management, national security, and planetary defense.

Using **reflectance spectroscopy**, we measure light as it **hits an object** and **reflects back** to our instruments.



FUN FACT!

The European Space Agency estimates over 170 million pieces of “space junk,” (over the size of 1 millimeter) orbiting Earth. Even a one-centimeter object can penetrate the shields on the International Space Station.



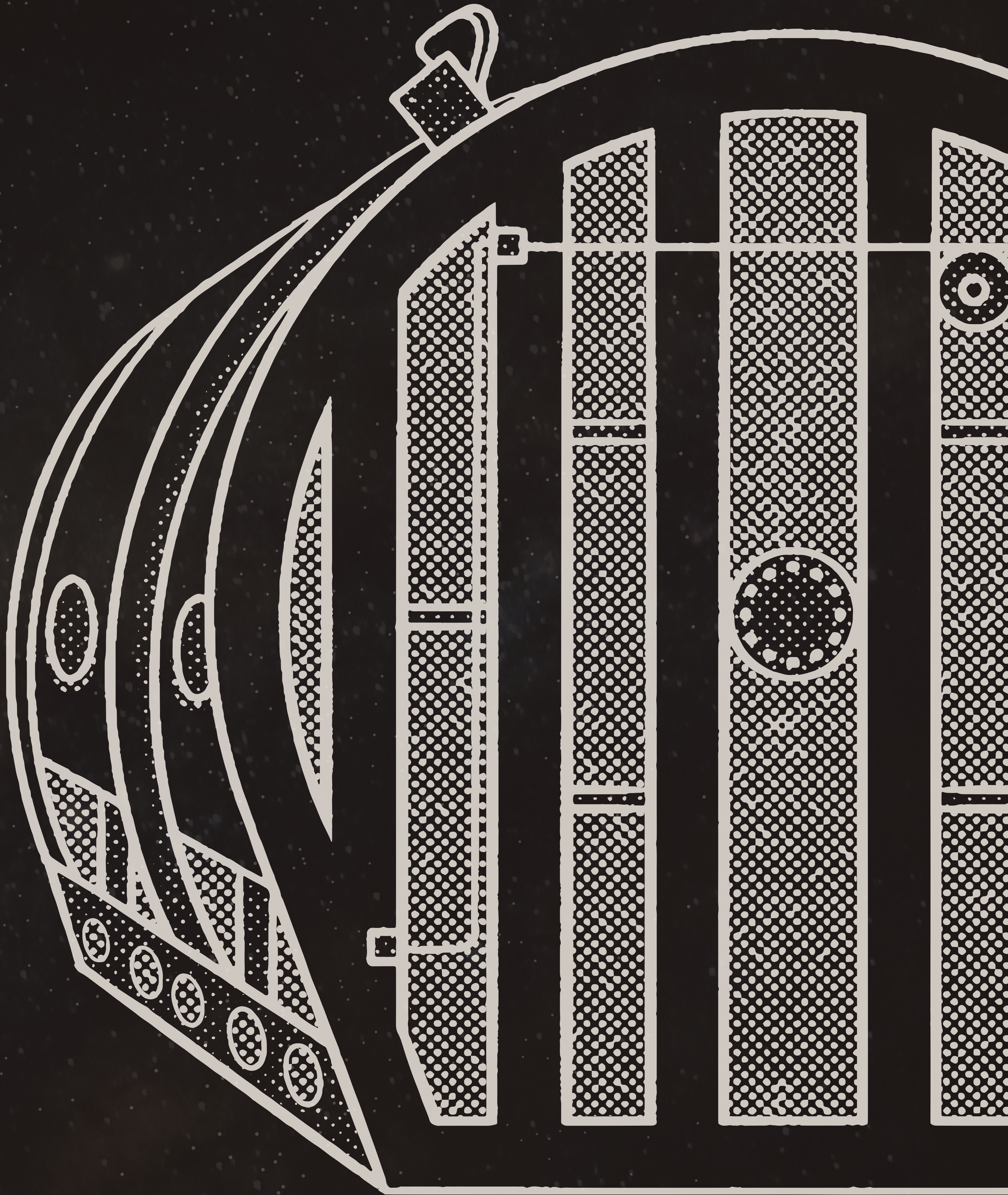
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Thermal Vacuum Chamber

Spacecraft and balloons benefit from being put to the test in a controlled environment on Earth before launch. The TV chamber simulates both the pressure and temperature conditions in space and near-space to test the performance of all components and subsystems before they launch.

Weights **40 tons**. Can fit an **entire pickup truck** inside.
Can **remove oxygen** and set temperature to **-315°F**.



FUN FACT!

In a vacuum, the lack of oxygen to the brain renders you unconscious in less than 15 seconds and water and dissolved gas in the blood forms bubbles which block blood flow and kills in about one minute.



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