

# World's largest camera makes epic trip from California to South America

BY ETHAN BARON  
The Mercury News

The world's biggest camera was on its way from its birthplace at SLAC National Accelerator Laboratory in Menlo Park, California, to a mountain-top half a hemisphere away in the foothills of the Andes. But there was a problem. And it required an order from Chile's President Gabriel Boric to solve.

"This was very high-stakes operation. It's the future of U.S. astronomy," said SLAC engineer and camera project manager Travis Lange. "There are literally thousands of people that are planning on using the data."

In addition to its famous linear accelerator, which is used to find the tiniest particles in the universe, and now the massive camera, SLAC is known for building large, sophisticated machines that use X-rays, lasers and electron beams to untangle enigmas on Earth and in the cosmos.

Most of the monumental trip had gone smoothly for the \$168 million instrument, which will provide never-before-seen views into outer space and allow groundbreaking astronomical research from its perch in the specially built Rubin Observatory atop the Cerro Pachón ridge in Chile.

It began its slow journey before dawn on May 14 in a shipping container on a

flatbed truck that traveled from SLAC up Highway 280, then down to San Francisco International Airport. Within a few hours, the container holding the 5 1/2-foot tall, 10-foot long, 6,250-pound camera was safely fastened to the floor of a chartered 747 cargo jet, along with two additional containers and dozens of crates holding its associated equipment.

The nearly 11-hour flight to Santiago, Chile, also went well, said Lange and fellow SLAC engineer Margaux Lopez, who were tasked with leading the operation to pack up and ship the device to the observatory.

But they didn't plan for striking truckers blocking highways around Santiago, the nation's capital, in protests that threatened to throw a giant logistical wrench into the transportation mission.

It is a testament to the importance of the camera to science that Chilean Interior Minister Carolina Tohá Morales took the call about the blockade from an official with the Association of Universities for Research in Astronomy, and then called Boric, who ordered a police escort so the camera could get through.

There were a few hitches as the nine-truck camera convoy wound its way for more than six hours up a 22-mile gravel road to Cerro Pachón at about 8,900 foot elevation in the Andes foothills — notably

a loss of traction by the vehicle carrying the camera container — but it arrived safely mid-day May 16.

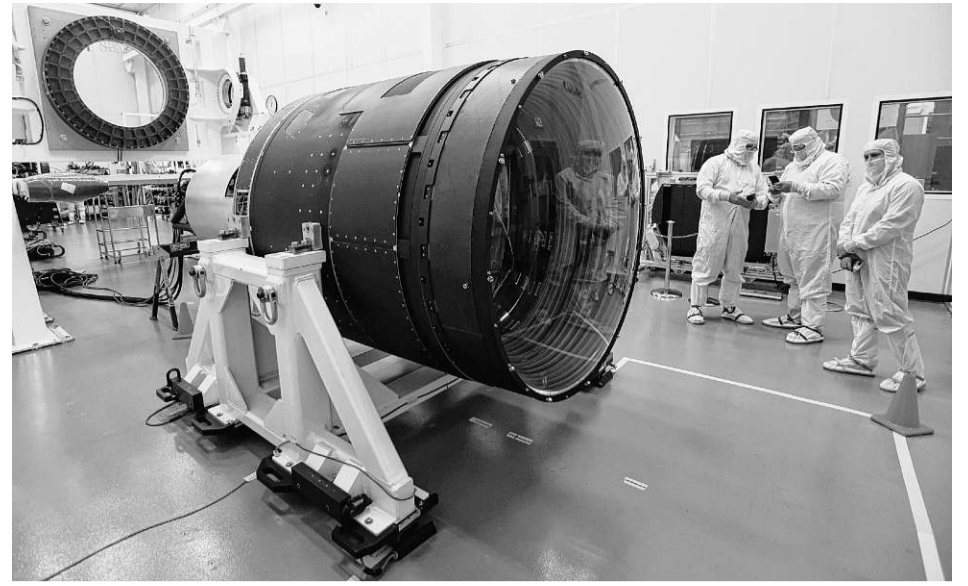
On Tuesday, Lopez, who had been working on the transportation plan since 2018, pronounced herself "very relieved" and "also proud." As soon as she had learned of the strike, and a separate labor action involving equipment handlers at the Santiago airport, she created five different scenarios to address the issues.

"While there were some hiccups, we were able to resolve all of the things that happened," Lopez said via video from the observatory in Chile. "Things mostly happened according to plan, which is pretty impressive."

Sending the hugely expensive and important Legacy Survey of Space and Time camera, with its 189 fragile light sensors, five delicate filters and assorted complex electronics by road, air and then road again put a heavy weight on Lopez and Lange.

"It's a little bit like sending your kid off to college," Lange said. "It's wonderful and terrifying at the same time."

At the Rubin Observatory, the camera will be bolted onto the end of a huge telescope, probably in October or November, Lange said. Once installation and setup is complete, it will shoot photos of 20 billion galaxies to be stitched together in expan-



JANE TYSKA Bay Area News Group/TNS

Staffers give media a tour of the 3,200 megapixel camera, the largest such device ever built, at the SLAC National Accelerator Laboratory in Menlo Park, California, on April 11.

sive panoramas providing astronomers with ever-changing vistas onto colliding and exploding stars, asteroids, and mysterious interstellar phenomena including dark energy and dark matter.

Given the value of the instrument and its importance to science, SLAC had kept the transport mission shrouded in secrecy, refusing to specify when the camera would leave for the San Francisco airport.

"I like to think that there are not bad actors who would sabotage something like this, but it's not difficult for us to not advertise that it's going out the door," Lange said earlier.

Building the camera required a facility with air 1,000 times cleaner than an average indoor space, to prevent dust and other materials from landing on the highly sensitive outer lens and degrading its quality, or from getting into the device's inner workings.

Engineers custom-built a sealed clean room with a 24-foot ceiling, and anyone entering had to don head-to-toe white bunny suits and blue latex gloves, lending day-to-day activities the ambience of a crime scene.

Before shipment, the

device was wrapped in a giant silver plastic bag and looked "like a burrito," Lopez said. Because moisture is an enemy of the instrument, into the bag went dozens of bags of moisture-grabbing desiccant, each the size of a small pillow and weighing several pounds — industrial-size versions of the tiny packs that come with many consumer electronics products.

The camera was bolted onto a 4,000-pound yellow steel frame, then lifted and lowered into a pristine steel shipping container, where the frame was fitted with sensors to measure and track impacts to the camera from bumps and jarring — which post-trip data showed were minimal.

Chief among Lange's pre-shipment impact worries were the camera's 189 custom-made silicon sensors, set a couple hairs' width apart and costing \$150,000 each.

"It doesn't take very much motion for that distance to be closed," Lange said earlier. "If they contact, they break. It would be pretty bad."

Earlier, to help make sure the transport apparatus could keep the camera safe on its journey to

Chile, a dummy version of the device, heavily weighted with black iron gym plates and hooked up with impact sensors, was put on a truck and driven around the Bay Area.

"We sent the driver on an eight-hour drive and said, 'Find all the worst roads that you can. Hit 101. Hit 880,'" Lange said, referring to U.S. Route 101 and Interstate 880. "We were logging the shocks during that process."

Then they did a much longer test run: by truck to Miami, then on a plane to Chile and up to the observatory site and back to Menlo Park.

Now the camera waits in its new clean room on the third level of the eight-level observatory. On installation day, the instrument will travel in a giant elevator five levels up to the facility's dome, and technicians will use 108 large, high-strength bolts to attach it to the tip of the telescope.

Five months of testing will follow. If all goes well, the first photons will enter the camera in the spring.

The camera and telescope, Lange said, are "going to revolutionize astronomy."



## CITY OF DORAL NOTICE OF PUBLIC HEARING TO CONSIDER ADOPTION OF RESOLUTION DESIGNATING THE LITHIA MOTORS GREEN REUSE AREA

All residents, property owners and other interested parties are hereby notified of a **COUNCIL MEETING** on **June 12, 2024** at **6:00 PM**, to consider the adoption of the following resolution designating the Lithia Motors Green Reuse Area, located at 9300 NW 13th Street, Doral, FL 33172. The City Council will consider this item for **SECOND READING**. This meeting will be held at the **City of Doral, Government Center, Council Chambers located at 8401 NW 53rd Terrace, Doral, Florida 33166**. The proposed resolution applies to the following property shown on the map below.

The City of Doral proposes to adopt the following Resolution:

### RESOLUTION No. 24-

**A RESOLUTION OF THE MAYOR AND THE CITY COUNCIL OF THE CITY OF DORAL, FLORIDA, MAKING CERTAIN FINDINGS AND DESIGNATING THE PROPERTY LOCATED AT 9300 NW 13 STREET, IDENTIFIED BY MIAMI-DADE COUNTY FOLIO NO. 35-3033-003-0010, AS THE LITHIA MOTORS GREEN REUSE AREA PURSUANT TO SECTION 376.80(2)(C), FLORIDA STATUTES, OF FLORIDA'S BROWNFIELD REDEVELOPMENT ACT, FOR THE PURPOSE OF REHABILITATION, JOB CREATION AND PROMOTING ECONOMIC REDEVELOPMENT; AUTHORIZING THE CITY CLERK TO NOTIFY THE FLORIDA DEPARTMENT OF ENVIRONMENTAL PROTECTION OF SAID DESIGNATION; PROVIDING FOR AN EFFECTIVE DATE AND FOR ALL OTHER PURPOSES**

HEARING NO.: 24-06-DOR-01

APPLICANT: FL Doral-S, LLC

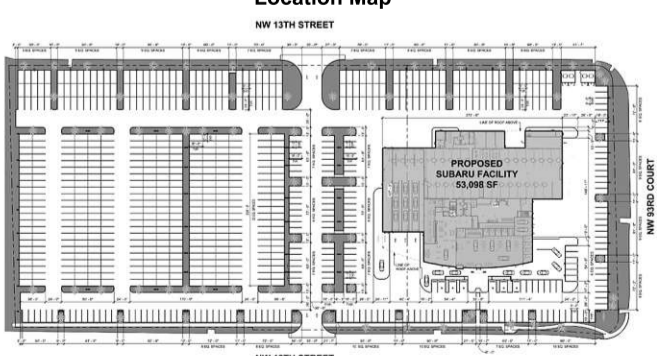
PROJECT NAME: Lithia Motors Green Reuse Area.

LOCATION: The Lithia Motors Green Reuse Area is located at 9300 NW 13th Street, Doral, FL 33172.

SIZE OF PROPERTY: 8.392± acres

REQUEST: The intent of this Resolution is to designate the Lithia Motors Green Reuse Area, located at 9300 NW 13th Street, Doral, FL 33172, as identified in the map below pursuant to Sec. 376.80, Florida Statutes, of Florida's Brownfields Redevelopment Act for the purpose of environmental remediation and redevelopment, job creation and promoting economic development and revitalization.

### Location Map



Inquiries regarding the item may be directed to the Planning and Zoning Department at 305-59-DORAL.

Pursuant to Section 286.0105, Florida Statutes, if a person decides to appeal any decisions made by the City Council with respect to any matter considered at such meeting or hearing, they will need a record of the proceedings and, for such purpose, may need to ensure that a verbatim record of the proceedings is made, which record includes the testimony and evidence upon which the appeal is to be based. This notice does not constitute consent by the City for introduction or admission of otherwise inadmissible or irrelevant evidence, nor does it authorize challenges or appeals not otherwise allowed by law. In accordance with the Americans with Disabilities Act, any person who is disabled and who need special accommodations to participate in this meeting because of that disability should contact the Planning and Zoning Department at 305-59-DORAL no later than three (3) business days prior to the proceeding.

Connie Diaz, MMC  
City Clerk  
City of Doral



## CITY OF DORAL NOTICE OF PUBLIC HEARING

All residents, property owners and other interested parties are hereby notified of a **COUNCIL MEETING** on **June 12, 2024** beginning at **6:00 PM** to consider an amendment to the City's Official Zoning Map. The City Council will consider this item for **FIRST READING**. The meeting will be held at the **City of Doral, Government Center, Council Chambers located at 8401 NW 53rd Terrace, Doral, Florida, 33166**.

The City of Doral proposes to adopt the following Ordinance:

### ORDINANCE No. 2024-18

**AN ORDINANCE OF THE MAYOR AND THE CITY COUNCIL OF THE CITY OF DORAL, FLORIDA, APPROVING AN AMENDMENT TO THE CITY'S OFFICIAL ZONING MAP FROM INDUSTRIAL DISTRICT (I) TO INDUSTRIAL COMMERCIAL DISTRICT (IC), FOR A ±0.028-ACRE PARCEL OF LAND LOCATED AT 10450 NORTHWEST 33 STREET; PROVIDING FOR SEVERABILITY; PROVIDING FOR CONFLICTS; AND PROVIDING FOR AN EFFECTIVE DATE**

HEARING NO.: 24-06-DOR-03

APPLICANT: Harborgenix, LLC (the "Applicant")

PROJECT NAME: Harborgenix, LLC Rezoning

PROPERTY OWNER: Harborgenix, LLC

LOCATION: 10450 NW 33 Street, Doral, FL

FOLIO NUMBER: 35-3029-118-0001

SIZE OF PROPERTY: ±0.028 acres

FUTURE LAND USE MAP CATEGORY: Industrial

ZONING DISTRICT: Industrial (I)

REQUEST: The Applicant is requesting a zoning map amendment from Industrial (I) to Industrial Commercial (IC) for the property located at 10450 NW 33 Street.

### Location Map



Inquiries regarding the item may be directed to the Planning and Zoning Department at 305-59-DORAL. The application file may be examined at the City of Doral Planning and Zoning Department located at 8401 NW 53 Terrace, Doral, FL 33166.

Pursuant to Section 286.0105, Florida Statutes If a person decides to appeal any decisions made by the City Council with respect to any matter considered at such meeting or hearing, they will need a record of the proceedings and, for such purpose, may need to ensure that a verbatim record of the proceedings is made, which record includes the testimony and evidence upon which the appeal is to be based. This notice does not constitute consent by the City for introduction or admission of otherwise inadmissible or irrelevant evidence, nor does it authorize challenges or appeals not otherwise allowed by law. In accordance with the Americans with Disabilities Act, any person who is disabled and who need special accommodations to participate in this meeting because of that disability should contact the Planning and Zoning Department at 305-59-DORAL no later than three (3) business days prior to the proceeding.

Connie Diaz, MMC  
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