National Aeronautics and Space Administration

Facilities Support Center

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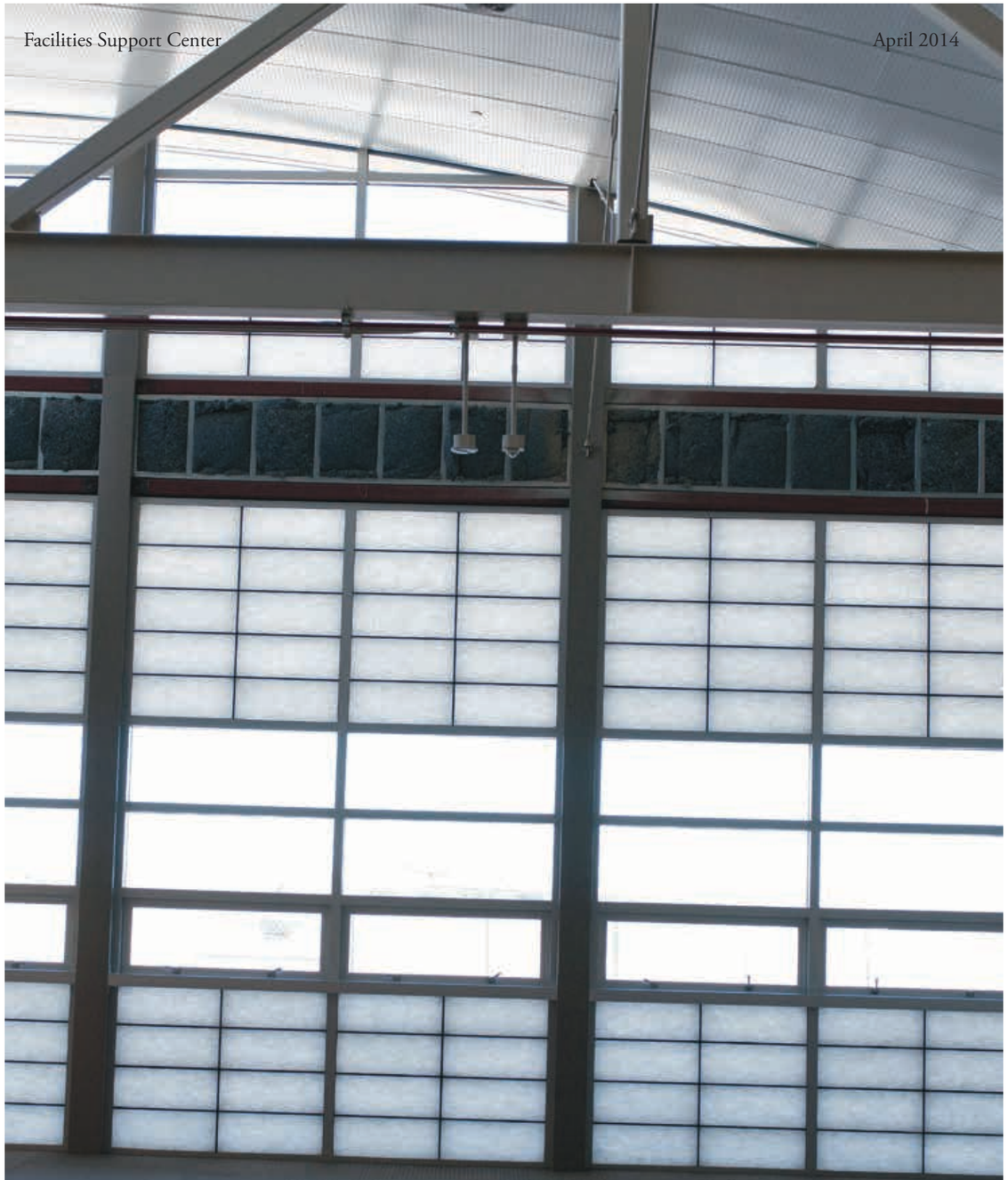
A desert gem

New building offers comfort and sustainability



Cover

ED14-0017-01
NASA/Tom Tschida

ED12-0162-428
NASA/Tom Tschida

The front windows of the FSC are designed to look like a hangar door and use materials that block heat, but allow light.

Sustainable

FSC efficiencies can be emulated at home

By Jay Levine
X-Press Editor

The new Neil A. Armstrong Flight Research Center Facilities Support Center on Edwards Air Force Base in California's Mojave Desert was built to be sustainable. The FSC construction incorporates energy and water conservation, solar energy, recycled materials and work spaces that are designed to enhance efficiency.

These elements of design and construction make Armstrong's mission more sustainable by saving energy costs and enabling those savings to be applied to the mission, said Dan Mullen, Armstrong energy conservation manager. The facility also minimizes long-term costs of operation and impacts to the natural environment. Some of these same methods also can be applied at home.

Conservation is the key for the new $12.7 million, 38,000-square-foot building, said Gemma Flores, Armstrong's FSC project manager. To that end, energy simulations determined the FSC's energy efficiency could be more than 40 percent better than traditional construction.

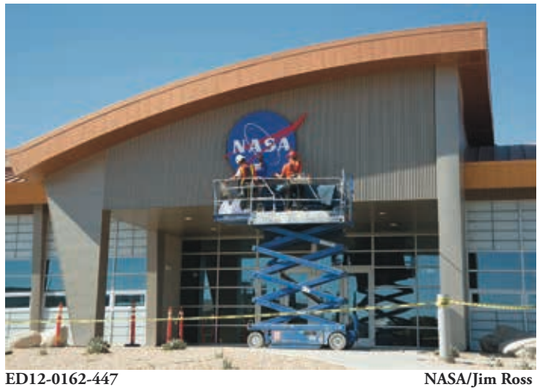
Sunny areas like the Mojave Desert provide opportunities for solar energy. The FSC has taken advantage of the sun to offset overall energy costs by more than 17 percent, Flores said. New solar initiatives and solar companies in California offer a number of options to make solar a viable option as utility rates continue to climb.

An indirect/direct ventilation system, which works like an evaporative cooler, will minimize FSC energy usage to maintain comfortable indoor temperatures, Flores said. On days when the weather is too hot and humid the indirect/direct system is supplemented with a small chiller.

The shell of the FSC was constructed to minimize energy leaks. At home people can take steps to seal energy leaks that rob their dwelling of its efficiency, Mullen said. Items such as weather stripping, double-pane windows with solar reflective glass and increased insulation in the walls or attic can help maintain internal temperatures and reduce energy consumption throughout the year.

Appliances and light fixtures are other areas of potential energy savings. The FSC uses natural light that is distributed by solar light tubes to illuminate many areas. All of the lighting fixtures are light-emitting diodes, or LED. These lights also are available at most home improvement stores, Flores said.

When the old washer, refrigerator or other appliances are ready for replacement, Energy Star rated appliances are a good option, Mullen said. Energy Star appliances are those that use less power than traditional ones and can make a difference on a person's energy bill.



ED12-0162-447 **NASA/Jim Ross**

The NASA logo is installed on the new Facilities Support Center.

ED12-0162-402 **NASA/Tom Tschida**

***Above**, solar is part of the energy solution for the FSC and can be at home. **Below**, insulation for the building is made from materials like recycled jeans.*

ED12-0162-227 **NASA/Tom Tschida**

Recycling saves energy and reduces the environmental impact and that was another focus in developing the FSC. During the construction of the FSC about 95 percent of the construction waste was recycled and more than 20 percent of its construction materials were made from recycled products, Mullen explained. For example, all of the wall and ceiling insulation was made from recycled denim.

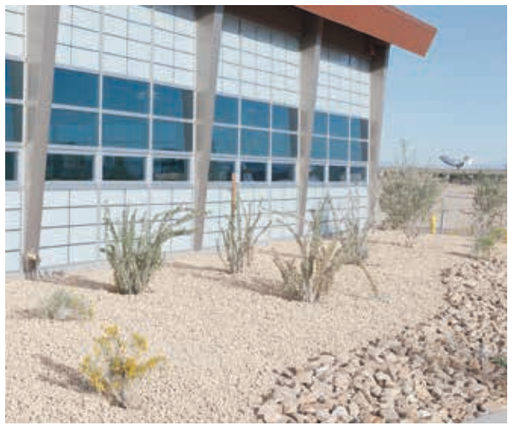
Many people can recycle at home, as many trash companies offer green waste collection for grass and yard waste and recycling for materials such as plastics, metal, glass and cardboard. In addition, unwanted furniture, clothing and miscellaneous items that are still usable can be donated to area charities or thrift stores.

Construction materials for the FSC such as adhesives, sealants, paints, coatings, carpet and wood products were selected to maintain good indoor air quality and reduce impact to the environment, Mullen said. Countertops were made from wheat board, which is considered a rapidly renewable material, Flores added. People can seek out similar materials for their home improvement projects.

Water usage was another key component in the FSC's design, where elements combine to use about 40 percent less than standard construction, Flores said. Most of the landscaping requires water for a short time until it matures. Water used from showers, laundry and restroom sinks – called gray water – will be collected in a tank, filtered and pumped back into the facility for use in flushing toilets.

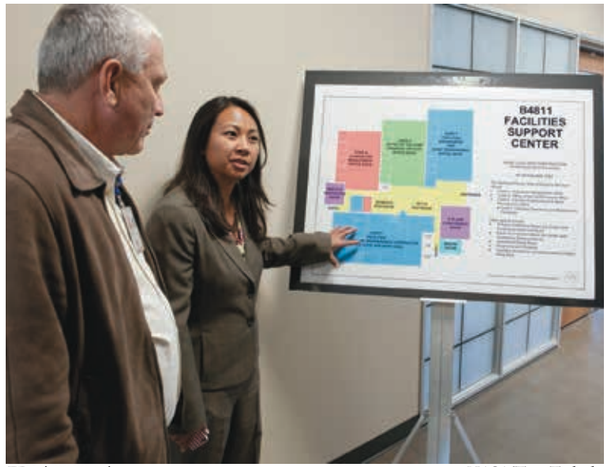
Like the FSC planners, people can choose landscaping that uses little or no water in designing their yards. Drought-tolerant plants such as ocotillo, agave plants and desert willow and ground cover such as gravel and paving stones are some possibilities, Flores said. Water efficient plumbing fixtures are used in the FSC and are available at neighborhood home improvement stores.

Outside the FSC concrete driveways, sidewalks and parking areas are made of white concrete. Light-colored concrete reflects more heat than more common materials such as



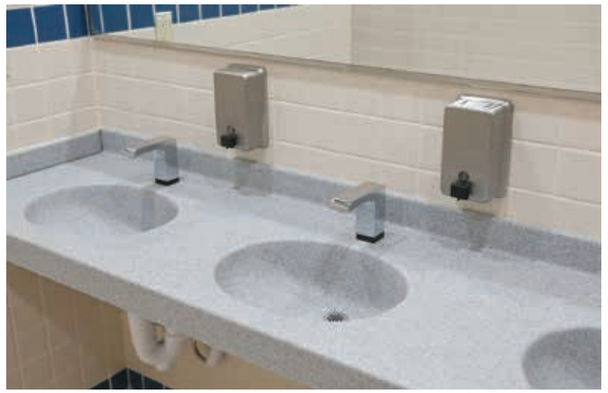
ED12-0162-412 **NASA/Tom Tschida**

Drought-resistant landscaping is another way that the new building is conserving water.



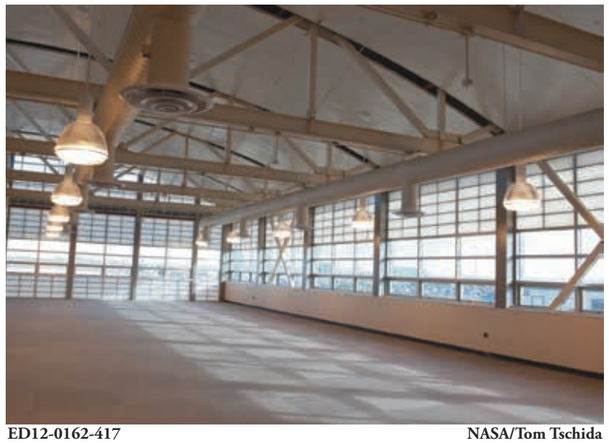
ED14-0013-04 **NASA/Tom Tschida**

Gemma Flores, right, facility project manager, gives a tour of the new facility to a group of Armstrong employees, including Brent Mead, at left.

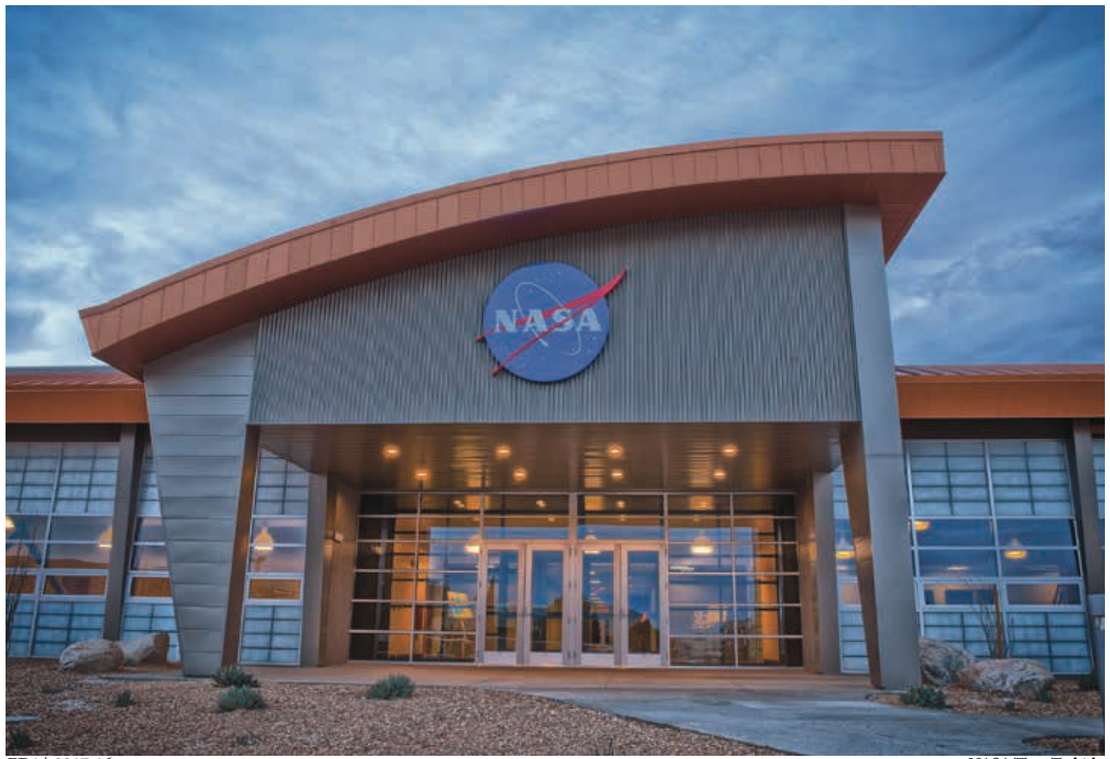


ED12-0162-424 **NASA/Tom Tschida**

***Above**, water-saving faucets can be used at home, as they are at the FSC. **Below**, the building has a combination of natural and LED lighting.*



ED12-0162-417 **NASA/Tom Tschida**



ED14-0017-16 **NASA/Tom Tschida**

The front entrance of the Facilities Support Center is seen as first light breaks across the desert landscape. The building is expected to rate high in energy and water efficiency and sustainability.

asphalt. Similar options can be selected at home.

Another feature of the FSC is 10 electric vehicle parking spaces with charging stations adjacent to the building, Flores said. The idea is to encourage and enable the use of alternative-fueled vehicles. People can lease or purchase alternative fuel cars, or join a carpool or van pool to help save fuel and cash and reduce pollutants.

Aeronautical elements and surrounding historical buildings and hangars inspire the overall design of the facility. The curved shape of the roofline resembles aircraft wings and the front facade reflects the look of Hangar 4802. The curved surfaces also offer advantages in reflecting natural light to illuminate major work areas, Flores explained. The FSC design also incorporated the use of translucent wall panels and low energy windows that allow light to pass through while blocking heat and cold.

Walking into the FSC through any of its entrances reveals what looks like a metal floor mat. The idea of these walk-off mats is to remove dirt and debris from people's shoes that would otherwise make its way into the facility and its ventilation system, Flores said. This contributes to better indoor air quality for occupants.

By a combination of these and other initiatives in the FSC, Armstrong officials anticipate the building will qualify for the Leadership in Energy and Environmental Design, or LEED, new construction platinum certification. LEED is a green building tool that addresses the entire building lifecycle recognizing the best green building strategies. The LEED rating system places platinum as the highest level of achievement. NASA requires all new buildings to be certified to the LEED silver level or higher.

The FSC is anticipated to be Armstrong's first LEED platinum certified building. However, the LEED silver accreditation was announced in October 2013 for Armstrong's $8.8 million, 22,000-square-foot Consolidated Information Technology Center, or CITC. The CITC was NASA's first LEED certified data center and Armstrong's first LEED certified building. The CITC was occupied in August 2012 and consolidated the center's information technology services under one roof.

The FSC includes collaborative office space, conference rooms, restrooms, shower/changing facilities, fabrication workshops, development and training laboratories and a storage mezzanine.

Comfort and Hays Electric Inc. of Long Beach, Calif., and its subcontractors built the facility. Development One, which is based in Santa Ana, Calif., designed the FSC and CITC.

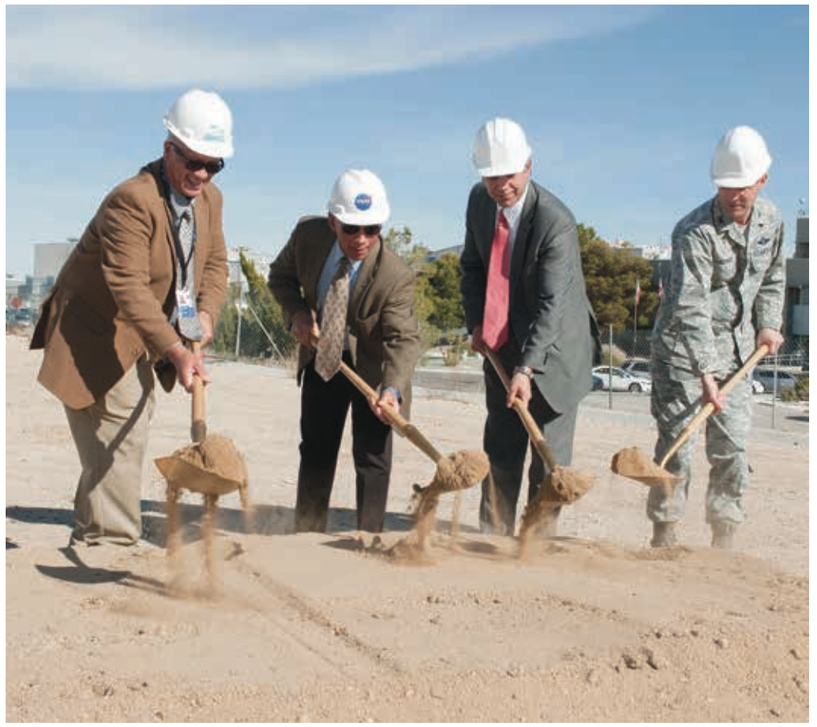
ED12-0162-40 NASA/Tom Tschida

Key people attended the groundbreaking ceremony and posed for this picture on the site of the Facilities Support Center.

From the ground up

The Facilities Support Center groundbreaking ceremony was Feb. 23, 2012, and the building was occupied in spring 2014. Here is a look at the process in photos.

For additional information, contact Gemma Flores, facility project manager, at 661-276-2817.



ED12-0162-31 NASA/Tom Tschida

Turning shovels full of dirt for the new facility were, from left, Chris Comfort, president of Comfort and Hays Construction, NASA Administrator Charlie Bolden, Armstrong Center director David McBride and Col. Gregory Schwab, then commander of the 95th Air Base Wing at Edwards Air Force Base.

ED12-0162-16 NASA/Tony Landis

The construction is pictured in its earliest stages.

ED12-0162-86 NASA/Tom Tschida

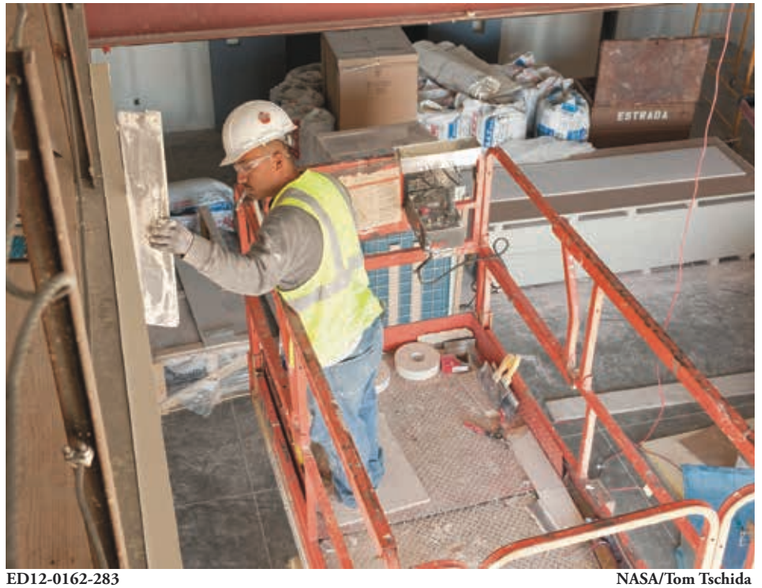
An exterior wall is erected while the foundation is prepared for another section of the facility.

ED12-0162-52 NASA/Tony Landis

Construction continued as work crews used heavy machinery for larger material loads.

ED12-0162-214 NASA/Tom Tschida

A crew looked over a number of items on the roof as work progressed in many areas.



ED12-0162-283 NASA/Tom Tschida

A worker evened out plaster on one of the walls as the inside of the facility began to take shape.