



Lockheed Martin Management Association Retirees Newsletter

Looking Forward Towards A Wonderful Retiree Future!

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APRIL 2014

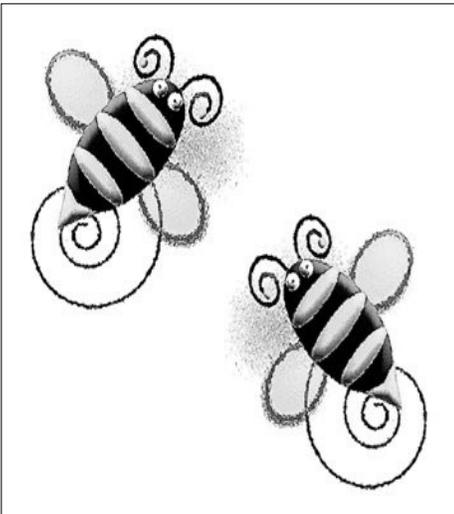
Needed: Staff Help

LMMAR needs volunteers to help keep LMMAR going. We particularly need a secretary and a newsletter editor.

If you think you can help please contact:

Norm Dhom, Membership Chair – (408) 732-2742

Jerry Vaughan, Treasurer – (408) 985-2708



From Tennyson – "Locksley Hall"

*"In the Spring a fuller crimson
comes upon the robin's breast;
In the Spring the wanton lapwing
gets himself another crest;*

*In the Spring a livelier iris changes
on the burnish'd dove;
In the Spring a young man's fancy
lightly turns to thoughts of love."*

So, what about all of us old folks? Here's what Bill & Jan Hammerlund are doing:

Hammerlund Trip

Hi All,

We left Recife, Brazil; Rio de Janeiro, Brazil; Lihabela, Brazil; Buenos Aires, Argentina; Montevideo, Uruguay, and are now heading to Stanley in the Falkland Islands. (There are about 650 islands in the Falklands.)

I could write pages about Rio's Carnival even though we did not pay the \$1200 that the ship's tour cost for two to go to the Carnival proper. We drove through the staging area for Carnival in our tour bus. The floats are similar to the Carnival floats in Panama, although many of the Brazilian floats are even more elaborate than most of the Panamanian ones.

The streets are filled with people. Most seem to be in their 20's, and are from many parts of the world. The people dress up more (or, perhaps, it would be more accurate to say that they undress more) in Brazil than in Panama. Many of the people on the street dress in costume for four

days. That's like a four day Halloween Party in costume with no dress code. With five million people coming to Carnival every year, it is pretty wild. The music was really loud. We could hear it from our ship, even when we were out in the harbor.

Once Carnival started, the car and bus traffic was re-routed past temporarily closed streets around the city. (It took two-and-a-half hours to make what should have been a forty minute drive.) If you look up certain streets, all you see are people's heads for blocks and blocks, in all directions. I don't think the police would even try to drive in the downtown. We did not check on hotel prices since sleeping on the ship was free, as was the ship's food. Going to Rio's Carnival is the kind of thing that is fun to do once in your life time, but it helps if you're young and like to have dinner at 9 PM, then party throughout the night until the sun comes up. Follow that with a day at the beach, I don't know when they sleep.

The trip to the top of Sugar Loaf

Mountain and to Christ the Redeemer are well worth the hour long lines waiting for the trains or trams. The sheer cliffs as you approach each attraction are very much like Yosemite. The city views are outstanding. Christ, the Redeemer is most impressive. We would love to go back to see it, again.

However, wherever we went, Brazilians, Argentinians, tour guides, and ship's personnel warned everyone to leave all valuables, including wedding rings, watches, etc. at home. We were also repeatedly warned to be very careful of our cameras and to watch out for pickpockets. As I was walking away from the elevators that took us to the top of the Christ the Redeemer mountain, I heard a fellow passenger firmly and loudly state, "You have bumped me two times! That is enough! Get away from me!..A few minutes later he discovered that his wallet was missing. The wallet was found about an hour later and turned into the police ... identification information was intact, but the credit cards and money were missing. The pick-pocket was found by the police, but had already passed his ill gotten gains on to an accomplice, and, therefore could not be charged. We have not spoken to anyone on the ship who felt safe in Rio

If you want a laid back life style, the Island of Lihabela, Brazil, is one of the most perfect that we have seen. The scenery is beautiful. There is a small yacht harbor in the bay. A paved path invites you to stroll along the waterfront. The town is small. The pace is calm. Shop keepers were friendly, and appreciated your visit to their store, even if you didn't purchase anything. Most of the ship's passengers seemed to enjoy it. We did. The town felt safe and peaceful. The restaurants didn't rush us. We heard about one buffet restaurant where they give you a little flag that is green on one side and red on the other. As long as you leave the green side up they will keep bringing you more food. You show the red side when you

have eaten enough. You are welcome to remain at the table all evening, if you wish.

Buenos Aires is a large busy port city, with parks generously scattered throughout the city. Here, again, we were repeatedly warned by Argentinians and others about pickpockets and thieves. Before the ship left port we heard that one person was pickpocketed, and another robbed. (We cannot personally verify those reports.)

This city was also dotted with many parks, which seemed to be well utilized by the residents. There were beautiful homes and apartment buildings along the water front. It felt very European. We saw some excellent tile work, many churches,

While in Buenos Aires we visited the Recoleta Cemetery, where Eva Peron is buried. There are hundreds of elegant, extravagant mausoleums crammed next to each other within the cemetery. The crypts are downright expensive, with a building site costing \$300,000-\$500,000. You still have to build the mausoleum, which may add another \$300,000-\$500,000 (or, in some cases, \$1,000,000 or more) to the cost. Many of the mausoleums go down two or three levels below the surface of the ground. Eva Peron is said to be buried on a level more than twenty feet deep. An anonymous person comes daily to put fresh roses on the front of her mausoleum. When we were there, someone had placed an entire bouquet of red roses at the doorstep of the gravesite, in addition to the several individual red roses that were tucked into the wrought iron grill work on the door to the crypt. It is a fascinating place to visit.

Montevideo is a smaller sea port that is quite busy, too. We took a tour to the popular tourist center of Punta del Este, two-and-a-half hours drive away from Montivideo. (All of the local tours were filled, so we took this tour.) Tourists rent these very expensive apartments and homes in the summer. The beaches look lovely, and, of course, the views of the Rio de la Plata and the Atlantic Ocean are excellent.

I have stop and E-Mail this before I get more behind on ports since we are about half through this trip.

Regards,

Bill and Jan.

New Advanced-materials Center

Uploaded: Tue, Mar 25, 2014, 5:19 pm

Lockheed Martin opens new advanced-materials center

New laboratory advances nanotechnology, high-tech products for space and earth environments

by Sue Dremann / Palo Alto Weekly

Officials at space-technology company Lockheed Martin unveiled a new research facility at Stanford Research Park on Tuesday, March 25, reinforcing its staying power in Palo Alto after more than 50 years.

The 82,000-square-foot facility will house 130 engineers, scientists and staff who do advanced research in the development of emerging technologies, such as 3-D printing, thermal sciences, nanotechnology and high-temperature materials.



The Lockheed Martin Space Systems Advance Technology Center's new Advanced Materials & Thermal Sciences Center is how to 130 scientists, engineers and staff. Photo courtesy of Lockheed Martin Space Systems Advance Technology Center

The Materials & Thermal Sciences Center, which is part of the Lockheed Martin Space Systems Advanced Tech-

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nology Center, quietly opened its new laboratory at 3251 Hanover St., Building 245, in December. The "green" facility uses energy-efficiency technologies and environmental practices that will save the company \$1 million in annual maintenance costs and will cut energy costs by more than 60 percent.

The center replaces an old structure and consolidates 30 laboratories out of two 50-year-old facilities. The laboratories at the building's core are surrounded by a perimeter of open work spaces. The modular lab design allows staff to easily reconfigure the facility's work spaces as needed, spokesman Mark Lewis said during a building tour.

In one of the labs, a large synthetic rocket nose cone stood upright on the floor. Inside, there is a place for a satellite. The black cone is made from a new type of lightweight polymer developed at the lab. The new material can withstand heat and can be molded in one piece instead of several assembled components.

"We can make 40 in two eight-hour work shifts," Slade Gardner, a Lockheed Martin fellow, said.

He pointed to a titanium sphere – a propellant tank that will help boost satellites to their positions in space. The tank was created through "additive manufacturing" – 3-D printer technology that allows designers to create a model in 3-D. A 3-D printer builds the object line by line and layer by layer using heated spools of polymer material or special metal.

Scientists use a six-arm robot to build the sphere in free space. The robot lays titanium wire in layers that are heated together. The result is a metal sphere that can easily be machined to 22 mils thick – the equivalent thickness of 10 pieces of paper, he said.

The cost is far less than if carving an object out of a solid block of metal, where leftover material would be

wasted, he said.

The lab has created its own recipes, which make the materials lighter and stronger, and far less costly. Just to get into earth orbit costs \$10,000 per pound. Shaving 40 pounds off a spacecraft can save \$400,000. If sending it to Mars, the savings is probably 10 times as much, staff said.

The center is creating technologies that are useful for earth-bound pursuits. A new form of carbon that is one atom thick and has atom-size holes is being turned into a new, inexpensive filtration system that could be used to purify water, for example, said Ken Washington, Advanced Technology Center vice president.

The new facility will allow the center to continue and expand its collaboration with Stanford University and U.C. Berkeley scientists, he said. Palo Alto, because of its rarefied academic environment and attractive amenities and climate, continues to be a place that attracts the best scientists and researchers, he said.

The City Palo Alto's carbon-neutral utilities goals are also attractive to companies such as Lockheed Martin, Mayor Nancy Shepherd said.

"Carbon neutral is on everybody's agenda. It is a real attraction to companies," she said.

Marshall Case, vice president of infrastructure services, called the new building part of "NextGen Lockheed Martin." The goal is to reduce its Palo Alto carbon dioxide output and its waste by 35 percent each and to reduce its water use by 25 percent, he said. The new building uses low-flow irrigation and buffer areas to reduce water output and retain runoff, for example, he said.

Palo Alto City Council member Liz Kniss said the new laboratories are an example of older companies taking up the model of new tech companies. Shepherd thinks this next generation of Lockheed Martin is one example of a growing "research econo-

my" that will help enrich Palo Alto for decades to come.

"We used to call it the Stanford Industrial Park, and it has transformed into the Research Park," she noted.

LMMAR Bridge

Mar 4 - Individual Duplicate – 1st Place – Doug Gordon, 2nd Place – Bob Vigeant and 3rd Place - Dave Topka.

Mar 6 – Pairs Duplicate - 1st Place – (tie) Gary Bea & Chuck Schmidt, Roger Abegg & Doug Gordon, and Dave Topka & A.Bidder.

Mar 11 - Individual Duplicate - 1st Place - Chuck Schmidt, 2nd Place - Dave Himmelblau, 3rd Place - Doug Gordon, and 4th Place – Ted Hinshaw.

Mar 13 - Pairs Duplicate – 1st Place - Gary Bea & Chuck Schmidt and 2nd Place - Roger Abegg & Doug Gordon.

Mar 18 – No Game.

Mar 20 – Pairs Duplicate – 1st Place – Dave Himmelblau & Dave Topka and 2nd Place – Don Kies & Bob Vigeant.

Mar 25 – Pairs Duplicate – 1st Place - Roger Abegg & Doug Gordon and 2nd Place – (tie) Alex Fucile & Wilma Tringaly and Angie Schynert & Bob Vigeant.

Mar 27 – Pairs Duplicate – 1st Place – (tie) - Roger Abegg & Doug Gordon and Dave Himmelblau & Dave Topka.

A First Look at Flight In 2025

In late 2010, NASA awarded contracts to three teams – Lockheed Martin, Northrop Grumman, The Boeing Company – to study advanced concept designs for aircraft that could take to the skies in the year 2025.

At the time of the award, the team gave NASA a sneak peek of the particular design they plan to pursue.

Each design looks very different, but all final designs have to meet NASA's goals for less noise, cleaner exhaust and lower fuel consumption. Each aircraft has to be able to do all of those things at

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the same time, which requires a complex dance of tradeoffs between all of the new advanced technologies that will be on these vehicles.

The proposed aircraft will also have to operate safely in a more modernized air traffic management system.

And each design has to fly up to 85 percent of the speed of sound; cover a range of approximately 7,000 miles; and carry between 50,000 and 100,000 pounds of payload, either passengers or cargo.

Lockheed-Martin recently released the following statement:

The future of air travel is bright – and fast. Since the dawn of the jet age in the 1960s, commercial air travel has remained relatively unchanged. However, today’s demand for smarter and faster technologies is driving the next generation of commercial travel with supersonic aircraft, which could potentially cut U.S. coast-to-coast travel time almost in half.

With the commercial air travel industry expected to grow to more than five times its current size, the economic impact and significant time savings of a more efficient supersonic travel system will become increasingly important in our global economy.

Quieting the boom

One of the major hurdles of commercial supersonic air travel is the noise associated with it. At speeds greater than Mach 1, disturbances of air pressure around the airplane merge to form enormous shock waves resulting in sonic booms. For example, when you hear a car coming, you can hear it before it passes you because you hear increments of that sound continuously over a duration of time. In the case of a supersonic aircraft, you get all that sound over a very short duration of time causing a boom-like effect.

If you’ve never heard a sonic boom, let’s just say it’s quite loud. And, that’s

putting it lightly. Because of this, current air traffic regulations restrict supersonic planes from flying over land. For more than a decade, Lockheed Martin has been working to solve these problems.

“To achieve revolutionary reductions in supersonic transportation airport noise, a totally new kind of propulsion system is being developed,” said Michael Buonanno, Lockheed Martin manager of the NASA N+2 program. “We are also exploring new techniques for low noise jet exhaust, integrated fan noise suppression, airframe noise suppression and computer customized airport noise abatement.”

Buonanno explained how over the years, his team has tackled several of these technology thrust areas.

“We’ve developed a vehicle conceptual design and built a sub scale wind tunnel model to test the sonic boom characteristics that we predict will validate our ability to shape the airplane to generate much lower sonic boom levels.”



One of their breakthroughs was being able to develop the tools and codes that allow engineers and designers to accurately predict the loudness of a plane’s sonic boom. With the availability of these tools, a designer can develop an airplane concept that significantly reduces boom levels. Though it is not practical to completely eliminate noise, these advancements would result in a sonic boom that sounds much more like a distant thump rather than a sharp crack.

Lockheed Martin’s design would accommodate 80 passengers and have the ability to travel more than 5,000 nautical miles with sonic boom levels one hundred times quieter than the now-retired Concorde supersonic pas-

senger airline. The Concorde was first flown in 1969 and was one of only two supersonic passenger airliners to have entered commercial service.

How would it work?

“It’s all about the design details,” said Buonanno. “You need to be able to manage the progress of volume and lift to create series of closely timed small shocks rather than one big one. Our testing has given us the confidence we need to have a good understanding of how sonic boom levels work and how to design airplanes to meet the required boom levels.”

The aircraft would have to be very long, so that the volume and the lift of the plane are allowed to gradually build up and then decrease. The engine is also extremely important. Under the N+2 program, Lockheed Martin has worked with General Electric and Rolls Royce to look at engine concepts that have high fuel efficiency and can meet the takeoff and landing noise constraints.

“The engine itself does not contribute to a sonic boom but you have to have a good integration of the engine into the airframe,” said Buonanno.

Lockheed Martin’s N+2 concept has a tri-jet configuration; one engine is on the top of the aircraft and the other two are located under each wing. Though not physically hidden, these locations are essentially concealed from the sonic boom because of the tailored volume and lift distribution of the plane. Therefore, the disturbance simply blends in.

And while passengers won’t be buying tickets for these aircraft in the next five years, Buonanno estimates the technology will be ready around the 2025 timeframe.

“We calculate that timeframe by gauging the technology readiness levels,” said Buonanno. He explained that one of the pacing items would be the availability of a propulsion system. “Having something that’s efficient at high speeds and quiet is a big technical

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challenge.”

By choosing Mach 1.7 design, the team has been able to significantly simplify the problem of developing a propulsion system that’s compatible with low emissions and takeoff and landing noise. Although slightly slower than Concorde’s Mach 2 cruise speed, this enables the use of higher bypass ratio engines for lower takeoff noise and would still permit approximately a 50 percent reduction of trip time compared to today’s aircraft.

“Our work with NASA has laid the groundwork for any future activity,” said Buonanno. The tools we’ve put in place really open up future opportunities.”

How Do Satellites Improve Your World?

From creature comforts to critical technology, satellites improve everyday life on Earth. It’s commonly understood that satellites beam down TV signals and broadband connection, but they also assist in many less-known industries including banking, agriculture and climate monitoring.

During Satellite Week in Washington D.C., Lockheed Martin is showcasing how space and satellite technology benefit life on earth. The week-long celebration, kicking off March 10, is centered on Satellite 2014, a gathering of more than 12,000 satellite professionals featuring speakers and panels covering the latest in satellite technology.

Workhorse: One Satellite, Many Missions

What if one satellite could do everything from predicting weather to providing secure military communications? It seems impossible, but that’s exactly what Lockheed Martin’s A2100 has delivered to both commercial and government customers. With more than 40 satellites built on a common framework, the A2100 has proven its worth through its family of satellites

including AEHF, which delivers jam-proof connectivity for heads of state and troops alike, and MUOS, which improves secure voice and data communications for U.S. forces on the move.

Building on its demonstrated performance, the A2100 is currently undergoing a comprehensive modernization resulting in a shorter build cycle, reduced cost, and longer orbit life – all while making the satellite more capable.

Connecting the Most Remote Place on Earth

The North Pole is arguably the most desolate place on earth. Bitterly cold and in full darkness during winter, the arctic is thought of as a barren landscape. But things are changing. Activity in the arctic is growing as the polar ice cap recedes.

More people, shipping, exploration and search and rescue expose the need for secure communications to protect the region. However, getting satellite communications signal is extremely difficult. And that’s where Lockheed Martin’s MUOS satellite – short for Mobile User Objective System – is stepping in to help bring communication to an entirely new region of the world.



MUOS recently underwent tests to better understand how it could bring communication to the arctic. The results revealed that MUOS covers more of the arctic than it was designed for. And the satellite will also be able to offer first-of-its-kind communications that mimic many smartphone features including secure communication, data and voice.

You Can’t Get There Without Launch
Satellites provide technology to earth,

but they can’t travel to space without a successful launch. Lockheed Martin pioneered the space transportation business and boasts an unparalleled 99% mission success rate. Decades of experience have yielded an unprecedented record, including more than 220 Titan flights, more than 600 Atlas flights, more than 120 space shuttle flights and seven Athena flights.

Through the Atlas V and Athena, Lockheed Martin can launch any payload to any orbit. As the exclusive provider of commercial Atlas rockets, we provide the commercial industry access to one of the most reliable launch vehicles in the world. In addition, the Athena series of vehicles draw from over 50 years of strategic missile technologies to provide complete mission flexibility specializing in ride shares or small satellite constellations.

Trivia (From Wikipedia)

A trencher (from Old French *tranchier*; "to cut") is a type of tableware, commonly used in medieval cuisine. A trencher was originally a flat round of bread used as a plate, upon which the food could be placed before being eaten. At the end of the meal, the trencher could be eaten with sauce, but was more frequently given as alms to the poor. Later the trencher evolved into a small plate of metal or wood.

A "trencherman" is one devoted to eating and drinking, often to excess; one with a hearty appetite, a gourmand.

An individual salt dish or squat open salt cellar placed near a trencher was called a trencher salt.

A "trencher-fed pack" is a pack of foxhounds or harriers in which the hounds are kept individually by hunt members and only assembled as a pack to hunt. Usually, a pack of hounds are maintained together as a pack in kennels.

FOR SALE

Hydraulic jacks, bottle style, 10 tons capacity, like new. \$10 each. Call Ed 408-555-6244. You may e-text me.

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April 2014

Activity Calendar

- **LMMAR Executive Board Meeting.** First Monday of each month unless holiday conflict, then second Monday. 9:30 a.m. Bldg. 157-Satellite Room (off the cafeteria).
 - **LMMAR Newsletter Mailing Session.** Volunteers needed. Second Thursday of each month. 9:30 a.m. Bldg. 157-Litrium. Contact Norm Dhom (408) 732-2742.
 - **LMMAR Luncheon.** April 25, 2014 at Michael's at Shoreline in Mt. View. Contact Lucille Wilson at 408.225.9566
 - **LMMAR Barbecue.** August (TBD) at Central Park In Santa Clara. Contact Lucille Wilson at 408.225.9566
 - **LMMAR Luncheon.** October 31, 2014 at Michael's at Shoreline in Mt. View. Contact Lucille Wilson at 408.225.9566
 - **LMMAR Luncheon.** December 5, 2014 at Michael's at Shoreline in Mt. View. Contact Lucille Wilson at 408.225.9566
 - **LMMAR Bridge Card Players.** Join the fun! Every Tuesday and Thursday, 12:00 noon at the Willow Park Condominiums located at the NE corner of Moffet Blvd. and Middlefield Road in Mountain View. Entrance is from Moffet Blvd. Contact Dave Himmelblau, 'phone No. 650 968-1121.
 - **Lockheed Martin Blood Bank.** Second Wednesday of each month. 8:00 a.m. - 3:00 p.m. Bldg. 163. LMMAR Contact Norm Dhom (408) 732-2742.
 - **Lockheed Martin Retirees Investment Group (LMRIG).** Meets last Thursday of each month, 1:00-2:00 p.m. in B163 at the corner of J Street and 1st Ave. (Employee Connection Building). Dues are \$2. Contact Don Kinell (650) 948-1520 or Martin Abelow (408) 253-6924. Join us for lunch in the B-157 cafeteria prior to the meeting between 11:40-12:40.
- For your financial needs, please contact Star One Credit Union at www.starone.org or (866) 543-5202 toll free.

LMMAR NEWSLETTER

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