



ASSOCIATES

Volume 36, Issue 3
July 2020

Sponsored by LOCKHEED MARTIN

MARS STAR



MARS STAR is going digital!! If you wish to receive hard (printed) copies in the future, contact Carl Kaminski at 303-726-1546 or via email at carlcolo@centurylink.net. See President's Corner article for details.

MARS Activities This Quarter:

- Dinner Club — pages 25-30

MARS Associates: A Social Club for Retirees of Lockheed Martin & United Launch Alliance

OFFICERS

President	Dick Sosnay	303-972-9209
President-Elect	TBD	
VP Activities	Linda Duby	303-249-1665
VP Business	Bill Schrott	303-808-3083
VP Communication	Mike Carroll	303-941-4193
VP Membership	Carl Kaminski	303-726-1546
Treasurer	Charlie Haupt	303-798-7113
Secretary	Al Nemes	303-908-0157
Historian POC	Barb Sande	303-887-8511

MARS STAR

Editor	Tom Pighetti	303-979-7933
Editor	Linda Stearns	303-797-3557
Memorials	Norma Emerson	303-646-1137
Webmaster	Jim Kummer	303-986-3966
Volunteers	Judy Nielsen	303-905-3957
<u>Reporting:</u>		
Cape Canaveral	Dick Olson	321-452-4015
Colo Springs	Doug Tomerlin	719-594-6392
Vandenberg	Charlie Radaz	805-733-2051

CLUB CONTACTS

Bridge	Dave & Kathy Martz	303-683-9524
Car Club	Roger Rieger	303-912-6217
Dinner	Becky & Gary Englebright	303-973-4062
	Anita & Roy Kannady	303-794-9210
Golf	Bo Rodriguez	303-798-9157
Hiking	Sue Janssen	303-936-8339
Photography	John Chapter (Pres)	303-986-8277

REMINDER:

If you move, please give the membership VP a change of address. Also, if you are a snowbird, let us know when you are leaving and when you plan to return so your MARS STAR can be sent to you. It costs us 70 cents for each STAR package returned.

(Published quarterly by MARS Associates, Retirees of Lockheed Martin Corporation and United Launch Alliance, Denver, CO)

DIRECTORS

Director Chair	Roger Rieger	303-912-6217
Director	John Janczy	303-973-3847
Director	Bill Wise	303-771-4887
Director	Karen Paulson	303-932-7192
Director	Dave Cattani	303-973-8805
Director	Robin Zen	303-335-6443
Past President	Dan Ellerhorst	303-794-0750

IMPORTANT PHONE NUMBERS

LM Employee Service Center 1-866-562-2363

MARS Important Phone Numbers

(Be sure to have your MARS ID available)

MARS Delta Dental of CO

Individual Team (representatives) 1-877-516-6512
Ron Rueger (Account Mgr) 303-889-8616

Assured Partners of CO

MARS Delta Dental "Vision" (EyeMed)

MARS Vision Service Plan (VSP)

Jon Elmore 303-228-2206
Hudson Howard 720-510-9505
Sharla Leary 720-510-9507

Aetna/Medicare Plus

1-888-562-8111

Kaiser Advantage Plus

303-338-3800

MARS Associates

P. O. Box 1128

Littleton, CO 80160-1128

MARS Website: <http://www.marsretirees.org>

Cover:

L: NASA's Hubble Space Telescope spacecraft was built by Lockheed Missiles Space Corporation (now Lockheed Martin) in its Sunnyvale, CA facility. Since the 1990 launch, LM personnel, at NASA's Goddard Space Flight Center, have helped manage the day-to-day spacecraft operations, and provided preparation and training for the telescope's servicing missions. (See Historian Corner, pg. 9)

R: One of the four solid rocket boosters that will help launch NASA's Perseverance rover toward Mars is moved into position for stacking on a United Launch Alliance Atlas 5 rocket at Cape Canaveral. (See ULA News, pg. 22) Credit: NASA/Ben Smegelsky

From the Editor's Desk

Tom Pighetti (tjpighetti@q.com)

Linda Stearns (linda80120@comcast.net)

For comments or corrections, contact Tom (issue editor) or Mike Carroll, V.P. of Communications.

MARS welcomes your submissions. Submissions must be relevant **to the MARS organization**, informative, and **appropriate for this newsletter**. No **personal dialogues or opinion pieces** will be accepted.

Please submit your article for approval **in advance** to the V. P. of Communications. Articles will be included as time / space allows.



President's Corner

By Dick Sosnay

(richardsosnay@gmail.com)

It is now 16 weeks since the Corona Virus hit and changed our world. I hope everybody out there is healthy and doing fine. Like every other organization in the world, it has had a major impact on the MARS Association. Everything has generally been shutdown; all activities were canceled starting after our Annual Meeting/Luncheon in March. Since then, we have been able to publish the April MARS STAR electronically in April, and then a hard copy in May. And as we go to press, we are planning to publish the July MARS STAR on schedule, both electronically and hard copy. The clubs have had everything cancelled since about mid-March, but the Golf Club, Hiking Club and Dinner Club have started up again in a limited manner. The Bridge Club and Car Club are still on hold, pending openings and planning for the coronavirus. The Photography Club is on their normal summer break and hoping to start up again in September. We have been able to hold officers/directors virtual meetings in April, May, June, and July via Zoom. As a direct result of the coronavirus, we had to cancel the Senior Luncheon, the MARS day at the Rockies and our annual Picnic. At this point, we are still planning to have our Holiday Celebration, but that too is subject to how well Colorado and the rest of the world can cope with the coronavirus.

The officers and directors want to continue our major events that we know so many of you enjoy, but we are also aware of the danger of holding events with a large number of participants and the susceptibility of people in our age group. We do not want to put anyone in danger. Our major events not only provide an enjoyable experience for our attending members and a wonderful chance to see old friends, but they also provide the opportunity for officers and directors to communicate with the members, and the chance for members to provide feedback on the things we are doing. In this age of the coronavirus, we miss that opportunity, and would like to encourage all members to communicate with the officers and directors as much as possible. You have all our email and phone numbers available on the web site and in the front of the MARS STAR. We welcome your questions, comments, and suggestions. We have also been talking about other methods to communicate with members during this time of the coronavirus. One possibility would be a large Webinar via Zoom, wherein we could offer a brief presentation on current and future plans for MARS, followed by opening the floor for questions or

suggestions. If you would like to participate in such a Zoom meeting, please let me know.

The April issue of the MARS STAR was first made available on our website and on our Facebook page. We received feedback back from several of our members that they preferred a soft copy and did not want a hard copy. We subsequently put out a mass email to all members asking to let us know if they preferred a soft copy and did not want a hard copy. We got responses from about 120 members that they did not want a hard copy. A month later, after the Colorado Stay-at-Home order expired, we mailed out the hard copy, but did not mail it to the members that requested only a soft copy. For those that did not respond, we do not know what your preferences are. We would like to reduce the number of hard copies that we mail out for several reasons. First of all, it is the green thing to do; we kill a lot of trees making hard copies. It is faster and easier to distribute soft copies. We can also reduce the expenses of printing and mailing. It requires less effort of the officers and directors who must sort, address, and mail the hard copies. And in the time of coronavirus, it reduces the activities where we cannot easily maintain safe distancing.

Therefore, for the next issue, and for subsequent issues of the MARS STAR, the default option will be soft copy only. Like before, it will be available on both the MARS Website and the MARS Facebook page; we will notify members via email when the MARS STAR is available and how to access it. We realize that some members may prefer to get a hard copy. **If you want to continue to get hard (printed) copies, please notify our VP-Membership, Carl Kaminski via email at carcolo@centurylink.net, or via telephone at 303-726-1546, that you would like to continue getting hard copies.** We appreciate your support while we are making this transition.

Once again, I would like to remind members that it is important that you update your email address and keep it current so that it is easier to contact you when the need arises.

I would also once again encourage our members to volunteer. We know that many of you are actively engaged in volunteer activities outside of MARS. If you are and would like to get your organization recognized in the MARS STAR and brought to the attention of all MARS members, please notify one of the officers or directors. We are looking for a write-up for our next MARS STAR. This serves to let other MARS members know about your volunteer organization, gets you a \$50 check for the organization, and may encourage others to join. In addition, we are always looking for volunteers to help run the MARS organization. We are

still looking for a President-Elect, and directors. Please let one of the officers or directors know if you are interested in one of these positions or if you would like to help with any of the other MARS activities. MARS is an organization that can only be managed by volunteers

In the last issue, I mentioned that I wanted to do a financial review of MARS activities. With the help of several volunteers and especially our previous Treasurer, Larry Stearns, we were able to look at MARS income from dues and events, expenses, and subsidies that we provided to members for the last 10 years. As expected, we have seen a rise in costs, along with a decrease in membership. However, when that was overlaid with the coronavirus impact to the MARS Association, where due to cancellation of many events this year, we did not incur some of the planned costs, we have determined that the dues structure for next year will remain the same as it is now. We will, of course, continue to monitor that over the next years.

I would like to close by saying thank you to all our members for your patience, while we try to get through this changing world due to the coronavirus. Like all of you, I cannot wait until we are beyond this and can continue with our lives as before. I look forward to seeing everyone again at our events and club activities when it is safe to do so. For now, stay safe, keep your friends and families safe, and keep smiling.



Activities Updates

By Linda Duby
(lindaduby@comcast.net)

Summer is finally here and it has been very interesting dealing with the circumstances caused by COVID-19. As published in the last STAR, the officers and directors of MARS decided to cancel the Luncheon Honoring Senior Members that was due to be held in July because of the on-going risk of COVID-19. Because of these on-going risks, we continue to have discussions about activities at the monthly MARS meetings.

Since the risk is still high and there are so many restrictions in place, the officers and directors decided to cancel both the Rockies game, scheduled for August 5 and the Annual Picnic, scheduled for September 9. We regret having to cancel so many activities but thought this was the best decision for everyone involved in our events.

As of July, MARS is still planning to have the Holiday Celebration. Unfortunately, we will not be able to have this event at Pinehurst Country Club. I am in the process of looking for a new venue for this event. I have talked to several venues and have received several bids. I hope to make a decision on the venue in the near future. More information on the Holiday Celebration will be included in the next issue of the STAR.

If you have any questions or concerns about the events, please email me at lindaduby@comcast.net.



Business

By William Schrott
(wmschrott@msn.com)

Hello MARS Associates members. I am Bill Schrott, your new Vice President of Business. I started at Martin Marietta in January 1970 and retired from Lockheed Martin in January 2001. I filled this position before and served from 2010 to 2014. You might I say "I'm back in the saddle again" (old Gene Autry song).

If you read our President's Report, you know that we cancelled the annual picnic in September. From my point of view, this means you will not be able to speak face-to-face with our vendors. If you have any questions, I'll be your point of contact for companies like Delta Dental, VSP, Red Rocks, and Kaiser. Contact information is also provided in our web page.

Delta Dental is not charging customers a full month's premium; it will be a 50% reduction in your June and July payment. Some members have already called when they notice the reduction in their premium payment. This is because the COVID - 19 viruses have stopped a lot of patients from visiting their dentist at this time.

The good news is that Delta Dental will not be raising rates for this year's renewal. Remember renewal will begin September 1, 2020. Please review your dental policy to see if you want to make any changes.



Membership Report

By Carl Kaminski
(carlcolo@centurylink.net)

Membership Report

By Carl Kaminski
(carlcolo@centurylink.net)

MEMBERSHIP STATISTICS

As of July 1, 2020, there are 1,277 MARS Associates members, including 676 seniors.

Please welcome the following new members:

Colorado

Arvada	Stuart & Elizabeth Marlatt
Castle Rock	Rafaelina Velasquez & Joseph Bohaczyk
Centennial	John & Jan Johnson
Littleton	William & Debra Edwards, Darrel & Susan Lamb, Barry & Barbara Mathias, Sandra Mossman, Randy & Theresa Regenold
Parker	Ty Meusburger
Pine	Stanley Kennedy & Maureen O'Brien

Other States

California

Redwood City Raymond & Carrie Bell

Facilitate Digital Communications

Over the past few months as the COVID situation progressed, we sent out several emails to maintain communications with our membership. In some cases, the emails 'bounced back' due to spam filters. Please enable any email filters to allow the receipt of email from marsretirees@marsretirees.org. We try to keep these emails to a minimum but believe that under the current circumstances it's an important mechanism for staying in touch. This will also facilitate the transition to soft copy of the MARS Star in October as Dick Sosnay described in the President's Corner article above.

NEW MEMBERS

Do you know someone who recently retired from LM or ULA? First year membership in MARS is free for 2020. Direct them to the website for more information or have them contact one of the Officers or Directors.

Change of email address or phone number?

Given the rapidly changing environment we are all dealing with, it's more important than ever that we have current email and phone information for our members. Please remember to include the MARS membership team in your list of people to notify when you have a new phone number or email. We want to make sure all communications are timely.

In Memoriam

By Norma Emerson
(emer801@msn.com)

Please contact me at the above email address or at 303-646-1137 with information about the passing of a member, the spouse of a member or other MM/LM retirees so they can be acknowledged in the In Memoriam section.

MARS Associates expresses our deepest sympathy in the loss of your loved one, and a donation will be made to a charity chosen by the Officers and Board of Directors in their memory.

Members:

Bigelow, Joyce (D: April 2020)
(Survived by John Bigelow)
Highlands Ranch, CO
<https://tinyurl.com/y7lrhtow>

Blacklock, Kate (D: November 2019)
(Survived by Norbert Paredes)
Littleton, CO
<https://tinyurl.com/y7qqnzoy>

Brown, Betty (D: March 2020)
Wheat Ridge, CO
No obituary published

Brown, Howard (D: June 2020)
(Survived by Gilda Brown)
Albany, TX
<https://tinyurl.com/yb9okaac>

Cole, Clarence (D: December 2019)
(Survived by Ruth Cole)
Broomfield, CO
<https://tinyurl.com/ya2ccgtf>

Gaughen, Pat (D: Jan 2017)
(Survived by Michael Gaughen)
Santa Maria, CA
<https://tinyurl.com/s5scrhv6>

Gilmore, Patricia Ann (D: May 2020)
(Survived by Dennis Gilmore)
Castle Pines, CO
<https://tinyurl.com/y84hh2e2>

Harder, Doris (D: February 2019)
(Survived by Dean Harder)
Littleton, CO
<https://tinyurl.com/ra4rxfb>

Hinds, Barbara (D: March 2018)
(Survived by Gary Hinds)
Colorado Springs, CO
<https://tinyurl.com/ybegzef8>

Keeley, Joseph "Joe" (D: April 2020)
Wheat Ridge, CO
<https://tinyurl.com/y7mu9uxu>

Kingery, Robert "Karl" (D: April 2020)
(Survived by Mary Lou Kingery)
Littleton, CO
<https://tinyurl.com/y8uc7mew>

Lillibridge, Kathryn (D: February 2018)
Littleton, CO
No obituary published

Lillibridge, Marvin (D: July 2019)
Littleton, CO
<https://tinyurl.com/y7c6w6t4>

Lundgren, Sue (D: January 2020)
Golden, CO
<https://tinyurl.com/y8enswov>

Major, Denise (D: April 2020)
(Survived by Art Major)
Aurora, CO
<https://tinyurl.com/uechx6f>

Massey, June (D: April 2020)
(Survived by Vernon Dale Massey)
Littleton, CO
<https://tinyurl.com/yc6ruvqs>

Moses, Lewis "Lew" (D: November 2019)
(Survived by Meta Moses)
Littleton, CO
<https://tinyurl.com/yblz22aw>

Phillips, John M. (D: December 2019)
(Survived by Betty Phillips)

Lakewood, CO
No obituary published

Podrasky, George (D: April 2020)
(Survived by Eva Podrasky)
Aurora, CO
<https://tinyurl.com/y7f4sskq>

Porter, Ralph (D: April 2020)
Lakewood, CO
No obituary published

Russak, Sidney "Sid" (D: October 2019)
(Survived by Caryl Russak)
Centennial, CO
<https://tinyurl.com/yakvvhb8>

Shirley, Twila Fern (D: April 2020)
(Survived by Clarence "Gene" Shirley)
Denver, CO
<https://tinyurl.com/y8ccohxk>

Spletstoser, Larry (D: April 2020)
(Survived by Carol Spletstoser)
Castle Rock, CO
<https://tinyurl.com/ya9u7x8w>

Thomas, Marilyn "Mickey" (D: June 2020)
(Survived by Robert "Bob" Thomas)
Lakewood, CO
<https://tinyurl.com/yddy348m>

Wesolek, Sylvia "June" (D: October 2019)
Littleton, CO
<https://tinyurl.com/rzboxzs>

Wesolek, John (D: October 2019)
Littleton, CO
<https://tinyurl.com/vhqegyl>

Wiltshire, Raymond S. (D: March 2020)
(Survived by Norma Wiltshire)
Loveland, OH
<https://tinyurl.com/y6wavexw>

Wood, George Ken (D: April 2020)
Lakewood, CO
<https://tinyurl.com/ybgzp74f>

Wood, Patricia (D: April 2020)
Lakewood, CO
No obituary published

Non Members

Amass, William "Bill" (D: March 2020)
(Survived by Lorie Amass)
Flathead Lake, MT
<https://tinyurl.com/y9j2a2j3>

Barkauskas, Anthony (D: May 2020)
Denver, CO
<https://tinyurl.com/y8ofwq9e>

Barkauskas, Dorie (D: March 2020)
Denver, CO
<https://tinyurl.com/yaysym2w>

Harvey, Hubert (D: April 2020)
Littleton, CO
<https://tinyurl.com/y7499z68>

Igelsrud, Iver (D: April 2020)
(Survived by Barbara Igelsrud)
Centennial, CO
<https://tinyurl.com/yc2n74nm>

Koclanes, George Peter (D: April 2020)
Cherry Hills, CO
<https://tinyurl.com/yclqsjtm>

Lain, Christopher (D: February 2020)
Littleton, CO
No obituary published

McClure, Barry (D: June 2020)
(Survived by Margie McClure)
Colorado Springs, CO
<https://tinyurl.com/yat6698s>

Nyland, Frederic "Fred" (D: May 2020)
Golden, CO
<https://tinyurl.com/yasnnpqq>

Pettus, Barbara Ann (D: April 2020)
Littleton, CO
<https://tinyurl.com/yd7p82lh>

Rozycki, Richard "Dick" (D: April 2020)
(Survived by Barbara Rozycki)
Littleton, CO
<https://tinyurl.com/y7qd8r3c>

Solano, Stephen "Steve" (D: June 2020)
(Survived by Marie Solano)
Littleton, CO
<https://tinyurl.com/ycsleesb>

Tiffany, Terry Lee (D: May 2020)
(Survived by Marlene Tiffany)
Strasburg, CO
<https://tinyurl.com/ybqhxk7f>

Warner, Jeff (D: May 29, 2020)
Colorado Springs, CO
No obituary published

Youtman, John (D: April 2020)
Littleton, CO
<https://tinyurl.com/y8zpmxg7>

General Dynamics Pension Underpayment

By Mark Brown
(ruthmark@comcast.net)

If you are part of the group of heritage General Dynamics (GD) employees who transitioned to Denver in 1994, read on. It could earn you a pretty penny.

In 1994, General Dynamics sold its Space Systems Division to Martin Marietta (LM). At that time, the companies agreed that the hundreds of affected employees would receive full pensions; that is, their pensions would be unreduced due to the switch in employers. Both companies would compute the GD portion, which GD would pay, and which LM would subtract from their computed full pension.

The management of the GD pension plan has rolled over several times, currently residing with Fidelity, and in those many transitions the data was corrupted. Employee data – such as dates of employment, marital status, and employment status – may have become inaccurate. In my own case, my Termination Date was in the 1990s when it should have remained "Active" till my retirement from LM, resulting in GD offering me less than $\frac{3}{4}$ of the value I had earned. For a co-worker, her dates were in error resulting in GD paying only half of the value she had earned.

A Fidelity representative admitted that this is a common problem, though none of these organizations will proactively inform these pensioners of the potential problem or correct it for them. Instead, it is the responsibility of individuals, or their heirs, to do so.

The process is simple.

- (1) Call the LM Employee Service Center, 866-562-2363, and request a "detailed pension calculation" of your pension.
- (2) Call Fidelity/GD, 888-432-3633, and request a "back office investigation" of your pension.
- (3) Compare the LM value (Detailed Calculation, page 5, Fort Worth Benefit section, c5) with the GD value (Accrued Benefit).
- (4) If they are different, inform Fidelity/GD of the discrepancy and request both retroactive correction of the underpayment and future correction of pension earnings.

Lastly, if you do go through this process, please write me an email about your experiences. I will be interested to learn what you discovered. It troubles me to think that many of my former GD heritage co-workers, and their heirs, may not be receiving all of their hard earned pensions.



Volunteering with A Little Help

By Nancy Kenry
(Kenrys2@aol.com)

Be a part of something *little*.

A Little Help is a community organization empowering older adults to age well in their homes while engaging the community. They connect elders with resources as they navigate the unknowns of aging and help facilitate a variety of services through access to volunteering neighbors and local service providers. The goal of A Little Help is to conveniently create multigenerational connections.

During this challenging time, A Little Help has supported older adults to stay safely in their homes by connecting them with volunteers who help with grocery shopping, prescription pick-up, and other essentials with doorstep delivery, while also conducting regular Care Calls and delivering Little Kindness Kits. If you would like to pitch in to support A Little Help's community response efforts, they are accepting neighborhood volunteers, who are background-checked, pre-screened, and trained. And if you need a little help during this time, A Little Help is also bringing on new members who need access to essential errands.



A Little Help Picnic

Are you newly retired and looking for a volunteer opportunity? Please consider A Little Help. They provide services to older adults who want to remain in their homes. The volunteer program is simple and flexible. If you can help, just say yes to a request. It's up to you when you can volunteer to provide a service.



A Little Help Senior Volunteer



A Little Help Teenage Volunteer

And as in-person requests become safer in the future, consider volunteering to give a ride to someone who needs transportation to the doctor, grocery store or to a social event. Or can you give computer help or do simple household tasks, such as climb a ladder to change a light bulb or install a new faucet washer? A friendly visit is always welcome. Service Saturdays provide opportunities to join a group (kids too) to rake leaves, trim shrubs, pull weeds or wash windows.



A Little Help Service Saturday

Are you an older person who has recently retired from driving? Transportation is the most requested service A Little Help provides. While A Little Help is currently only providing limited transportation to health-related appointments with strict safety protocols, they will be providing rides as it becomes safe in the future. Do you need assistance with simple chores around your home and yard or have questions about your cell phone or computer? With just a phone call, A Little Help can connect you to background-checked local volunteers, who are currently providing outdoor chores and will resume indoor help in the coming months. Living alone can be isolating. Check out the social events and "Tough Talks" on topics of interest to older adults, which are now virtual. This information is available in the monthly newsletter.

I became involved in A Little Help when I noticed that they were expanding in my neighborhood. I no longer drive because of poor vision and need transportation services. I also volunteer to publicize and grow the organization by helping to plan social activities. I post information in NextDoor, carry brochures in my purse and give them out to friends, doctors, recreation centers—anyplace that might attract members and volunteers.

My very personal involvement occurred last summer (2019). I had a total knee replacement and then twelve sessions of physical therapy over seven weeks. Through A Little Help, I was able to meet all twelve appointments. The volunteers are friendly, caring people and many have become my friends.

Please consider A Little Help either as a member to receive services, as a volunteer, or as a donor to support this mission.

To learn more or sign up, visit the website at www.alittlehelp.org under "Get Involved" or call 720 242-9032.

Or contact me, Nancy Kenry at 303 800-3810 or Kenrys2@aol.com. I'll be happy to answer your questions.

Historian's Corner

By Barb Sande
MARS Facebook Page Historian
(barbsande@comcast.net)

ANNOUNCEMENT: MARK YOUR CALENDARS!!! The Titan Panel Discussion in honor of the 15th anniversary of the end of the program has been scheduled for Thursday, October 15 from 1:00 to 3:00 pm MDT via a Zoom teleconference (virtual panel). There are ten volunteers currently enlisted to participate in the panel, including Norm Fox, Bob Hansen, Ken Zitek, Ralph Mueller, Larry Perkins, Dave Giere, Dennis Brown, Jack Kimpton, Fred Luhmann, and Samuel Lukens. If you want to call into the panel discussion to hear the roundtable, please RSVP to me at the email above (emails only for RSVP, no phone calls). There are limitations to Zoom attendance for meetings. The details of the meeting will be emailed to the attendees at a later date (Zoom link).

Program Profile

This 2020 Q3 issue profiles the Hubble Space Telescope (HST) in honor of its 30th anniversary in orbit. For the MARS STAR in Q4, please come back to explore the "successful failure" that was the Apollo 13 mission.

Mission Overview and Introduction

On April 24, 2020, NASA, the European Space Agency, the Space Telescope Science Institute (STScI), astronomers and space science organizations around the world, and enthusiastic public supporters in many nations gathered on-line to celebrate thirty years of operations for the extraordinary Hubble Space Telescope. HST has changed our view of the universe in so many ways through its various instruments, scientific discoveries, and beautiful imaging. HST is a resounding success and may eventually celebrate a total of 40 or even 50 years in operation. HST is also the only Space Telescope deployed so far that was maintained and repaired on-orbit; this capability was, unfortunately, lost with the end of the Space Shuttle program in 2011 (more on the servicing missions later in this article). In 2017, there were talks about using Dream Chaser, the commercial crew vehicle built by Sierra Nevada, in a possible servicing mission to HST. However, no follow-on plans have been developed.

Hubble Space Telescope Mission

- Launched: 04/24/1990 12:33:51 UTC
- STS-31 (Discovery) LC-39B KSC
- Deployed 04/25/1990
- HST in-service date 05/20/1990
- Crew: Loren Shriver, Charles Bolden, Bruce McCandless, Steven Hawley and Kathryn Sullivan
- STS-31 landed 04/29/1990 Edwards AFB

HST Orbital parameters:

- Low Earth Orbit (roughly circular orbit)
- Perigee: 537.0 km (333.7 miles)
- Apogee: 540.9 km (336.1 miles)
- Inclination: 28.47 degrees
- Period: 95.42 minutes

HST Mission:

- On-going optical (near-infrared to UV wavelength) astronomical observations of the universe
- End of HST mission estimated to be 2030-2040
- Estimated costs of the HST program (including replacement instruments and five servicing missions) = ~ \$10 billion – does not include on-going science

Connection to Lockheed Martin:

- Lockheed Sunnyvale built and integrated the main HST spacecraft and systems
- Martin Marietta/Lockheed Martin provided six external tanks and associated subsystems for the shuttle launches supporting the HST program.



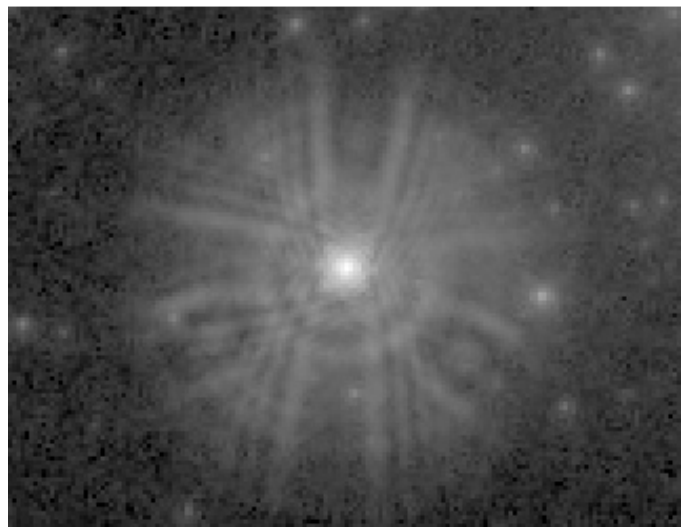
HST 30th Anniversary Image: The Cosmic Reef
Image Credit: NASA, ESA and STScI

Development, Launch, Deployment, Disaster

Orbiting space telescopes have long been in the plans and dreams of astronomers and NASA and much earlier versions included the Orbiting Astronomical Observatories (OAO-1 and OAO-2). The concept of a Large Space Telescope with a 3-meter (9 feet, 11 inch) mirror was pursued and developed in the 1970s, with contracts going to Lockheed for the Spacecraft and Perkin-Elmer for the critical Optical Telescope Assembly in 1983. Initial budget constraints then limited the primary mirror to 2.4 meters (7 feet, 10 inches). A decision was made to name the Large Space Telescope

after Edwin Hubble, an American astronomer who discovered the expanding universe and formulated Hubble's constant or law - a roughly linear relationship between the distances of galaxies and their radial velocities that is used to measure the age of the universe. Spacecraft systems and integration would be managed by Marshall Space Flight Center (MSFC) and the instruments would be under the purview of Goddard Space Flight Center (GSFC), which also manages ground control operations for the STScI. The ESA would also participate as a partner in the HST program. Delays and overruns occurred, but the HST was finally ready for possible launch in October, 1986. Sadly, the Challenger accident required the launch to be postponed for several years, necessitating storing the completed spacecraft. HST finally made the shuttle manifest on Discovery in 1990 (see launch details in the overview).

Within a few weeks of deployment of HST, astronomers were aghast to realize that, although the initial images were sharper in most respects than ground-based telescopes, the telescope failed to achieve a final sharp focus (see image below for an example) and the Point Spread Function was over a radius of more than 1 arcsecond, when the requirements were 0.1 arcseconds or less. An investigation revealed that the primary mirror had been polished into the wrong shape, resulting in severe spherical aberration. Observations were still possible with bright point sources and ground image reprocessing, but the HST was declared by the public and media to be a disaster. It became the target of jokes on late night shows and in comedy movies. If you have seen "Naked Gun 2 ½: The Smell of Fear", this screwball comedy displays a photo of HST along with other disasters (Lusitania, Edsel, Hindenburg) in a bar scene.



Star Image from HST showing Spherical Aberration Effects
Image Credit: NASA, ESA, STScI

The causal investigation, led by Lew Allen from JPL, revealed that a reflective null corrector test tool at Perkin-Elmer was incorrectly assembled, resulting in the critical fine grind of the mirror being done precisely, but in an incorrect shape. Testing with conventional null correctors noted the spherical aberration, but those results were dismissed. A system-level optical test at Lockheed was also canceled due to schedule constraints. NASA considered options such as retrieving the telescope and returning it to Earth and replacing the Perkin-Elmer Optical Telescope Assembly with a back-up built by Kodak, but that was considered prohibitively expensive and difficult.

Design Solution, First Servicing Mission, Success

The ultimate design solution for eliminating the spherical aberration was brilliant and used two instruments for replacement on HST on the first servicing mission. In essence, the Wide Field and Planetary Camera 2 design was modified to include an inverse error of the spherical aberration in the relay mirrors directing light onto four Charge-Coupled Device (CCD) chips. The Corrective Optics Space Telescope Axial Replacement (COSTAR) instrument corrected the error for three other on-board instruments (the Faint Object Camera, Faint Object Spectrograph and the Goddard High Resolution Spectrograph). The COSTAR placement required the sacrifice of the High Speed Photometer instrument. On future missions, all other instruments would be replaced with upgraded versions with optical corrections thus eliminating the need for COSTAR after all the upgrades were completed.

Because of the optical aberration, the first servicing mission became a higher priority and would require specialized training to do the instrument replacements and integration. STS-61 (Endeavour) was launched on December 2, 1993 from LC-39B and had a crew of seven veteran astronauts (Richard Covey, Ken Bowersox, Kathryn Thornton, Claude Nicollier (ESA), Jeffrey Hoffman, Story Musgrave, and Thomas Akers). After capturing HST on the second day in orbit with the robotic arm, the remaining eight days of the mission required five long EVAs to do the instrument swaps, perform other HST maintenance, including solar array replacements, and complete system checks. The orbit of HST was also boosted. Endeavour landed at KSC after a very successful and complex mission on December 23, 1993.

The resulting HST images, after the first servicing mission, were extremely sharp and the success of the design solutions and the mission was lauded by the astronomical community. Now the large orbiting telescope was truly functional and the scientific discoveries began in earnest. Later in this article, a

top-level overview of the HST science projects and discoveries will be explored.

Summaries of HST Servicing Missions 2, 3A, 3B, 4

Four more servicing missions were performed for HST before the shuttle program ended. These missions are summarized below.

HST Servicing Mission 2

Launched: 02/11/1997 08:55:17 UTC

STS-82 (Discovery) LC-39A KSC

Crew: Ken Bowersox, Scott Horowitz, Joseph Tanner, Steven Hawley, Gregory Harbaugh, Mark Lee, Steven Smith

- Five lengthy EVAs required
- Goddard High Resolution Spectrograph (GHRS) replaced with Space Telescope Imaging Spectrograph (STIS)
- Faint Object Spectrograph (FOS) replaced with Near Infrared Camera and Multi-Object Spectrometer (NICMOS)
- Other maintenance and replacements were performed (Fine Guidance Sensor, Solid State Recorder, Reaction Wheel Assembly, insulation repair, orbit boost)

Landed 02/21/1997 at KSC

HST Servicing Mission 3A

Launched: 12/20/1999 00:50:00 UTC

STS-103 (Discovery) LC-39A KSC

Crew: Curtis Brown, Scott Kelly, John Grunsfeld, Jean-Francois Clervoy (ESA), Michael Foale, Steven Smith, Claude Lecollier (ESA)

- Mission moved up to 1999 after three of six gyroscopes failed on HST (3B mission split out)
- Three lengthy EVAs required
- All six gyroscopes replaced
- Fine Guidance Sensor replaced
- HST main instrument computer replaced (new computer was 20 times faster and had six times the memory size as the original unit)
- Other maintenance performed (Voltage and Temperature improvement kit installed, new S-Band transmitter installed, outer insulation replaced, spare solid state recorder)

Landed 12/28/1999 at KSC

HST Servicing Mission 3B

Launched: 03/01/2002 11:22:02 UTC

STS-109 (Columbia) LC-39A KSC

Crew: Scott Altman, Duane Carey, John Grunsfeld, Nancy Currie, Richard Linnahan, James Newman, Michael Massimino

- 3B mission split out from more urgent 3A mission in 1999
- Five lengthy EVAs required

- Advanced Camera for Surveys (ACS) installed
- New rigid solar arrays installed
- New Power Control Unit (PCU) installed
- Cryocooler installed to return NICMOS instrument to service
- Other routine maintenance performed on HST
- Last successful flight of Columbia, which disintegrated on re-entry on February 1, 2003

Landed 03/12/2002 at KSC

HST Servicing Mission 4

Launched: 05/24/2009 18:01:56 UTC

STS-125 (Atlantis) LC-39A KSC

Crew: Scott Altman, Gregory Johnson, Michael Good, Megan McArthur, John Grunsfeld, Michael Massimino, Andrew Feustel

- Mission originally planned for 2005, canceled by NASA Administrator after Columbia failure
- Lengthy political and scientific community negotiations resulted in the agreement to do the servicing mission in 2008 or 2009
- Five lengthy EVAs required
- Cosmic Origins Spectrograph installed
- Wide Field Camera 3 installed
- Removed COSTAR
- Advanced Camera for Surveys repaired
- Space Telescope Imaging Spectrograph repaired
- Soft-Capture mechanism installed for eventual safe de-orbiting
- All six gyroscopes replaced again
- Fine Guidance Sensors replaced again
- Other critical maintenance of spacecraft and instruments performed to allow operations for several more years
- IMAX camera included on the mission (movie: *IMAX: Hubble 3D*)
- Last solo (Non-ISS) flight of Atlantis

Landed 05/24/2009 at Edwards Air Force Base

NOTE: I was thrilled to be a team member on an independent Mission Success review of the safety requirements and mission objectives for HST Servicing Mission 4 at the Lockheed Martin facility supporting GSFC in Greenbelt, Maryland, so I have a little bit of personal interaction with the HST mission!

Technical Description of HST Optics, Current Instruments, Spacecraft Systems

Be prepared, class – this section is rather dry, but crucial to understanding the full history of HST. HST is a Cassegrain Reflector telescope of the Richey-Chrétien design. This means that the telescope functions with a hyperbolic primary mirror (2.4 meter or 7.8 feet) reflecting off a hyperbolic secondary mirror (0.3 meter or 12 inches) to minimize the off-axis errors (coma) found in parabolic mirror systems. Most large ground-

based optical telescopes are of this design. The mirrors are made with a special glass coated with aluminum and a compound that reflects ultraviolet light. HST operates from near-infrared to ultraviolet light frequencies, which led to the very precise polishing requirement of 10 nanometers (the aberration error was in the perimeter of the primary mirror, which was too flat by only 2200 nanometers or less than the width of a human hair).

Currently, there are four functioning instruments, one instrument in hibernation (NICMOS) and three fine guidance sensors used in HST positioning and observing. All of the current instruments have corrective optics to eliminate the spherical aberration of the primary mirror:

Advanced Camera for Surveys (ACS): This is a third-generation axial instrument designed by a team at Johns-Hopkins University and assembled and tested at Ball Aerospace and GSFC. The ACS was installed during HSM-3B and repairs were done where possible during HSM-4. ACS has three independent, high-resolution channels covering ultraviolet to near-infrared spectra, a large detector area, and quantum efficiency (incident photon to converted electron sensitivity). The High-Resolution channel has been disabled since 2007, but the Wide Field Channel (WFC) and Solar Blind Channel (SBC) continue to operate. The WFC has two CCDs for a total of 16 megapixels; the SBC is a low-background photon counting device optimized in ultraviolet ranges. The ACS also has 38 filters and dispersers.

Cosmic Origins Spectrograph (COS): This ultraviolet spectrograph is optimized for high sensitivity and spectral resolution of large scale structures in the universe. The COS was installed during HSM-4 and was built and designed by the University of Colorado and Ball Aerospace. The COS has two channels: Far Ultraviolet (90-250 nm wavelengths) and Near Ultraviolet (170-320 nm wavelengths), with a selection of diffraction gratings. Obtaining absorption spectra of interstellar and intergalactic gas forms the basis of the COS science programs.

Wide-Field Camera 3 (WFC3): This is the most technologically advanced instrument on HST that takes images in the visible spectrum. It was installed during HSM-4 and has two independent light paths: A UV and optical channel using CCDs for wavelengths from 200-1000 nm and a near infrared detector array covering wavelengths from 800-1700 nm. The optical channel has a field of view of 2.7 by 2.7 arcseconds; the CCDs are each 2048X4096 pixels. The near infrared channel has a field of view of 135 by 127 arcseconds; this channel is a pathfinder for the James Webb Telescope. WFC3 was built at GSFC and Ball Aerospace.



Infrared image of Horsehead Nebula (in Orion Great Nebula M42) using WFC3 Image credit: NASA, ESA, STScI

Space Telescope Imaging Spectrograph (STIS): This combination spectrograph and imaging camera was designed and built by GSFC. It was installed during HSM-2 and operated until 2004. A lengthy EVA during HSM-4 repaired the instrument, which has now been functional again since 2009. The STIS has three 1024X1024 detector arrays covering spectra wavelengths from 160 nm to 1030 nm (near-UV to near-infrared). Imaging is primarily focused on UV light.

Near Infrared Camera and Multi-Object Spectrometer (NICMOS): This instrument, designed at the University of Arizona and built by Ball Aerospace, is designed to image and perform spectral analyses of infrared wavelengths (0.9 to 2.4 micrometers). The instrument is dormant at this time, but could be utilized again; WFC3 performs some of the same observations. HST is a warm telescope, making true infrared wavelength observations to be limited in their quality. NICMOS was installed during HSM-2 and went into a dormant stage in 2009 after experiencing a start-up anomaly during a software upload in 2008.

Fine Guidance Sensors (FGS): Three FGS on HST are used for pointing the telescope in space and for astrometry (tracking precise movements of stellar bodies). The FGS were built by Perkin-Elmer and have been refurbished and replaced during servicing missions. The FGS are used in conjunction with the six gyroscopes and the main computer to ensure accurate pointing and tracking.

Spacecraft Systems: HST is operated from the ground and has four high-gain communications antennas, two rigid solar arrays (provided by ESA), parallel main computers (instrument processing and pointing

control/system functions), thermal protection, solid state recorders, instrument microprocessors, batteries, and a sun filter door that can be opened or closed on the telescope depending on orientation and exclusion zones. The computers were upgraded from DF-224 and NSSC-1 designs to 25 Mhz-Intel based 80486 processors during HSM-3A.



General Layout of HST Image Credit: NASA, ESA

Major Projects and Scientific Results

STScI is responsible for the scientific operation of the telescope and delivery of data products. STScI is located in Baltimore, Maryland on the campus of Johns Hopkins University. The European Space Astronomy Centre helps coordinate observation times for European astronomers. GSFC supports the STScI on a 24/7 basis.

Scheduling time on the telescope is very complex. Many astronomical targets are occulted, or not visible, during half the orbit of HST (in a low-earth orbit). Observations cannot take place when HST is passing through the South Atlantic Anomaly zone. There are sizeable exclusion zones for the Sun, Moon and Earth (the requirement is that no direct sunlight is allowed on any part of the OTA). Earth and Moon avoidance keep bright lights out of the Fine Guidance Sensors; they can be observed if those sensors are turned off. There is a Continuous Viewing Zone at roughly 90 degrees to the plan of Hubble's orbit, which minimizes occultation delays depending on the observation requested. Proposals for observations are solicited each year (HST is on a yearly observation "cycle" schedule) and several amateur astronomers have successfully submitted proposals that resulted in unique observations and discoveries.

The important discoveries from HST include:

- 1) Age of the universe: The Hubble constant was constrained using accurately measured distances to Cepheid variable stars, resulting in an estimated age of 13.7 billion years (+/- 10%).
- 2) Expansion of the universe: Observations of distant supernovae from the High-z Supernova

Search Team and the Supernova Cosmology Project resulted in the surprising discovery that expansion of the universe is accelerating. Two Nobel prizes were awarded for these discoveries. The acceleration is most likely caused by dark energy (or is it? Dark energy is still controversial).

- 3) Black holes: Observations established the prevalence of black holes in the center of nearby galaxies and concluded that black holes are probably common to all galactic structures. The masses of the black holes and the properties of the galaxies are closely related.
- 4) Deep Field investigations: Discoveries of the most far-flung objects in our universe were done in the Deep Field, Ultra Deep Field and Extreme Deep Field observations. Images reveal galaxies billions of light years away, including GN-z11, which is estimated to be 13.4 billion light years away, only 400 million years after the Big Bang. Gravitational lensing resulting from nearer objects have also expanded the deep-field observations. Just recently, another deep field investigation looking for first-generation stars did not find them, pushing back the timeline for the evolution of the Universe (galaxies formed even earlier than previously thought).
- 5) Solar System discoveries: HST has observed Pluto and Eris and found five new Kuiper Belt objects for the New Horizons mission to select from for its fly-by in 2019. HST was able to image the collision of Comet Shoemaker-Levy with Jupiter in 1994 after HSM-2 restored the sharp optics. HST also discovered that Ganymede, the largest moon in the Solar System in orbit around Jupiter, has a subsurface ocean (based on observations of the aurorae of the moon).
- 6) Other observations: HST has helped determine the mass of the Milky Way galaxy (1.5 trillion solar units, with a radius of 129,000 light years), found evidence for extrasolar planets, observed optical counterparts of gamma-ray bursts, and used observations of a reappearing supernova to characterize dark matter distribution.
- 7) New projects: Other new HST projects include the Cosmic Assembly Near-Infrared Extragalactic Legacy Survey, the Frontier Fields program, and the Cosmic Evolution Survey. These surveys rely on deep-field observations and gravitational lensing to see the faintest galaxies in the distant universe.

HST observations have resulted in over 15,000 papers in peer-reviewed journals and thousands of citations. Ground-based telescopes, at much cheaper costs, have

exceeded many of HST capabilities, but some observations were only possible with a space-based platform. The orbit of HST will eventually decay, probably between 2028 and 2040. A soft-capture mechanism was installed to provide for assist by another servicing mission (robotic or human) to allow for controlled re-entry. HST will be replaced by the problematic James Webb Telescope, which has seen many years of delays and cost overruns and will not launch any earlier than March 2021. The amazing legacy of HST is firmly established, however, and it is one of the most popular programs that NASA has sponsored. Take a look at this recent ultra-deep space image, taken using the ACS and WFC3 in 2014, and ponder how vast our universe is and how HST has redefined our place in the cosmos.



Ultra Deep Field using ACS and WFC3 2014
Image Credit: NASA, ESA, STScI

References for HST Article

NASA Hubblesite: <https://hubblesite.org>

Space Telescope Science Institute (STScI):

<https://www.stsci.edu/>

Hubble History Timeline:

<https://www.nasa.gov/content/goddard/hubble-history-timeline>

Wikipedia (HSM missions and mission overview)

https://en.wikipedia.org/wiki/Hubble_Space_Telescope

On This Date in History

This section has milestones retrieved from publicly available information for LM, ULA and heritage programs from 10 to 60 years ago (2010, 2000, 1990, 1980, 1970, and 1960). Delta launches prior to the

formation of ULA, unless it included an LM or heritage company payload or upper stage, are not listed. No classified programs are identified, even if the program is now considered unclassified. The events reflect milestone activity in the quarter previous to the release of the MARS STAR -- where appropriate, key press releases are also included; significant milestones are in bold. There will be gaps if no events occurred in that decadal year for that month (no events April 2000, April 1980, May 1990, May 1970, June 2010, and June 1970). The list is not intended to be all-inclusive due to historical record inaccuracies.

Events in April (10 to 60 years ago)

- 04/05/2010: STS-131 (Discovery) launched, LC-39A, KSC; Leonardo ISS module, seven astronauts
- 04/01/2010: Lockheed Martin Press Release: World's First Weather Satellite Launched 50 years ago today and Lockheed Martin has been Involved from the very Beginning
- **04/13/2010: Lockheed Martin Press Release: Space Foundation Honors Hubble Servicing Mission Team that Extended Life of the Orbiting Observatory**
- 04/14/2010: Lockheed Martin Press Release: Lockheed Martin Completes Work on First U.S. Air Force Advanced EHF Satellite
- **04/22/2010: USA-212 (X-37B) launched by ULA Atlas V-501, LC-41, CCAFS. Maiden flight of Atlas V 501 and X-37B**
- 04/11/1990: USA-56,-57,-58 launched by GD Atlas E/Altair 3-E, SLC-3W, VAFB
- **04/25/1990: LM Hubble Space Telescope launched by STS-31 (Discovery); six astronauts**
- 04/26/1980: Navstar 6 launched by GD Atlas E/F-SGS-1, SLC-3E, VAFB
- **04/11/1970: Apollo 13 launched by Saturn V (C-5), LC-39A, KSC; successful failure – crew performed lunar free return after explosion in Service Module. This mission will be profiled in the Q4 2020 MARS STAR.**
- **04/01/1960: RCA Tiros-1 launched by Thor DM-18 Able II, LC-17A, CCAFS; partial failure before design life in orbit – first weather satellite**
- 04/08/1960: GD SM-65D Atlas launched, LC-11 CCAFS; launch failure
- 04/08/1960: MM HGM-30A Titan I launched, LC-16, CCAFS
- 04/15/1960: Discover 11 launched by Thor DM-18 LM Agena-A, LC-75-3-5
- 04/18/1960: Lockheed UGM-27 Polaris A1 launched, USNS Observation Island, ETR; launch failure
- 04/21/1960: MM HGM-30A Titan I launched, LC-15, CCAFS

- 04/22/1960: GD SM-65D Atlas launched, LC-576B-2, VAFB
- 04/26/1960: Lockheed UGM-27 Polaris A1 launched, LC-29A, CCAFS
- 04/28/1960: MM HGM-30A Titan I launched, LC-16, CCAFS
- 04/29/1960: Lockheed UGM-27 Polaris A1 launched, LC-29A, CCAFS
- 04/30/1960: Lockheed UGM-27 Polaris A1 launched, LC-25A, CCAFS

Events in May (10 to 60 years ago)

- 05/06/2010: Lockheed Martin Press Release: NASA, Lockheed Martin Team Launch Orion Crew Safety to New Heights (Orion abort test)
- 05/14/2010: STS-132 (Atlantis) launched, LC-39Am KSC; Rassvet ISS module, six astronauts.
- 05/28/2010: GPS IIF launched by Delta IV-M+ (4,2), LC-27B, CCAFS
- 05/03/2000: GOES-11 launched by LM Atlas IIA, LC-36A, CCAFS
- 05/08/2000: DSP-20 launched by LM Titan IVB (402/IUS), LC-40, CCAFS
- 05/19/2000: STS-101 (Atlantis) launched, LC-39A; Spacehab, seven astronauts
- 05/24/2000: Eutelsat W4 launched by LM Atlas IIA, LC-36B, CCAFS
- 05/29/1980: RCA NOAA-B launched by GD Atlas E/F-Star-37S-ISS, SLC-3W, VAFB (launch failure)
- 05/06/1960: GD SM-65D Atlas launched, LC-576B-2, VAFB; launch failure
- 05/13/1960: MM HGM-30A Titan I launched, LC-15, CCAFS
- 05/18/1960: Lockheed UGM-27 Polaris A1 launched, LC-25B, CCAFS
- 05/20/1960: GD Atlas SM-65D launched, LC-12, CCAFS
- 05/23/1960: Lockheed UGM-27 Polaris A1 launched, USNS Observation Island, ETR
- 05/24/1960: Midas-2 launched by GD Atlas LV-31 Lockheed Agena A, LC-14, CCAFS
- 05/27/1960: MM HGM-30A Titan I launched, LC-16, CCAFS

Events in June (10 to 60 years ago)

- 06/30/2000: TDRS-H launched by LM Atlas IIA, LC-36A, CCAFS
- 06/08/1990: USA-59,-60,-61,-62 launched by MM Titan TIV-A (405), LC-41, CCAFS
- 06/23/1990: Intelsat 605 launched by MM Commercial Titan III, LC-40, CCAFS
- 06/18/1980: Classified launch by MM Titan III(23D), SLC-4E, VAFB

- 06/07/1960: Lockheed UGM-27 Polaris A1 launched, LC-25A, CCAFS; launch failure
- 06/11/1960: GD SM-65D Atlas launched, LC-11, CCAFS
- 06/22/1960: GD SM-65D Atlas launched, LC-14, CCAFS
- 06/23/1960: Lockheed UGM-27 Polaris A1 launched, USNS Observation Island, ETR
- 06/23/1960: Lockheed UGM-27 Polaris A1 launched, LC-25B, CCAFS
- 06/24/1960: MM HGM-30A Titan I launched, LC-15, CCAFS
- 06/28/1960: GD SM-65D Atlas launched, LC-12, CCAFS
- 06/29/1960: Discoverer 12 launched by Thor DM-18 Lockheed Agena A, LC-75-3-4, VAFB; launch failure

Reference websites:

<https://nssdc.gsfc.nasa.gov/planetary/chronology.html#2014>
https://en.wikipedia.org/wiki/Timeline_of_spaceflight
<https://www.ulalaunch.com/missions>
<https://news.lockheedmartin.com/news-releases?year=2020>
<https://space.skyrocket.de>
<http://www.astronautix.com>

Next Edition

Check back in the next MARS STAR for a program profile of the Apollo 13 mission! Future editions will include more Apollo missions, the first shuttle launch, and other significant milestones.

Barb Sande, MARS STAR and MARS Facebook Page Historian. Contact me at barbsande@comcast.net or 303-887-8511 or find MARS Associates on Facebook

Bridge Club

By Dave & Kathy Martz
martz20@comcast.net

"Use this time in quarantine to reinvigorate your relationships.

How you might ask?

It starts with forgiveness, rounded out by patience, and crystalized by love."

— Charles F

Glassman

MARS Bridge is currently suspended but we hope to be back soon. Right now, plans are to evaluate the return on a month-to-month basis, until we receive an "all clear" from our many government agencies, the Buck

Center and the willingness of our members to return. Some members are keeping their bridge skills in-tune by playing online with apps like Bridge Base Online at <https://www.bridgebase.com/v3/>.

Meanwhile, we are still accepting requests to join our Club. We meet monthly share the camaraderie and a good game of bridge! All MARS members and their guests are welcome. We play on the **3rd Friday of each month at the Buck Community Recreation Center (Littleton) from 10 AM to 2 PM.** You'll need to pack a lunch, as we stop midday to eat. The club provides the cards and all required items for the games. We also provide coffee, tea, and hot water. There is a small fee for the Buck Center, as well as a small fee to the club (which helps with supplies and the year-end party in December).

We have couples, as well as singles, playing. If you're a single, invite a friend to be your partner, as your partner does not need to be a member of MARS to play.

If you have any questions, please contact any of the following Bridge Club Officers:

Presidents:

Dave & Kathy Martz, 303-683-9524

Vice-President:

Bill Kacena, 303-973-2685

Secretary:

Theodore Bornhoeft, 303-933-9730

There were no 2nd Quarter 2020 winners, since all play was cancelled. We hope to be back playing soon!

Car Club

By Roger Rieger

rrieger10731@gmail.com

303-912-6217

Carol Lovelace

cyberbear51@comcast.net

303-358-7459

Greetings! With all the precautions around the coronavirus, the Car club has essentially gone into hibernation. I've gone to a couple of local shows in the last month (maintaining my social distance and wearing my mask!) and have not been comfortable in the precautions, or lack thereof, taken by people in attendance as well as those showing their cars. With the pending cancellation of the annual MARS picnic, we will be cancelling our car show as well. Man this all sucks! I do hope you have taken this opportunity to make that ride sparkle, or maybe do those updates and

modifications you have been waiting for the right time to do. I look forward to seeing all the changes and updates when we are able to be together again!

As always, the club invites all car enthusiasts to become members, meet other like-minded people, and enjoy and share our love for the automobile. Be safe out there and hope to see you soon on the open road! Keep an eye tuned to the MARS website and Facebook page for our reschedule date! Hope you will be able to join us! We would love to have you join the club and share your beautiful toys!

Dinner Club

By Becky and Gary Englebright
(englebright@earthlink.net)
303-941-3167 (Gary)
303-263-6457 (Becky), and
Anita and Roy Kannady
(anitakannady@yahoo.com)
303-794-9210

There is an English expression "May you live in interesting times"; the Chinese have a curse "Better to be a dog in times of tranquility than a human in times of chaos". Anyway you want to look at it; the last few months have been 'interesting' for the Dining Club. Due to the coronavirus, the luncheons in March, April, May and June were cancelled. Currently the July luncheon at Zest is on schedule. We have our fingers and toes crossed that everything will go as planned. We will continue to keep everyone updated about Zest and future events.

We have luncheons planned through October of this year; see below for the schedule and location. We have not scheduled an event for November because of the coronavirus uncertainty and what we will be allowed to do at that point. We also want to see how the process at Zest works out and how comfortable our members are with the process. When we make a decision, we will let everyone know via email and the MARS website.

We would like to extend a big "Thank You" to everyone for their patience and understanding with the luncheons cancellations. If you're reading this and have not been getting update emails from us, it is probably because we don't have a valid email address for you. To be added to our email list, you can call or email us your email address. See contact information above. Any email information sent to us will be kept in confidence.

The restaurants currently scheduled for the rest of 2020 are as follows:

- August 18th – Hickory House (Parker)
- September 22nd – Red Lobster (Littleton)
- October 13th – Maggiano's Little Italy (Englewood)

We want to encourage anyone who is interested to join us for any of luncheons, but we really encourage you to stay safe and healthy.

Golf League

By Bo Rodriguez
(boandpat@comcast.net)

As I mentioned in the last issue of the MARS STAR, the acute impact of the COVID-19 virus certainly has had a big impact on our golf league this year. Broken Tee Golf Course, where we play our weekly golf league throughout the year, closed down temporarily prior to the start of our league play. In late April, Broken Tee offered our league members two tee times (eight slots) on Thursdays starting on April 30th on a first come first-served basis. Members interested in casual play had to make reservations four days in advance. Social distancing restrictions included but not limited to walking only (no motorized golf carts), pay by credit card only, no entering the clubhouse and no restroom facilities were available. The putting greens and the driving range were closed. We were advised by Broken Tee that the golf course was postponing any organized play until June.

During the month of May and early June, Broken Tee phased in their practice areas and offered restaurant take-out service and limited dine-in services. The use of motorized carts became available although restricted to one player per cart, on June 4th. We began casual individual stroke league play with thirty-six members signed up and nine tee times. Each player was asked to enter their own golf score into the Golf Genius system previously established for our league in order to establish or maintain member handicap scores. On July 2nd, we transitioned from casual individual play to organized league play with thirty-two members participating. Albeit, we are still under some indoor COVID-19 restrictions at Broken Tee, we can now set up and run the events on the clubhouse patio, are able to collect the weekly prize fee from each player, enter their golf scores into Golf Genius, and determine the winners for the event and award the winners their prize money.

Come join us! Although our organized league season has been shortened due to COVID-19, we still have league play through October which will include our

annual two week tournament on August 13th and 20th
If you and/or your spouse are MARS Associates members who enjoys playing golf and would like to join our league, please feel free to contact me at boandpat@comcast.net or at (303) 798-9157.



Allen Sanders models a smile

Hiking Club

By Sue Janssen

(susan.g.janssen@gmail.com)

Stay-at-home and Safer-at-home restrictions limited our group's activities, but club members individually took to the trails in April and May. For April, members reported over 100 miles hiked. Allen Sanders regularly walks 20 miles a week, many along Raccoon Creek. Sue and Tom Pawlowski scoped out the eagles' nest at Marston Reservoir. Sue and Lee Janssen wore a rut in the Highline Canal Trail around deKoevend Park. Ken Ruiz walked the roads in Douglas County and saw very few people. Val Gregory hiked a 5-mile loop along Raccoon creek, Wadsworth, Lilly Gulch, and Kipling. Bob and Linda Berry reported a loop around Johnson Reservoir and also South Valley. I'm sure other members also went for walks near their homes. Getting outside improved our attitudes during this unusual time.

By mid-June pandemic restrictions were relaxing and club members felt comfortable resuming group hikes. We still practiced social distancing and wore masks when near others. Our group of nine met early on 15 June at the trailhead to Bluffs Regional Park. The parking lot was full and there were lots of people – MANY without masks. But our group donned our face coverings and headed out. We hiked a little over three miles around a loop with a stop at an overlook. Although it was predicted to be a hot, 90 degree, day the breeze made it quite pleasant. The grass was still green and lots of wildflowers were in bloom. As we strolled along (wearing our masks or keeping our distance), we caught up with the latest news from one another. When we finished, the group agreed this was a safe approach to group hiking and we would resume our regular monthly hikes.



Bob and Linda Berry model their face coverings



Masks required for our group photo: (front row) Vicky Eberhardt, Val Gregory, Sue McKaig, Pam Alstott, Mike McKaig; (back row) Sue Janssen, Chris Casar, Lee Janssen, Allen Sanders.

I guess we are adding an 11th essential to our packs – face coverings. Stay safe and stay well.

If you wish to join the MARS Hiking Club, contact Sue Janssen at susan.g.janssen@gmail.com who will add you to the club distribution list. Please provide your email address, home phone and cell phone for the roster. The schedule of hikes is posted on the MARS website (<http://www.marsretirees.org/>). Even if you have never gone snowshoeing or hiking you are welcome to join in the fun. Happy trails!

The MARS Associates Website

By Jim Kummer
(jkummer@comcast.net)

The COVID pandemic has interrupted the monthly lunch meetings of the web committee. Social distancing discouraged meeting at all, plus the restaurant at which we normally meet appears to have permanently closed. Everyone has probably heard of ZOOM, the online virtual meeting application. We met once by shared video with ZOOM, and since have simply corresponded by email. We look forward to some future time when we can comfortably resume our monthly meetings in person.

Many events and club activities are also on hold during the COVID pandemic. The MARS website provides members with the latest club status and event planning. We list a monthly Site of the Month for the enjoyment of our members. Below are the most recent for the past quarter.

Apr – Enjoy Viewing these
[Mammal Society Award-Winning Photos](#)

May – Stories and Interesting Topics at
shareably.net

Jun – Interactive Map Tracks Covid Last 14
Days at
heritage.org/data-visualizations/public-health

Your website committee members welcome your suggestions for improvement, and for proposed websites of the month. Email them to me at jkummer@comcast.net. Your website committee members are: Al Butvidas, Bob Knickerbocker, Linda Stearns, Duane "Smitty" Smetana, and Jim Kummer (Webmaster).



Photography Club

By John Chapter
johnchapter@msn.com
303-986-8277

The Retirees Photo Club normally meets in the Littleton Public Library. Our last meeting set for March 12, 2020 was cancelled because of the pandemic. Our meetings normally have about fifteen attendees. **The Littleton library is now closed and there is no scheduled date as when it will be open for group functions.** Normally, before the COVID-19 pandemic we met the second Thursday of the month except for June, July and August where there are no meetings. We have no plans for any meetings in the near future.

We are exploring possible online virtual meetings but we have nothing planned. Thanks and regards, John Chapter, President Retirees Photo Club President

Colorado Springs Lockheed Martin Retiree Group News

By Doug Tomerlin
(dougincs@aol.com)

The Colorado Springs Lockheed Martin Retiree Group is an organization for retirees from any Lockheed Martin division. However, a large percent of our members live in the Colorado Springs area and have retired from divisions located in Colorado Springs. Retirees from heritage companies Philco, Philco-Ford, Ford Aerospace, and Loral are also welcome to join the group. There are no fees to belong to the group. Luncheons are held twice a year, typically including a yearly barbeque and other activities to allow retirees to stay in contact with each other. In addition, information about deaths, services, and other pertinent information is disseminated via email.

Our retiree group has not sponsored any group activities since the last newsletter, due to the COVID-19 pandemic. We are hoping to have a luncheon soon -- after it is safe to do so. If you would like more information about the group or the luncheons, please contact Doug Tomerlin at dougincs@aol.com.

We are all deeply saddened by the passing of fellow retirees:

- Barry McClure, June 8, 2020
- Jeff Warner, May 29, 2020

Cape Canaveral News

By Dick Olson

Olsons5145@aol.com

Luncheons

We haven't had a luncheon since March. It looks like we will resume lunches in July.

July - A real real light turnout for the retiree's lunch today. Present were: Jimmy Weddle, Abe Smith, Larry Gleason and myself. We were able to have all the social distancing we wanted and the four of us had a good visit. None of us knew anyone personally that has had the virus and that's a good thing.

We took a poll, abet a small one, as to having a luncheon next month and decided we would. Maybe a few more brave souls will join us but I don't blame anyone for choosing to stay hunkered down as the virus numbers continue to rise. Hope everyone is in good health and stay safe.

Have a happy Fourth of July,

Recent Obituaries

Ernest "Ernie" Hirschert, 83, passed away Jan. 2nd. Ernie worked in Operations Electrical group as a tech and later as an engineer until he retired. After retirement, he and his wife lived in South America, Turkey, and Europe.

Linda Graves, 80, wife of Materiel Rep Ralph Graves, passed on January 7, 2020.

Ulysses "Brad" Bradshaw, 71, passed away on February 2. Brad worked in repro at the Cape.

Bobbie Wright, 76, wife of Roger Wright passed away on March 7, after a long illness.

Velldean Roberts, wife of Eddie Roberts, passed away March 10 after a long battle with cancer.

Tim Hanrahan, 90, passed away on 18 April. Tim was Aerospace Corporation's head of their Titan III group when formed in 1963, and became their Regional Office Director at the Cape, and retired in 1996.

Anna Cotton, 83, wife of Titan team member Jim Cotton passed away May 1st.

Thomas J. Kunka, Jr., 73, passed on 25 May. Tom Supported the Titan program while in the Air Force and after his retirement he went to work for Martin in the Quality Dept and rose to the position of Quality Manager until his second retirement.

David Halcomb, 64, died on June 17th. David was a Quality Inspector on the Titan team and son of Ron Halcomb who was head of Martin Safety at the Cape at one time.

Gary Hill, 67, passed away on July 5. He worked in procurement and in the warehouse on Titan.

Bob Moyer, 92, passed away on July 8th. Bob worked for Martin in Baltimore before transferring to the Cape as a Project Engineer on the Titan II program.

Martin Marietta Retiree's Club (Vandenberg News)

By Charlie Radaz

fcmjradaz@aol.com

We haven't tried to have meetings with many members' having medical problems and coping with the virus precautions!

Our fine employee and friend to all, Don Buck, passed away a few days ago. He worked communications for all Vandenberg Operations programs.

Better luck next issue!

Lockheed Martin (LM) News

Lockheed Martin's New Contract With DARPA Can Disrupt The Future Of Space

SUNNYVALE, Calif – Apr. 27, 2020 – DARPA has awarded Lockheed Martin (NYSE: LMT) a \$5.8 million contract for the first phase of satellite integration on the Blackjack program.

Lockheed Martin will define and manage interfaces between Blackjack's bus, payload and Pit Boss - its autonomous, space-based command and data processor. Additional scope includes testbed validation of internal and external vehicle interfaces. Program work will primarily be performed in Sunnyvale, CA.

"Lockheed Martin has built and integrated a variety of payload types and sizes for every type of mission and we bring all of that experience to the Blackjack program," said Sarah Reeves, vice president of Missile Defense Programs at Lockheed Martin. "This is an exciting new approach to plug-

n-play design for LEO and we are up for the challenge.”

DARPA’s Blackjack program aims to develop and demonstrate the critical elements for a global high-speed network in low earth orbit (LEO) that provides the Department of Defense with highly connected, autonomous, resilient, and persistent coverage employing multiple payload types and missions. Future phases of Blackjack are expected to include build, test, and launch of a demonstration constellation in 2021-2022.

Jim Taiclet Joins Lockheed Martin as Our New President and CEO

On June 15, we welcomed Jim Taiclet as our new president and CEO. Jim succeeds Marilyn A. Hewson, who has served as chairman, president and CEO since 2014 and president and CEO since 2013. Jim is an experienced chief executive, military veteran and pilot and is widely regarded as one of America’s most successful CEOs. He will continue to serve as a member of the corporation’s board, which he joined in 2018. Marilyn is now executive chairman of the Lockheed Martin board of directors.

For the past couple of years serving on Lockheed Martin’s board of directors, I’ve seen first-hand much of the incredible work across this corporation providing the tools for a strong national defense and advancing scientific progress. So when I was asked to become president and CEO, it was a call-to-service that I had to answer. - *Jim Taiclet, President and CEO*

About Jim Taiclet



Jim served as chairman, president and CEO of American Tower Corporation starting in 2004 and as CEO in 2003. During that time, American Tower grew significantly and increased its market capitalization from approximately \$2 billion to approximately \$100 billion. Jim guided the company's transformation from a primarily U.S. business to a global player in its industry, with significant assets and operations in 19 countries around the world.

Prior to joining American Tower, Taiclet served as president of Allied Signal, subsequently Honeywell Aerospace Services, conducting worldwide aircraft engine and component overhaul and repair, parts sales and distribution, space operations, and technical services. Prior to that he served as vice president, Engine Services at Pratt & Whitney, responsible for both military and commercial jet engine overhaul and repair.

Taiclet began his career as a United States Air Force officer and pilot, where he logged over 5,000 flying hours as an aircraft commander, instructor pilot, and unit chief of Standardization and Evaluation. His rotational assignments included the Joint Staff and Air Staff at the Pentagon, and he served in the Gulf War and among other missions, was a pilot in one of the first transport aircraft deploying U.S. forces into Saudi Arabia during Operation Desert Shield, a Lockheed C-141B Starlifter.

He holds a master’s degree from Princeton University, where he was awarded a Fellowship at the Woodrow Wilson School, and he is a distinguished graduate of the United States Air Force Academy with degrees in engineering and international relations

Mr. Taiclet is a member of the Council on Foreign Relations, the Business Roundtable, and the Business Council. He also serves as a member of the Board of Trustees of Brigham and Women’s Health Care, Inc., Lockheed Martin’s Board of Directors, the U.S.-India Business Council board and the U.S.-India Strategic Partnership Forum board. In August 2015, Mr. Taiclet was appointed to the U.S.-India CEO Forum, and, in October 2018, he was appointed Co-Chair of the U.S.-India CEO Forum by the U.S. Department of Commerce.

About Marillyn Hewson



As president and CEO, Hewson led Lockheed Martin through a period of consistent financial performance and impressive growth during which the corporation's market capitalization increased 280%. During her 37 years at Lockheed Martin, Hewson has held increasingly responsible executive positions with the corporation, including president and chief operating officer and executive vice president of Lockheed Martin's Electronic Systems business area.

In 2019, TIME magazine identified Hewson as one of the "100 Most Influential People in the World," and FORTUNE magazine ranked her No. 1 on its list of "50 Most Powerful Women in Business" for the second year in a row. In 2018, she was named the "CEO of the Year" by Chief Executive magazine, a Top 10 "Businessperson of the Year" by FORTUNE magazine, and one of the "World's 100 Most Powerful Women" by Forbes.

United Launch Alliance News

After crane problem, ULA caps build-up of Atlas 5 rocket for Mars rover launch

United Launch Alliance has completed stacking of the major elements of the Atlas 5 rocket assigned to power NASA's Perseverance rover toward Mars, but the mission's launch date has been pushed back three days to July 20 after teams repaired an issue with a crane in the Atlas 5's assembly building.



The first stage of a United Launch Alliance Atlas 5 rocket, seen here with its RD-180 engine, is lifted into position on a mobile launch platform inside ULA's Vertical Integration Facility at Cape Canaveral Air Force Station. Credit: Kim Shiflett/NASA

NASA said ULA needed the extra time to repair an issue with ground system equipment associated with the Atlas 5 rocket. The issue was a "controller fault" on a crane at Cape Canaveral. ULA uses a crane to hoist rocket components inside the Atlas 5's Vertical Integration Facility, located a quarter-mile south of the Atlas 5's seaside launch pad at Complex 41.

The launch of NASA's Perseverance Mars rover was previously scheduled for July 17, the opening of a 26-day launch window to enable the robotic spacecraft to travel directly on a seven-month journey from Earth to Mars. NASA and ULA recently assessed the performance of the Atlas 5 rocket and the final mass of the spacecraft, engineers determined they could add six days to the launch period to close Aug. 11.

"We're moving the launch over by three days to the 20th," said Thomas Zurbuchen, associate administrator of NASA's science mission directorate. "We, of course, have a long window ahead of us." There's a two-hour launch window available July 20 opening at 9:15 a.m. EDT (1315 GMT), according to NASA.

If the Perseverance mission misses its launch opportunity this year, the next chance to launch the mission won't come until 2022. NASA prioritized the continuation of launch preparations for the Perseverance rover amid the coronavirus pandemic, even as other missions faced delays.

The agency says a two-year delay in the rover's launch would add some \$500 million to the mission's cost, which is already more than \$2 billion.

Stacking of the Atlas 5 rocket — tail number AV-088 — began May 28 with the hoisting of the first stage

vertical on top of the Atlas mobile launch platform inside the VIF.

The Atlas 5 for the Perseverance rover mission will fly in the "541" configuration with four strap-on solid rocket boosters and a 17.7-foot-diameter (5.4-meter) diameter payload fairing. It's the same Atlas 5 configuration used to launch the Curiosity rover in 2011.

The Perseverance rover is based on the Curiosity design, but it features several technology upgrades and a new suite of scientific instruments. One of the prime goals of the Perseverance mission is the collection of rock core samples inside small cigar-shaped tubes for retrieval by a future rover for return to Earth.

ULA completed stacking of the four solid-fueled boosters after raising the first stage inside the rocket's vertical hangar. The solid-fueled motors, already packed with propellant, were manufactured by Aerojet Rocketdyne.

The Atlas 5's Centaur upper stage, which will propel the rover on an escape trajectory away from Earth, was stacked on top of the rocket Wednesday, June 10. The Centaur stage, with a single Aerojet Rocketdyne RL10 engine, was integrated with the Atlas 5's interstage adapter and the lower half of the rocket's payload fairing in a nearby processing facility at Cape Canaveral before its move to the VIF this week.

ULA will roll the Atlas 5 rocket out to pad 41 later this month for a fueling test. ULA performs such fueling demonstrations before launches with limited planetary launch windows to ensure teams can detect and resolve any problems on the rocket before launch day.

The Atlas 5 will return to the VIF after the tanking test for attachment of the Perseverance rover, which will be encapsulated inside the Atlas 5's payload shroud in the coming weeks inside the Payload Hazardous Servicing Facility clean room at the Kennedy Space Center.

The Multi-Mission Radioisotope Thermoelectric Generator, or MMRTG, is the rover's nuclear power source. It will be connected with the rover once the spacecraft is already mounted on top of the Atlas 5 launcher inside the VIF.



The Centaur upper stage, interstage adapter and the lower half of the Atlas 5's payload fairing were installed as a single unit on top of the launch vehicle June 10. Credit: United Launch Alliance

The MMRTG converts heat from the radioactive decay of plutonium into electricity. Provided by the U.S. Department of Energy, the power generator is one of the final items installed on the rover in the final weeks before launch.

The Atlas 5 rocket is the only launch vehicle currently certified by NASA to carry nuclear-powered payloads into space.

After launching this summer, the Perseverance rover is scheduled to land Feb. 18, 2021, on Mars in a region named Jezero crater, the site of a dried-up river delta where scientists hope to find signatures of ancient life.

[Email the author or follow Stephen Clark on Twitter: @StephenClark1.](#)

Page Intentionally Blank

Lunch on Tuesday, August 18th, 2020

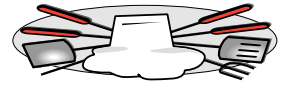
Join your fellow MARS Associates for a wonderful lunch at



Hickory House BBQ

10335 S. Parker Rd., Parker, CO 80134
(see map on back)
303-805-9742

Lunch will be served at Noon.



Featuring a customized Family Style menu of coleslaw, baked beans, garlic toast, BBQ ribs, chicken, beef brisket, pulled pork, desserts and non-alcoholic beverages. Cash bar will be available. (Tax and gratuity included.)

Seating is LIMITED to 60
\$29/person

Please write 1 check per event. We will hold your check until we know if the event will take place. Please indicate on the reservation form below how you would like us to handle your check in case we need to cancellation the event.

Please complete the form shown below and mail it, along with your check, payable to **MARS Associates Dinner Club by August 10th, 2020** to

	<p>Becky and Gary Englebright 7855 S. Vance Ct. Littleton, CO 80128 303-941-3167 or 303-263-6457 englebright@earthlink.net</p>	
---	---	---

If you need to cancel, please let us know no later than August 10th to receive a refund.

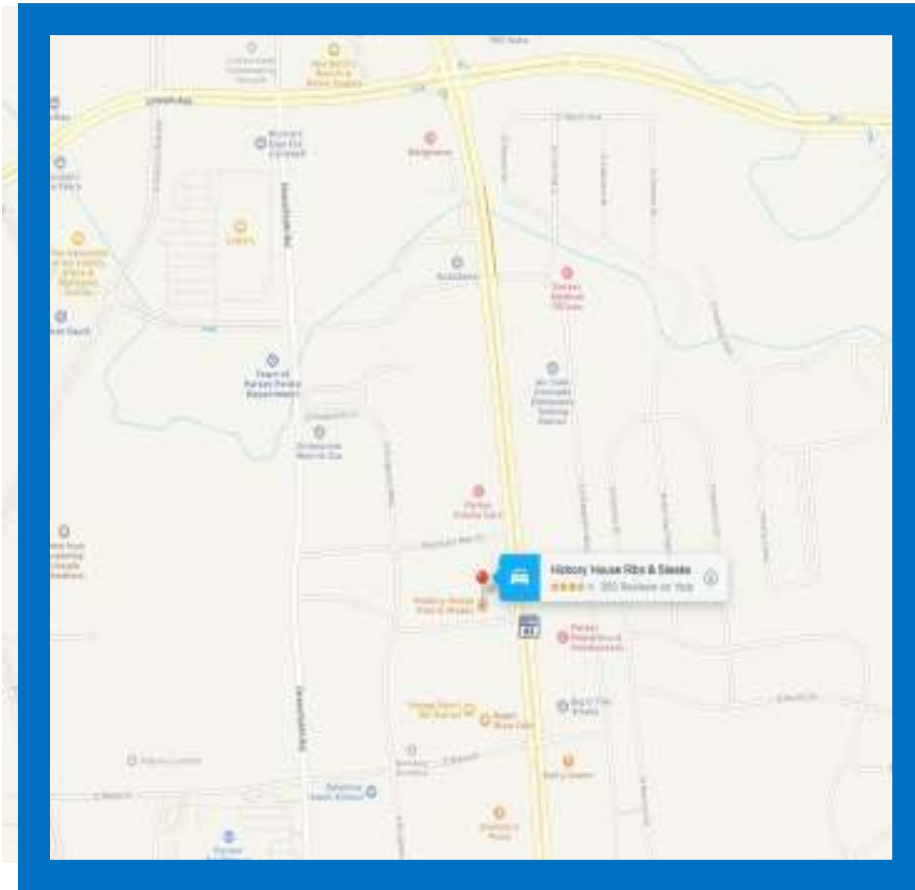
Lunch at Hickory House BBQ on Tuesday, August 18th, 2020

Name(s): _____ Number of Attendees: _____
Address: _____ Amount of Check: \$ _____
City/State/Zip: _____ Check Number: _____
Phone Number: _____ Date: _____
Email: _____

Shred check

Return check

Map to Hickory House BBQ



10335 S. Parker Rd., Parker, CO 80134
303-805-9742

Lunch on Tuesday, September 22th, 2020



in your fellow MARS Associates for a wonderful lunch at

Red Lobster

5656 S. Wadsworth Blvd., Littleton, CO 80123
(see map on back)
303-978-1416



Lunch will be served at Noon.

Featuring a plated lunch including soup or salad, Cheddar Bay biscuits, entree, dessert, coffee and tea. Cash bar will be available for sodas and alcoholic beverages. (Tax and gratuity included.)

Seating is LIMITED to 60
\$26/person

Please write 1 check per event. We will hold your check until we know if the event will take place. Please indicate on the reservation form below how you would like us to handle your check in case we need to cancellation the event.

Please complete the form shown below and mail it, along with your check, payable to **MARS Associates Dinner Club by September 10th, 2020** to

Becky and Gary Englebright
7855 S. Vance Ct.
Littleton, CO 80128
303-941-3167 or 303-263-6457
englebright@earthlink.net




If you need to cancel, please let us know no later than September 13th to receive a refund.

Lunch at Red Lobster on Tuesday, September 22th, 2020

Name(s): _____ **Number of Attendees:** _____

Address: _____ **Amount of Check: \$** _____

City/State/Zip: _____ **Check Number:** _____

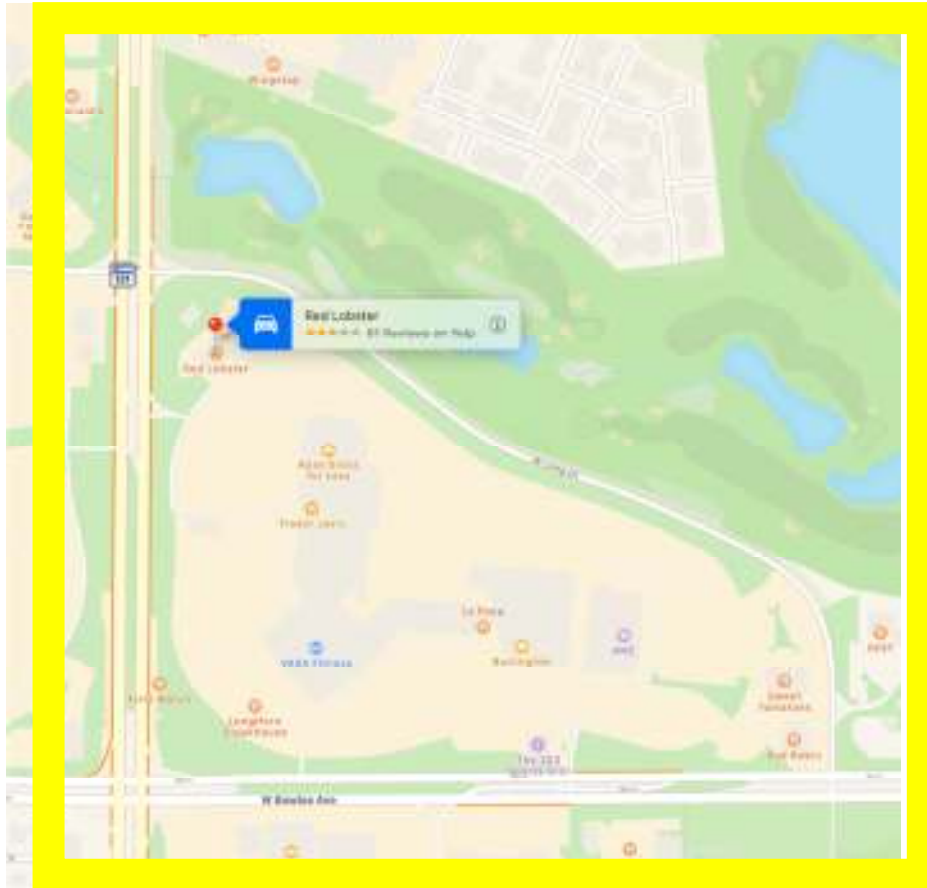
Phone Number: _____ **Date:** _____

Email: _____

Shred check

Return check

Map to Red Lobster



5656 S. Wadsworth Blvd., Littleton, CO 80123
303-978-1416

Lunch on Tuesday, October 13th, 2020

Join your fellow MARS Associates for a wonderful lunch at

Maggiano's Little Italy

7401 S. Clinton St., Englewood, CO 80112
(see map on back)
303-858-1405

Lunch will be served at Noon.

Featuring a customized family-style menu of fresh Ciabatta Rolls, Appetizers, Salad, Entrées, Desserts and non-alcoholic beverages. Cash bar will be available. (Tax and gratuity included.)

**Seating is LIMITED to 60
\$29/person**

If we have reached the seating limit prior to receiving your reservation, we will contact you about putting you on a waiting list.

Please complete the form shown below and mail it, along with your check, payable to **MARS Associates Dinner Club** by **October 5th, 2020** to

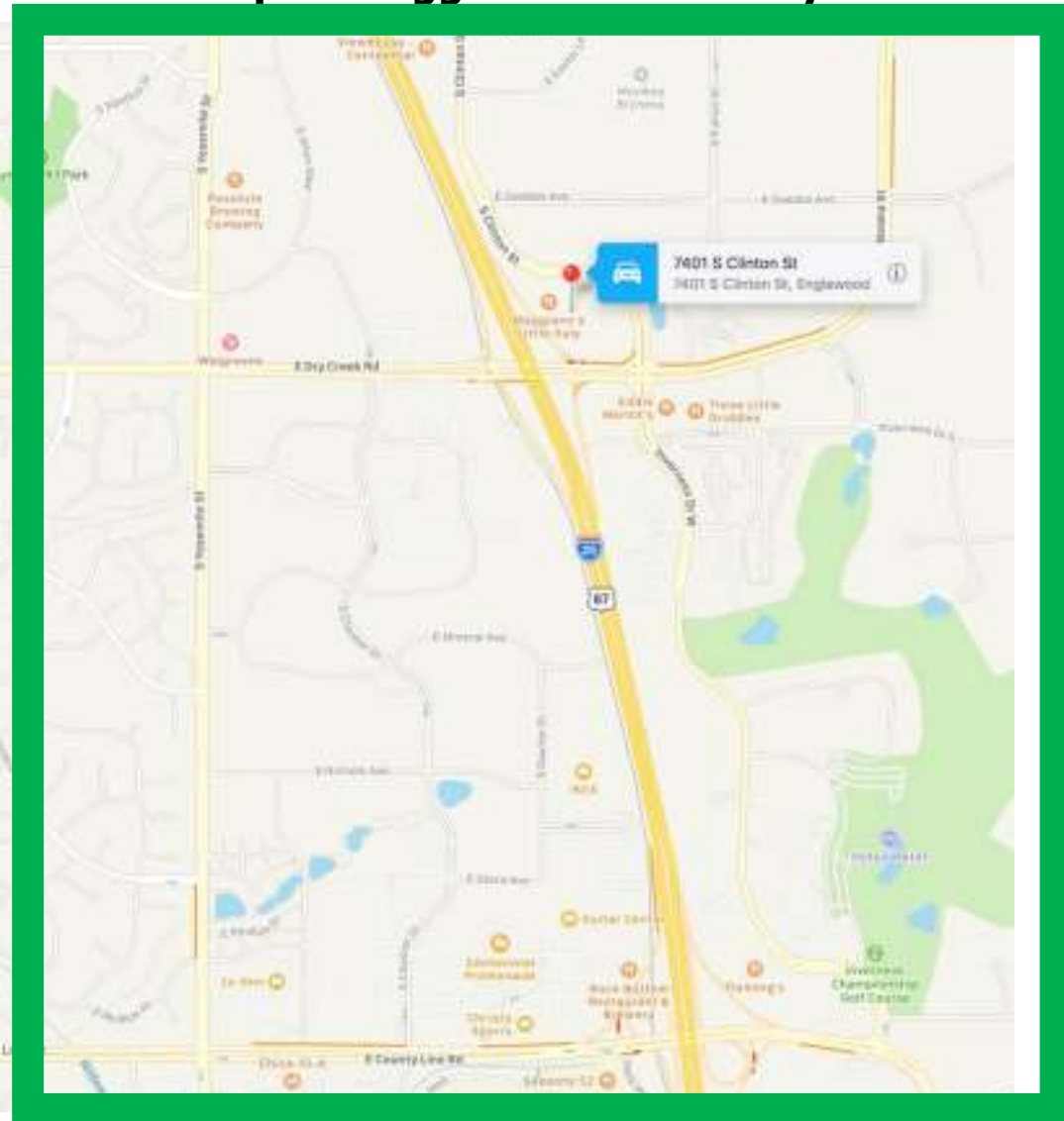
Becky and Gary Englebright
7855 S. Vance Ct.
Littleton, CO 80128
303-941-3167 or 303-263-6457
englebright@earthlink.net

If you need to cancel, please let us know no later than October 5th to receive a refund.

Lunch at Maggiano's on Tuesday, October 13th, 2020

Name(s): _____ Number of Attendees: _____
Address: _____ Amount of Check: \$ _____
City/State/Zip: _____ Check Number: _____
Phone Number: _____ Date: _____
Email: _____

Map to Maggiano's Little Italy



7401 S. Clinton St., Englewood, CO 80112
303-858-1405

MARS STAR is going digital!!

If you wish to receive hard (printed) copies in the future, contact Carl Kaminski at 303-726-1546 or via email at carcolo@centurylink.net. See President's Corner article for details.

Schedule Addendum (See last page)

1. BOD meets 1st Wednesday of every other month on Zoom at 09:30 am.
2. Officers meet 1st Wednesday of every month at TBD at 09:30 am.
3. Bridge Club meets 3rd Friday of every month at 10:00 am at Buck Recreation Center.
4. Dinner Club (All events are lunch unless otherwise noted): Jul 20 - Zest (Denver), Aug 18 - Hickory House (Parker), Sep 22 - Red Lobster (Littleton), Oct 13 - Maggiano's Little Italy (Englewood)
5. Golf club meets every Thursday from April through Oct of each year.
6. Hiking Club: Outings on 3rd Wednesday of the month. Check website for Point of Contact for each hike.
7. Photo Club meets 2nd Thursday every month (except Jun, Jul & Aug) at 1:00 pm at the Bemis Public Library in Littleton
8. Web Committee meets at 12:00 noon at TBD, on Tuesday prior to BOD/Officer mtg
9. Happy Hour - TBD
10. **2020 Senior Recognition Luncheon - Cancelled for 2020**
11. **2020 MARS Day at the Rockies - Cancelled for 2020**
12. **2020 Annual Picnic - Cancelled for 2020**
13. **2020** Holiday Celebration - Dec 2 at TBD
14. **2021** Annual Meeting & Spring Luncheon-TBD

Note: Dependent on coronavirus Status

Please review dates and times and notify Dick Sosnay (richardsosnay@gmail.com) if you have any changes or additions.



ASSOCIATES

P.O. Box 1128
LITTLETON, CO 80160

ADDRESS SERVICE REQUESTED

PRESORTED STANDARD
US POSTAGE
PAID
LITTLETON, CO
PERMIT NO. 245



DATE: July 2020

MARS ASSOCIATES EVENT SCHEDULE

EVENT/MONTH	2020						2021						
	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	
Board of Directors	1		2		4		6		3		5		
Officers	1	5	2	7	4	2	6	3	3	1	5	2	
Bridge Club	17	21	18	16	20	18	15	19	19	17	21	18	
Dinner Club	20	18	22	13	TBD	-	TBD	TBD	TBD	TBD	TBD	TBD	
Golf Club	Thur	Thur	Thur	Thur	-	-	-	-	-	Thur	Thur	Thur	
Hiking Club	15	19	16	21	18	16	20	17	17	15	20	16	
Photo Club	-	-	10	8	12	12	14	11	11	8	13	-	
Web Committee	6/30	4	1	6	3	1	5	2	2	3/31	4	1	
MARS Events													
Happy Hour	TBD												
Senior Recognition Luncheon	Canc												
CO Rockies Game		Canc											
Annual Picnic			Canc										
Holiday Celebration						2							
Annual Meeting/Spring Lunch									TBD				
MARS STAR Schedule													
Items due for MARS STAR													
STAR Flyers Due to Comms	6			5			4			TBD			
STAR Input to Editor	7			6			5			TBD			
STAR Repro. Deadline	20			19			18			TBD			
STAR Mailing	29			28			27			TBD			