MARS ASSOCIATES
SPONSORED BY LOCKHEED MARTIN

Volume 38, Issue 3
July 2022

MARS STAR

MARS STAR has gone digital!!
If you currently receive a printed copy, you will continue to receive a printed copy. If you currently receive an electronic copy and wish to receive a printed copy in the future, contact Carl Kaminski at 303-726-1546 or via email at carlkcol66@gmail.com

Dinner Club Venues, pages 31 - 36

Rockies Picnic and Game, July 27

Annual Picnic on -- September 14, 2022 at Clement Park, See page 27

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

OFFICERS

President	Dick Sosnay	303-972-9209
President-Elect	Ken Marts	303-868-2168
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

DIRECTORS

Director Chair	Roger Rieger	303-912-6217
Director	John Janczy	303-973-3847
Director	Bill Wise	303-771-4887
Director	Robin Zen	303-335-6443
Director	Monte Kopke	303-973-4301
Director	Daniel Crumb	303-909-0490
Director	Debbie Carr	303-503-7113
Director	Dan Ellerhorst	303-794-0750
Director	Heidi Urie	303-588-6762

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
Reporting:		
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 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)

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: https://www.marsretirees.org
MARS Facebook:
https://www.facebook.com/groups/MARSAssociates

Cover:

L: View of City Park from Spratlen Lounge at the Museum of Nature and Science taken during MARS Day at the DMNS.

R: LMT has received a contract totaling $74 million to produce the Terminal High Altitude Area Defense (THAAD) Weapon System for the Missile Defense Agency (MDA). See article on pg. 22.

From the Editor's Desk

Linda Stearns (linda80120@comcast.net)
Tom Pighetti (tjpighetti@q.com)

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)

Summer has started for MARS and our activities are in full swing. By the time this STAR issue is released, we will have had our Senior Luncheon, and the MARS Rockies game. In addition, our extra activities are proceeding at a fast clip. In the first quarter of the year, we did the sleigh ride in the mountains, and our first Waterton plant tour. In the last few months, we had the Cassini Zoom discussion, visited the Denver Museum of Nature and Science (including an excellent brunch, an outstanding lecture on the James Webb Telescope, and access to the museum itself), the Durango – Silverton Narrow gauge railroad trip and our private MARS Wings Over the Rockies Air & Space Museum tour. Take a look at the pictures from several of those events in other sections of this issue and ask yourself "Why didn't I go to that?" While I missed the first two of these activities in the winter and the spring, I have participated in all the latter ones and, I have to say, they were all great fun. I hope that as we continue with these activities, more and more of you will join us. Coming up at the end of the summer are the Royal Gorge train trip in August, a visit to the Estes Park observatory in the August/ September/ October time frame, and the Cumbres/Toltec train trip in September. As we finish out this year's activities, we are beginning to think about which ones we will want to redo next year and maybe look at some new ideas. If you have other ideas on events that MARS can support, please let one of the officers or directors know. We are looking not only for participants in those events, but also members to set up and lead other events, please let us know if you are interested.

We are extremely encouraged with the results of the Marketing Committee and want to continue to use it to plan for the future of your MARS Association. We are continually looking for MARS members that want to help identify and plan for new opportunities. If you think you have some good ideas and want to help define the future of MARS, please notify any of the MARS officers or directors.

As I mentioned in my last column, we have restarted the study of our finances, including the costs to MARS of all of our MARS' activities, our income both from dues and from event prices, and our support of those costs to our members. We are evaluating our options and plan to report our results in the October MARS STAR. There will be very little surprise, as I am sure that all of you have noticed our costs to members going up.

As I have said many times, we are a volunteer organization, and we are always looking for volunteers to support us. That includes not only being an officer or director, but also all the other volunteer positions we have, including MARS STAR editors, Historian, Volunteer coordinator, managing our Memorials section of the MARS STAR, helping the web committee, and managing and running the MARS website and the MARS Facebook page. And running one of our 6 MARS clubs, including the Bridge Club, Car Club, Dinner Club, Golf Club, Hiking Club, and Photography Club.

As I mentioned in the last MARS STAR, more and more of our communication with members is done through electronic means, including the electronic distribution of our MARS STAR, our MARS Website, our MARS Facebook page, and our increasing use of blast emails to keep members informed in a timely manner. If you have a background in computers and/or Information technology (IT) and are interested in using your skills to help your MARS Association, we need more help in our web committee. If you are interested, please contact any of the officers or directors, or our webmaster Jim Kummer. Since we first asked for volunteers in our last issue of the MARS STAR, we have had two volunteers step up, Rick Gonzales and Mark Brown. Thank you, Rick and Mark, for volunteering. It is always great to see new members stepping up and volunteering to help with our organization. We have begun an initiative through our Web Committee which involves updating the software behind our website. The goal is to modernize that application, make it more readable and user friendly, and reduce the workload on our web committee that maintains and updates the website. We will follow through on this when we confirm that it does everything that we do now, contains the improvements we want to make and has very little impact on our members when we finally transition to it. You will hear more about this in future issues of the MARS STAR.

As I have mentioned in previous MARS STARs, if you are a volunteer in a local organization, we are interested in hearing about it. We will help you promote that volunteer organization in the MARS STAR. You can provide members information about what that organization does, and how interested MARS members can also join that organization. And we provide a $50 check to that organization as thanks for your writing an article in the MARS STAR. In this issue, Russ Bogardus introduces us to Volunteering at Engineering Ministries International. If you are interested in promoting your volunteer organization in future MARS STARs, please let us know.

Coming up in the next few months, I hope to see many of you at our annual picnic in Clement Park in September, at our Happy Hours, and at several of the new activities we have planned. Please provide feedback so we know how we are doing. Thanks for all your continuing support,

and I am looking forward to an exciting and interesting year for our MARS Association.

MARS Day at the Denver Museum of Nature and Science

By Dan Ellerhorst

On May 25th, approximately 40 members and guests of MARS Associates enjoyed a delicious breakfast buffet at the Denver Museum of Nature and Science, followed by a fascinating talk by Dr. KaChun Yu, the museum's Curator of Space Science.

Dr. KaChun Yu, Curator
of Space Science at
Denver Museum of Nature & Science

Dr. Yu spoke extensively about the James Webb Space Telescope including the rationale and history of its development, the engineering challenges of its deployment, and the current status and mission successes. Feedback from our group was universally positive. Following the talk, many of us took advantage of the free museum entry to visit the permanent exhibits, the special exhibit on ancient Egypt, the Planetarium, or IMAX.

MARS members watching
Dr. Yu's presentation

MARS Associates Durango-Silverton Train Ride

By Shar Petty

It began with a beautiful drive to Durango, over Wolf Creek Pass for most of us. Our first evening with the group was a dinner at the Bar D Chuckwagon with GREAT food, hand clapping and hoe down music.

BAR D Chuckwagon entertainment

The next morning 27 MARS retirees boarded the Durango Silverton Narrow Gauge Train. Travelling along the Animas River, we saw breathtaking scenery of the high and rugged San Juan Mountains.

Animas River

We arrived in Silverton for lunch and a step back into the 1800's.

The crowd goes off to lunch

After arriving back in Durango, we reflected on the wonderful memories we shared with our group.


The Haupts and Cal Harr


MARS Travelers AFTERward

The sounds of the clickety-clack of the wheels traveling over the rails, the screech of the brakes and the whistles of the train. We shared memories at a Durango Speak-easy or a quick Cold Stone ice cream looking forward to another MARS Adventure.

Next Up

By Ken Marts
(martshouse2@aol.com)

We're now in the dogdays of summer as I write this in mid-June. It will be interesting to see what the rest of the summer brings. Spring and Summer have been busy for those joining MARS Associates in some of our activities. March began the fun with the Annual Banquet and speaker presentation by Dr Vanessa Aponte Williams. After an April break (did you miss the April Happy Hour at Blue Spruce Brewery???), Dan Ellerhorst set up a May tour of the Denver Museum of Nature and Science including a presentation by the museum curator on the James Webb Telescope. June found us in Durango for the Durango-Silverton Narrow Gage train set up by Shar Petty and Beth Worthington. Short write-ups can be found in this issue on both events. July was a busy month with the Senior Recognition Luncheon, Wings Over The Rockies Tour (Terry Lilly arranged) and Rockies Baseball game and picnic. August brings us another Happy Hour (Aug 10) and train ride being set up by Robin Zen at Royal Gorge (Aug 17) followed by the September annual picnic. We've also scheduled our third train ride Sept 22 on the Cumbres-Toltec line starting in Chama, NM. Thanks to Ralph Pacheco for lining this up activity. Check out the MARS Associates webpage marsretirees.org for the latest activities and news.

The Marketing Committee is beginning planning for 2023 events. Please let me know if you want a repeat of some of the events this year, next year, or some new events. Central City Opera in July can be fun. Maybe a trip to the Botanical Gardens (Denver or Chatfield locations). Maybe a bingo night, or for those wild adventurous people, a trip to Water World to whet your appetite! I've heard this is a favorite of Bill Wise to slide down those GIANT slides. Bill Schrott on the other hand prefers the meandering river cruise thru the snake filled jungles of Florida. Send me your input via email and we'll see what we can work up.

I've also had several people ask me about home-grown "experts" that could provide help to others researching different topics. Some of these topics include old radios and their history, coin collections, inherited heirlooms and antiques. If you have a hobby or special interest or expertise that you would love to share with other members, please let me know so we can hook you up with other MARS members who want to be educated a bit. We may develop a survey or incorporate it into our annual renewal form for this as well.

I'd also like to hear from our Star Dusters members who've been with us about 6 months. What are your thoughts and how can we provide value to you as we move forward? We've included Pete Harrigan's "In the News" as a regular feature. I invite any of you to provide articles to the MARS STAR that you believe would be of interest to your fellow members. What are you doing in retirement? Have you been anywhere unique that you'd like to share with the group (include pictures)? What volunteer activities are keeping your interest? Let us hear from you! We all need some different voices to light up our lives.

Stardusters members should also recognize the article detailing where your funds went after dissolution of the organization. This was forwarded to me by Mike DeBry, but I was ALSO a Stardusters member and sad to see it close.

In closing, how are all of you doing with the exercise I asked each of you to do with respect to your "Thankful" list. Let me know if you want to share any of these with me or other MARS members. I promise NOT to embarrass you like the Bills mentioned above. I hope you're enjoying your summer and hope to see at some of the upcoming events.

Ken Marts
Martshouse2@aol.com or kmarts4109@msn.com
(303) 868-2168

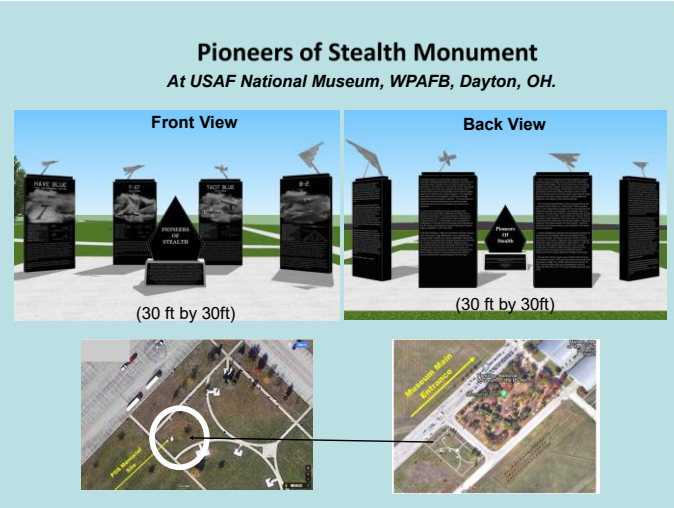
Star Duster Donations

Star Dusters members
When the Star Dusters ceased operations, our bylaws required us to distribute our remaining funds approximately $35,000 to charity. Due to IRS rules, we were prohibited from donating to 501 C-3 charities, which unfortunately represent 99%. Additionally, the board wanted to make sure the funds went to aerospace aligned organizations. Ultimately the board voted to donate to 4

organizations. I felt that it was not only important, but fitting that you know where the money went and I can assure you all were very appreciative. Attached is a word document with a few pictures and more information on who received funds.
Mike DeBry

Pioneers of Stealth Monument

The Pioneers of Stealth is a national organization with members from aerospace and government who were involved in the early development of stealth aircraft. Original members had to be invited to join or have a member sponsor. Of the approximately 500 original members, about only half remain today. In order to continue the legacy, the membership decide to build a monument located at the USAF Museum in Dayton, Ohio. The majority of funds have been allocated and materials are being procured. The monument will not only highlight the pioneers, but showcase four aircraft two of which are Lockheed, Have Blue a low observable technology demonstrator and the F117A, the first operational stealth aircraft. The Star Duster donation stipulated for the monument and not the organization.



The Pioneers of Stealth monument will highlight two Lockheed Martin programs, Have Blue and the F117A

P-38 National Association

The P-38 National association was formed in 1987 by WWII pilots who flew the P-38. They pooled their funds and built the "Hanger" which is dedicated to Lockheed test pilot Tony LeVier. A large monument dedicated to LeVier sits just outside the entrance. The exhibits in the museum reflect the lives of the pilots who flew the P-38 with many displays of uniforms, pictures, documents and memorabilia donated by members. For years the museum received the majority of its donations from veteran pilots. With most of them now gone, the museum was very grateful for the Star Dusters donation. After I made the presentation, I walked outside where a B-17 is located. I thought it very ironic when I walked up and you guessed it, the name was "Starduster". The museum is located in Riverside, California at March Air Force Base next to the March Field Air Museum.

Lockheed test pilot Tony LeVier monument P-38 National Museum

B-17 located just outside the P-38 National hanger, note the name

AV Rural Museum

The AV Rural Museum is located at the Fairgrounds in Lancaster, California. Although the museum has a variety of displays, the aviation section is one of the biggest and growing. With Lockheed Martin, Northrop, Boeing, Edwards AFB, Nasa Armstrong and Rocket Propulsion Lab all located nearby the area has a rich history of aviation. The museum is just completing construction of its new building, and is over twice the size of its existing location. When completed the museum will be open as an educational and research center. In order to preserve the legacy of the Star Dusters we provided a digital copy of our archives, so future generations will be able to access items such as Star Dusters newsletters. Our donation to the museum stipulated that the funds must be used for the aviation section.

LMLA Scholarships

Each year the Star Dusters made donations to the LMLA scholarship fund. With our final donation we provided enough funds for up to 10 scholarships through the Lockheed Martin Leadership Association. The stipulation was that they must go to sons and daughters of Lockheed employees. Awards will be made over the next 3 years and awards for 2022 will be made in the name of Sherm Mullin former Skunk Works president and more importantly thanks for all the articles he wrote for the Star Dusters newsletters.

Director's Notepad

By Roger Rieger
Chairperson, BoD
(rrieger10731@gmail.com)

Greetings everyone! Hope you are all well and enjoying the beautiful Colorado spring and early summer weather. I know we've been busy restarting our travel schedule and enjoying our new trailer. Your MARS Club has been busy with a variety of new events (Denver Nature and Science, and Durango-Silverton railroad) as well as traditional favorites like the Senior recognition luncheon and MARS Day at the Rockies. These functions do not happen without someone stepping up to volunteer and organize. Your club has many many talented people, with a variety of interests and it's great to see some new volunteers step forward and organize these new events for the benefit of your club. Please consider participating in some of these new events, everyone who has had a great time! As always, we continue to seek new volunteers, if you are interested in helping in any way, please reach out to me, or any of the BOD members or MARS Officers and let us know your interests!

Activities Updates

By Linda Duby
(lindaduby@comcast.net)

The MARS events for 2022 are back to normal and the organization is working on more "extra" events this year along with doing happy hour and regular MARS events.

MARS had a happy hour on April 27 at a new venue – Blue Spruce Brewery at Ken Caryl Ranch. We had almost 100 people attend! It was a great venue for the happy hour – food was good as was the beer. The next happy hour is being planned for August 10 and will probably be held at the Lansdowne Arms in Highlands Ranch.

The Luncheon Honoring Senior Members was held on July 13 at the Manor House at Ken Caryl. I will have more information on that event and pictures in the next edition of the STAR.

The Rockies Picnic and Game was held on July 27 and more about that event and pictures will be in the next STAR.

The next event will be the **Annual Picnic** that will be held on **September 14, 2022 at Clement Park**. The flyer is available in this edition of the STAR and on the website (https://marsretirees.org). The picnic will be in the shelters (A, B and C) on the east side of the park near Columbine High School. Bennett's unfortunately has gone out of business so we will be using a new BBQ caterer this year, Smokin' Outlaw Kitchen. Beer, wine and water will be provided by MARS. We are hoping for a big turnout for this event.

The picnic again will have two payment/reservation options: (1) fill out the form on the flyer and mail it with your check to the MARS P.O. Box, or (2) make your reservation and payment electronically with the STRIPE option. The link for STRIPE is on the flyer and on the MARS website (https://marsretirees.org).

The final event for 2022 is the Holiday Celebration and will be held at the Wellshire Event Center. More information on that event along with the flyer will be in the next STAR and on the website.

Have a great summer and hope many of you will attend the MARS events.

If you have any questions or comments about events, please contact me at lindaduby@comcast.net.

Business

By William Schrott
(wmschrott@msn.com)

Sign up for Delta Dental begins 9/1/2022. Those already with Delta Dental do not have to do anything; however, there will be a 6.14 increase in premiums. They have agreed to send current members a letter identifying the new increase.

Included below is the data Delta Dental sent me to justify the increase.

Delta Dental rate increase for 2023

	MEDIUM	OPTION	HIGH	OPTION
RATES	CURRENT	RENEWAL	CURRENT	RENEWAL
Subscriber (S)	$35.45	$37.63	$37.63	$47.46
S+Spouse	$67.38	$71.51	$84.97	$90.18
S+Child	$67.38	$71.51	$84.97	$90.18
S+Children	$97.25	$103.22	$119.17	$126.48
Family	$97.25	$103.22	$119.17	$126.48

Below are some of the details on the plan claims.

- The plans ran at a loss ratio of 81.79%, above the target loss ratio of 77%
- The average paid claims per subscriber per month is $56.62, an increase of 23.1% from the prior year of $45.99 and 19% above the Delta Dental norm
- MARS claims per subscriber count increased by nearly 21% from the prior year, and more than 2 claims per subscriber higher than the Delta book of business
- Delta Dental processed 5.24 claims per subscriber
- The Major service usage on both plans was dramatically higher at 31.8% (medium) and 44.2% (high) compared with the Delta Dental norm of 18%.

Please keep in mind that this is the first increase since 2015 and should help us align with better renewals in the future.

VIA Benefits – I am adding information about VIA on the MARS web site "Health Benefits" page. If you look at the linked presentation, you'll find all the services they provide. The one service that is important to all of us is reimbursement of medical costs up to $900 per retiree and $900 for the spouse, if you are both on Medicare. That is $1800 per couple, provided by Lockheed Martin through Via Benefits. If you are not taking advantage of this, please look into it. You don't have to have medical insurance sponsored by them. I am a Kaiser patient and get reimbursed for my premiums.

Membership Report

By Carl Kaminski
(carlkcol66@gmail.com)

MEMBERSHIP STATISTICS

As of July 1, 2022, there are 1,281 MARS Associates members, including 628 senior members. We have a total of 58 new members who have joined MARS for the 2022 CY.

Please welcome the following new members who have joined this quarter:

Colorado

Castle Rock	Eric & Debbie Haverly, James & Lori Smith
Centennial	Sue Ilmberger & George Massey, Gordon & Sheila McPherson
Commerce City	Doug & Carye Baker
Conifer	Daniel & Christy Beary, Scott & Carole Curtis
Elizabeth	Gordon & Susan Hornbaker
Evergreen	Agnes Chou & William Walker
Frisco	Robert Nicol
Highlands Ranch	Charles & Becky Keith, George Schamel
Lakewood	James Dornbos & Belinda Johnson
Littleton	Scott & Nancy Durrant, Kenneth & Kathryn Friesen, Keith & Ro Hamlyn, Mark & Patricia McDaniel
Lone Tree	Louise & Robert Ladow
Morrison	Larry & Geri Rutz
Parker	Delores Boxler
Peyton	Phillip & Maria Berumen
Sedalia	Robert & Joan Winn, Pamela Burke & Richard Reynolds

Other States

Florida

Merritt Island	Christina & Rodney Davignon

NEW MEMBERS

Do you know someone who recently retired from LM or ULA? First year membership in MARS is free for 2022. 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 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 Bord of Directors in their memory.

Members

Beaty, Byron (D: January 2022)
(Survived by Phyllis Beaty)
Englewood, CO
https://tinyurl.com/yz9tffw2

Dunbar, Betty Jean (D: August 2021)
(Survived by Reed Dunbar)
Cape Canaveral, FL
https://tinyurl.com/2p8zx82j

Fedec, Paul (D: April 2022)
(Survived by Gloria Fedec)
Centennial, CO
https://tinyurl.com/s7y68bwb

Gallentine, Barbara Jean (D: May 2022)
(Survived by Jerry Gallentine)
Littleton, CO
https://tinyurl.com/amp66y39

Green, Charles "Charlie" (D: February 2022)
(Survived by Lynn Green)
Castle Pines, CO
https://tinyurl.com/2p94v83a

Houser, Darrell "Keith" (D: April 2022)
(Survived by Marlene Houser)
Lakewood, CO
https://tinyurl.com/ynvw897j

Kolves, Dean (D: No date given)
(Survived by Winnifred "Winnie" Kolves)
Littleton, CO
No obituary published

Kupilik, Fred (D: June 2021)
Longmont, CO
https://tinyurl.com/3aykrpuj

Makuch, Jane (D: August 2021)
Aurora, CO
https://tinyurl.com/2p929z5v

Morris, James "Jim" (D: March 2022)
(Survived by Diane Morris)
Canton, GA
https://tinyurl.com/492cvmwp

Mueller, Gary (D: March 2022)
(Survived by Sharon Mueller)
Littleton, CO
No obituary published

Parker, John (D: May 2022)
(Survived by Betty Parker)
Centennial, CO
https://tinyurl.com/yc69h4xt

Rosener, Arthur "Art" (D: May 2022)
(Survived by Gloria Rosener)
Highlands Ranch, CO
https://tinyurl.com/mw9jmjk7

Sellers, Ronald "Ron" (D: February 2022)
(Survived by Sandy Sellers)
Castle Rock, CO
https://tinyurl.com/3sjj56u5

Troy, Elliot (D: April 2022)
(Survived by Barbara Troy)
Evergreen, CO
https://tinyurl.com/2p8tetr7

Vitry, Richard (D: August 2021)
(Survived by Mary Vitry)
Denver, CO
https://tinyurl.com/y6xwkjt8

Non-Members

Bolt, Martin "Bud" (D: February 2022)
(Survived by Rhea Bolt)
Littleton, CO
https://tinyurl.com/yckyjzw6

Bruce, Thomas (D: January 2022)
(Survived by Barbara Bruce)
Denver, CO
https://tinyurl.com/2p9fppza

Caples, Jon (D: April 2022)

(Survived by Jeanie Stokes)
Lone Tree, CO
https://tinyurl.com/yr4ysctw

Masterson, William "Bill" (D: June 2022)
(Survived by Ileen Masterson)
Merritt Island, FL
https://tinyurl.com/2p9e283m

Overturf, Charles "Turf" (D: May 2022)
(Survived by Shelley Overturf)
Castle Rock, CO
https://tinyurl.com/2f5zcyj6

Reed. Thomas "Tom" B. (D: June 2022)
(Survived by Celia Reed)
Castle Rock, CO
https://tinyurl.com/yc5nhxhz

Rich III, William "Bill" (D: February 2022)
Hasty, CO
https://tinyurl.com/mvvp7d83

Ruscio, Donald "Don" (D: March 2022)
Erie, CO
No obituary published

Ruscio, Melanie (D: March 2022)
Erie, CO
No obituary published

Soderberg, Laurence "Larry" (D: January 2022)
(Survived by Kay Soderberg)
Arvada, CO
https://tinyurl.com/257wn588

Thrash, Paul (D: April 2022)
Wheat Ridge, CO
https://tinyurl.com/328tvj7t

The MARS Associates Website

By Jim Kummer
(jkummer@comcast.net)

The MARS Website Committee is pleased to welcome two new members – Rick Gonzales and Mark Brown. These two are familiar with website design and bring some new talent and enthusiasm to the group. They have expressed desire to enhance the website's privacy, security and usability. The committee members will benefit from the help and new ideas these two will bring. We express thanks to Steve Sande who has volunteered to provide expert review of any improvement considerations the committee develops. Until such improvements are implemented and approved, the current website design will remain as-is.

MARS Associates is continually adding new event opportunities. These will be announced in the website as they become available. Watch the website for updates. In particular, take a look at the **MARS 2022 Special Activities** link near the top website's of main page for current and future activities the officers have compiled.

Here are the websites of the month that the web committee has offered for your browsing pleasure.

Jun– YouTube Showing
The Scale of the Universe
May - Interesting Graphical Imagery
Projection Mapping Demos
Apr – Play WORDLE in the WWW, not an app, www.nytimes.com/games/wordle/index.html

Your website committee members welcome your suggestions for website improvement. If you frequent websites that would be of interest to our membership as websites of the month, email them to me at jkummer@comcast.net. Your website committee members are: Rick Gonzales, Mark Brown, Linda Stearns, Al Butvidas, Bob Knickerbocker, and Jim Kummer (Webmaster).

Volunteering at Engineering Ministries International

By Russ Bogardus
(russbogardus@comcast.net)

My favorite volunteering activity is "Engineering Ministries International" (emiworld.org) which I have volunteered with for the past 8 years after retiring. EMI is a Christian non-profit made up of architects, engineers, surveyors and construction managers that provides design services to missionary organizations that serve the poorest of the poor in the world's poorest countries. How did I get involved? I thought it was a good idea since it would both keep me mentally active solving engineering problems and helping others that are far less fortunate than I. The primary focus of missionary organizations in these areas is on helping the poor, regardless of religious beliefs, to both simply survive and improve their lives. Their activities include providing primary, secondary and vocational/trade school education and health care services (including hospitals). And sometimes clean water and electricity to adjacent villages (700 million Africans live without electricity.) Missionaries request help from EMI in order to either: 1) provide a master plan along with a high-level design and cost estimate for new development of a vacant site or 2) a forensic engineering evaluation and re-design of an

existing site which has serious health or safety problems or structures that are simply at end-of-life. EMI provides these services as well as educating the leadership and their staff in project management, and in operation and maintenance of the new facilities.

One of my most rewarding trips was to a 175-acre Christian missionary complex (hospital, K-12 school, nursing school and various other vocational schools) located on a dirt road serving a Muslim population in a remote area of Tanzania -- No government supplied electricity, water or sanitation services for either the surrounding villages or the missionary complex. Site power generation was via diesel generators which was becoming cost prohibitive due to increasing fuel costs and resulting in a very reduced number of hours of electric service. To add to this problem, the distribution lines were carrying an excessive amount of current (due to an increased number of buildings over a 25-year period and poorly designed wiring protection) resulting in overhead distribution wires melting, falling to the ground and causing brush fires. Four years later and with an incredible amount of hand labor they had a completely new electrical generation and distribution system. Power generation consisted of a local grid consisting of 715 solar panels, 3-Tesla storage batteries and two new diesel generators all managed by a computer implementing control laws to minimize energy costs. Electric distribution was via 256 new electric poles (hand dug) and 6 miles of new cabling.

Arial view of the complex with solar array at center right

Children going to school

More information on the work that EMI has accomplished and future trips can be found at their website www.emiworld.org, by email at info.us@emiworld.org or by calling them at (719) 633-2078. Their USA office is located in northern Colorado Springs at 7025 Campus Drive, Colorado Springs, Colorado, 80920.

Historian Corner

By Barb Sande
(barbsande@comcast.net)

Program Profile

This issue profiles the Apollo 16 mission, the second "J" mission and second-to-last lunar landing mission of the Apollo program.

Apollo 16 Mission Overview

Launched: 04/16/1972 17:54:00 UTC LC-39A, KSC
Splashdown: 04/27/1972 19:45:05 UTC, South Pacific, USS *Ticonderoga* recovery ship
Saturn V AS-511 Launch Vehicle
CSM (Command/Service Module) Call Sign: *Casper* (CSM-113) – named after the "friendly ghost" cartoon character
LM (Lunar Module) Call Sign: *Orion* (LM-11) – named after the prominent winter/spring northern constellation
Crew: Commander John W. Young, LM Pilot Charles M. Duke, Jr, CM Pilot Thomas K. "Ken" Mattingly II
64 total lunar orbits
Landing site: Descartes Highlands – 8.97301 degrees S, 15.50019 degrees E lunar coordinates
Second "J" mission (expanded science operations, use of a lunar rover, extended lunar stay, expanded CM science operations)
Connection to Lockheed Martin/ULA: The contributions of our heritage companies to the Apollo program were listed in the MARS STAR article about Apollo 11 in 2019.

Apollo 16 Crew: Ken Mattingly, CM Pilot; John Young, Commander; Charlie Duke, LM Pilot
Photo Credit: NASA

A long time preparing before launch

Equipment designated for the Apollo 16 mission began arriving at Kennedy Space Center in July, 1970, almost two years before the mission. The primary crew was assigned on March 3, 1971, well before the highly successful Apollo 15 mission launched in July, 1971. John Young was named the commander of the mission and, at the time of Apollo 16, he was the most experienced astronaut at NASA, having flown on Gemini III and Gemini X and on the "dress rehearsal" mission of Apollo 10 in 1969 as command module pilot. Young was joined by two rookies, Charles "Charlie" Duke, Jr, who became the youngest man to walk on the moon, and Thomas "Ken" Mattingly II, who was originally assigned as CM pilot on Apollo 13, but had to be replaced by Jack Swigert at the last minute because he had been exposed to Rubella (measles). Fred Haise (Apollo 13 LM Pilot) was named back-up commander and Ed Mitchell was named back-up LM pilot with Stuart Roosa as back-up CM pilot; Roosa and Mitchell performed their same roles as primary crew on Apollo 14. The cancellation of Apollos 18 and 19 in September, 1970, led to this decision to use experienced crew for back-up rather than training astronauts for dead-end assignments.

Because Apollo 16 was a "J" mission, the crew underwent extensive geological training for a couple of years prior to the mission. The landing site in the Descartes Highlands was selected because it appeared to have features that were the result of volcanic activity. It was also a considerable distance away from previous landing sites, which would be of interest to seismologists monitoring the growing network of seismographs on the moon.

The flight was originally put on the manifest for March 17, 1972, but there were a series of problems during vehicle processing that delayed the launch date to April, including the need to change out the main parachutes after one chute did not open on the Apollo 15 mission return. In December, 1970, the combined stack was moved from the VAB (Vehicle Assembly Building) to launch pad LC-39A. During testing, a mistake resulted in the bursting of one of the Teflon bladders in the CSM RCS (Reaction Control System). This resulted in a leak of helium (fortunately, not hypergolic fuel) and the damage was limited. However, the RCS tank had to be replaced, which would disturb the Command Module heatshield. A separate concern was seen for the explosive cords that separate the LM and the CSM prior to Earth return (found during testing for Skylab). Both problems resulted in the first return of an Apollo Saturn V to the VAB; the move back occurred on January 9, 1972, with a return to the pad after the rework on February 9, 1972; this was insufficient time to meet the original launch date. The launch window for these missions to have the required conditions at lunar landing was once a month, leading to a new date of April 16.

Launch of Apollo 16, Translunar Trajectory

Weather conditions were good on April 16, with clear to partly cloudy skies and warm temperatures. The crew entered the CM three hours before launch and continued pre-launch checks. The countdown proceeded smoothly and Apollo 16 launched at 12:54 EST. While in earth orbit, there were minor issues with the environmental control system and the third stage (S-IVB) attitude control system, but these were resolved satisfactorily. After two orbits, the third stage reignited for five minutes, propelling Apollo on a course to the moon at 22,000 mph. Shortly after the burn, the Command and Service Module (CSM) separated from the S-IVB stage and turned around to retrieve the lunar module. The transposition, docking and extraction, performed by CM pilot Ken Mattingly, went smoothly. The crew noted that particles were coming off the LM skin; Young and Duke did an early entry into the LM for an inspection and did not find any concerns.

Launch of Apollo 16 Photo Credit: NASA

Days two and three were spent preparing for lunar orbit and lunar landing and doing some scientific experiments. A two-second burn of the Service Propulsion System (SPS) engine on day two provide a minor course correction. The crew observed more material and paint flaking off the LM, but it was not considered a major concern. A problem also occurred with gimbal lock in the CM attitude system, requiring Mattingly to realign the guidance system manually using Sun and Moon observations. Several entries into the LM on these two days by Young and Duke were made to ensure that all systems were ready for the landing.

Lunar Orbit – BIG Problems to Solve

The Lunar Orbit Insertion burn was performed on the far side of the moon on day four; the SPS burned for 6 minutes and 15 seconds, putting the two spacecraft into a 80.3 by 170.4 nautical mile orbit. A later Descent Orbit

Injection maneuver was successful, putting the spacecraft to a pericynthion (low point) of 10.7 nm. The crew finally had rest before the hectic day 5 activities began (undocking, descent, landing).

The first problem on day 5 was a stuck boom for the mass spectrometer in the Scientific Instrument Module (SIM) bay on the CSM. It was decided that Young and Duke would inspect the boom after separating from *Casper.* After entering the LM, the checkouts included a series of problems. The first LM problem was a concern for getting the steerable S-Band antenna to perform and provide good communications. Then there were pressure imbalances between the LM Reaction Control System (RCS) Systems A and B, requiring a cross-feed operation before hot fire test; the test was limited to System A only. The antenna problem was resolved by relaying data through Omni antennas and receiving at Goldstone in California. The two spacecraft finally undocked and began their separation attitudes. Mission Control continued to troubleshoot the steerable antenna problem and worked to ensure that the RCS pressure balance was satisfactory.

As the separate spacecraft passed behind the moon during the 12th orbit, a problem with the landing radar occurred. During its self-test mode, there were spurious readouts. A second self-test seemed to resolve the issue and Young speculated that they were receiving some ground reflections from the lunar surface. The steerable antenna was still locked in the stow mode, but the Omni communications backup was working acceptably. The RCS pressure on system A was still creeping up, but it appeared that venting propellant into the ascent tanks would stabilize the situation. Mattingly was given a "GO" to circularize the CSM orbit with an SPS burn of 99.5 feet/second. Lunar landing was also still a "GO".

A few minutes later, a major problem occurred with the SPS backup gimbal system on the CSM. Here are the transcriptions at the time of the problem from the Apollo Flight Journal; this problem occurs out of communication with Mission Control until they emerge from the far side of the moon:

097 35 01 Mattingly (CM comm): Hey, Orion?

097 35 03 Young (LM onboard): You speak.

097 35 04 Young (LM comm): Go ahead, Ken.

097 35 10 Mattingly (CM comm): I have an unstable yaw gimbal Number 2. It's just been oscillating and - oscillates in - yaw any time it gets excited.

097 35 22 Young (LM comm): Oh, boy.

097 35 26 Mattingly (CM comm): You got any quick ideas?

097 35 33 Young (LM comm): No, I sure don't,

097 35 41 Duke (LM comm): What does your rules say, Ken?

097 35 43 Mattingly (CM comm): This thing says I have to have four servo loops to do the Circ [Burn].

097 35 49 Duke (LM onboard): It's what?

097 35 51 Mattingly (CM comm): Every time I put Number 2 servo on, it's okay until I disturb it, and then it starts to oscillate. And you can feel the spacecraft shaking. It's really doing it.

097 36 02 Young (LM comm): Okay. You have to have four loops to do Circ, huh?

097 36 12 Mattingly (CM comm): That's what it says. It's unstable in all SCS modes on secondary servo [garble]. I can't believe it, but I'm watching it. Every time I select the secondary yaw gimbal, any excursion in the thumb-wheel to go unstable.

After both spacecraft emerge from the far side, Mission Control is informed about the problem. Under the mission rules, *Orion* was supposed to re-dock with *Casper* in case Mission Control decided to abort the landing and had to use the lunar module's engines to return to Earth. Instead, Mission Control decided to station-keep the two spacecraft close to each other rather than redocking. The spacecraft could do five revolutions (a total of ten hours) around the moon in this configuration before they would have to decide on an abort situation.

Mission Control and NASA Conferring on Apollo 16 SPS Program

Photo Credit: NASA

Mission Control jumped into action and set up simulations at the nearby Training Building and at the contractor Rockwell to try and develop a bypass or workaround for situation. An attempt at a circularization burn of the CSM SPS on the first pass on the far side was unsuccessful due to a problem in a secondary circuit on the Thrust Vector Control (TVC) system, which ended up being resolved fairly quickly. The landing attempt is waved off. Let's look in at an excerpt from the Public Affairs Officer as the 14th revolution acquisition of signal is approaching:

> ***Public Affairs Officer:*** *This is Apollo control 99 hours, 56 minutes Ground Elapsed Time into the mission of Apollo 16. Some seven minutes, 40 seconds away from acquisition on the 14th lunar revolution. To recap again the current situation in the mission, the circularization burn for command module Casper was aborted when Ken Mattingly discovered some discrepancies in the backup system which control the Service Propulsion Engine. We still have a good prime system, that is a Guidance and Navigation system aboard the Command Module, however, we would be one failure away for the very critical Trans-Earth Injection maneuver which requires a fairly lengthy burn and a stable engine bell from the Service Propulsion System; therefore, quite a few people here in Houston and at the spacecraft manufacturer in Downey, California are looking into the ramifications of the backup system having apparently failed would this present any structural strain on the spacecraft if the engine bell went to full yaw, and would we be able to do a successful Trans Earth Injection with this engine. As all of these questions are answered the decision will be made whether or not to continue with the landing phase or to rendezvous and do a Trans Earth Injection burn using the Descent Engine on the Lunar Module, Orion. We have about five revolutions or some 10 hours in total time in which to make this decision. This, again, is dictated by the orbital mechanics. The fact that the Lunar Module would drift away from the desired ground track for the landing site at Descartes during any time past these five revolutions. The Gold Team of flight controllers will stay on duty in the Control Center for the landing if a decision is made to land.*

Finally, after another revolution of the moon, the decision was made to tell the crew they were "GO" for circularization burn of the CSM SPS and powered descent burn for the LM during the 16th revolution. Here's the PAO again:

> ***Public Affairs Officer:*** *this is Apollo Control [at] 101 hours, 56 minutes Ground Elapsed Time in the mission of Apollo 16. Less than two minutes prior to acquisition of signal with Orion and Casper coming around from the rear face of the Moon on the 15th revolution. As the conversation begins with the crew the word that we're Go for landing will be passed up to the crew. Apparently during the simulations here and Downey in California it has been determined that the oscillations in the backup control system which controls the motion of the large engine on the Service Propulsion System, would present no structural hazard to the spacecraft. The backup system is go at this time and we've had no problem at all with the primary system, the G&N [Guidance and Navigation] system as it's called. To repeat again the preliminary time for the Command Module circularization burn would be 103:22:05 [and] for the Power Descent Initiation 104:17:20.*

The circularization burn was successful for the CM SPS and *Orion* began its powered descent. Young and Duke are ecstatic at this decision and enjoy their descent to the Descartes highlands, landing at 104:29:35 ground elapsed time. The descent was from the highest altitude for any lunar landing and Young was able to observe the entire landing site.

This issue with the backup gimbal system on the SPS was a significant problem that was resolved with excellent work by the crew and by hundreds of people on the ground running simulations and ensuring they were good with a decision to proceed rather than abort. Amazing! Interestingly, I was, of course, watching and listening to almost every minute of this mission in 1972 (when I didn't have to be in school) and I don't remember this problem being as serious as it was, although I do remember the delayed landing.

Orion on the Surface; EVA-1

After landing, the crew secured LM systems, ate, and had a rest period. The schedule for Apollo 16 was significantly altered by the problem before landing. It was decided to shorten the third EVA by two hours and the crew would spend one less day in lunar orbit after surface exploration.

Both astronauts had some difficulty putting their EVA spacesuits on, but eventually Young backed out of the LM and stood on the surface of the moon, the ninth American to have this experience. His words: "There you are: Mysterious and unknown Descartes. Highland plains. Apollo 16 is going to change your image. I'm sure glad they got ol' Brer Rabbit, here, back in the briar patch where he belongs". Young was harkening back to his

southern roots and the folk tales of the troublemaker Brer Rabbit, who survives by his wits; Young was happy to be in the briar patch on the moon. Duke followed a few minutes later and joined Young, exclaiming "Fantastic! Oh that first foot on the lunar surface is super, Tony". He is addressing CAPCOM Tony England. To date, Charlie Duke is the youngest person to have walked on the moon at the age of 36.

The moonwalkers offloaded the Lunar Rover, the Far/Ultraviolet Camera/Spectrograph (a unique instrument for this mission that performed astronomical observations and recorded them on film that was retrieved before leaving the surface) and other equipment. Young test-drove the rover and found that the rear steering was not working. He informed Mission Control, then set up the television camera and planted the US flag. After these tasks, they deployed the ALSEP (Apollo Lunar Science Experiments Package) at a distance from the LM to avoid damage to the equipment during ascent of the LM. The ALSEP for Apollo 16 had a Passive Seismic Experiment, an Active Science Experiment, a Lunar Heat Flow Experiment and a Lunar Surface Magnetometer. While parking the Lunar Rover so that the work could be seen from the on-board TV camera, the rear steering began to function again. Unfortunately, the Heat Flow Experiment was lost when Duke inadvertently tripped over the cable to the package. Fortunately, the deep drill core extractions and geophone emplacements work better on this mission (the drill was built by Martin Marietta).

Four hours into EVA-1, Young and Duke jumped on the Lunar Rover and drove to their first geologic stop, Plum Crater, about 0.87 miles from the LM. They sampled material in the vicinity and Duke retrieved a breccia rock sample known as Big Muley (named after principal geology investigator William R. Muehlberger), the largest rock returned from any of the lunar landing missions, weighing in at 26 pounds. Big Muley was estimated to be 3.97 billion years old and the rock was highly shocked by some unknown event in its history based on the amount of plagioclase (feldspar) glass in the rock. After hauling this rock on-board, the next stop was at Buster Crater, about 0.99 miles from the LM. The samples in both places had yet to confirm that the Descartes area had ancient volcanic activity. After the Buster Crater stop, Young did his best Formula One "Grand Prix" driver imitation on the Lunar Rover, with Duke standing by and filming it with a 16 mm camera. The pair returned to base camp at the LM, completed a few more tasks with the ALSEP, then ended the first EVA, which was 7 hours, 6 minutes and 56 seconds long.

EVA-2

After the crew sleep period, Young and Duke woke up a little early to discuss the second EVA with Mission Control. The second EVA's objective was to visit Stone Mountain and climb up the slope of approximately 20 degrees to reach a cluster of craters known as the Cinco craters. Young and Duke exited the LM, hopped onto the Lunar Rover and drove to this area, located about 2.4 miles from the LM. The view was considered spectacular; they were 499 feet above the valley floor, the highest elevation above the LM of any Apollo mission. The drive over to Stone Mountain was rough, with the crew encountering lots of boulders and small craters. Here's a brief excerpt of the reaction to this location from the Apollo Lunar Surface Journal:

> **144:16:27** Duke: Wow! What a place! What a view, isn't it, John?
>
> **144:16:30** Young: It's absolutely unreal!
>
> **144:16:34** Duke: We've really come up here, Tony. It's just spectacular. Gosh, I have never seen...All I can say is "spectacular", and I know y'all are sick of that word, but my vocabulary is so limited.
>
> **144:16:50** England: We're darn near speechless down here. [Tony England, CAPCOM]

-Young and Duke gathered samples from the vicinity of the craters and spent 54 minutes on the slope of Stone Mountain. At the steeper angle on the side of the mountain, one of the Lunar Rover back wheels was actually off the ground! The next stop for the crew was a nearby crater (dubbed Station 5) that was 66 feet across. The hope was that they would find material that was not contaminated by ejecta from the South Ray crater located south of their landing site; the geologists were reasonably certain that the material was original to the Descartes area. The next stop, Station 6, was a 33-foot wide crater where the soil was most likely firmer and was part of the

Cayley Formation. They skipped Station 7 and arrived at Station 8, on the lower flank of Stone Mountain, an area that had materials in a ray from the South Ray crater. They collected smaller, crystalline rocks rich in plagioclase (feldspar). At Station 9, dubbed the Vacant Lot (thought to be free of ejecta from the South Ray crater), they spent about 40 minutes gathering samples.

Heading back, Young and Duke stopped between the ALSEP and the LM and dug double core samples and conducted penetrometer tests. After returning to the LM, the crew was tired, but happy with their day; they spent 7 hours, 23 minutes and 26 seconds on this second EVA, breaking a record set on Apollo 15. It was time for dinner and another sleep period.

EVA-3, Return to Lunar Orbit

The final EVA for Young and Duke was an excursion to the North Ray crater, located 2.7 miles away from the LM. As they got closer to this crater, there were more and more large boulders in the area. After arrival, they visited a boulder that was taller than a four-story building (dubbed "House Rock") and obtained samples from the boulder. These samples were the final nail in the coffin of the theory of volcanic origin for the Descartes Highlands area of the moon. The huge boulder was riddled with micrometeorite impact holes; the crew spent over an hour in this area documenting the landscape and gathering samples.

They traveled on to Station 13, a huge boulder field 0.31 miles from the North Ray crater, setting a speed record of 10.6 mph on the LRV, going mostly downhill (this speed record was broken by Gene Cernan on Apollo 17). Stopping at a 10 foot-high boulder, they were able to sample soil that is permanently in shadow. After a Lunar Rover excursion with a total time of three hours and six minutes, they returned to the LM, offloaded samples and completed a few more experiments. Duke walked a short distance away and placed a photo of his family and an Air Force commemorative medal on the surface. Young drove the rover to a point about 300 feet east of the LM so that its television camera could witness the liftoff from the Moon. The crew entered the LM and began preparations for liftoff.

Shadow Rock, EVA-3 Photo Credit: NASA

At 175:31:55 hours into the mission, the ascent engine on *Orion* is fired and Young and Duke are on their way back to rendezvous with *Casper*. Duke pointed a camera out the window to view their landing area as they rocketed away; Young had temporary eyesight issues due to the lunar dust all over the place and was unable to see the liftoff. The crew tried to clean up the lunar dust so that it would not be transferred to the CM.

***Casper* in Orbit; Rendezvous and Docking**

While *Orion* was on the surface, Mattingly had brought the CSM *Casper* to a higher orbit to prepare for scientific observations. These experiments and observations were hampered by a serious of annoying technical problems. The Panoramic Camera used so much power from the CSM electrical systems that it triggered the Master Alarm. The Mass Spectrometer boom did not fully retract following its initial extension (similar to a problem on Apollo 15). The Mapping Camera did not function properly, having problems with a glare shield and resulting in overexposures. The Laser Altimeter slowly lost accuracy due to reduced power and finally failed just before it was used the final time. However, Mattingly did get a lot of useful science completed and he imaged the Descartes area with *Orion* visible on the surface.

After the ascent stage of *Orion* departed the Descartes region, the rendezvous between the two spacecraft began and docking was successfully achieved as they came up on Lunar Orbit 55. The sample bags were transferred into the CM and Mission Control worked to get them a revised, shorter post-lunar operations timeline because of the on-going concerns for the SPS backup gimbal system.

Particles and Fields Subsatellite #2 was released from the SIM bay into lunar orbit after the *Orion* crew returned; this satellite was placed in a low orbit that limited the life of the satellite because Mission Control did not want them to perform an additional SPS burn, but scientists still received data for just over a month. The crew rapidly moved on to LM jettison; because of a failure to activate a required switch prior to jettison, the LM tumbled out of control and did not impact the moon for almost a year. Finally, on the 65th orbit, the SPS engine was reignited to propel *Casper* on a earth return trajectory. No problems were noted with the engine.

***Orion* Returns to Earth**

Enroute to Earth, Mattingly performed an 83-minute deep-space spacewalk to retrieve the film canisters in the SIM bay, with assistance from Duke at the CM hatch location. Mattingly also set up a unique biological experiment known as MEED (Microbial Ecology Evaluation Device), evaluating the response of microbes to the space environment.

The crew performed more experiments as they got closer to Earth and answered questions in a 20-minute press conference about the SIM. *Casper* approached Earth on April 27, jettisoning the service module and re-entering Earth's atmosphere. They splashed down at 265 hours, 51 minutes and 5 seconds after launch in the Pacific region southeast of the island of Kiritimati. The USS *Ticonderoga* had the crew on-board only 37 minutes after splashdown. The aftermath of this mission had the geologists re-evaluating the pre-flight observations they had hypothesized on the possible volcanic origins in the Descartes region; they were so certain of this outcome that dissenting views were not allowed during the mission planning. The USS *Ticonderoga* delivered the Apollo 16 CM to North Island Naval Station near San Diego. During off-loading of RCS residual fuel, a ground servicing system exploded in the NAS Hangar. 46 people were sent to the hospital due to exposure to toxic fumes and one person suffered a fractured kneecap. The explosion put a three-inch gash in one panel of the CM. The Apollo 16 CM is currently on display at the U.S. Space and Rocket Center in Huntsville, Alabama.

The second J-mission was a success, particularly in terms of the rapid problem analysis and group decision-making that allowed the landing to proceed in spite of a significant backup gimbal system anomaly in the SPS engine. NASA now turned to the final lunar mission, Apollo 17, which will be explored in the fourth quarter 2022 MARS STAR edition.

John W. Young Biography

A detailed biography of the legendary John Young can be found in the MARS STAR History Corner in the Q3 2021 edition (from the STS-1 profile). John Young was a veteran of six spaceflights (two Gemini, two Apollo, and two Space Shuttle) and was one of the only astronauts so far to fly four different spacecraft.

Charles "Charlie" M. Duke, Jr. Biography

Charles Moss Duke, Jr. was born in Charlotte, North Carolina on October 3, 1935. His father was an insurance salesman and his mother Willie Catherine worked as a buyer for Best & Co. He has an identical twin brother, William Waters (Bill) Duke. His father served in the Navy during WWII and the family briefly lived at the North Island Naval Station in San Diego. After the war, they settled in Lancaster, South Carolina and Charlie's sister Betsy was born in 1949.

Charlie and his brother Bill enjoyed making model airplanes; Bill had a congenital heart defect that kept him out of sports and led to a career in medicine, but they enjoyed golfing together. Charlie earned an Eagle Scout rank and decided he wanted to pursue a military career. He asked a local Congressman for a nomination to the US Naval Academy and was advised to go to a military prep school; he attended Admiral Farragut Academy in St. Petersburg, Florida for the final two years of high school, graduating as valedictorian in 1953. He was accepted to the USNA class of 1957.

Duke entered the Naval Academy and did a two-month cruise on the escort carrier USS *Siboney*; unfortunately, he suffered from seasickness and began to question a career in the Navy. He enjoyed a flight on an N3N seaplane and started thinking about a career in aviation. He applied to be transferred to the US Air Force (the new academy would not graduate a class until 1959). He was accepted, although a commissioning physical found that he had minor astigmatism, which would have precluded a naval aviator career. He was commissioned as a second lieutenant in the Air Force in June, 1957.

Duke's flight training took him to Spence Air Force Base in Moultrie, Georgia and then Webb Air Force Base in Big Spring, Texas, flying T-33 Shooting Star jet aircraft. He graduated near the top of his class and picked his next assignment as a fighter pilot doing advanced training in the F-86 Sabre. He had his choice of follow-on assignments and went to the 526th Fighter-Interceptor Squadron at Ramstein AFB in West Germany, at the height of the Cold War. After his three-year tour of duty, he wanted to further his education and was offered a place in a Master of Science program in Aeronautics and Astronautics at MIT. While he was in Boston, he met Dotty Meade Claiborne; they became engaged in 1962 and were married on June 1, 1963.

Duke's grades slipped while courting Dotty, but he did team up for a dissertation on Apollo guidance system statistical analyses with a classmate. Their work earned them an "A" and Duke received his Master of Science in May, 1964. Duke applied at the USAF Aerospace Research Pilot School and, to his surprise, he was accepted. Chuck Yeager was the commander at that time and Duke's 12-member class included Al Worden, Stuart Roosa and Henry Hartsfield. His first child was born at Edwards AFB hospital in 1965 (Charles Moss Duke III).

On September 10, 1965, NASA announced the recruitment of a fifth group of astronauts. Duke investigated this opportunity and was informed by his superiors that there were two astronaut program selections in work: One for NASA and one for the USAF MOL (Manned Orbiting Laboratory) program. He was told he could apply to both, but MOL would probably grab him. He applied to NASA only, as did Worden and Roosa. He passed the physical examinations and no trace was seen of his astigmatism. He went through a week-long interview process with a number of NASA astronauts on a selection panel (including John Young) and was selected as one of the 19 new astronauts on April 4, 1966; Mattingly was also in that group. He and his family moved to Texas, worked on having a house build in El Lago, Texas, and his second son Thomas was born in May.

Duke plunged into the astronaut training courses, with heavy emphasis on orbital mechanics, astronomy and geology. After training, he and Roosa were assigned to oversee the development of the Saturn V launch vehicle; he also participated in Mission Control on the launches of Gemini XI and XII in 1966; he was personally responsible for the Titan II booster. He received his choice assignment as a Lunar Module specialist and helped with a combustion instability problem in the ascent engine. He worked on the support crew for Apollo 10 and served as CAPCOM for the LM activities on that mission; he reprised that role on Apollo 11, saying the famous words: "Roger, Tranquility, we copy you on the ground. You got a bunch of guys about to turn blue. We're breathing again!" after Apollo 11 LM *Eagle* landed. Duke was assigned to the backup crew for Apollo 13; he worked many hours in the simulators with Young and Mattingly on developing emergency procedures for the crew. Duke was the culprit who caught Rubella just before the Apollo 13 mission launched, resulting in a swap of Swigert for Mattingly (who was not immune). He was called "Typhoid Mary" by his compatriots.

Duke was assigned to the primary crew on Apollo 16 on March 3, 1971. While doing geology training in Hawaii in December, 1971, he caught a nasty case of the influenza and developed double pneumonia. Fortunately, the processing of Apollo 16 was delayed (see main article) and he recovered to participate in the mission. He is the first twin to fly in space; a brouhaha happened during the pre-launch quarantine when they thought Charlie had broken protocol. It turns out his brother Bill, there for the launch, was the one who was seen by NASA Administrator Rocco Petrone.

After Apollo 16, Duke served as the backup LMP for Apollo 17. After Apollo ended, there was a only a slim chance that Duke would fly again, so he retired from NASA on January 1, 1976. He entered the Air Force Reserve and retired as a Brigadier General in 1986. Duke did a variety of retirement activities, including owning a Coors distributorship in San Antonio (he and his wife still live in that area). He also consulted for Lockheed Martin. In 1978, Duke became a committed born-again Christian and credits this with saving his marriage and his relationship with his children and he is active in Christian ministry (his wife Dotty also became a born-again).

Duke received the usual raft of awards and honors, including honorary doctorates, awards from the USAF and NASA and induction into the US Astronaut Hall of Fame in 1997. As of this writing, Charlie Duke and his wife are still alive.

Thomas "Ken" Mattingly, II. Biography

Mattingly was born on March 17, 1936, in Chicago, Illinois. His father was hired by Eastern Airlines soon after Ken's birth and the family moved to Hialeah, Florida. Aviation became a part of Ken's life from a young age. Ken was active in the Boy Scouts, graduated from Miami Edison High School in 1954, and went on to get a BS degree in Aeronautical Engineering from Auburn University in 1958.

Mattingly joined the US Navy as an Ensign in 1958 and received his aviator wings in 1960. He was assigned to the Attack Squadron3 35 at NAS Oceana, Virginia and flew A-1H Skyraider aircraft aboard the USS *Saratoga*. In July, 1963, he moved to NAS Sanford, Florida. He accompanied a fellow officer on an aerial reconnaissance mission to photograph the launch of Gemini 3 from Cape Canaveral (with future Apollo 16 commander John Young). Mattingly wanted a career in the Naval Test Pilot School at Patuxent River, but was unable to get an appointment there. He did manage to obtain a place in the Air Force test pilot school at Edwards AFB. One of his instructors was Charlie Duke and Henry Hartsfield was a fellow classmate; Hartsfield flew with Mattingly on STS-4 in 1982.

When the opportunities arose to apply for the NASA or USAF MOL programs, Mattingly and Edgar Mitchell chose the latter and were rejected. However, their applications were accepted by NASA. Mattingly felt that he blew the interview process by making negative statements about the F-104, but he was informed by Deke Slayton that he had successfully passed the process and was now an astronaut.

Mattingly served as part of the support crew for Apollo 8 and trained in parallel with Bill Anders as backup for Apollo 11 CMP. He was assigned as primary CMP for Apollo 13, but was removed from the mission due to exposure to Rubella (Charlie Duke's fault!) and replaced by Jack Swigert. He played a critical role in figuring out how the crew could conserve energy during re-entry. He was then assigned to the primary crew of Apollo 16 and performed admirably during the significant problems that occurred that almost aborted the lunar landing.

After Apollo 16, Mattingly served in various astronaut managerial positions on the Space Shuttle development program. He was assigned to command the last test flight of *Columbia* with Henry Hartsfield as the pilot. I was at Cape Canaveral in 1982 when STS-4 launched on June 27 and was able to see the launch with a co-worker from the NASA causeway. The STS-4 mission completed 112 orbits and performed a variety of experiments, demonstrating that the shuttle system was ready for "prime time".

Mattingly also commanded STS-51-C, that launched on January 24, 1985 with a DoD mission using a modified Inertial Upper Stage. The crew included Loren Shriver, James Buchli, Ellison Onizuka, and Gary Payton.

Mattingly retired from NASA in 1985 and from the Navy in 1986, reaching the rank of Rear Admiral. He worked as a director of Grumman's Space Station Support Division, then headed the Atlas Booster program for General Dynamics in San Diego. At Lockheed Martin, he was a Vice President in charge of the X-33 space plane program development and recently worked at Systems Planning and Analysis in Virginia. He is an advocate of the commercialization of space.

Mattingly received many awards and honors, including induction into the US Astronaut Hall of Fame in 1997. He married Elizabeth Dailey in 1970 and they had one child. As of the writing of this article, Mattingly is still alive.

Resources and Links

Apollo Flight Journal: https://history.nasa.gov/afj/

Apollo Lunar Surface Journal:
https://history.nasa.gov/alsj/a16/a16.html

Apollo 16 Mission report:
https://www.hq.nasa.gov/alsj/a16/A16_MissionReport.pdf

Wikipedia: Astronaut Biographies, general overviews of the mission:
https://en.wikipedia.org/wiki/Apollo_16

Next Edition

In the next MARS STAR, I will highlight the discussions from the Titan/Centaur Cassini Roundtable that was held on May 12, 2022. The 25th anniversary of that critical launch and planetary mission is October 15, 2022. Later MARS STARs into 2023 will have articles on Apollo 17, Skylab 1 (Skylab launch) & 2 (first lab crew), Mercury/Atlas 7-9 missions, and Skylab 3 &4 (second and third crews).

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)

Come play bridge with us! It is social, not tournament bridge, with light conversation while we play. All MARS members and their guests are welcome. With a few exceptions, we normally play on the **3rd Friday of each month at the Buck Community Recreation Center in Littleton from 10 AM to 2 PM.** The next quarter, we are scheduled to play on 15 July, 26 August (4th Friday), and 16 September.

You'll need to pack a lunch, as we stop midday to eat and then resume playing. 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 Holiday party).

Come and join us by calling at least a week ahead to reserve a place at the tables.

This quarter we welcome our newest players, Betty Hirst & Wayne Jackson. There is still room for more players, as the room will accommodate 8 tables.

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

If you want to join us for bridge, or 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

The 2nd Quarter 2022 winners are as follows:

April 22 (4 tables)
1st – Ed & Laurie Bock
2nd – Ernie & Cecile Berliner
3rd – Curt & Phyllis Brudos
4th – Dave & Kathy Martz

May 20 (2 tables) mostly snowed out
1st – Jack & Margie O'Boyle
2nd – Bill & Mavis Kacena
Tied with Ed Bock & Amy Hefestay

June 16 (5 tables)
N-S 1st – Bill & Mavis Kacena
2nd– Ernie & Cecile Berliner
E-W 1st – Betty Hirst & Wayne Jackson
2nd– Leo Johnson & Joni Rosenburg

Car Club

By Roger Rieger
(rrieger10731@gmail.com)
303-912-6217

Carol Lovelace
(cyberbear51@comcast.net)
303-358-7459

Greetings MARS members and fellow Car Clubbers! Summertime is here! To paraphrase an old print ad - have you "made dead bugs fast" on the roads lately?

Bonus points if you know the car advertised in the ad. Colorado has a short "bug splatting" season so what are you waiting for?
Several club members got together at the Highlands Ranch Classic car show, there were many other beautiful cars on display. Cars and Coffee at Cornerstone is still held the first Saturday of every month from 8-11am, if you're able to come out and join your fellow MARS members. The Car club was planning a visit to the Carroll Shelby Museum in Boulder CO in May; however, not enough club members were able to join so that event is back in the planning queue. Like all good ideas, we just need someone willing to organize (thanks Carol) and then club members to participate! The club is still planning for our annual car show held in conjunction with the MARS Picnic. Stay in touch with the Car Club through our MARS Car Club Facebook page, MARS Associates website link, or by contacting either Carol or myself to get added to our email distribution.
Happy motoring and hope to see you soon at a club event! There is nothing special you need to do to join the MARS Car Club, all it takes is to be a MARS member in good standing, and a desire to have fun! If you are interested in joining the club, please drop either Carol or myself an email, we'd love to have you!

Dinner Club

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

We have had 3 very good events so far this year. Outback Steakhouse was well-attended and liked by all. In May, we went to Red Lobster. Their staff did a great job of keeping everyone happy and everyone enjoyed the food and company. For June, we enjoyed a private lunch at Zest. We almost filled up the restaurant since it was too hot to sit on their lovely patio. The food was great. It was great catching up with friends. July will find us at Café Jordano for lunch. We look forward to seeing everyone there.

The following events have been scheduled for the rest of the year:

1. August 16th at Imperial Chinese in Denver
2. September 19th at Black-Eyed Pea in Englewood
3. October 31st at Maggiano's Little Italy in Englewood

For this year, we have combined the October and November events into a single event. This works nicely since Maggiano's is more expensive than we would normally budget for a monthly event; however, we had several people request Maggiano's, so we decided it was time to go back.

We want to encourage anyone who is interested to join us for any of the luncheons. Please send us an email so that you can be added to our mailing list. Note that we are now mailing out the flyers to everyone on our email list, even in advance of the STAR being published. This change was made at the request of our attendees so that they could have more time to plan for the Dining Club events.

On a different note, we have decided that we need to stop doing this full-time by the end of the year. With everything that has occurred over the last 2 years, we are really burned out. Consequently, we are looking for someone to take over the Dining Club, whether full-time or part-time. It would involve deciding on restaurants, scheduling them, and collecting the money. If you, or anyone you know, is interested, feel free to email us or contact either Dick Sosnay or Ken Marts. Their contact information is on the MARS website.

Golf League

By Bo Rodriguez
(boandpat@comcast.net)

Sandy Mossman
(smoss5592@gmail.com)

Our golf league season thus far has had good weather with no cancellations. The remaining season from July through the month of October should provide us good weather so we look forward to enjoying twelve team events (4 team scramble, 2 team best ball, 4 team 2 best ball, 4 team Cha Cha Cha, 4 team Lone Ranger, 4 team Shamble) and six individual events (based on individual stroke play and Modified Stableford). On August 18th and 25th we will have our combined two-week annual individual stroke championship tournament paying low net winners, closest-to-the-pin winners on all PAR 3 holes, and we will award the medalist trophy to the low gross score player. In order for a tournament member to win placement prize money (top six places) they must play in both weeks of the tournament. There is also a celebratory picnic scheduled post-golf on the last day of the tournament for prize awards and socialization.

Broken Tee Golf Course has a new restaurant operation called Wyatt's at Broken Tee. It is now open for a

selection of grab-and go-items including sandwiches, salads and assortments of soft beverages and snacks. Wyatt's is waiting for final approval for full food services and a liquor license. Effective June 1st, Broken Tee imposed a slight rate increase for green fees. Senior rates for weekday eighteen holes of golf went up $2 to $28. Slight increases for non-seniors, golf carts and driving range balls were also put in place.

Our league currently has 51 members (eight women and 43 men). If you and/or your spouse enjoy playing golf and would like to join our league, or experience play as a guest player, please feel free to contact either one of us at the email addresses listed above. We encourage you to log on to our MARS website: www.marsretirees.org and click on "Golf" to get a complete update on our league activates, membership and much more. You will see that our past weekly result shows women and men throughout our high to low handicap index system have won prize money in varying flight categories.

Hiking Club

By Sue Janssen
(susan.g.janssen@gmail.com)

The hiking club is getting back on the trail.On June 2, 2022 seven members of the MARS hiking group went to Sandstone Ranch, one of Douglas County's newer open spaces. We had been there, as a group, in October 2019 for a guided private tour before trails were built and the ranch was open to public use. It was time to return and check out the new trails! We hiked the Gambel Oak/ Sandstone Meadow Trail, under 4 miles (in perfect weather) in some places being just across a fence from the cattle which still graze the ranch. The shorter Juniper Valley Trail has a sign post for the county's Decode Outdoors program: visit eight of the open spaces and parks to win a prize! Afterwards we went to Charritos House in Larkspur for lunch.

Hikers at Sandstone Ranch: Don Foley, Norman Luepschen, Debbie and Bob Adamoli, Lee Janssen and host Vicky Eberhardt. (photo by Sue Janssen)

At times the well-planned trail winds through stands of Gambel oak

.

This is prime hiking season! 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!

Photography Club

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

The MARS Photo-Club does not meet during June, July, and August. We resume normal club operations in September. Please check our MARS Information on the MARS Retirees home page under the Photo-Club tab. Regards, John Chapter. Have a nice summer

Colorado Springs Lockheed Martin Retiree Group News

By Doug Tomerlin
(dougincs@aol.com)

Our Colorado Springs retiree group did not sponsor any group activities since the last newsletter. The last luncheon on Tuesday, March 29 at Cheddars Scratch Kitchen had good attendance. We are hoping to have another luncheon later this summer or early fall.

We were sad to hear that fellow retiree George Mineah passed away in June 2022. Our deepest and condolences go to his family and friends.

If you would like more information about the Colorado Springs Lockheed Martin Retiree Group or luncheons, please contact Doug Tomerlin at dougincs@aol.com.

Cape Canaveral News

By Dick Olson
(olsons5145@aol.com)

Luncheons

April 2022 – via Abe Smith's notes: We had a decent turnout. Present were: Me, Wendel MacDanial, Roger Wright, Don Bollinger, Cecil Snipes, Allison Kallson, Darryl Laws, Laverne Wilcox Jones, Sylvie Sansing, Bob Rodamer, and Wilbur (or William – not sure which – ask Roger) Sadler. Lots of discussion around the table. Bob brought some more pictures from the earlier days at the cape – always back to the BOMARC/ Redstone days. The only news was that Tom Nelson was in the hospital undergoing tests related to an irregular heartbeat and respiratory problems. He is doing well and it appears to be an A-Fib problem. He is being treated and expects to be discharged Friday. Dick -- you were missed and everyone says good luck.

May 2022 -- A real light turnout this month. Present were Bill Rhode, Wendell McDaniels, Dave Kintigh, Abe Smith, Bob Rodamer, Cecil Snipes and Laverne Jones.

Cecil said that he had stopped by Danny Wyatt's to see if he could make it to the luncheon but he wasn't able to. He did send his regards to everyone. Cecil also updated us on Butch and Leatha Ford and they are getting by. Butch has trouble getting around, bad knee, but he still makes it to the monthly poker game along with Cecil, Gerry Geeser, Jack Corfield and Don Jacobs amongst others.

Talked to Lynn Johnson and she is slowly recovering from a fall. Hope she gets better soon.

This Sunday is Mother's Day so Happy Mother's Day to all you mothers.

June 2022 -- Another light turnout this month. We talked about hanging it up but the consensus was to keep plugging along as long as Kay's doesn't have a problem providing us with the back room. Present this month were Wendell McDaniels, Abe Smith, Roger Wright, Ken Webb, Don Bollinger, Dave Kintigh, Bill Rhode and Bob Matschner.

Roger announced that both Lynn Johnson and Cathy Klein would join us next month without fail. Looking forward to seeing them.

Don Bollinger has some info on Health Advocates that he wants to pass on. He will sent me an e-mail and I will forward it to the troops.

All you fathers have a happy Father's Day this month.

July 2022 -- Another small turnout this month. Everybody must have played too hard over the 4th. Did hear of a couple COVID cases and COVID exposes and everyone effected was playing it safe. Present were: Cecil Snipes, Abe Smith, Roger Wright, Ken Webb, Jimmie Weddle and LaVerne Jones.

I was out of town for about 20 days and tried to go back and review the obituaries on-line but not sure how thorough it was. If any of you notice the passing of a Titan Team member, or other news, let me know and I will pass the info along.

Have a good July and hope to see you next month,

Recent Obituaries

William "Bill" Trudeau, 82, passed away on Friday, 20 May. He came to Lockheed from Atlas but worked many years for Titan in the warehouse as a Quality Engineer.

William "Matt" Masterson, 87, passed on Monday, 6 June. Matt ran the EM Lab for as long as I can remember and was a jack-of-all-trades. He could build/fix almost anything and was always willing to jump in and help.

Lockheed Martin (LM) News

LM to Produce Eighth THAAD Battery

LM has received a contract totaling $74 million to produce the Terminal High Altitude Area Defense (THAAD) Weapon System for the Missile Defense Agency (MDA). It's expected to be fielded by 2025.

"With 16 of 16 successful flight test intercepts and recent combat success clearly documenting the effectiveness of THAAD, adding an eighth battery will further enhance

readiness against existing and evolving ballistic missile threats."

THAAD is a highly effective, combat-proven defense against short, medium and intermediate-range ballistic missile threats. THAAD is the only U.S. system designed to intercept targets outside and inside the atmosphere. The system uses Hit-to-Kill technology to destroy a threat with direct impact neutralizing lethal payloads before they reach protected assets on the ground. THAAD continues incremental capability improvements within the weapon system to continually improve capability against current and emerging threats.

United Launch Alliance (ULA) News

ULA Successfully Launches the Boeing CST-100 Starliner

A United Launch Alliance (ULA) Atlas V carrying Boeing's CST-100 Starliner spacecraft on Orbital Flight Test-2 (OFT-2) to the International Space Station (ISS) as part of NASA's Commercial Crew Program, lifted off on May 19 at 6:54 p.m. EDT, from Space Launch Complex-41 (SLC). The Atlas V rocket delivered the Boeing Starliner spacecraft to a 98-nautical mile sub-orbital trajectory. Following separation from the Atlas V, the Starliner engines ignited to put the Starliner on its orbital path toward the ISS.

Producing more than one and a half million pounds of thrust at liftoff, the Atlas V configuration was modified specifically for the Starliner spacecraft – it does not include a payload fairing. Instead, the Starliner's own protective surfaces take the place of the fairing to protect the uncrewed spacecraft during launch and ascent. The Starliner is attached to the Atlas V using a launch vehicle adapter (LVA), which includes an aeroskirt to reduce aerodynamic loads on the vehicle. The Atlas V booster for this mission is powered by the RD AMROSS RD-180 engine. The Atlas V Centaur is powered by dual Aerojet Rocketdyne RL10A-4-2 engines, each producing 22,600 lb of thrust. The Centaur upper stage includes an active Emergency Detection System (EDS) that monitors the health of the rocket throughout the flight. The EDS also provides critical in-flight data that supports jettison of the ascent cover and initiates Starliner spacecraft separation.

IN THE NEWS

Compiled by Pete Harrigan

The following news headlines are drawn from open-source publications, as noted parenthetically. Click on the hyperlink to access the full article. Please note that some links may not work for all readers. Some sites may require a paid subscription or a login for free access. Other paywall sites may limit the number of free articles you are able to access each month.

CORPORATE NEWS

Lockheed Martin posts mixed results in first quarter, affirms full-year outlook (Investor's Business Daily)

Lockheed Martin declares third quarter 2022 dividend (Company news release)

Lockheed Martin offloads another $4,3 billion in pension liabilities (Pensions & Investments)

Rising rates benefit pension funding further in 2022 (Pensions & Investments)

"21st Century Security" becomes Lockheed Martin's driving vision of the future (Forbes)

Lockheed Martin secretly worked to block Airbus' influence in Washington, while teaming on a major Pentagon bid (Defense One)

Aerojet Rocketdyne reprimands chairman over attempt to oust CEO, failed Lockheed Martin merger (Defense News)

Aerojet CEO says chairman offered Hermes bag to tweak Lockheed Martin deal (Bloomberg News)

Defense firms push Congress for defense budget increase over inflation (Defense News)

Lockheed Martin among companies supporting Biden's 3D manufacturing push (The Associated Press / Arkansas Democrat-Gazette)

Defense execs say industry should collaborate to jump-start joint all-domain command and control (Air Force Magazine)

Indian government clashes with foreign defense sector over offset demands (Defense News)

Connecticut offers $75 million in tax incentives to keep Lockheed Martin's Sikorsky business in the state (The Associated Press / Defense News)

Lockheed Martin Canada's first female CEO discusses F-35, objections to arms companies, investing in AI (Toronto Star)

Boeing becomes latest defense giant to move its headquarters close to the Pentagon (Military,com)

Raytheon moving corporate headquarters to DC area, joining other defense primes (Breaking Defense)

Spaceplane company Sierra Space names former Skunk Works boss as COO (Aerospace Manufacturing)

Norman Mineta, former congressman, Cabinet officer, Lockheed Martin executive, dies at 90 (Washington Post)

Man, 62, who died by suicide at Lockheed Martin gate was an aircraft mechanic on leave (Fort Worth Star-Telegram)

MISSILES AND FIRE CONTROL NEWS

Biden visits Lockheed Martin plant as weapons stockpile strained (The Associated Press / Defense News)

Taiclet, in CBS interview, says Lockheed Martin aims to double Javelin production, seeks supply chain "crank up" (Defense News)

Amid Ukraine crisis, Lockheed Martin-Raytheon partnership gets $309 million for Javelins (Breaking Defense)

U.S. will send Lockheed Martin's HIMARS precision rockets to Ukraine (Defense News)

Poland eyes 500 HIMARS launchers to boost its artillery forces (Defense News)

U.S. Army's autonomous HIMARS moving forward, will be at Project Convergence (Breaking Defense)

Lockheed Martin in talks with Pentagon on Ukraine weapons (Wall Street Journal)

U.S. defense contractors see longer-term benefits from war in Ukraine (Agence France Press / The Defense Post)

Lockheed Martin, L3Harris, Northrop Grumman get Stand-in Attack Weapon contracts (Air Force Magazine)

U.S. Navy kills drone with electric-powered laser for the first time (New York Post)

U.S. Army plan to replace Patriot interceptors gets a jolt in FY23 budget request (Defense News)

Industry teams move to accelerate work on MDA's next-generation missile interceptor (Defense News)

South Korea to buy more Patriot missiles, upgrade launchers (Defense News)

Lockheed Martin may repurpose its Joint Air-to-Ground Missile for air defense (Defense News)

Australian government names Raytheon, Lockheed Martin as strategic partners in guided weapons (Asia-Pacific Defence Reporter)

F-15 and F-16 jointly test Lockheed Martin Legion pod's infrared tracker (Air Force Magazine)

How the massive Lockheed Martin "flow battery" coming to an Army facility in Colorado will work (Popular Science)

HYPERSONICS NEWS

Lockheed Martin eliminated from competition for hypersonic interceptor; Raytheon, Northrop Grumman advance (Defense News)

Lockheed Martin's CEO wants to fund a hypersonic wind tunnel, but says DoD isn't buying in (Breaking Defense)

Pentagon kept successful test of Hypersonic Air-breathing Weapon Concept (HAWC) quiet amid Russia tensions (Defense News)

Aerojet Rocketdyne-Lockheed Martin partnership advances hypersonics technology with HAWC (Huntsville Business Journal)

Successful test could rally U.S. Air Force's Air-launched Rapid Response Weapon (ARRW) hypersonics program (Defense News)

Lockheed Martin tests new hypersonic weapon concept for DARPA (Space.com)

DARPA seeks funding for next phase of hypersonic weapon (Defense News)

U.S. Air Force to name newest hypersonic weapon maker by September (Breaking Defense)

U.S. Navy's next-generation, ship-killing missile will be a hypersonic weapon dubbed HALO (Breaking Defense)

5G.MIL NEWS

Intel, Lockheed Martin advance 5G-ready communications for military (Tech Times)

Northrop Grumman, AT&T partner to build 5G digital battle network (C4ISRNet)

SPACE SYSTEMS NEWS

Hubble Space Telescope detects most distant star ever seen, near cosmic dawn (Washington Post)

Hubble Telescope zooms in on the largest comet ever spotted (New York Times)

NASA confirms impending end for InSight Mars lander (Space News)

Lockheed Martin to provide additional Trident II D5 submarine-launched ballistic missiles (Military & Aerospace Electronics)

Lockheed Martin, Filecoin Foundation plan demonstration of decentralized data storage in space (Space News)

Space Development Agency's satellite contractors team up to deal with supply shortages (Space News)

Artificial intelligence tapped to fight Western wildfires (The Associated Press / Denver Post)

Lockheed Martin proposes multi-layer space network for missile defense (Space News)

DARPA moving forward with development of nuclear-powered spacecraft (Space News)

U.S. to ramp up spending on classified communications satellites (Space News)

Lockheed Martin funds two satellites to demonstrate joint all-domain operations (Aviation Week Network)

Roadmap for GPS IIIF satellite upgrade laid out by Lockheed Martin (Aviation Week Network)

Lockheed Martin releases open-source standard for on-orbit spacecraft docking interface (Space News)

Companies build up teams to compete for Artemis lunar rover (Space News)

GM, Lockheed Martin taking their lunar rover project to the commercial space market (CNBC)

Company exploring options as NASA prepares for another Artemis lunar lander award (Space News)

Lockheed Martin signs deal to use SpiderOak cybersecurity to protect satellite networks (Space News)

First UK vertical launch by Lockheed Martin, ABL slips into 2023 (Space News)

Atlas V launches Starliner on uncrewed test flight to space station (Space News)

Starliner launches to remain on Atlas V (Space News)

Northrop Grumman expects a $2 billion order from ULA for solid rocket boosters (Space News)

Space Force acquisition chief to meet with ULA and Blue Origin, expects Vulcan to launch in December (Space News)

ULA orders 116 Aerojet Rocketdyne engines for Vulcan's upper stage (Space News)

Northrop Grumman to boost production of solid rocket motors following big order from ULA (Space News)

U.S. Space Force awards five 2022-2023 national security launches to ULA, three to SpaceX (Space News)

Musk's SpaceX views for military satellite launches as defense giants reset (Bloomberg News)

ULA's Bruno says Amazon launch contracts are a "big deal" for U.S. and allies' industrial competitiveness (Space News)

AERONAUTICS NEWS

Lockheed Martin is delivering F-35s late, but the Pentagon is also buying them too quickly, GAO says (Defense One)

U.S. Air Force cuts F-35 buy, but "would buy more" if resources allowed, official says (Air Force Magazine)

U.S. Navy slows F-35 orders amid rising readiness grades of its fighter fleet (Defense News)

Inflation, supply problems could push F-35 cost higher than expected, Lockheed Martin says (Defense One)

Pentagon wants $500 million to get F-35 parts data, set up organic supply chain (Breaking Defense)

F-35 sustainment is improving, but lawmakers' patience is growing thin (Air Force Magazine)

Lockheed Martin to redesign F-35 panoramic display electronics to blunt effects of component obsolescence (Military & Aerospace Electronics)

NATO planners put the F-35 front and center in European nuclear deterrence (Defense News)

Amid Russian aggression, Lockheed Martin leaders say F-35's value is on display (Fort Worth Star-Telegram)

Manned-unmanned teaming eyed for F-35 Block 4 (Aviation Week Network)

Germany and Lockheed Martin "sprint" for F-35 contract finalization (Aviation Week Network)

Canada picks the F-35 (again!) in fighter replacement competition (The Associated Press / Defense News)

Finnish Finance Ministry clears F-35 buy amid higher spending on pandemic, Ukraine (Defense News)

Greece seeks to join F-35 program as it lobbies against Turkey F-16 sale (Defense News)

Lockheed Martin F-35 plant machinists approve new contract with pay raises (Dallas Morning News)

Boeing's F/A-18 outshines Lockheed Martin's flashy hypersonic jet in "Top Gun: Maverick" (Defense One)

Does Lockheed Martin's stealthy SR-72 Darkstar spy plane have a cameo in "Top Gun: Maverick"? (Space.com)

Congress signals openness to Turkey F-16 sale amid Ukraine cooperation (Defense News)

Jordan orders eight F-16 Block 70 fighters (FlightGlobal)

U.S. Air Force wants to retire nearly three dozen F-22s at Tyndall AFB (Defense News)

KAI strengthens T-50 marketing cooperation with Lockheed Martin (Aviation Week Network)

Lockheed Martin claims record-breaking endurance flight of lightweight drone (FlightGlobal)

U.S. Air Force "bridge tanker" competition looking less likely (Aviation Week Network)

NASA's experimental X-59 supersonic jet returns to California for assembly (Space.com)

Safran announcement hints at secret Lockheed Martin aircraft (Aviation Week Network)

ROTARY AND MISSION SYSTEMS NEWS

Lockheed Martin awarded $3.3 billion to commence full-rate production of new counter-fire radar to protect against artillery, drones (Military-Aerospace Electronics)

Fresh off U.S. Air Force Three-Dimensional Expeditionary Long-Range Radar win, Lockheed Martin eyes Norway, other international buyers (Breaking Defense)

Lockheed Martin delivers first five A4 radars to the Army (Breaking Defense)

Lockheed Martin blends AI decision aide, virtual Aegis combat system in drill near Guam (Defense News)

Lockheed Martin's Sikorsky wins $2.3 billion U.S. Army Black Hawk multi-year contract (Defense News)

The upgraded Marine One helicopter will still scorch the White House lawn (Task & Purpose)

Industry teams aim to fly prototypes of future attack recon aircraft by end of 2023 (Defense News)

U.S. Marine Corps declares its new heavy-lift helicopter operational (Defense News)

Germany chooses Boeing over Sikorsky for new heavy-lift helicopter (Reuters)

U.S. Air Force's new Jolly Green II combat rescue helicopter begins operational testing (Defense News)

Post-Afghanistan, U.S. Air Force to buy fewer HH-60W combat search-and-rescue helicopters (Defense News)

Taiwan says it cannot afford new U.S. anti-submarine helicopters (Reuters)

Victoria Shipyards' lawsuit against Lockheed Martin over New Zealand warships delayed by document review (Times Colonist)

U.S. Navy wants to eliminate nine Freedom-class littoral combat ships, end anti-submarine warfare mission for the class (Defense News)

Future USS Beloit christened (FOX 11 News)

The littoral combat ship's latest problem: Class-wide structural defects leading to cracks (Navy Times)

U.S. Navy leader floats idea of selling troubled littoral combat ships to South America (Military,com)

Space Fence now has direct link to key Space Force data hub (Defense News)

U.S. Navy to buy 18,000 multistatic sonobuoys for anti-submarine warfare; Lockheed Martin, ERAPSCO will compete for orders (Military-Aerospace Electronics)

Join Us for the Annual Rite of Summer….

2022 MARS ANNUAL PICNIC

The Officers and Directors of MARS Associates invite you, your spouse or companion, and your friends to celebrate the end of summer with an old-fashioned barbecue picnic complete with BBQ ribs, pork, and brisket plus all the trimmings, provided by Smokin' Outlaw Kitchen. There will also be water, wine and beer, and door prizes. The event will be ***Wednesday, September 14, 2022***, at **Clement Park**. The event will be in Pavilions A, B, and C located on the east side of the park (map of park is on the reverse side). The event will be held rain or shine. **The BBQ line will open at 12:00 noon**.

The cost of the picnic is $25.00 per person for members and spouse/companion and $32.00 per person for non-MARS guests. **There are two payment options**. If you wish to pay electronically, **please use the STRIPE link (CTRL+click) below**:

STRIPE: https://form.jotform.com/221805544375053

OR, if you wish to pay by check, please complete the form at the bottom of this sheet, detach it along the dotted line, and mail it with your check (**made payable to MARS Associates**) to the address on the form.

Reservations and cancellations must be received by September 6, 2022. If you must cancel, please notify Linda Duby at 303-249-1665 or lindaduby@comcast.net; Carl Kaminski at 303-726-1546 or carlkcol66@gmail.com; or Charlie Haupt at 303-725-7595 or qcrfccoach@gmail.com. Please notify one of these persons **by September 6 to receive a refund.** MARS Associates must commit to an exact number of attendees and we must pay for that number as a minimum. Admission is by reservation only. Pick up name tags and drawing tickets as you enter the picnic area. The name tags will be available at 11:00 a.m.

---------- Reservation Form (detach here) ----------

2022 Annual Picnic Reservation Form – September 14, 2022. Please print clearly.

Mail to: MARS Associates, PO Box 1128, Littleton, CO 80160-1128

Member _____ **Spouse/Companion** _____

Non-MARS Guests _____

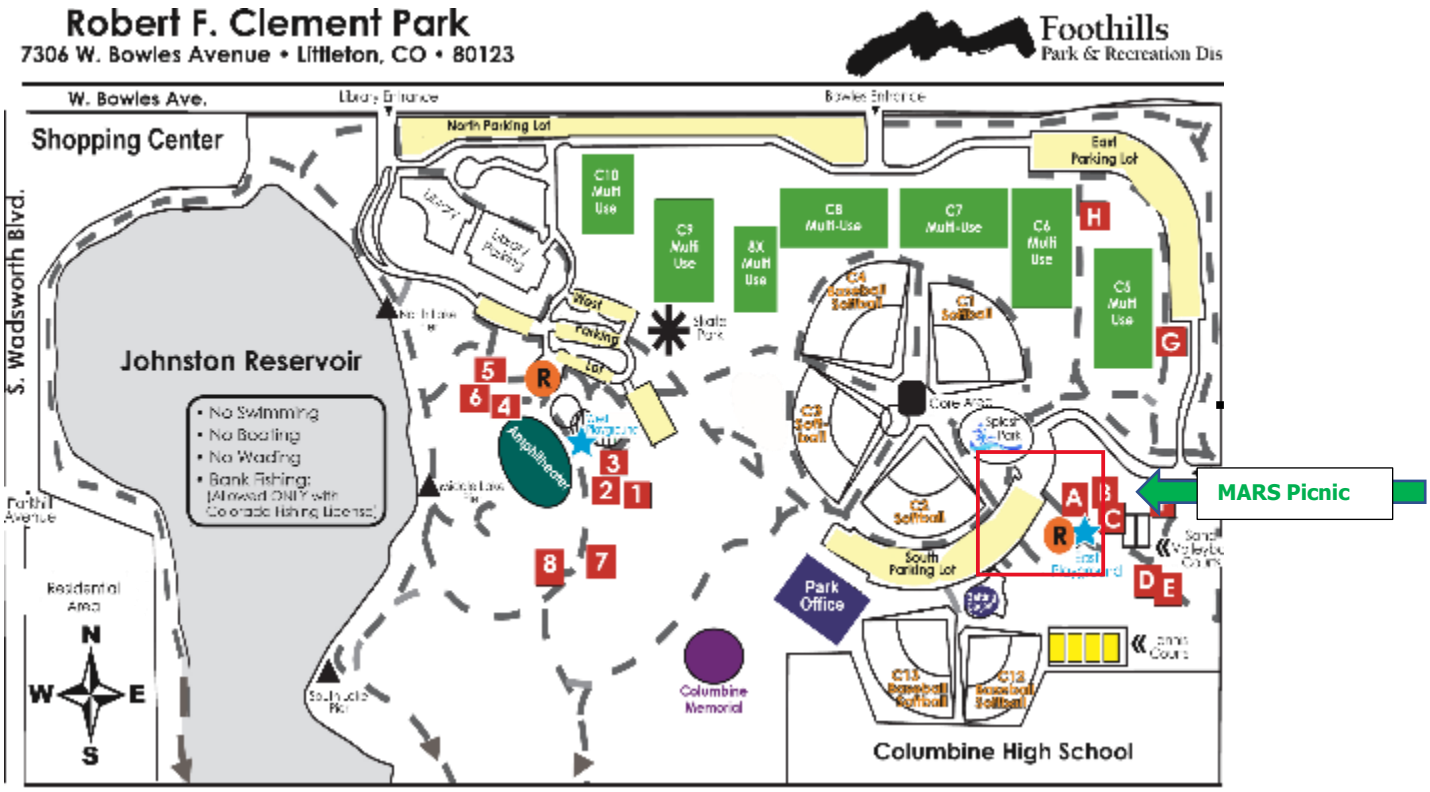
Member Phone No. _____ **E-Mail address** _____

Member/Spouse or Companion @ $25.00/person = $ _____

Non-MARS Guests @ $32.00/person = _____

Total enclosed $_____ **Check Number** _____

Special dietary needs? Contact Linda Duby at 303-249-1665 or lindaduby@comcast.net with the details.



The picnic will be held in Pavilions A, B and C.

4th Annual MARS Car Club Car Show

Wednesday, September 14, 2022
11:00 a.m. – 2:00 p.m.
Clement Park - Littleton, CO

It's that time again to dust off your jalopy and join us for the 4th Annual MARS Car Club Car Show being held in conjunction with the MARS Picnic. Roll out your 2-, 3-, or 4-wheeler and cruise on over to the park and share your ride with all the MARS members and guests. Each show entrant will receive a special gift for their participation.

The show entry fee is $15 and will be used for show expenses with the remainder donated to The Marine Toys for Tots Foundation, whose main goal is to provide Christmas toys to America's less fortunate children.

Please fill out the below form, make your $15 check payable to MARS Associates, and mail to:

MARS Associates
P.O. Box 1128
Littleton, CO 80160-1128

NOTE: Participation in the MARS Picnic is a separate registration

----------cut here----------

Club Member Name(s)_____

Non-Member Names(s)_____

Phone # _____

Email address _____

Car Year, Make, Model_____

Day of Show registration will be accepted, but we will only guarantee the special gift to pre-registered cars.

INFORMATION and REQUESTS

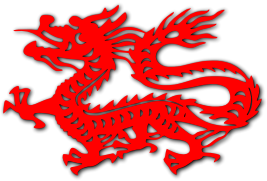
- Please arrive NLT 10:45a so we can get all cars parked safely.
- Look for the Club Banner designating the show parking area.
- Check in at the Registration table under the tent to receive your car dash plaque and gift.
- For your car's dash plaque, send a short write-up or fun story (e.g., how, why, where, etc. you acquired your car) or anything else you'd like attendees to know. Email to Carol Lovelace at cyberbear51@comcast.net Your write-up along with your name, make, model, year will be printed on your car's dash plaque.
- Further information will be posted on both the MARS Associates and MARS Car Club Facebook pages, along with the MARS Associates and Car Club webpages.
- If you have questions, please contact either Roger Rieger rrieger10731@gmail.com, 303-912-6217 or Carol Lovelace, cyberbear51@comcast.net, 303-358-7459

COME OUT AND ENJOY AN OLD FASHION DAY IN THE PARK!

Lunch on Tuesday, August 16th, 2022

Join your fellow MARS Associates for a wonderful lunch at
Imperial Chinese

431 S. Broadway, Denver, CO 80209
(see map on back)
303-698-2800
Lunch will be served at Noon.



Featuring a delicious family style lunch of wonderful Chinese delicacies including a gluten-free option, ice cream and hot tea. Cash bar for all other beverages will be available. (Tax and gratuity included.)
Seating is LIMITED to 50
$35/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 **August 8th, 2022** to

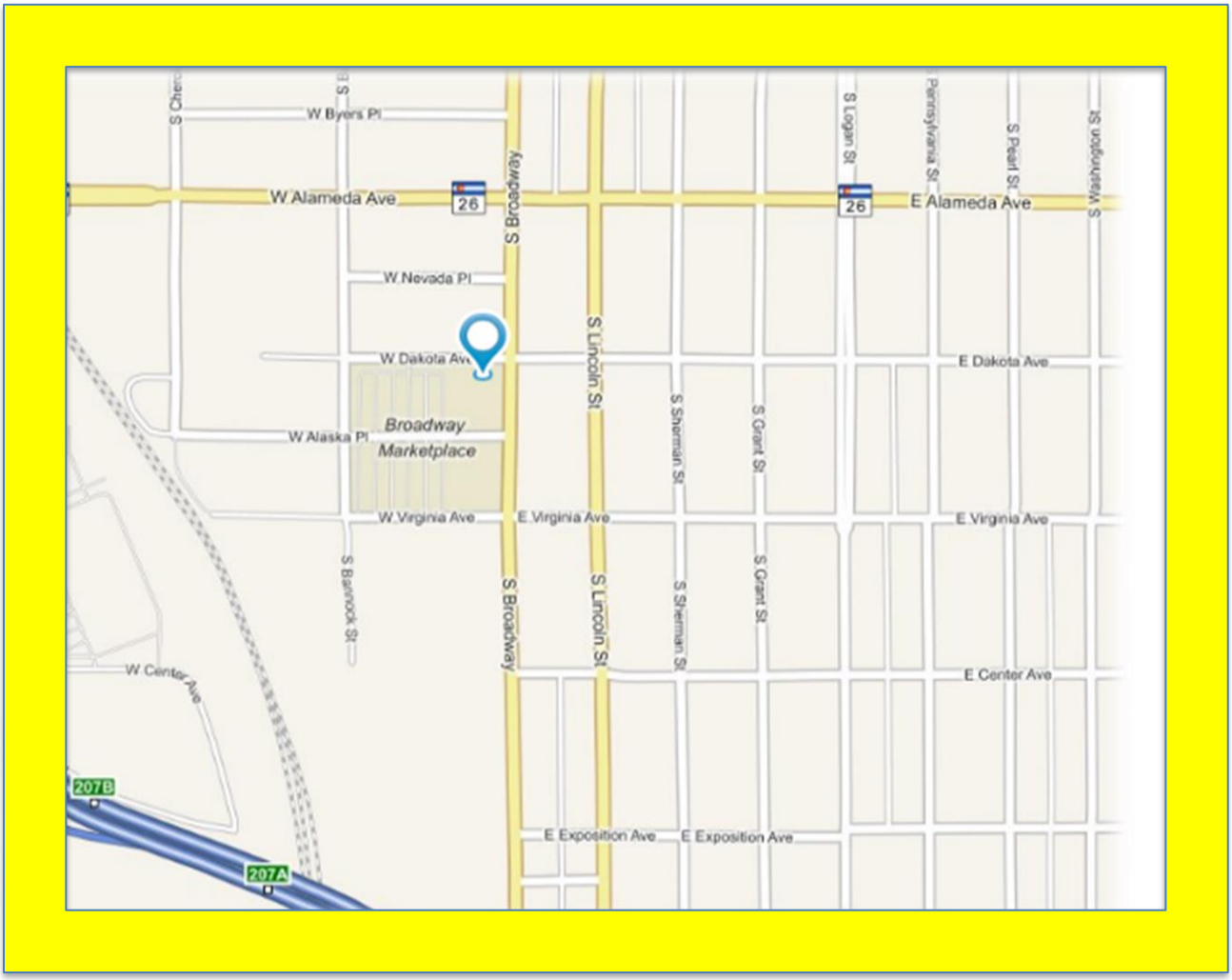
Becky and Gary Englebright
7855 S. Vance Ct.
Littleton, CO 80128
303-941-3167 or 303-263-6457
englebright@me.com

If you need to cancel, please let us know no later than August 8th to receive a refund.
If you can't get us a check prior to the cutoff date, just let us know that you are coming and be sure to bring the check or cash to the restaurant.

Lunch at Imperial Chinese on Tuesday, August 16th, 2022

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

Map to Imperial Chinese



431 S. Broadway, Denver, CO 80209
303-698-2800
Imperial is located at the northwest corner of W. Dakota Ave. and S. Broadway

Lunch on Monday, September 19th, 2022

Join your fellow MARS Associates for a wonderful lunch at

Black-Eyed Pea

5180 S. Broadway, Englewood, CO 80113
(see map on back)
303-788-1350

Lunch will be served at Noon.
Featuring a choice of entrée with two side items, dessert and non-alcoholic beverages. Cash bar will be available. (Tax and gratuity included.)

Seating is LIMITED to ~40
$26/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 **September 6th, 2022** to

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

If you need to cancel, please let us know no later than September 6th to receive a refund.

Lunch at Black-Eyed Pea on Monday, September 19th, 2022

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

- ☐ **Glazed Ham**
- ☐ **Meat Loaf**
- ☐ **Turkey Dinner**
- ☐ **Chicken Fried Steak**
- ☐ **Chicken Fried Chicken**

Also choose 1 dessert:

- ☐ **Peach Cobbler**
- ☐ **Banana Pudding**
- ☐ **Apple Crisp**

Map to Black-Eyed Pea

5180 S. Broadway, Englewood, CO 80123
303-788-1350
The restaurant is on the southeast corner of S. Broadway and E. Belleview Ave.

Lunch on Monday, October 31st, 2022

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
$39/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 21st, 2022** to

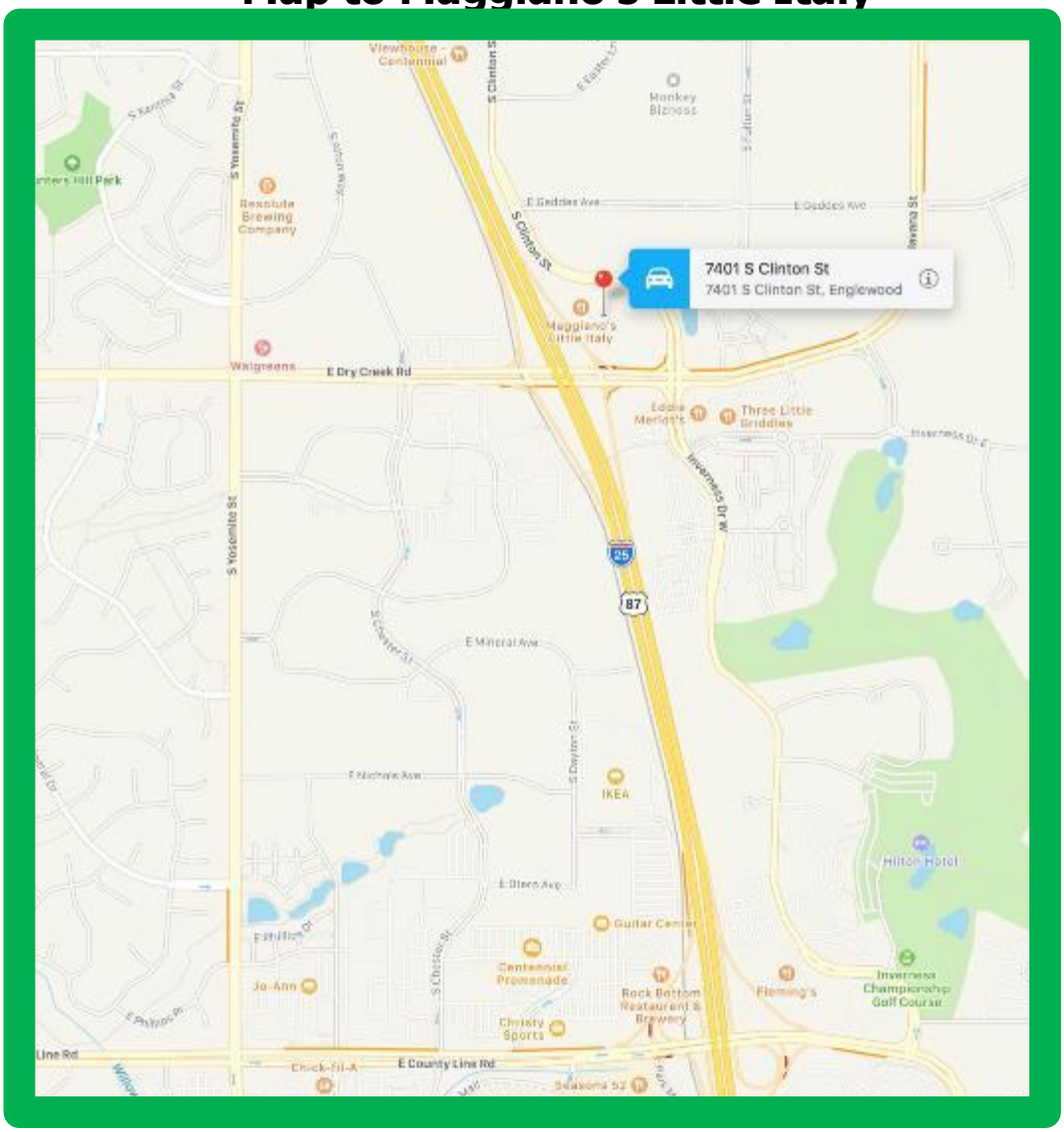
Becky and Gary Englebright
7855 S. Vance Ct.
Littleton, CO 80128
303-941-3167 or 303-263-6457
englebright@me.com

If you need to cancel, please let us know no later than October 21st to receive a refund.

Lunch at Maggiano's on Monday, October 31st, 2022

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

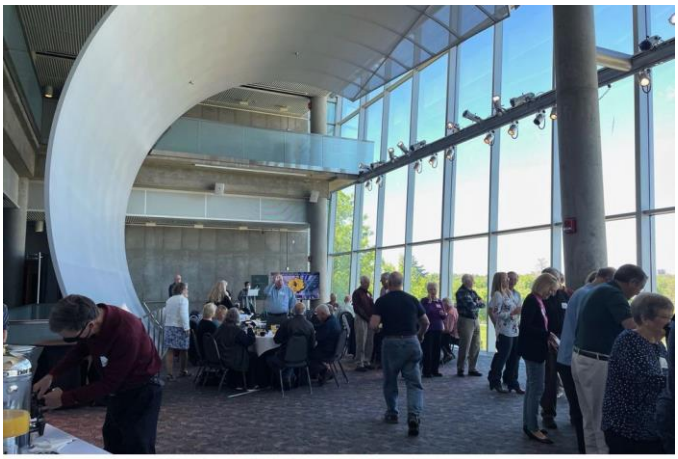
Map to Maggiano's Little Italy



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

MARS at the DMNS

Dan Ellerhorst ready for
Brunch Attendees (5/25/2022)



Moving through the buffet line

Enjoying the breakfast!

Bill Wise, Ron & PJ Slovikoski

Beth Worthington, Jeanne Eha and Ken Marts

Jack Luckow, Sandy Thimmig, Ron & Maureen Gedeon

Joel Kostyrka, Dan & Lucy Ellerhorst, Linda Duby

Shirley & John Mc Kenzie, Cindy McNamara,
Gina Curet, Roger McNamara,
Mike Bartlett, Roy Duszynski

Larry & Linda Stearns, Larry Bundy

Steve & Barb Sande, Shar Petty, Beth Worthington

Luanne & Dick Sosnay, Steve Sande

Patrick Shannon, Tom Henning, Bob & Debbie Adamoli,
Barbara & Barry Mathias (Anne Henning stepped away)

Intro to the Presentation:
James Webb Space Telescope in the Test Lab

Mary & Bill Wise, Lucy Ellerhorst

****

Are there any HO model RR enthusiasts, i.e., builders, operators, etc… out there? This might not be something big enough to form a special club or group; but maybe it could help connect people that might be interested together. If interested contact Richard Hurley at rdhurley@aol.com.

Schedule Addendum (See last page)

NOTES:

1. BOD meets as required
2. Officers/Directors meet 1st Wednesday of every month at 09:30 am.
3. Bridge Club meets 3rd Friday of every month at 10:00 am at Buck Recreation Center.
4. Car Club meets 1st Sat of every month, and as noted on their website.
5. Dinner Club (All events are lunch unless otherwise noted): Check website for details
6. Golf club meets every Thursday from April through Oct of each year.
7. Hiking Club: Outings on 3rd Wednesday of the month. Check website for Point of Contact for each hike.
8. Photo Club meets 2nd Thursday every month (except Jun, Jul & Aug) at 1:00 pm on Zoom
9. Web Committee normally meets last Tuesday of month, prior to BOD/Officer mtg, at a designated restaurant or by email.
10. Marketing Committee meets on a monthly basis as determined by members with guests invited (Typically last Thursday)

***11. 2022/2023 Happy Hour Dates and Locations are tentative; MARS website will have details when available**

12. 2022 Senior Recognition Luncheon - July 13, 2022 Ken Caryl Manor House
13. 2022 Rockies Game - July 27, 2022
14. 2022 Annual Picnic - Sep 14, 2022 at Clement Park
15. 2022 Holiday Celebration - Dec 7, 2022 at Wellshire Events Center
16. 2023 Annual Meeting is TBD

17. See MARS website (https://marsretirees.org) for additional information on these events.

Please review dates and times and notify Ken Marts (martshouse2@aol.com) if you have any changes or additions.

MARS ASSOCIATES
P.O.Box 1128
LITTLETON, CO 80160-1128

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

' ADDRESS SERVICE REQUESTED

DATE: July 2022

EVENT/MONTH	Jul	Aug	Sep	Oct	Nov	Dec	2023 Jan	Feb	Mar	Apr	May	Jun
Officers/Directors	6	3	7	5	2	6	4	1	1	5	3	7
Bridge Club	15	26	16	21	16	15	20	17	17	21	19	16
Car Club	2	6	3	1	5	3	7	4	4	1	6	3
Dinner Club	19	TBD	TBD	TBD	-	-	-	-	-	TBD	TBD	TBD
Golf Club	Thur	Thur	Thur	Thur	-	-	-	-	-	Thur	Thur	Thur
Hiking Club	20	17	21	18	16	21	18	15	15	19	17	21
Photo Club	-	-	14	13	10	8	12	9	9	13	11	8
Web Committee	26	30	27	25	29	27	31	28	28	25	30	27
Marketing Committee	28	25	29	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD
MARS Events												
Senior Recognition Lunc	13											
Annual Rockies Game	27											
Happy Hour		10*					TBD			TBD		
Annual Picnic			14									
Holiday Celebration						7						
Annual Meeting									8			
MARS Extra Events												
WingsOver The Rockies	20											
Royal Gorge Train		17										
Estes Park Observatory		TBD	TBD									
Cumbres-Toltec Train			22									
MARS STAR Schedule												
Items due for MARS STAR												
STAR Input to Editor	5			4			5			6		
STAR Repro. Deadline	18			17			16			17		
STAR Mailing	27			26			25			26		