

## **The Apollo Lunar Module Descent Engine**

*As Told By Jerry Elverum, Program Manager, at the ATD Annual Reunion November 5, 2019.*

*Recorded by Cecile Valliere, Transcribed by Bob Marohn.*

On May 25, 1961, President Kennedy announced before a joint session of Congress the dramatic and ambitious goal of sending an American safely to the moon before the decade was out. It was already a year and a half into the sixties, and it took NASA almost a full year to decide what was going to be the mission, and how they were going to get from here to the Moon.

After one year they finally decided on lunar orbit rendezvous as the way they were going to do it. Lunar orbit rendezvous meant they had to put a spacecraft in lunar orbit. They would land a Lunar Module with a descent and ascent stage. They would separate and leave the descent stage on the moon and the ascent stage would rendezvous back with the Command Module and Service Module in lunar orbit.

You had to realize at that time when Kennedy made that speech, we didn't have a Saturn 5, there was no launch vehicle. We didn't have Saturn 1. There was no second stage. And one of the key things that NASA said was we don't have a throttling rocket engine and no one has ever made one that really works and yet we have to have one to land the people on the moon. And so NASA was sitting there with time going by and it was already two and one-half years into the sixties. Since we didn't have any of these things, these were big red flags that were out there.

So, back in those days when I was working at STL, I was thinking to myself, wait a minute, you are just going to land guys on the moon but you don't have a rocket engine, you don't have a booster, you don't have a second stage. How are you going to do that? Well, back in those days, "We're going to do it" was the attitude. We just took it on and said, "We're going to do it." It isn't that we can't do it, or won't do it. We're going to do it. And so the program got going.

They had selected a descent engine from Rocketdyne because Rocketdyne was the biggest engine manufacturer in that time. But Rocketdyne was busy trying to figure out how to build the F-1 engine. They were trying to figure out how to build the S-2 engine for the second stage and how to put something under the S-4B third stage. They were busy. And in those days, nobody built engines except to drill hundreds of holes in a big plate and put a chamber on the end of it and light it off.

Combustion instability became the most dominating thing in those days. The Atlas engine had gone unstable. The Titan engine had gone unstable. All of these engines that put energy out around the edge of the engine would go unstable. So people were really afraid of that. And NASA said we are still going to pick Rocketdyne but we're really afraid. And I can remember going down to JSC and talking to Max Faget, who was the JSC chief engineer and

Robert Gilruth, who was running JSC, and this was the thing that worried them more than anything.

So they, along about the beginning of 1963, which by now we're looking at only seven years to go, they decided they wanted a backup engine. And I went to them and said we at STL want to bid on that back up engine. And they looked at me like, who are you that wants to build a backup engine for the Apollo program? But they made us, with our management, swear that if we ever won the backup we would build brand new facilities far outside of Inglewood, California, because we had had an NO2 leak back in our little rocket test facility in Inglewood, California.

So, our STL managers, Dunn and Mettler, agreed they would build a test site somewhere around the San Juan Capistrano area adjacent to Pendleton, and we would put in a facility that could test full duty cycles in vacuum, the whole bit. And once they agreed to that NASA said, OK, we'll let you bid. And they gave us three months to bid on that backup engine.

We had been running a little 500 pound variable thrust rocket engine at STL in a little facility over in Inglewood, California. We were busy throttling it 25:1 and the performance was almost flat over the whole region. It never went unstable. We had control of the mixture ratio. Because we weren't certain as to what might happen, at the beginning we were using cavitating venturis to control the flow rates while we messed around with the oxidizer and fuel injection velocities. We didn't want the pressures to be dependent on whether the flow rate was this or that.

We showed NASA all of that and they said, Will the engine go unstable? How are you going to control the mixture ratio when you didn't know what the duty cycle is going to be? And so on. And we said we're already doing that. They said, Well, that's a small engine. But if you'll scale it up we'll give you an RFP for a backup engine.

And so we scaled the thing up by a factor of ten and they gave us an RFP. We now had a 5000 pound thrust engine which we throttled 20:1 and perfectly stable. Perfect performance. The same as the 500 pound engine. And at the last minute, they said we still think that it may go unstable. Because that was the biggest worry they had. So they said you've got to scale the diameter of the chamber up because as soon as you get to a big diameter chamber it will go unstable.

So we rushed out and built a large engine out of iron and steel that was seventeen inches in diameter. And it got called the iron pig because it looked like a big pig sitting out there on the test stand. We only had a few days left when we finally installed that big iron pig and put all kinds of bomb ports in it and we could keep setting off bombs on it. And NASA and everybody showed

## TRA for Northrop Grumman Retirees

The Retirees Association (TRA) welcomes the retirees of Northrop Grumman and TRW.

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**By Mail:**

TRA, P.O. Box 1276, Redondo Beach, CA 90278

**By Phone:**

310-813-7745 for voice mail.

**By Email:**

TRA@tra-spacepark.org - Your emails will be routed to the appropriate source. And, if we have your e-mail address on file, we send out special alerts to TRA members as the need arises. To get on the TRA email list, just send us a brief email requesting to be added to it.

**By Web:**

Our website is at [www.tra-spacepark.org](http://www.tra-spacepark.org). It is an excellent source for the latest news, lists of the new retirees, travel details, party photos (more than get into the NNG), forms of all sorts, personal photographs, and much more. Register, log on, and browse.

**For Membership:**

TRA Membership is open to Northrop Grumman and TRW-legacy retirees at \$10 per calendar year. The application is available on the website.

## TRW/NG Retirees Meetings Around the US

Find a group in your area and give them a call. Changes from last edition are in **bold**.

GROUP	MEETING LOCATION	DATE & TIME	OTHER INFO	CONTACT
TRA Board Meeting	Bldg. E2/B114, Space Park	3rd Wednesday, 9:30 AM, Monthly except December	Decisions, planning and actions on archives, events, NNG, coordination with NG	All members welcome. Contact TRA prior to attendance to arrange for escort
ATD Friends & Colleagues	Send ideas for meeting location	3 November 2020, 11:00 AM	Social, Nostalgia, Lunch	Jack Trost, Dena Bouskos, Carol Schamp 310-377-2194 cschamp@aol.com
Beach Cities Get-together	Grunions Restaurant, 1501 N Sepulveda Blvd, MB, CA	Last Monday, Even months, 11 AM to 2 PM	Social	Allen Parker 310-780-0712 777allendsp@gmail.com
Brevard Retirees	Various Locations in Brevard, NC	1st Wednesday, 8 AM, 3rd Wednesday, 5 PM	Social	Tom and Vicki Moore 828-883-8080 seneca75@verizon.net, thistle33@verizon.net
Central Coast Chapter	Various Locations in the Central Coast Area	Various days: contact Zaiser for details	Social	George Zaiser 805-473-2105 gzais34@icloud.com
Houston Chapter	Baybrook Denny's, 19212 Gulf Fwy, Friendswood, TX	3rd Tuesday, 8:30 AM	Social	Gary Dinsmore 281-461-6270 samngary@att.net
Huntsville Chapter	Red Lobster	2nd Tuesday, 11:30 AM	Lunch and Social	Jim Troy 850-797-0044 jtroy28x@gmail.com
Las Vegas	Various Locations in Las Vegas Metro Area	Last Tuesday, 11:30 AM	Social	Carol Noblet 702-889-6773 cannob70@gmail.com
Northern Virginia	Old Brogue Pub, Great Falls, VA	3rd Friday, 11:30 AM	Social	Jim Miller 703-483-5448 jmiller158@gmail.com
Utah	Cracker Barrel Restaurant, Layton, UT	1st Thursday, 8:30 AM	Social	Charles Vono 801-745-5879 charlesvono@comcast.net
San Diego Chapter	Event Dependent	3rd Tuesday, Alternate Months	Social or Board Meeting	<a href="http://sandiego.tra-spacepark.org">http://sandiego.tra-spacepark.org</a> Jim Denton 858-385-0150 JWDenton@san.rr.com
Temecula Valley	J. Carter's Tavern Grill, 40365 Murrieta Hot Springs Rd, Murrieta, CA 92562	2nd Wednesday, Lunch	Social	Maureen Locken 951-818-6811 Maureen_Locken@yahoo.com
The Mountain Folks	Various Locations in the Denver Area	First week of each quarter	"We do have fun!"	Carl Winkelman 303-693-0034 winkelman@att.net
TRIN	<b>Sizzler VIP Room, 2880 W Sepulveda, Torrance</b>	<b>2nd Thursday, 1:00 PM, Optional lunch at 12:30</b>	Investment Info based on monthly newsletter reviews	Bob Eshbaugh 310-376-5880 eshonnet@yahoo.com
Ventura Romeos	Mimi's Cafe Thousand Oaks	1st Tuesday, Lunch	Social	Frank Yunger 805-444-1541, Harry Stroud 805-653-5117

*ELVERUM - Continued from Page 1*

up on our test site. It was on a Saturday morning I remember.

They were all there. We never had a chance to fire the engine before we had to do it in front of the customer. Guys like Mettler and George Solomon were not too happy about that. If we don't fire we will lose. If we do fire and it goes unstable we'll lose. If we do fire and it is stable I have a feeling we will win the backup program. So that's what we did. We fired it. We throttled it up and down. We kept changing the engine flow speeds in there and it was stable at every thrust level under every condition. That won us the backup program for the lunar module descent engine.

Then we had eighteen months to compete with Rocketdyne for the flight engine. And those were the busiest eighteen months of my life. In those days it wasn't next year we'll do it more and after that we'll try again. You either get it all done in eighteen months or you're gone. And so, we did all of that and I can remember I was briefing all of the guys from Houston and NASA headquarters, Joe Shea, Max Faget and all of the rest of them were there in a conference room at TRW.

And I was about two hours into my briefing telling them what we had done and what the engine looked like and the phone rings and the Grumman representative who had been at TRW for a long time calls up the conference room and he said we just finished a complete duty cycle and ran through everything it had to do. The performance was where it belonged, the duty cycle worked out perfectly. So I'm sitting there and go back from the phone and I tell Rube we just completed a complete duty cycle. It was like, how do you pull these things off in front of the customer at the last minute? And, as a result of that, we finally got the lunar module descent engine.

But I might add something that people didn't believe, that I don't believe myself – but what a brash young guy I was back in those days. But we were back at Grumman when they said we want to negotiate the backup engine with you. And so we took the contract manager back there and I went back there with my team, Jim Vrungos that many of you knew of course and so forth. And we argued for about six hours with Grumman up in their conference room because Grumman, like everybody else in those days, didn't have anywhere near enough money to do the program.

And people knew that they just got the bid and they got me down to a number finally and I said I just can't do the program for that. I can't make a believable case. And so I turned to Grumman and I turned to Vrungos and my contracts guy and I said were just going to have to walk away from this. I am not going to buy into that. Well of course I had read a few things prior to that about the fact is when somebody has to have something they're not going to let you walk away. So we took the elevator down to the ground floor and the entrance to Grumman and we were ready to go out and get in our car and fly back to Los Angeles. Just then a couple of guys came running in from upstairs.

They, of course, had gone immediately to Joe Gavin and Tom Kelly and said hey, these guys, we have to have a backup engine and these guys are the only alternative we can see. So they came downstairs and they said come on back and we'll do whatever we can. So we went back upstairs and argued with them for about an hour and came to a conclusion for the backup engine. But my people never got over the fact that when we got back to Space Park and they said we heard you walked out on them. How could you be so dumb? Anyway, that's a little side story. But it really jarred the management back at TRW when I had to tell Art Grant and George Solomon what we had done.

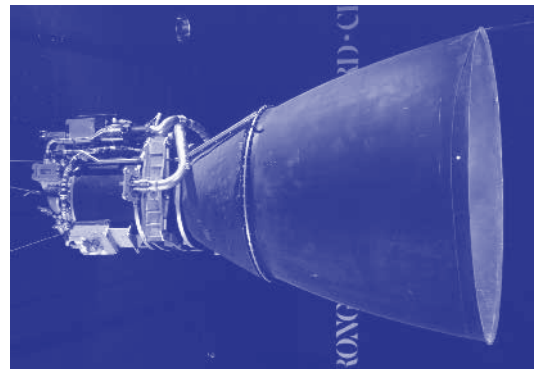
But in any event, the program that went for that next eighteen

months when we won the engine was very busy. We had to bring that test site on line. A year after we started it we were making full engine tests down at Capistrano with the full skirt on the end of a test motor down there. One year from the time we started that test facility which is what can be done. Now it would have taken fifteen years to get that thing ready to go. That was the environment at that time.

So along about when we finally received the engine contract, the final flight engine contract, we still had to qualify it. By that time it was January of 1965. We had to deliver engines from the day we got that final flight engine contract by the middle of 1967. If Grumman didn't have the engines available to start integrating the flight lunar module they wouldn't make 1969 for the flight. So we delivered nine engines to them in May of 1967. That was two years, roughly, from the time we got the contract for the flight engines and where we delivered nine engines and Grumman was busy integrating.

That process, and everybody that worked on the program, everybody I talked to at NASA, there was no question well what is this and what is that. It was what is it we have to do to do it. And Joe Shea was one of the greatest systems engineers I have ever worked and dealt with. He was a masterful systems engineer. The answer to that question was what do we do if this doesn't work. Joe Shea always said they were going to do this. And we trade risk from one place to another and you know, take the sure thing. Don't beat your head against an impossible wall over here. Change this requirement and take the load somewhere else. Well I learned a lot from those guys. In fact, Max Faget, Joe Shea and the rest of them.

So I want to leave you with one last thing. I have a picture of it here that I have at home. And it shows a picture of that engine you see on your table there. Here is the lunar module. You can come up and look at it later if you want. The lunar module landing on the moon for Apollo 11. And here is the NASA history publication which was called Chariots for Apollo. That was the official NASA history of the Apollo program for all of the stages. And it states in that history the lunar module descent engine was the biggest challenge and the most outstanding technical development of Apollo. And that's the official NASA comment on the Lunar Module Descent Engine.



*Apollo Lunar Module Descent Engine*

## New TRA Members

Diana Di Domenico  
Stanley Getsla

Manhattan Beach, CA  
Olivehurst, CA

We hope these new members will send a note to us telling us a little about themselves and where they worked at Northrop Grumman/TRW.



## The Apollo Lunar Module Abort Guidance System

April 13, 2020 was the 50th anniversary of one of the most momentous events in the history of American space exploration. That's the day astronaut James Lovell uttered the now memorable phrase, "Houston, we've had a problem," following an explosion aboard Apollo 13.

That day should be considered of equal importance to the July 20, 1969 moon landing, according to Paul Melancon, because what was achieved in facilitating the rescue of Lovell and fellow astronauts Jack Swigert and Fred Haise, was an engineering, design, and technical accomplishment no less impressive than Apollo 11's successful moon landing.

Melancon, a Solvang resident, has a unique perspective.

An engineer at TRW at the time, he was the assistant program manager for the Lunar Module Abort Guidance System (AGS), and played a critical role in bringing Apollo 13 and its three astronauts safely home. For his efforts, he received a Presidential Medal of Freedom.

### SAVING APOLLO 13

Apollo 13 was on its way to the moon when the explosion occurred 205,000 miles from Earth. The AGS was one of two guidance modules for the Lunar Module (LM), known as Aquarius. It was intended to come into play for the lunar landing and again at the completion of the exploration, to put the module into a "safe orbit so they could rendezvous with the Command Module," explained Melancon.

As was his usual practice, Melancon was at TRW headquarters in Redondo Beach when Apollo 13 lifted off at 13:13 on April 11. He then flew to Houston to be in position with his team for the lunar landing. He was in his rental car, driving from the Houston airport when he heard on the radio that Apollo 13 was in trouble and the lunar landing had been scrubbed.

"I was driving as fast as I could. I'm driving 125 mph through downtown Houston and I'm looking for a cop to give me an escort," recalled Melancon. Finally he spotted flashing red lights in his rear view mirror, pulled over, pulled out his identification and asked the officer to escort him to his destination.

"He told me 'we can't give you an escort but just be careful. It's foggy down towards NASA,'" Melancon recalled, still slightly bemused by the incident.

There were approximately 600 contractors for the various hardware in a building apart from Mission Control at NASA's Johnson Space Flight Center in Houston.

"I was there representing the AGS and had a team back in Los Angeles that I was in contact with," said Melancon.

### ACCOMPLISH ONE GOAL

At issue was a single goal: getting the astronauts back to Earth. "If the accident had to happen, it couldn't have happened in a better place," said Melancon. "If they'd already gone into lunar orbit, we wouldn't have been able to get them out of lunar orbit. If they'd landed on the moon, that would have been it."

The first decision was to try to slingshot the spacecraft around the moon and set it on a "free return" trajectory back to Earth. With the Service Module and its power supply dead, they had to rely solely on the thrust supplied by the Lunar Module's descent engine. It worked and the maneuver went off without a hitch.

The astronauts were also moved from the Command Module (which got its power from the now-crippled Service Module) into

## Important Contacts for Retirees

The main contact for Northrop Grumman employee and retiree benefits is:

### Northrop Grumman Benefits Center

[www.benefits.northropgrumman.com](http://www.benefits.northropgrumman.com)

Or [www.netbenefits.com/northropgrumman](http://www.netbenefits.com/northropgrumman)

phone: 800-894-4194

Here you can get help on health benefits, pensions, savings, and to report a death. It's voice activated, so listen to the instructions and answer the first few questions to reach a representative.

Information on Health and Insurance benefits for those retirees on the Northrop Grumman Retiree Medical plan is accessible on line at Fidelity NetBenefits. The link is available on the Benefits Center web page.

If you have Medicare Supplemental Insurance coverage through Towers Watson OneExchange, it has changed its name to Via Benefits. This is your contact information:

### Via Benefits (a Tower Watson Company)

[viabenefits.com](http://viabenefits.com)

phone: 855-832-0976

For Medicare Supplemental Insurance, Via Benefits administers various accounts including Health Care Flexible Spending and Reimbursement, the Limited Flexible Spending Account, and the Retiree Reimbursement Account.

Some TRW retirees receive their medical benefits through the Northrop Grumman Benefits *Service* Center. This center is staffed by Benefits Outsourcing Solutions, Inc. Their number is 800-410-6605.

If you continued your life insurance coverage on the Northrop Grumman group plan, this is administered by Metlife. They have a website at the link below but phone calls should be directed to the NGBC.

### Metlife

[www.metlife.com/NGC](http://www.metlife.com/NGC)

the Lunar Module.

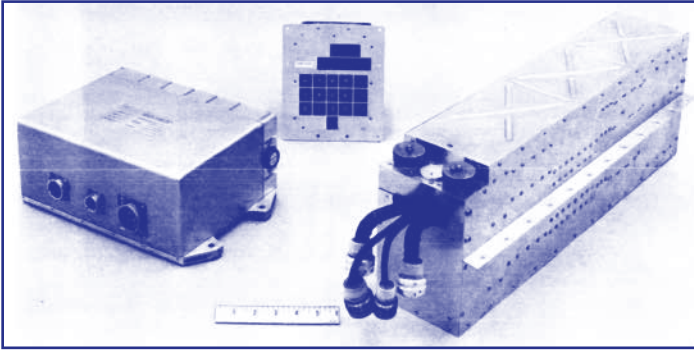
"NASA had never rehearsed using the LM as a lifeboat. It was never considered," Melancon said. It was the only option but also brought up the next problem.

"The Command Module was built to support three guys for five days. The LM was built to support two guys for 36 hours. The first thing we had to figure out was where we stood on consumables - water for cooling, power, and oxygen. If you compared our guidance system (the AGS) to the primary guidance system, ours used much less. We found that if we just used the AGS we had enough consumables, but just barely, to get them home. A speed-up was performed to shorten the return trip from five to four days."

It was 6 a.m. - seven hours after Melancon had arrived at the Houston center - and he felt like he could breathe again.

"We'd established that we had enough consumables to bring them back. We made a list of things we had to do, and in generating that shopping list, we were pretty thorough. We felt good that we'd gone from the unknown to the known. We had a lot of work to do but we felt confident we were going to bring the guys back - barring another explosion, that is."

MELANCON - Continued from Page 4



Apollo Lunar Module Abort Guidance System

### COMING HOME

On April 17, four days after the explosion, Apollo began preparations for splashdown. After jettisoning the damaged Service Module, the astronauts transferred into the Command Module, and jettisoned the Lunar Module.

"When they got into the Command Module and Lovell said, 'Farewell, Aquarius, and thank you,' we knew we'd done our job. They were safely in the Command Module just as they would have been had none of this ever happened," said Melancon, tears welling up in his eyes. The splashdown in the South Pacific came just 90 minutes later.

Melancon, a Louisiana native, who worked on all 17 Apollo missions, attended the Apollo 13 splashdown party.

"It was the only one I ever went to," he said.

The very next day, President Richard Nixon issued a Presidential Medal of Freedom to the approximately two hundred people who worked on the Mission Operation Team. Each one was presented with a personalized certificate.

Melancon has his framed certificate hanging on what he jokingly calls his 'I Love Me' wall in the Solvang home he shares with his wife of 38 years, Nadine Melancon.

The couple met at TRW - Nadine worked in the software division. They are the parents of seven children, grandparents to 14 and have five great grandchildren. After retiring, they moved to Solvang in 1996 into a home they built themselves.

Volunteering is now a full time pursuit for the Melancons but Paul does leave time for occasional reunions with several of his former TRW colleagues who live on the Central Coast.

"We rehash old war stories," he laughed.

And he doesn't even object to being asked his opinion of the Tom Hanks movie "Apollo 13."

"They did a reasonable job of presenting the situation. I thought they brought in a little too much of the gloom and doom drama that the press stirred up. For instance, the press floated the concern the heat shield on the Command Module might have been damaged by the explosion. There was no way to inspect or fix it. Otherwise, the movie was OK."

"We looked at the rescue as an engineering problem. We only worried about what we could fix, and what we couldn't, we left to God and he did pretty good on most of that."

Paul Melancon still looks at life the same way.

### Call for 2021 Officer and Director Candidates

Each summer, the TRA Board nominates its candidates for the coming year. Officers are elected for a one-year term and Directors-at-Large for two years. If you have an interest, please contact TRA.

### IN MEMORIAM

**Jack Anderson**, March 12, 2020. He was a dedicated, hard-working, devoted engineer and family man.

**David Clarence Breeding**, 94, April 3, 2020. David started at Ramo-Wooldridge in 1958, in the Inertial Guidance Department, retiring in 1986. He spent the last 13 years enjoying flying daily to work at Norton Air Force base in San Bernardino.

**Robert William Burkhardt**, 88, July 20, 2018. He was an Aerospace Engineer and Systems Programmer employed with TRW at Space Park in Redondo Beach, California, starting in 1959, retiring in 1986.

**Robert A. (Bob) Greenberg**, March 15, 2020. Director, Resources at TRW.

**Robert (Bob) Helt**, November 29, 2019. He retired from TRW at Buckley Air Force Base.

**Chuck Mendoza**, April 4, 2020. Chuck was a retired manager at TRW/NG.

**Paul Morgan**, March 1, 2020. He was very proud of his associations with TRW, Northrop, and the media center. A web site has been established to honor Paul, [www.rememberingpaul.net](http://www.rememberingpaul.net).

**Thong Ngo**, March 1, 2020.

**George Ortiz**, April 2, 2020.

**Myrrl Santy**, March 24, 2020. Myrrl worked at TRW for 40 years and was an expert in space-related testing and manufacturing processes. He passed away at Little Company of Mary Hospital as a result of contracting the COVID-19 virus.

**Jene Shinagawa**, March 6, 2020. For many years at TRW, Jene was a talented graphic artist supporting many classified programs.

**Sherry Snell**, March 5, 2020. She started at STL (Sherry Allen) in 1967. She retired from TRW in 2003.

The first step in notifying Northrop Grumman of a retiree's death is to call the Northrop Grumman Benefits Center. For many retirees, there is a Burial Benefit which will be paid to the beneficiary upon proper notification of death.

If the deceased was a member of TRA, please notify TRA whether you want the NNG continued for the duration of their subscription or to be removed from future mailings.

If you know of a person that should be included in the "In Memoriam" column, please inform us by either email or mail to the TRA office. As a minimum, we need the name of the deceased, date of death, and the name of the person submitting the information. If more information is available and desired, include age, position and years at NG/TRW, any notable programs, and special skills.

### Volunteer Opportunities at the Western Museum of Flight

The Western Museum of Flight, 3315 Airport Drive, Torrance, CA 90505 is looking for volunteers for Tour Guides/Docents, Reception, Gift Shop, Aircraft Maintenance, Aircraft Restoration, Library, Archives, and Operations Support. Please contact the museum to apply and mention that you heard of the opportunity through TRA. The museum hours are Tuesday through Sunday, 10:00 AM to 3:00 PM and its phone number is 310-326-9544. Or, send an email to [info@wmof.com](mailto:info@wmof.com) for more information.



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The next NNG will be  
mailed in July.

## THE MAIL POUCH

*By Pam Overton and Joan Merritt*

◆◆◆ From **Kathi Chaney** - I'm sure enjoying retirement! ◆◆◆ From **Diane Tillman** - Hi from the Santa Ynez Valley. Mostly I'm busy with various members of my family after 23 years in retirement. ◆◆◆ From **Ralph Iwens** - I can hardly believe that I am already 21 years retired from TRW. During the past years my wife, **Joanne**, and I have been spending the summer months in our condo in Germany near my old hometown of Frankfurt/Main. From there we have explored many European countries, traveling by car or train. In the winter months we frequently enjoy skiing in Mammoth, especially since now I can ski for free (over 80). I am still a member of the TRW Ski Club and enjoy skiing with all my good old buddies in various US and sometimes European ski resorts. On Wednesdays I often have lunch with a group of ex-TRW colleagues in restaurants near TRW/Northrop Grumman. My long-time former boss and mentor, **Al Frew**, also attends these lunch gatherings. ◆◆◆ From **MaDonna McKittrick** - Signing up for another three years! To the TRA Board, thank you for all your work. I do the same for my class and we stay in touch. I know how much work it is. I only have 130-140. I can only imagine how many you have! ◆◆◆ From **Paul Courcy** - My wife **Carol** and I still love our life in Avila Beach. A highlight of 2019 was our road trip to Yellowstone and the Grand Tetons. Next we are planning a trip to Corsica and France. ◆◆◆ **Harold** and **Linda Koletsky** - We are very content to continue living in Palos Verdes after 22 years. In 2019 we spent 15 days touring very beautiful and historic northern Spain and western Portugal. The food and wine were

also very good. Year 2020 will have two grandchildren getting married in Austin, TX, one in April the other in December, over running this year's travel budget. We will also be celebrating the youngest grandchild's first birthday and Harold's 90th birthday in April. ◆◆◆ From **Evy Paulson** (written last December) - It is beginning to look a lot like Christmas everywhere I go ... yippee, I am almost through decorating my condo. Got red and white candles from Yvonne Lindberg so now I can celebrate Christmas with Martha. I bought some Christmas DVDs and we can sing along. The year has been up and down with good and bad ... visiting ER and hospital and later home therapy. Presently I am coping with painful eyes but this too shall pass. ◆◆◆

### Mail Pouch Items

Pam and Joan need your help! They need Mail Pouch items! Let us know what you are up to by e-mailing the Mail Pouch at [mailpouch@tra-spacepark.org](mailto:mailpouch@tra-spacepark.org) or by mail to Mail Pouch, P.O. Box 1276, Redondo Beach, CA 90278.