

TOTAL IMPULSE



JACKSON MODEL ROCKET CLUB

TOTAL IMPULSE VOLUME 22, No. 5

JMRC
HUVARS

HURON VALLEY ROCKET SOCIETY

SEPTEMBER - OCTOBER 2022



CAJUN-DART SCALE DATA
SEPT/OCT SPORT LAUNCH COVERAGE
VIEW FROM THE FLIGHT LINE
CLUB ELECTIONS

CLUB OFFICERS

President: Scott Miller
Vice President: Roger Sadowsky
Treasurer: Tony Haga
Secretary: Bob Dickinson
Editor / NAR Advisor: Buzz Nau
Communications: Dan Harrison
Board of Director: Dale Hodgson
Board of Director: Mark Chrumka
Board of Director: Dave Glover

MEMBERSHIP

To become a member of the Jackson Model Rocketry Club and Huron Valley Rocket Society means becoming a part of our family. We have monthly launches and participate in many educational events. We encourage our members to actively participate in our club projects, running for office in our annual elections, contributing to our monthly newsletter with articles or tips, and offering services to the club in their area of expertise. We have many members comprised of children, men, women, professionals, lay people, educators and people from many other walks of life.

You may fill out an application at a launch or request an application from one of our board members at scott@sfsindustries.com and mail it along with a check for the annual membership dues (\$30.00 individual or \$40.00 family) to our mailing address:

JMRC/HUVARS
 C/O Tony Haga
 711 Wilwood Rd
 Rochester Hills, MI 48309

Members enjoy participating in club projects, meeting an incredible group of positive people, and no launch fees!

COMM CHANNELS

There are several ways to keep in touch with the JMRC/HUVARS and it's members.

Website: <http://www.jmrconline.org>. Information includes directions to launch sites & schedule, range procedures, and instructions on how to join the club.

Groups.io: The JMRC groups.io site is a place to share files and also serves as our primary e-mail list serv. Follow this link to join, <https://groups.io/g/jmrc>

Facebook: If you have a FaceBook account search for "Jackson Model Rocket Club JMRC" and request to be added.

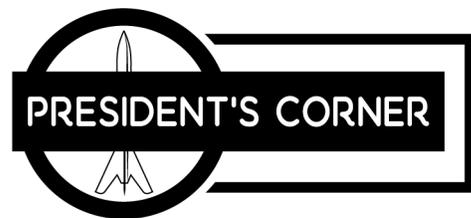
GroupMe: Our new chat channel for broadcasting notifications instantly using a free download client for IOS and Droid as well as by SMS text messaging. You can join the notification chat after creating a free account and following this link, https://groupme.com/join_group/28013422/zc51C1

Fade To Black Rocket Works

Heavy Duty Launch Pads For Every Need
 All pads are powder coated for lasting durability

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- Concept Mini \$119 Concept X-treme \$325
- Concept \$285 Ground Pounder \$345
- TARC Pad \$285 Ground Pounder Heavy \$425
- +Shipping



Welcome to the September/October 2022 issue of *Total Impulse*. We are approaching the beginning of the holiday season which also means the end of the flying season. We hosted six launches this year with one being a two day. Some of us also enjoyed the two day Crapshoot event in Muskegon.

With the holidays quickly approaching I want to take a moment to give some thanks. I can't thank the Hornings enough for being so generous with their field allowing us a nice place to launch. Thanks to everyone that has contributed to the newsletter with content. This was key towards winning the LAC trophy again. Thanks to the officers and other BOD members for providing leadership and keeping us moving forward.

And finally thanks to everyone that came out to our launches this year and made them so special. It was a lot of fun and we saw some awesome flights. I can't wait to see what we do next year!

We have one more launch this year on November 12. Lets send out 2022 on a positive note and enjoy one last flying day before the building season begins.

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Launch/Event Calendar - 2022

- January 28-30 NARCON 2022 (Virtual Event)
- April 30 (Horning 2)
- May 21/22 Crapshoot VIII (Muskegon)
- June 4 (Horning 1)
- LDRS 40 - June 9 - 12 (Lucerne, CA)
- NARAM 63 - July 16 - 22 (Springfield, MO)
- July 2,3,30 (Horning 1)
- September 10 (Horning 1)
- October 22 (Horning 1)
- November 12 (Horning 1)

NOTE: Launch dates are subject to change without notice. Be sure to monitor the club email list for the latest weather and field information or sign up for the JMRC Notification GroupMe chat.

The 2022 rocket season is sneaking up on a closure so this seems like a perfect time to reflect. If we were to attempt to measure this year to others it would not break any records in flights, attendance, or any other common metric. However, I personally feel the 2022 season was vital and extremely successful for our club.

Standing on the precipice of a rough couple years with a rocky start to 2022, the club banded together with a strong finish and another launch on the books assuming Mother Nature cooperates. To top it off this is the first time in our club's 27+ years in existence where we have to hold a formal election because more candidates than seats exist. I am personally thrilled with the interest to help drive our club forward.

Thanks everyone for the strong finish to 2022 and I can't wait to see what 2023 brings!



About Total Impulse

Total Impulse is the official newsletter of the Jackson Model Rocket Club (JMRC), Tripoli Prefecture 96, NAR Section 620. Published Bi-Monthly, *Total Impulse* is a space-modeling newsletter devoted to representing the diversity of interests in today's hobby of model rocketry. This newsletter is in the public domain except where otherwise marked. Unmarked articles, photographs, and drawings may be re-printed elsewhere, but credit to the author and this newsletter is expected. Material marked as copyrighted may not be re-printed without the consent of the author.

The editor of *Total Impulse* accepts material for inclusion from anyone.

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On the Cover:

Chris Timm's Viper 4 launch at the October 22 launch. It was a four motor cluster with Estes E9-8's and flew beautifully. Unfortunately it was lost in the wind to the North. Launch site: Horning 1 at Manchester, MI



SEPTEMBER SPORT LAUNCH

MANCHESTER, MI SEPTEMBER 10, 2022

Most flying seasons we're lucky in Michigan to get one, maybe two launch days where the weather is perfect. Low winds and not too hot or cold. September 10th marked the fourth launch in a row with perfect weather yet again. We certainly owe someone for favoring conditions at every launch this year. We were once again at the Horning 1 site. Some of the corn was harvested from the adjacent fields which aided recoveries, but with the low wind most flights landed nearby.

There were 10 fliers making a total of 67 launches for the day. Mike Rangtisch led the pack with 15 flights and also flew for the cycle by using motors from 1/8A through G. These flights included his well finished White Sands V-2 on a D12-3, LOC HiTech on an F40-7, and Micro Jayhawk.

Al de le Iglesia was next with 13 flights. His Maxi Alpha III flew on a D12-5 and other familiar models included his MRC Standard ARM and National Space Plane on C6-5's. Al also flew his rarely seen Nova Scout Ship on a B6-4. Buzz was right behind Al with 12 flights. The Cherokee G on a F36-6, Space Twins dual gliders with a D12-3, and Estes DOM Saturnian on a C6-5 were some of his flights.

Andy Tomasch and Steve Kristal made 5 flights each. Most of Steve's flights were towards 1/4A duration competition. Andy mainly flew his Cheap High Altitude Dart (CHAD). Jay Calvert was able to attend and in addition to providing motor sales was also able to make 4 flights. Do Not Crush went up on a G75-7 and G54-5. He also flew his 13mm Slide Wing Rocket Glider.

Putting in 4 flights was Rick Arden which included a beautiful Black Brant II on a H100-14. He also flew his DX3 on a I175 and Devastator on a J250. Dale Hodgson continued his testing of Scott's 3D models. His Alien flew great on a G94-short and the 3D original design on



Al, Mike, and Andy are concerned about the hold up an I210. Dale also flew his Mosquito upscale on an E20-4.

Mike Lewandowski made three flights. His LOC EZI-65 had a nice flight on a Loki H144 and his Estes Star Orbiter flew well on an Estes F15-8. Rick Sharp put in a couple launches, his 38 Special on an E30-6 and IBEX54 on a H250. Wrapping things up was Fred Ziegler. His Wahoo made a nice flight on a H151.

Again, it was a fine launch and a lot of fun was had by all. It's easy to have a good time when the weather is this good.



Rick Arden's Black Brant II



Mike Rangtisch's White Sands V-2



Mike Lewandowski's EZI 65



Dale Hodgson's Original 3D printed rocket on an I210



Buzz Nau's Astron Farside



Al de la Iglesia's Maxi Alpha III



Rick Arden's Sentra SRB 2.7 - The SRB's had a mind of their own



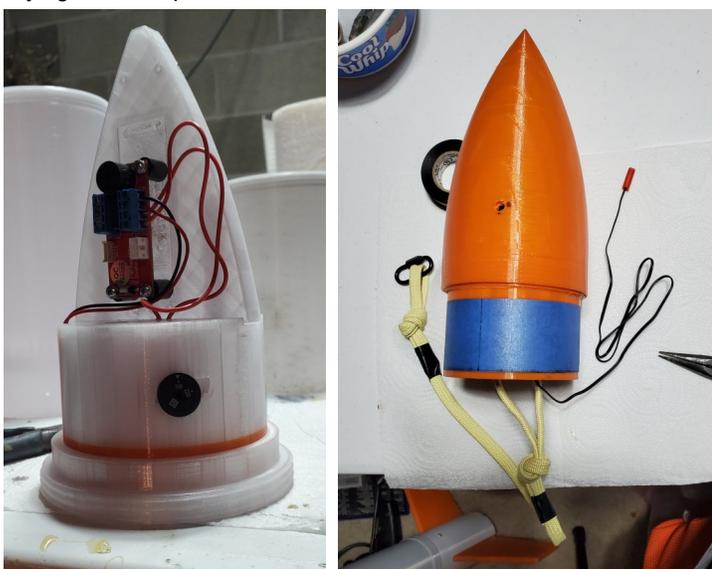
Al de la Iglesia's Nova Payloader

VIEW FROM THE FLIGHT LINE

A LESSON RELEARNED

DALE HODGSON

Well, the 3D saga goes on. I've said from day one we would "test to the point of failure" and maybe I hit that goal... sort of. Usually when testing like this, one pushes the envelope until something gives. Well, something did give, and I will blame it on one thing... me. It wasn't the inherit design, it was the modifications I made. To make a bad situation worse I violated one of HPR's basic rules, always disarm unexpended charges! My mistake could have hurt someone, mainly Tony Haga, but fortunately he just got a scare. Good thing he has a strong heart. More details on that later, right now we will get into the nuts and bolts of what I was trying to accomplish.

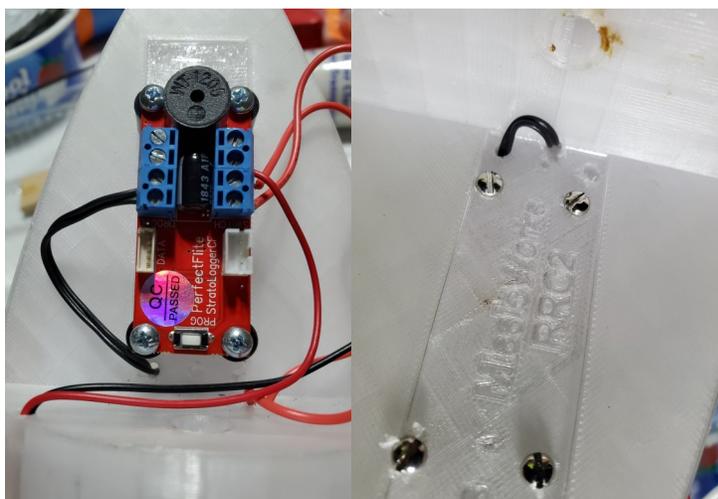


Scott and I during a late night texting blitz, were talking about the next phase of his 3D development plan which is to add electronics and provide more variability along with the option of bigger motors. So, after the discussion it popped into my head how to pull it off. Refer to the accompanying photos for details. It was just a matter of configuration. Scott designed the electronics sled to accommodate most of the altimeters in use these days. I chose to use a Perfectflite Stratologger CF (compact footprint) due to the proven reliability and small size, a lot of electronics taking up a small space. Mounting the altimeter was a matter of simply drilling a few holes and using the right screws, nuts, and spacers to secure the thing. The switch was a bit more troublesome. I decided to use a rotary switch that I am comfortable with. Mounting it though was a little more cumbersome. I finally came up with the idea of mounting it to the bottom part of the sled assembly. Doing so provided space for the switch to clear the cone shell when it was screwed on. Getting to it was easy. To turn on the altimeter I drilled a small hole through the cone shell so I could "hit the switch" without moving the cone or removing it from the rocket. I fed the switch wires up through the assembly so they could be attached to the altimeter. Scott provided four electronic bays to accommodate batteries, etc if needed. I needed one bay for the battery and another to secure the threaded end of the switch and route the wires to the altimeter. Again, refer to the pics for a much better visual detail.

At this point I will depart from the assembly narrative and get to

the actual flight part. We'll come back to it and the reason will become pretty clear soon, so be patient. For the flight we chose to fly the 3D Original rocket, the version with the very large fins. Up to this point the bird logged five completely successful flights and all apogee deploy. The motor of choice this time 'round was a Loki I 210 Red, a very cool motor that doesn't hit too hard off the pad but has plenty of punch to it. We armed the rocket and everything checked out. The boost was beautiful, straight and high. The altimeter contained one ematch and a charge set to activate at apogee and kick out the chute. This is when trouble ensued. We didn't think the charge fired as the rocket arched over and was well on its way down when the motor backup charge kicked in and deployed the chute. This proved to be too much for the booster and the high-speed deployment pretty much ruined the airframe sections.

We recovered the rocket and on initial observation saw that the ematch indeed did not fire so we brought it back to my table for a closer look. I turned off the switch thinking that was enough to deactivate everything. I was wrong. Instead, what I should have done was remove the BP charge which would have been very easy to do. I was in too much of a hurry to see what was happening with the electronics to determine what went wrong. I started unscrewing the assembly when I heard Tony say "Don't unscrew it" ... too late. At that moment the charge went off. Fortunately, no one was injured but it was scary. What a stupid mistake, I spent the rest of the day apologizing but Tony was gracious enough to not make a bigger deal of it which he had every right to do. Fred was right there with us, but he was standing next to me. Tony took the brunt of it but is scared the snot out of all of us. Then, curiosity took over since none of us ever had an experience like that before and were really wondering. The answer came when I did unscrew the assembly. What had happened was that the ematch got crushed in the threads of the assembly when I put it together. It retained enough continuity to allow the altimeter to "think" it was properly armed. What we think happened was that the wire separated during flight breaking continuity and not allowing the ematch to fire. When I started unscrewing the assembly somehow the wire cross-shortened, regained continuity and fired. It was a very weird scenario, but the most important thing was that no one was hurt and I learned a valuable lesson.



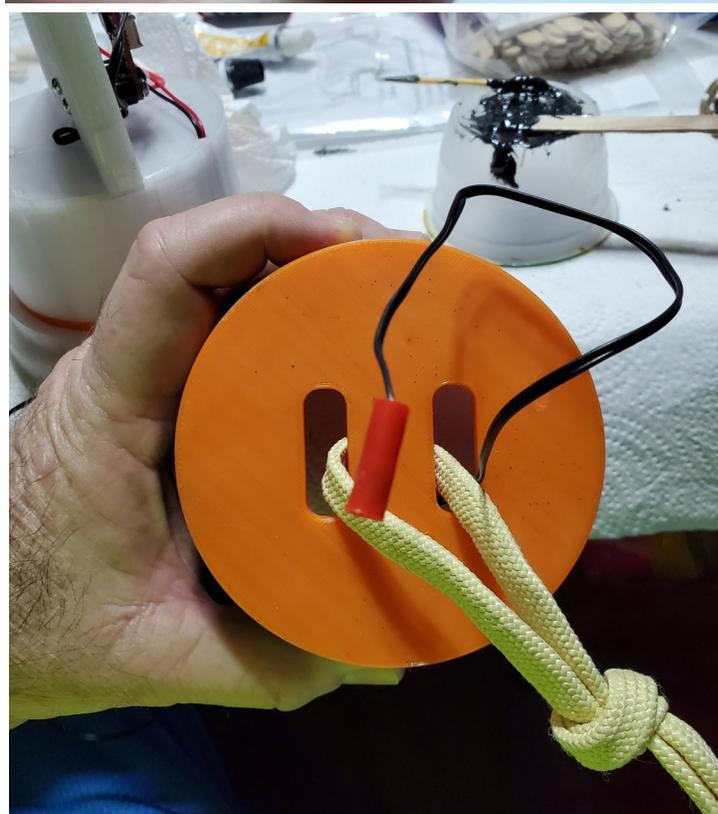
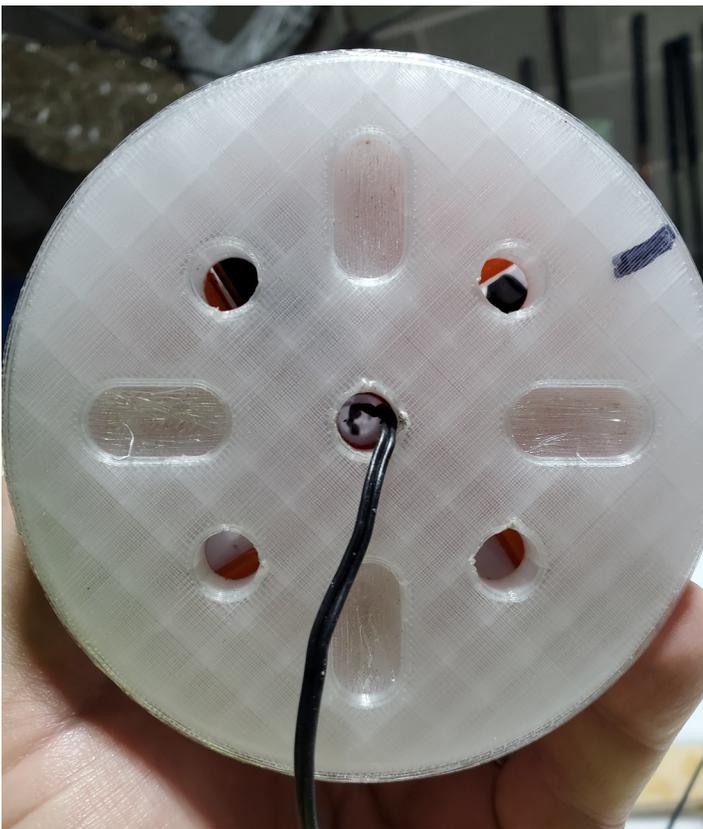
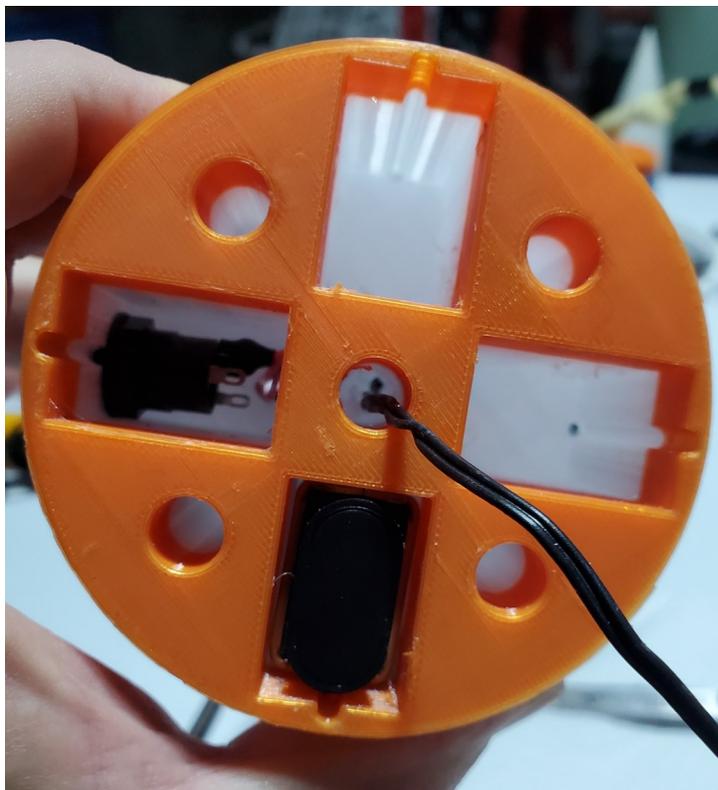


A LESSON RELEARNED

DALE HODGSON

Now let's go back to the assembly. This is post-flight and with the advantage hindsight I had to come up with a way to run the ematch without it becoming twisted up and crushed in threads. What I came up with was to drill an additional hole up through the sled assembly so the ematch would be centered rather than running through a port on the side and getting twisted. This way when everything is screwed together the ematch will freely float and not become entangled. Everything is ready to go again. The cone is intact and should function as designed. The booster however was a total loss. Scott is already printing a new one with some improvements that we discussed in past articles. The Original had a thin airframe, narrow connector rings and short threads. This one has the thicker airframe, wider connectors and the motor tube tabs spacer that allows tightening the retainer ring without spinning the whole unit. There is also a spacer sleeve on the motor tube that allows better tightening of the forward motor mount ring. All these improvements are now standard issue like on my Alien delta fin version which has performed beautifully.

So, the testing will go on. We'll fly the nose cone again with the new mods with confidence the altimeter will function and ematch will fire when it is supposed to. At least that's what the mission calls for. Again, lesson learned, or in this case relearned. Never, ever try and manipulate an ematch with an intact charge still attached. Remove the charge and wear safety glasses while doing it. We do have a very safe hobby but only if all the details, large and small are followed. So, keep flying, keep testing, and keep improving!





LAUNCH REPORT

OCTOBER SPORT LAUNCH

MANCHESTER, MI OCTOBER 22, 2022

Our October launch was pushed to the 22nd due to the Hornings wanting to get one last cut of alfalfa after the first hard frost. The Horning 2 field was unavailable because it was still full of corn and hunters are leasing there. Regardless, the weather was favorable with nice temps in the 70's though the wind was a little more than we like. It was at least blowing in a nice direction, and I think only one rocket was lost to the trees near Pleasant Lake. We had fourteen fliers including the Gryn's from Canada, Chris Timm from Bay City, and two members, Michael O'Neal and Brian Winzeler. The total number of flights was 67 which included two successful Junior Level 1 attempts.

The top flier this month was Mark Chrumka with 13 launches, though I think he burned a lot more igniters than that. ;) Several were high drag saucer types that were safe bets for the day, but Mark also flew his Ghost Halloween decoration on a F50-4 and his SLS Hustler on a E12-4. He also flew a pair of 3D printed models, the SpaceX Mars Lander and scale Aries.

The Gryns combined for 15 flights, Mark with 10, Joshua had 3, and Lauren had 2. Notable flights included Mark's Flis Kits Frick & Frack, Red Maximum on a Loki I210, and Sprint XL on a C11-5. Joshua had a prang with his Electric Ladyland on a F22-5, but followed later with a successful Junior Level 1 flight. He flew his Aerobee 150 on a H100 and the Jolly Logic chute release helped keep the recovery out of the trees. Lauren flew her "Hold the Onions" on a G94 and will attempt her Junior Level 1 the next time the Gryns make it to a launch.

Also with double digit flights was Al de la Iglesia at 10. He recently picked up some StickerShock vinyl decals for some of his nekkid rockets including his Maxi Alpha III, a reminder of one his first kits when he got in the hobby. Al also put in some Big Bertha practice flights for the upcoming contest as well as his Maxi Der Red Max. Buzz put up 9 flights for the day, none of which were gliders in an attempt to keep recoveries short. He flew a lot of smaller models that had never flown before as well as a Mini Mars Lander that was staged from an Estes UFO saucer. The first flight went perfect, the second, not so much, but damage was minimal.

One of our new members, Brian Winzeler had four flights includ-



Buzz and his staged UFO Saucer to a Mini Mars Lander



Brian Winzeler's USA

ing two of his USA rocket on D12-7's. Michael O'Neal, also a new member, put in three flights. His Estes Tazz had a nice helicopter recovery on a B6-4 and he also flew an Estes Hi-Flyer on a B4-4.

In a rare occurrence, Herb Crites had a failed recovery on his Mach Schnell SLK54M. It will take some forensics to determine what went wrong. Herb made up for that flight with three impressive flights of his Mach Schnell SLK75m using a Loki I430, I316, and Aerotech I599. Dave Glover made the trip from Saginaw and it's always great to see Dave and his rockets. Of his three flights, his Torrent on a G79-6 was especially impressive.

Chris Timm trekked from Bay City and formally joined the club. He flew his cool Shrox Navaho on an E9-4, but his Viper 4 on a cluster of four E9-8's was especially cool. Unfortunately, this was the one lost rocket of the launch that I'm aware of. Also with two flights was Andy Tomasch. He flew his upscale "Michigan" Mosquito on a C6-3 and Alpha III on a C6-7.

Our other successful Junior Level 1 flight was flown by Reyan Ahmad. He flew his Mach 1 Thunderbird on a H128-8 which recovered on the main field. Finally, Fred Ziegler got in one flight with his Sky Ripper on a Loki H100-10.

Overall, the launch went well with a lot of rockets flown, four new memberships, two Junior Level 1 flights, and a lot of help to set up and tear down the range. Our next, and final launch of the year will be on November 12 at Horning 1. Here's hoping our weather luck holds out one last time for the year.



Mark Gryn's Frick and Frack



Fred Ziegler's Sky Ripper



A trio of upscale Red Max's



Reyan Ahmad and his Jr Level 1 rocket



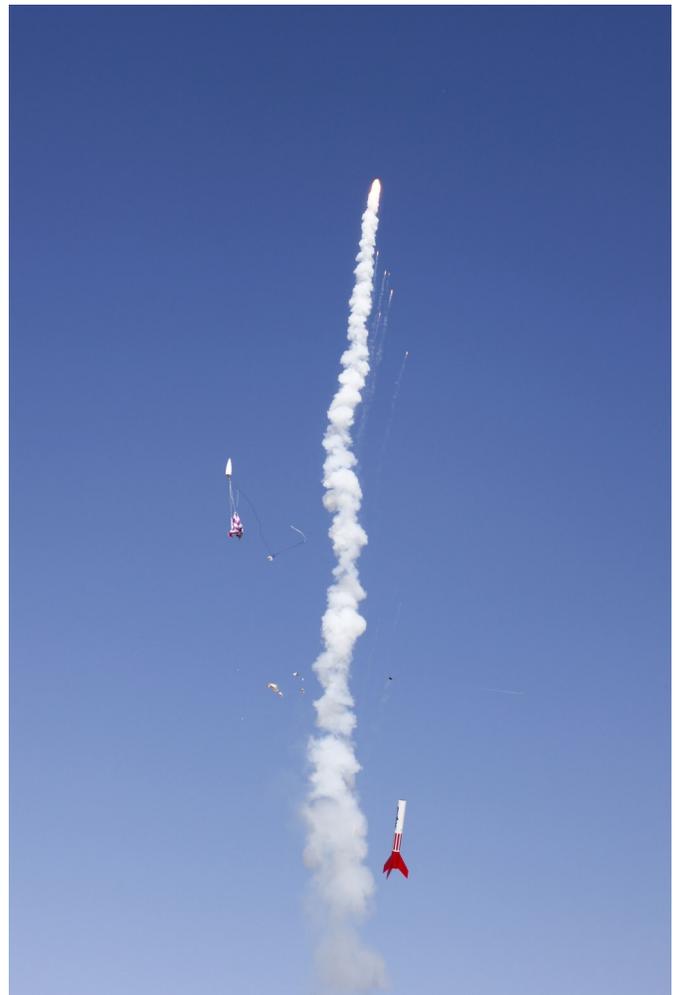
Joashua Gryn and his Jr Level 1 rocket



Dave Glover's Torrent



Al de la Iglesia's Maxi Alpha 3 CATO on a D12





Buzz Nau's staged UFO Mini Mars Lander



Herb Crites' Mach Schnell



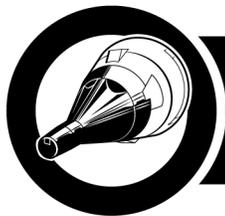
Mark Chrumka's Areis 3D printed rocket



Michael O'Neal's Tazz



Lauren Gryn's "Hold the Onions"



CAJUN-DART SOUNDING ROCKET

Chris Timm & Buzz Nau

The Cajun-Dart was a low cost two-stage chaff sounding rocket used for measuring wind speeds at altitudes primarily in the 60 to 80 kilometers band.

The Cajun first stage booster was 6.5 inches in diameter, 102 inches long and had four cruciform clipped delta fins. The TE-M-82-3 Cajun Mod III solid propellant motor was manufactured by Thiokol Chemical Corporation. It weighed 168 pounds at launch and produced ~112318 newtons of impulse. The motor burned for 2.8 seconds and imparted a velocity of 5000 feet per second to the Dart. Launch lugs were affixed to the booster for single rail launch operation.

The second stage non-propulsive Dart was 1.75 inches in diameter, 51.7 inches long, with four cruciform clipped delta fins mounted above the boattail. The Dart drag separated from the booster after the Cajun motor burned out. The high ballistic coefficient of

the Dart allowed it to coast to altitudes of 95 kilometers (310,000 feet).

In February of 1964 the Aero-Astroynamics Laboratory of the Marshall Space Flight Center sought proposals for a sounding rocket system capable of measuring winds in the 70 to 90 kilometer (230,000 to 295,000 foot) region. The contract was awarded to Space Data Corporation for 60 Cajun-Darts in June of 1964. Six test flights were launched at Elgin Air Force Base in August 1964 to demonstrate the sounding rocket's performance. The remaining 54 were sent to Cape Canaveral and flown at a rate of one per week from the Air Force Eastern Test Range.

The 31 cubic inch payload contained ~1.33 pounds of radar reflective chaff cut to $\frac{1}{4}$ the wavelength of the tracking radar. The chaff was dispensed by an expulsion (small propellant) charge 145 seconds after first motion off the pad. Radar tracking of the



NASA photo L-65-7806



NASA photo L-65-7804

chaff cloud provided wind data from 65 to 90 kilometers (215,000 to 295,000 feet) to Cape Canaveral.

Testing was also performed using an inflatable sphere in combination with the chaff. The sphere was an excellent wind detector from 65 kilometers (215,000 feet) all the way to the surface while the chaff cloud remained at high altitude.

The second contract for 7 additional rounds included a redesigned interstage adapter and an ablative coating added to the booster fins. These improvements increased the reliability of the vehicle and were included in a third contract for 20 Cajun-Darts delivered

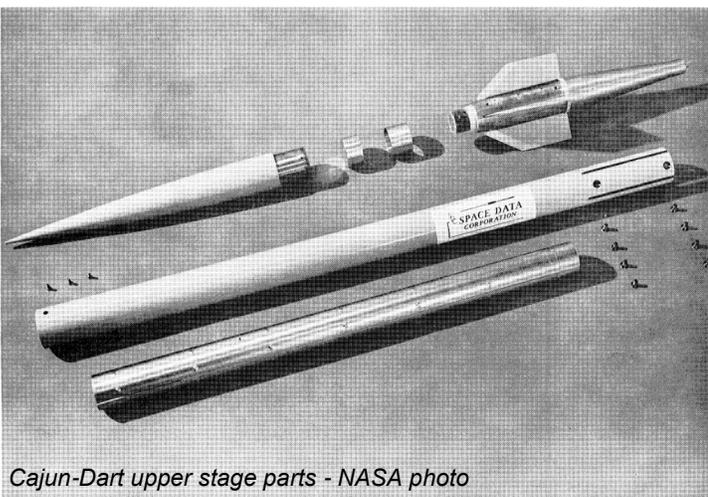
Additional Cajun-Darts were procured by the Naval Ordnance Laboratory (NOL) and Sandia Corporation and flown from the Wallops Island Flight Facility.

Resources:

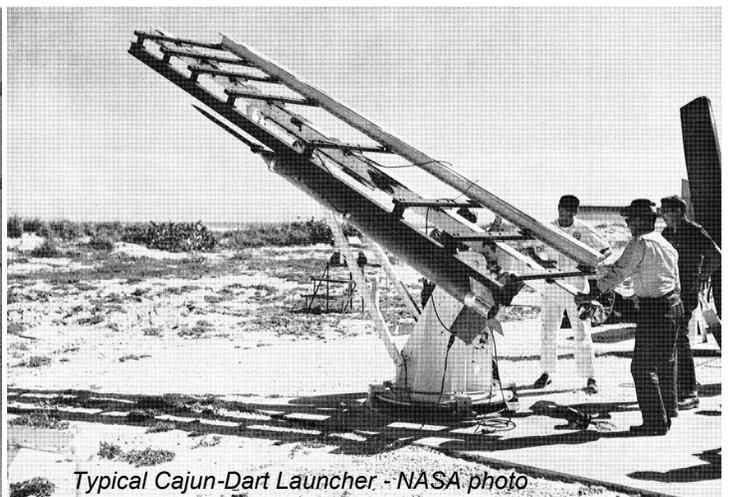
Cajun-Dart 95 Kilometer Sounding Rocket, NASA CR-61175, August 29, 1967

The Cajun-Dart Chaff Rocket, Space Data Corporation TM-53, February 5, 1965

Cajun-Dart Sounding Vehicle, NASA CR-74067, October 1965



Cajun-Dart upper stage parts - NASA photo



Typical Cajun-Dart Launcher - NASA photo

Space Data Corporation

CAJUN-DART

1/20 scale

Dimensions in inches

© 2020 Chris Timm

Sources:

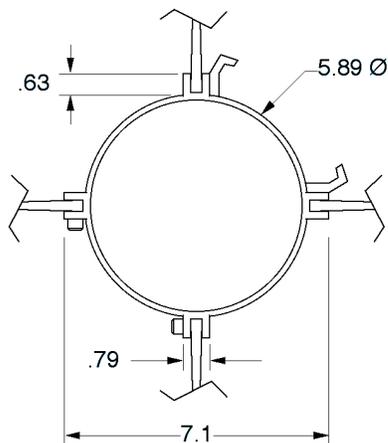
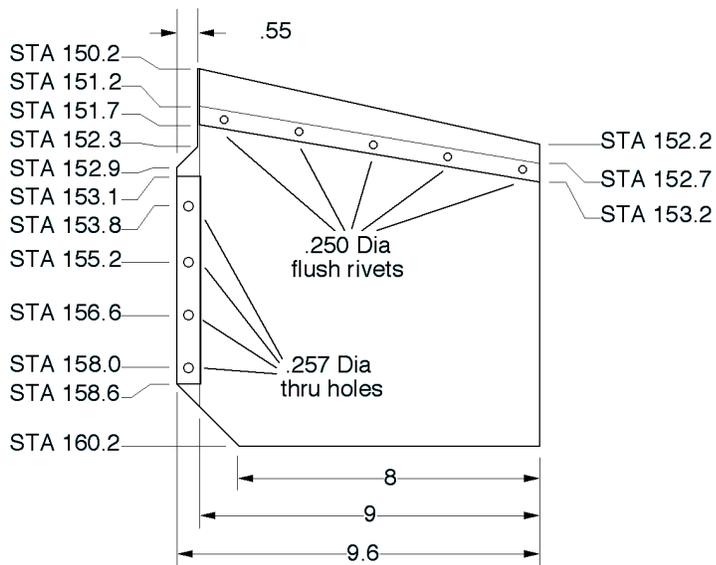
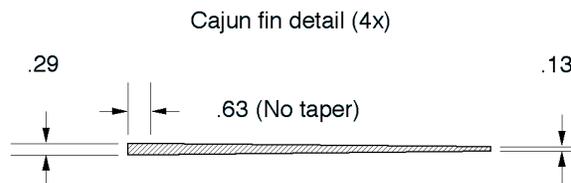
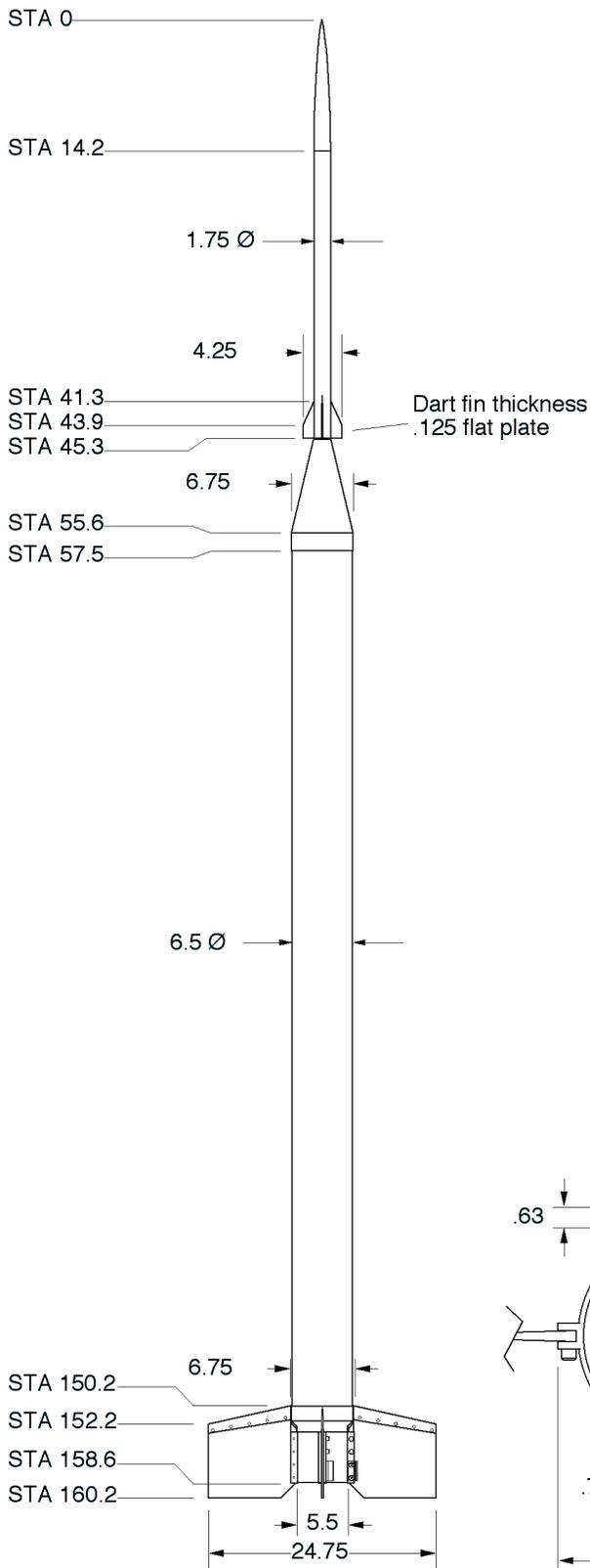
The Cajun-Dart Chaff Rocket, Space Data Corporation TM-53, February 5, 1965.

Cajun-Dart Sounding Vehicle, NASA CR-74067, October 1965.

Cajun-Dart 95 Kilometer Sounding Rocket, NASA CR-61175, August 29, 1967.

Small Sounding Rockets, Richard Morrow with Mitchell Pines, Small Rockets Press, 2000, pp 300-305, 332-351.

SDC Drawings and NASA photos provided by Richard Morrow. NASA photos L65-7804, L65-7805, and L65-7806.



CAJUN:
 Fin- Magnesium
 Fin cuff- Stainless steel
 Fin ring- Aluminum
 Motor- Aluminum
 Adapter- Stainless steel

DART:
 Fin- Steel
 Airframe- Light blue
 Nose cone- Light blue



NASA photo L-65-7805



CURRENT EVENTS IN SPACE EXPLORATION

The pace of launches has definitely slowed a little recently. Hurricane Ian caused NASA to stow the maligned Artemis 1 SLS in the Vehicle Assembly Building (VAB) to ride the storm out. It is due to make it's next launch attempt on November 14.

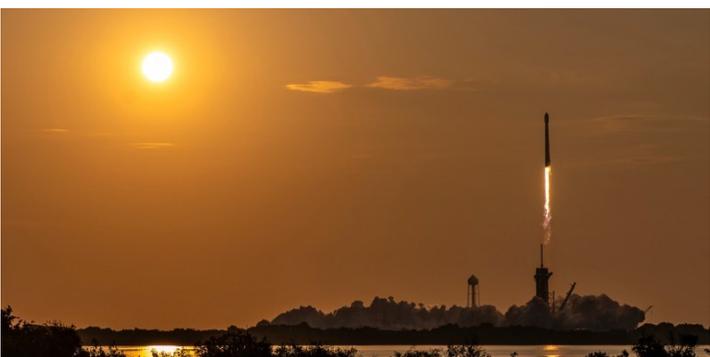
Other notable upcoming launches include a SpaceX Falcon Heavy on November 1 and Starship with an unknown launch date, but you have to figure it's going to be soon.

SPACEX

The first two SpaceX launches in September were Starlink missions which included rideshare satellites. Starlink 4-20 included the communications technology demonstration satellite for Boeing named Varuna. It will use a SpaceX orbital transfer vehicle called Sherpa-LTC to increase it's orbit to 1,056 kilometers.



Starlink 4-2 included the BlueWalker 3, another demonstration satellite by AST & Sciences to test cellphone capability in space.



The fifth manned Crew Dragon flight, Crew-5, was launched on 5 October from Launch Complex 39A at Kennedy Space Center. Crew Dragon *Endeavor* carried Commander Nicole Aunapu Mann (NASA), Pilot Josh Cassada (NASA), Mission Specialist Koichi Wakata (JAXA), and Mission Specialist Anna Kikina (ROSCOSMOS) to the International Space Station for a six month rotation. This was the first flight for this Falcon 9 booster which landed aboard the dronship, *Just Read the Instructions*.



The Galaxy 33 and 34 communications satellites were placed in geostationary transfer orbit by a Falcon 9 on 8 October. The Intel-sat satellites will eventually reach a geostationary earth orbit and provide C-band communications for North America. It was the fourteenth flight for this Falcon 9 booster. It landed safely on the dronship *A Shortfall of Gravitas*. Both fairing halves were also recovered.



Mission	Date	# of Satellites	Launch Site	Booster Flt#	Landing Site	Fairings Recovered?
Starlink 4-20*	4-Sep-22	51	SLC-40 CCSFS	7	<i>Just Read the Instructions</i>	Yes
Starlink 4-2*	10-Sep-22	34	LC-39A KSC	14	<i>A Shortfall of Gravitas</i>	Yes
Starlink 4-34	18-Sep-22	54	SLC-40 CCSFS	6	<i>Just Read the Instructions</i>	Yes
Starlink 4-35	24-Sep-22	46	SLC-40 CCSFS	4	<i>A Shortfall of Gravitas</i>	Yes
Starlink 4-29	5-Oct-22	52	Vandenberg AFB	5	<i>Of Course I Still Love You</i>	Yes
Starlink 4-36	20-Oct-22	54	SLC-40 CCSFS	10	<i>A Shortfall of Gravitas</i>	Yes
Starlink 4-31	27-Oct-22	53	Vandenberg AFB	8	<i>Of Course I Still Love You</i>	Yes



CURRENT EVENTS IN SPACE EXPLORATION

The Hotbird 13F telecommunications satellite built by Airbus Defence was launched in the early hours of October 15 from Launch Complex 40, Cape Canaveral Space Force Station. Hotbird 13F is pairing up with another Hotbird to replace three aging telecom satellites. They will provide service to Europe, North Africa, and the Middle East. The Falcon 9 booster had three previous flights and landed aboard the droneship *Just Read the Instructions*.



Rocket Lab's *The Owl Spreads Its Wings* mission was flown from their Launch Complex 1B in New Zealand on 16 September. The Electron launch vehicle lifted a StriX-1 satellite to the Synthetic Aperture Radar constellation for Synspec, Inc. When complete, the earth imaging constellation will provide millimeter changes to the Earth's surface for use with infrastructure planning and monitoring. Rocket Lab did not attempt to recover the booster.



A New Shepard 4 booster suffered an inflight anomaly during an un-manned flight on 12 September. It was the ninth flight of the booster which had performed well on the eight previous flights. The anomaly occurred during Max Q, the period of maximum aerodynamic pressure. The capsule performed a flawless abort sequence and recovered normally. The booster appeared to have an engine issue and was lost.

It Argos Up From Here was the next Rocket Lab launch on 8 October, again from Launch Complex 1B. The Electron launch vehicle carried the General Atomics GAZelle satellite. The GAZelle is a hosted payload for the Argos Advanced Data Collection System. There is an alphabet of agencies involved including the US Space Force, NOAA, and French Space Agency CNES. The Argos program primarily provides oceanographic and meteorological monitoring data.





CURRENT EVENTS IN SPACE EXPLORATION



United Launch Alliance (ULA) launched the last Delta IV Heavy mission, NROL-91, to be flown from Vandenberg Space Force Base on 24 September. There will be one more Delta IV Heavy launch at Cape Canaveral and then the vehicle will be retired. NROL-91, a mission for the National Reconnaissance Office (NRO) was another hush hush, super secret payload, though suspected to be an electro-optical surveillance satellite.



FIREFLY

A E R O S P A C E

Firefly Aerospace made it to orbit with the second flight of their Alpha launch vehicle on 1 October from Vandenberg Space Force Base. The second stage failed to perform a successful final burn leaving the payloads in a lower than planned orbit and shortening their time in space before de-orbiting.



The next ULA launch was at Space Launch Complex 41, Cape Canaveral Space Force Station on 4 October. An Atlas V 531 carried a pair of SES communications satellites, SES20 and 21. These C-band satellites were designed and built by Boeing Satellite Systems for SES, S.A. a Luxembourgian telecommunications company. They will provide digital broadcasting services for North America.



Continued on Page 19

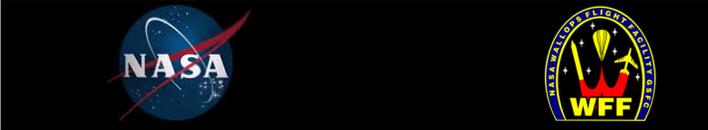


<http://www.millermotorworks.com/>

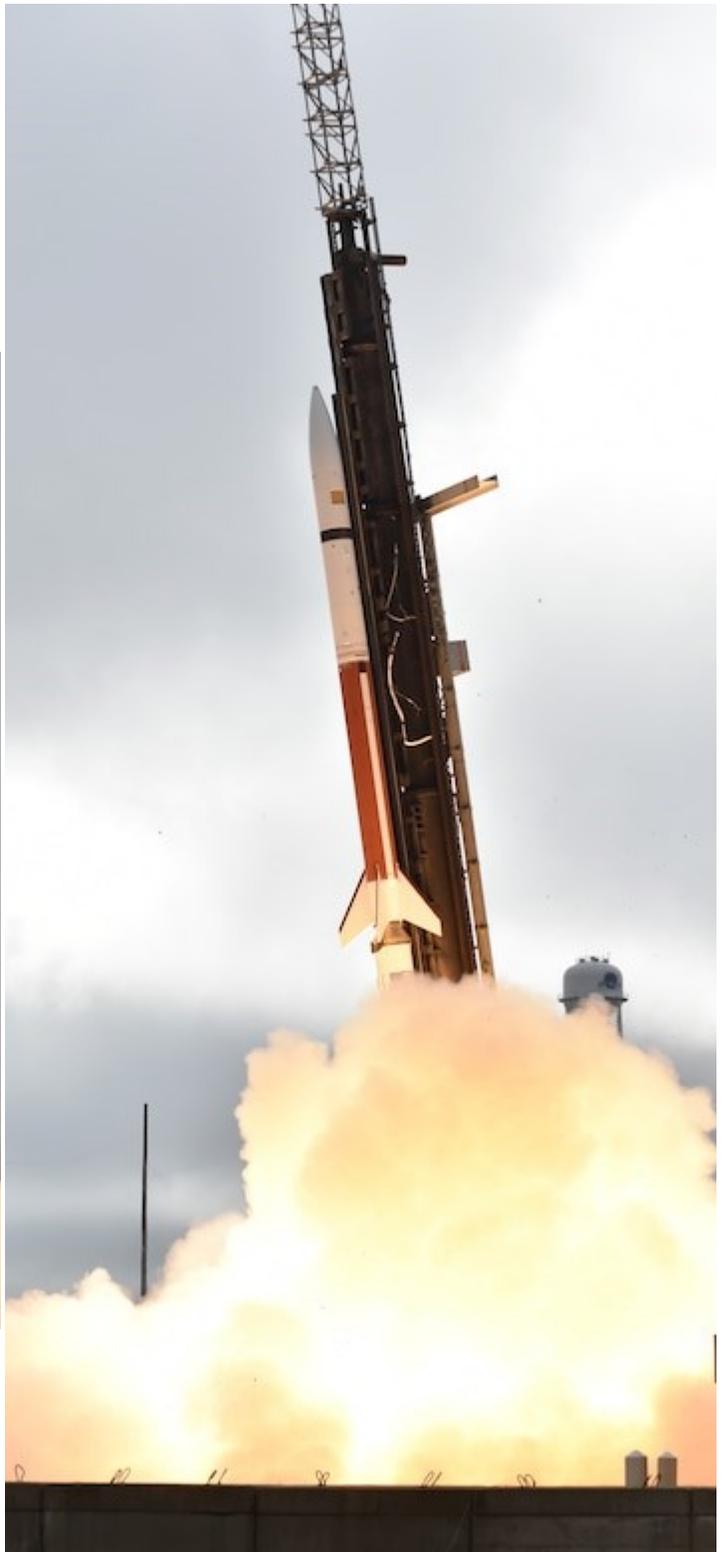
Vintage Ad



CURRENT EVENTS IN SPACE EXPLORATION



Wallops Flight Facility launched the first of two US Navy Hypersonic missile tests on 26 October. The Terrier Improved Malemute sounding rocket launch was performed by Sandia National Laboratories in support of the Navy Strategic Systems Program and the Army Hypersonic Project Office. This high tempo program is set to develop a Common Hypersonic Glide Body (CHGB) and booster to be deployed by the Navy and Army.



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In Memoriam - James McDivitt (06/10/1929 - 10/13/2022)

NASA

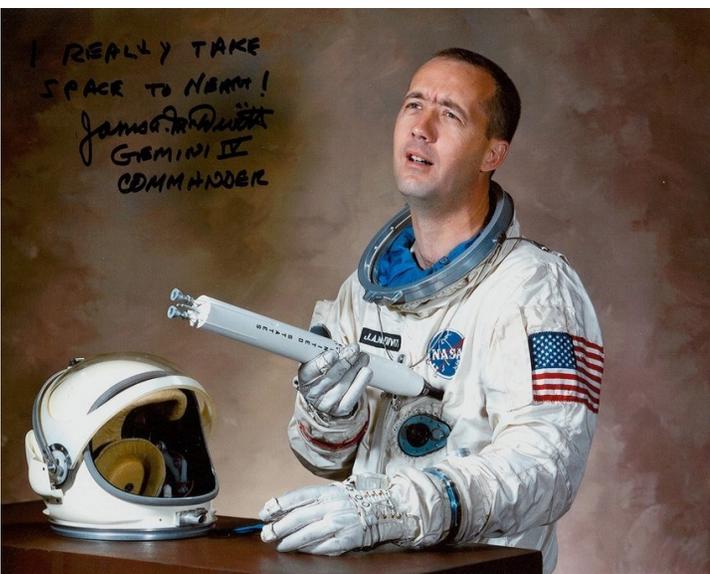
Former NASA astronaut James A. McDivitt, who commanded the Gemini IV and Apollo 9 missions, died Oct. 13. McDivitt passed away peacefully in his sleep surrounded by his family and friends in Tucson, Arizona. He was 93 years old.

McDivitt was born June 10, 1929, in Chicago. He graduated from Kalamazoo Central High School, in Kalamazoo, Michigan, before going on to receive a Bachelor of Science degree in Aeronautical Engineering from the University of Michigan, graduating first in his class in 1959.

He joined the Air Force in 1951 and retired with the rank of Brig. General. He flew 145 combat missions during the Korean War in F-80 and F-86 aircraft. He was a graduate of the U.S. Air Force Experimental Test Pilot School and the U.S. Air Force Aerospace Research Pilot course and served as an experimental test pilot at Edwards Air Force Base, California. He logged more than 5,000 flying hours during his piloting career.

McDivitt was selected as an astronaut by NASA in September 1962 as part of NASA's second astronaut class.

He first flew in space as commander of the Gemini IV mission in June 1965. McDivitt was joined by fellow Air Force pilot Ed White on the program's most ambitious flight to date. During Gemini IV, White would become the first American to venture outside his spacecraft for what officially is known as an extravehicular activity (EVA) or as the world has come to know it, a spacewalk. In the following years, it was a skill that allowed Apollo explorers to walk on the Moon and American astronauts and their partners from around the world to build the International Space Station. The mission's four-day duration nearly doubled NASA astronauts' previous time in space to that point, with the longest American spaceflight previously being Gordon Cooper's 34-hour Mercury 9 mission.



McDivitt's second spaceflight as the commander of Apollo 9 played a critical role in landing the first humans on the Moon. This was the first flight of the complete set of Apollo hardware and was the first flight of the Lunar Module. The mission launched from NASA's Kennedy Space Center on March 3, 1969, with Com-



mander James McDivitt, Command Module Pilot David Scott, and Lunar Module Pilot Russell Schweickart. After launch, Apollo 9 entered Earth orbit and the crew performed an engineering test of the first crewed lunar module, nicknamed "Spider," from beginning to end. They simulated the maneuvers that would be performed during actual lunar missions. During the mission, the astronauts performed a series of flight tasks with the command and service module and the lunar module. The top priority was rendezvous and docking of the lunar module with the command and service module. The crew also configured the lunar module to support a spacewalk by McDivitt and Schweickart. On Flight Day 10, March 13, 1969, the Apollo 9 capsule re-entered Earth's atmosphere and splashed down in the Atlantic Ocean, within three miles and in full view of the recovery ship, the USS Guadalcanal, about 341 miles north of Puerto Rico.

After Apollo 9, he became manager of lunar landing operations, and led a team that planned the lunar exploration program and redesigned the spacecraft to accomplish this task. In August 1969, he became manager of the Apollo Spacecraft Program, guiding the program through Apollo 12, 13, 14, 15 and 16.

McDivitt retired from the U.S. Air Force and left NASA in June 1972, to take the position of executive vice-president, corporate affairs for Consumers Power Company. In March 1975, he joined Pullman, Inc. as executive vice-president and a director. In October 1975 he became president of the Pullman Standard Division, The Railcar Division, and later had additional responsibility for the leasing and engineering and construction areas of the company. In January 1981 he joined Rockwell International as senior vice president, government operations, and Rockwell International Corporation, Washington, D.C.

His numerous awards included two NASA Distinguished Service Medals and the NASA Exceptional Service Medal. For his service in the U.S. Air Force, he also was awarded two Air Force Distinguished Service Medals, four Distinguished Flying Crosses, five Air Medals, and U.S. Air Force Astronaut Wings. McDivitt also received the Chong Moo Medal from South Korea, the U.S. Air Force Systems Command Aerospace Primus Award, the Arnold Air Society JFK Trophy, the Sword of Loyola, and the Michigan Wolverine Frontiersman Award.

Cheryl Warner
Headquarters, Washington

Dan Huot
Johnson Space Center



THIS MONTH IN AEROSPACE HISTORY

Source—NASA / ROSCOSMOS Archives

140 Years Ago – 1882

October 5: Robert H. Goddard born in Worcester, Massachusetts



October 14: X-1 first supersonic flight, Capt. Charles E. Yeager, Edwards AFB, CA



speech, Kennedy stated that we explore space not because it is easy but because it is hard



80 Years Ago - 1942

October 3: First successful V2 flight, Peenemünde, Germany



65 Years Ago - 1957

October 4: Sputnik 1 launched, first earth satellite, 184 pounds, 22.8 inches in diameter from Baikonur, USSR



September 18: Tiros 6 launched by Thor Delta from Cape Canaveral



75 Years Ago - 1947

September 6: Operation Sandy V2 launched from the flight deck of the USS Midway near Bermuda



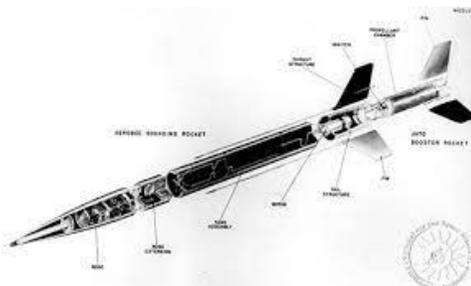
October 11: First successful flight of Thor, Cape Canaveral



September 28: Alouette 1 launched, by Thor Agena from Vandenberg AFB. Although launched by the U.S., it became the first satellite operated by a country (Canada) other than the USSR or the United States



September 25: First launch of the Aerobee sounding rocket, White Sands, NM



60 Years Ago – 1962

September 12: President John F. Kennedy's address at Rice University on the nation's space effort. In this well-known



October 2: Explorer 14 launched by Thor Delta from Cape Canaveral



THIS MONTH IN AEROSPACE HISTORY

Source—NASA / ROSCOSMOS Archives

October 3: Mercury Atlas 8, Sigma 7 launched carrying astronaut Wally M. Schirra from Cape Canaveral

55 Years Ago - 1967
September 7: Biosatellite 2 launched by Thor Delta from Cape Canaveral

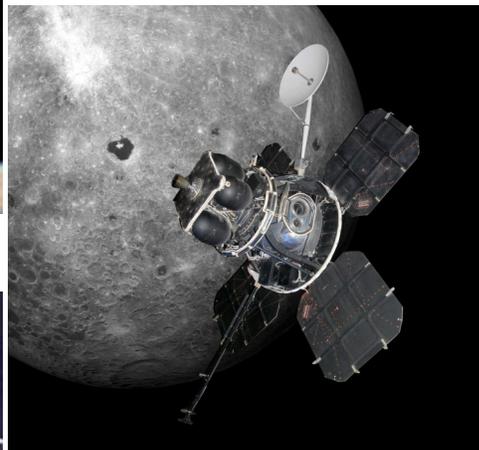
October 9: Lunar Orbiter 3 intentionally crashed on Moon
October 11: Lunar Orbiter 2 intentionally crashed on Moon



October 18: Ranger 5 launched by Atlas Agena from Cape Canaveral



September 8: Surveyor 5 launched by Atlas Centaur from Cape Canaveral



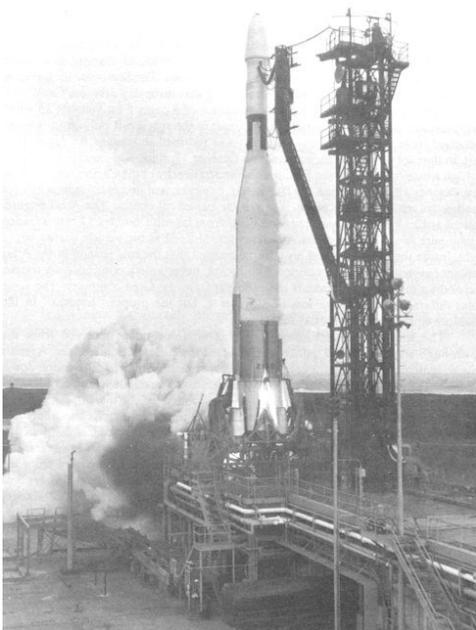
October 18: Venera 4 Landing on Venus



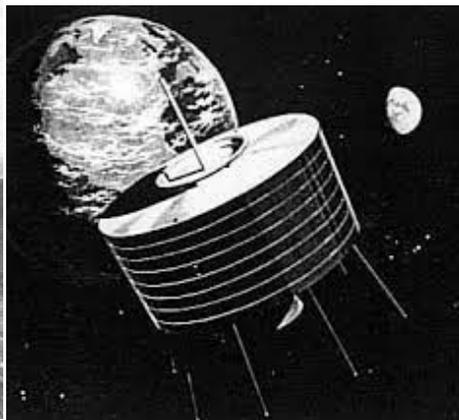
September 28: Intelsat 2 F4 launched aboard Delta rocket from Cape Canaveral



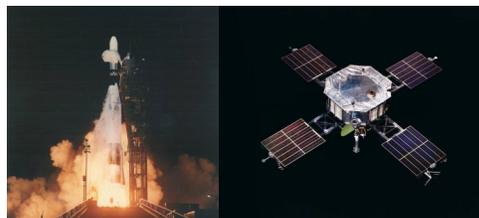
October 19: Mariner 5 flies by Venus returning valuable information about the planet's atmosphere and its radiation and magnetic field environment



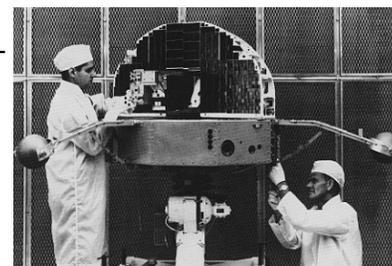
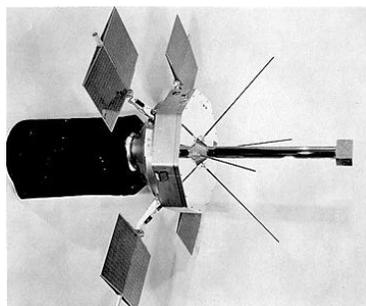
October 22: Explorer 15 launched by Thor Delta from Cape Canaveral



October 3: Fastest X-15 flight, 4,520 mph (mach 6.7) piloted by William J. "Pete" Knight at Dryden Flight Research Center



October 18: OSO 4 launched by Thor Delta from Cape Canaveral



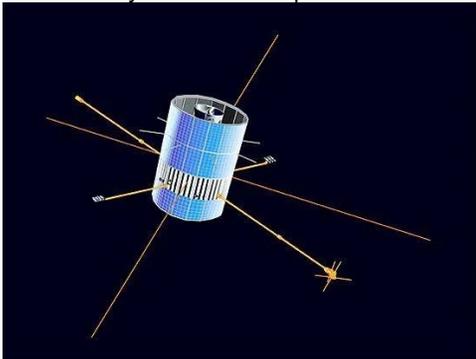


THIS MONTH IN AEROSPACE HISTORY

Source—NASA / ROSCOSMOS Archives

50 Years Ago – 1972

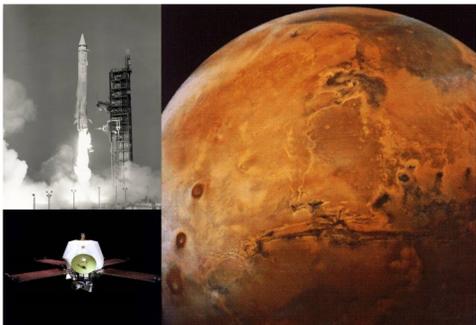
September 22: Explorer 47 (IMP 7) launched by Delta from Cape Canaveral



October 15: NOAA 2/Oscar 6 launched by Delta from Vandenberg AFB



October 27: Mariner 9 mission ended as attitude control gas exhausted



45 Years Ago – 1977

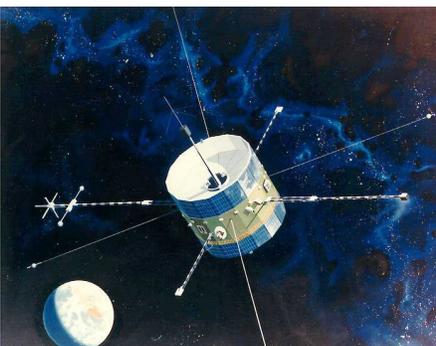
September 5: Voyager 1 launched from Cape Canaveral on a Titan IIIE-Centaur



September 29: USSR launched the Salyut-6 space station aboard a Proton K rocket from Baikonur

October 9: USSR launched Soyuz-25 aboard a Soyuz rocket from Baikonur. Ferry flight to Salyut-6 space station. Docking failed and crew returned early. Cosmonauts: Vladimir V.Kovalyonok and Valeri V.Ryumin

October 22: ISEE 1 & 2 launched by Delta from Cape Canaveral



40 Years Ago – 1982

September 27: Intelsat 5 F5 launched aboard Atlas Centaur from Cape Canaveral



October 30: DSCS II & III launched from Cape Canaveral. First use of Titan 34D and IUS launch vehicle and stage



35 Years Ago – 1987

September: Ariane 3 launches Aussat-3 and Eutelsat 4 satellites from Kourou. A significant milestone because the Ariane rocket program had been grounded 16 months after a 1986 launch failure



30 Years Ago - 1992

September 12: STS-47 (Space Shuttle Endeavour) lifted off from KSC. Crew: Robert L. "Hoot" Gibson, Curtis L. Brown, Jr., Mark C. Lee, Jerome "Jay" Apt, N. Jan Davis, and Mae C. Jemison. Payload specialist: Mamoru Mohri (Japan). Landed September 20 at KSC. Mission Duration: 7 days, 22 hours, 30 minutes





THIS MONTH IN AEROSPACE HISTORY

Source—NASA / ROSCOSMOS Archives

30 Years Ago - 1992 (continued)

September 25: Mars Observer launched on Titan III from Cape Canaveral. Spacecraft fell silent Aug. 21, 1993, three days before it would have entered Mars orbit



October 22: STS-52 (Space Shuttle Columbia) launched from KSC. Crew: James D. Wetherbee, Michael A. Baker, Charles L. Veach, William M. Shepherd, Tamara E. Jernigan, and Steven G. MacLean (Canada). Deployed LAGEOS II on October 23, and CTA (Canadian Target Assembly) on October 31 from cargo bay. Landed November 1 at KSC. Mission Duration: 9 days, 20 hours, 56 minutes



25 Years Ago – 1997

September 23: Launch of Intelsat 803 aboard Ariane 42LP rocket from Kourou



September 25: STS-86 (Space Shuttle Atlantis) launched from KSC. Crew: James D. Wetherbee, Michael J. Bloomfield, Vladimir G. Titov (Russia), Scott E. Parazynski, Jean-Loup J.M. Chrétien (France), Wendy B. Lawrence, and David A. Wolf. Docked with Mir and exchanged David Wolf for Michael Foale who returned with the rest of the crew. Landed at KSC, October 6. Mission Duration: 10 days, 19 hours, 20 minutes



October 15: Cassini/Huygens (Saturn Orbiter probe using Titan lander) launched from Cape Canaveral Air Force Station using a U.S. Air Force Titan IVB/Centaur launch vehicle



20 Years Ago – 2002

September 6: Launch of Intelsat 906 aboard Ariane 44L rocket from Kourou

October 7: STS-112 (Space Shuttle Atlantis) launched from KSC. Crew: Sandra H. Magnus and David A. Wolf, Pilot Pamela A. Melroy, Jeffrey S. Ashby, Piers J. Sellers, and cosmonaut Fyodor N. Yurchikhin. International Space Station (ISS) Flight 9A. Delivered S-1 (S-One) Truss. Landed on October 18 at KSC. Mission Duration: 10 days, 19 hours, 58 minutes



October 30: Russian Soyuz TMA-1 spacecraft launched by a Soyuz-U rocket from Baikonur at 03:11 UTC. The fourth Soyuz taxi flight, it carried a crew of two Russian cosmonauts (Sergei V. Zalyotin and Yuri V. Lonchakov), and one Belgian (Frank De Winne) to automatically dock with the International Space Station (ISS). This new Soyuz TMA-1 is a larger craft that has more comfortable space and ergonomic furniture than the previous TM models.





THIS MONTH IN AEROSPACE HISTORY

Source—NASA / ROSCOSMOS Archives

15 Years Ago – 2007

September 18: WorldView 1, a U.S. commercial (DigitalGlobe) imaging satellite, was launched by a Delta 2 rocket from Vandenberg AFB. The camera is a panchromatic imaging system featuring half-meter resolution imagery



September 14: Kaguya, a Japanese (JAXA) lunar orbiter, also known by its pre-launch name SELENE (for SELEnological and ENgineering Explorer), was launched by a H-2A rocket from Tanegashima Island. Kaguya entered lunar orbit on October 3 and subsequently deployed two subsatellites



September 27: Dawn was launched by a Delta 2 rocket from Cape Canaveral. It visited two nearby asteroids, Vesta and



Ceres, and transmitted multi-color images of them

October 10: Russia launched Soyuz TMA-11 by a Soyuz-FG rocket from Baikonur to dock with the International Space Station (ISS) Zarya module. Crew consisted of a Russian, Yuri I. Malenchenko; an American, Peggy A. Whitson; and a Malaysian, Shukor A. Muszaphar.



October 23: STS-120 (Space Shuttle Discovery) launched from KSC. Crew: Pamela A. Melroy, Daniel M. Tani., George D. Zamka, Douglas H. Wheelock, Scott E. Parazynski, Stephanie D. Wilson and Paolo Nespoli (ESA-Italy). International Space Station (ISS) Flight 10A. Installed Harmony Node 2 connecting module to the station to facilitate connecting, in future missions, the European Columbus laboratory and the Japanese Kibo laboratory. Landed: on November 7 at KSC. Mission Duration: 15 days, 2 hours, 23 minutes



10 Years Ago – 2012

October 7: The first operation mission of the Dragon spacecraft under the NASA



COTS program launched from Cape Canaveral with a Falcon 9 launch vehicle. It successfully docked with the ISS and delivered its cargo

October 14: The Space Shuttle Endeavour, mounted atop an overland transporter, arrived at its new home, the California Science Center near downtown Los Angeles

October 23: Soyuz TMA-06M launched from Baikonur cosmodrome by a Soyuz-FG launch vehicle. It carried Russian cosmonauts Oleg Novitskiy (Commander) and Evgeny Tarelkin (Flight Engineer). Along with astronaut Flight Engineer Kevin Ford to the International Space Station (ISS).

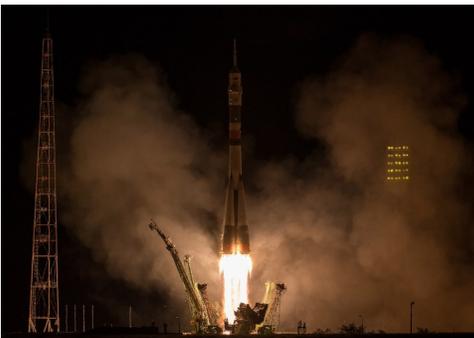


5 Years Ago – 2017

September 7: OTV-5 launched by Falcon 9 from Cape Canaveral. X-37B mission carrying the Air Force Research Laboratory



September 12: Soyuz MS-06 launched by a Soyuz FG launch vehicle. Crew: Alexander Misurkin, Mark Vande Hei, and Joseph Acaba. (ISS Expedition 53). The arrival of the Expedition 53 crew marked the first long-term increase in crew size on the U.S. segment from three to four, allowing NASA to maximize time dedicated to research





LAUNCH WINDOWS

Launch dates from SpaceFlight.com

November 1, 2022

Atlas 5 - JPSS 2 & LOFTID

Launch site: SLC-3E, Vandenberg SFB

A United Launch Alliance Atlas 5 rocket will launch Joint Polar Satellite System 2, or JPSS 2, polar-orbiting weather satellite for NASA and NOAA. Built by Northrop Grumman, JPSS 2 will provide global weather observations for medium and long-term forecasts. The Atlas 5 will also launch the Low-Earth Orbit Flight Test of an Inflatable Decelerator, or LOFTID, re-entry aeroshell vehicle on a test flight. LOFTID is a joint project between NASA and ULA. The rocket will fly in the 401 vehicle configuration with a four-meter fairing, no solid rocket boosters, and a single-engine Centaur upper stage.

November 2022

Falcon 9 - Starlink 4-37

Launch site: SLC-40, CCSFS

A SpaceX Falcon 9 rocket will launch with another batch of Starlink internet satellites.

November 2022

Antares - NG-18

Launch site: Pad 0A, Wallops Island

A Northrop Grumman Antares rocket will launch the 19th Cygnus cargo freighter on the 18th operational cargo delivery flight to the International Space Station. The mission is known as NG-18. The rocket will fly in the Antares 230+ configuration, with two RD-181 first stage engines and a Castor 30XL second stage.

4th Quarter 2022

Falcon 9 - WorldView Legion 1 & 2

Launch site: SLC-40, CCSFS

A SpaceX Falcon 9 rocket will launch the first two WorldView Legion Earth observation satellites for Maxar Technologies. Maxar plans to deploy six commercial WorldView Legion high-resolution remote sensing satellites into a mix of sun-synchronous and mid-inclination orbits on three SpaceX Falcon 9 rockets.

4th Quarter 2022

Falcon 9 - Hotbird 13G

Launch site: SLC-40, CCSFS

A SpaceX Falcon 9 rocket will launch the Hotbird 13G television broadcasting satellite for Eutelsat. Hotbird 13G is the second satellite to be built on Airbus's new Eurostar Neo all-electric spacecraft design, and will provide television broadcast services to Europe, North Africa, and the Middle East.

TBD, 2022

November 2022

Space Launch System - Artemis 1

Launch site: LC-39B, KSC

NASA's Space Launch System heavy-lift rocket will launch on its first test flight with an uncrewed Orion spacecraft. The mission, known as Artemis 1, will place the Orion spacecraft into orbit around the moon before the capsule returns to Earth for splashdown in the Pacific Ocean. Ten small CubeSat rideshare payloads will also launch on the Artemis 1 mission.

November 2022

Falcon 9 - O3b mPOWER 1 & 2

Launch site: SLC-40, CCSFS

A SpaceX Falcon 9 rocket will launch the first two O3b mPOWER broadband internet satellites into Medium Earth Orbit for SES of Luxembourg. The satellites, built by Boeing, will provide internet services over most of the populated world, building on SES's O3b network.

November 18, 2022

Falcon 9 - SpaceX CRS 26

Launch site: LC-39A, KSC

A SpaceX Falcon 9 rocket will launch a Dragon 2 spacecraft on its sixth cargo resupply mission to the International Space Station. The flight is the 26th mission by SpaceX conducted under a Commercial Resupply Services contract with NASA.

November 2022

Falcon 9 - Eutelsat 10B

Launch site: SLC-40, CCSFS

A SpaceX Falcon 9 rocket will launch the Eutelsat 10B communications satellite for Eutelsat. Based on the Spacebus Neo platform built by Thales Alenia Space, Eutelsat 10B will provide maritime and in-flight broadband, data, and video connectivity to customers in the Americas, the Atlantic Ocean, Europe, Africa, the Middle East, and Central Asia.

November 21, 2022

Vega-C - Pléiades Neo 5 & 6

Launch site: ZLV, Kourou

An Ariespace Vega-C rocket will launch the Pléiades Neo 5 and 6 Earth observation satellites for Airbus. Pléiades Neo 5 and 6 are the third and fourth members of the four-satellite Pléiades Neo constellation built, owned, and operated by Airbus.

4th Quarter 2022

Starship - Orbital Test Flight

Launch site: Starbase, Boca Chica

A SpaceX Super Heavy and Starship

launch vehicle will launch on its first orbital test flight. The mission will attempt to travel around the world for nearly one full orbit, resulting in a re-entry and splashdown of the Starship near Hawaii.

TBD 2022

SSLV - BlackSky Global

Launch site: Satish Dhawan Space Center

India's Small Satellite Launch Vehicle (SSLV) will launch on its first commercial mission with four Earth observation satellites for BlackSky Global, a Seattle-based company. The rideshare mission for BlackSky is being arranged by Spaceflight.

4th Quarter 2022

Falcon Heavy - USSF 67

Launch site: LC-39A, KSC

A SpaceX Falcon Heavy rocket will launch the USSF 67 mission for the U.S. Space Force. The mission will launch an unspecified military payload on this mission.

4th Quarter 2022

Falcon Heavy - ViaSat 3 Americas

Launch site: LC-39A, KSC

A SpaceX Falcon Heavy rocket will launch the ViaSat 3 Americas broadband communications satellite. ViaSat 3 Americas is the first of at least three new-generation Boeing-built geostationary satellites for ViaSat. A small communications satellite named Arcturus will launch as a secondary payload for Arianis.

December 5, 2022

Falcon 9 - SWOT

Launch site: SLC-4E, Vandenberg SFB

A SpaceX Falcon 9 rocket will launch the Surface Water and Ocean Topography mission for NASA. SWOT is a science mission jointly developed by NASA and CNES, the French space agency, to measure how much water is in Earth's oceans, lakes, and rivers.

December 2022

Ariane 5 - Galaxy 35, Galaxy 36, and MTG-I1

Launch site: ELA-3, Kourou

Arianespace will use an Ariane 5 ECA rocket, designated VA259, to launch the Galaxy 35 and 36 communications satellites for Intelsat, and the MTG-I1 weather satellite for Eumetsat. Galaxy 35 and 36, built by Maxar, will provide C-band television and video broadcast services over the United States.



JMARC
HUVERS

Club News

It's Election Season!

That's right. It's been nearly three years since our last club elections were held at the 2019 Annual Meeting/Holiday Party. Several members have expressed an interest in volunteering to serve on the Board of Directors this past summer. The current leadership came up with a virtual nomination and election process so that all members could partake and not just those that attend the annual meeting.

A call for nominations was sent through an email to the membership for the four main officer positions (President, Vice-President, Secretary, and Treasurer) as well as the five Board of Directors. We only received single nominations for each Officer position so no election will be necessary.

Your club officers for the next year are;

- President - Scott Miller
- Vice-President - Roger Sadowsky
- Secretary - Buzz Nau
- Treasurer - Tony Haga

There were six nominations for the BOD positions so there will be an election. A link to an anonymous ballot and candidate resumes was sent to membership on 10/30/22. The poll will remain open until 11/6/22 at 8 pm.

Your BOD candidates are;

- Al de la Iglesia
- Bob Dickinson
- Dale Hodgson
- Fred Ziegler
- Herb Crites
- Mark Chrumka

NAR Section Grants Available for 2022

The NAR provides \$250 grants to sections for the purchase of safety and launch operations equipment. With the joining of our two sections we can request up to \$500. We are still looking for ideas from the membership for ways we can improve our launch operations.

Let the BOD know if you have an idea which we could apply towards a grant application. It doesn't have to be one big thing and many small things add up. The BOD is considering investing in a new PA system and if anyone has experience with these please contact any of the board members. We would appreciate guidance and advice.

Big Bertha Contest..... Punted to 2023

Like Lucy pulling the football away from a charging Charlie Brown, the Big Bertha contest is not to be this year and we will attempt to hold it at an early 2023 launch.

More Fun Contests for 2023

Random Altitude - This will be like the "Current Year Altitude" event we used to run all summer long. Rather than using the current year as the target altitude, we will use a random number generator to pick an altitude between 1500 and 2500 feet. Otherwise, the same rules apply, get closest to the target altitude without going over. It will run all season long for 2023. The entry fee will be \$5 per attempt. The winner will receive 50% of the pot, second place will earn 25%, and the remaining 25% will go to the club.

Iron-man III – Just like the past Ironman contests. Build a single model to be flown in three events. Cost will be \$10 which will get you motors needed to fly the events. We're still working out the details, but the models will likely be 18mm and two-stage. Prizes will be awarded to the top three overall performers

Events

- Double Spot Landing (booster and sustainer!)
- Streamer Duration
- Altitude (with an altimeter)

Flying Field News

The November 12 launch will be held at the Horning 1 field and it will close out our flying for the year. I will update everyone as soon as I know what the crops will be next year.

Under Development

Testing continues with Scott's wireless intranet launch control system. It has been used as the primary launch control system for the High Power range at the last three launches and has performed well. Future development over the winter includes WiFi Pad modules, pad cam, and more!

Buzz and Scott are also working a new flight record database system. The main goal is to track member's launch data and may include an online flight card system to reduce or eliminate paper flight cards.



LAUNCH WINDOWS
CONTINUED

Launch dates from SpaceFlight.com

4th Quarter 2022

Falcon 9 - GPS 3 SV06

Launch site: SLC-40, CCSFS

A SpaceX Falcon 9 rocket will launch the U.S. Space Force's sixth third-generation navigation satellite for the Global Positioning System. The satellite was built by Lockheed Martin.

TBD 2022

Falcon Heavy - USSF 52

Launch site: LC-39A, KSC

A SpaceX Falcon Heavy rocket will launch the USSF 52 mission for the U.S. Space Force. The mission will launch an unspecified military payload on this mission.

TBD 2022

Falcon 9 - SES 18 & SES 19

Launch site: Cape Canaveral

A SpaceX Falcon 9 rocket will launch SES

18 and SES 19 communications satellites for SES of Luxembourg. SES 18 and 19, built by Northrop Grumman, will provide C-band television and data services over the United States.

December 2022

Falcon 9 - Transporter 6

Launch site: SLC-40, CCSFS

A SpaceX Falcon 9 rocket will launch the Transporter 6 mission, a rideshare flight to a sun-synchronous orbit with numerous small microsatellites and nanosatellites for commercial and government customers.

December 2022

Falcon 9 - SDA Tranche 0

Launch site: SLC-4E, Vandenberg SFB

A SpaceX Falcon 9 rocket will launch around 10 Tranche 0 demonstration satellites for the U.S. military's Space Develop-

ment Agency. The launch is the first of two Falcon 9 missions to carry SDA demonstration spacecraft for a future constellation of military missile tracking and data relay satellites.

Late 2022

Vulcan Centaur - Peregrine

Launch site: SLC-41, CCSFS

A United Launch Alliance Vulcan Centaur rocket will launch on its inaugural flight with the Peregrine commercial lunar lander for Astrobotic. The Peregrine robotic lander will carry multiple experiments, scientific instruments, and tech demo payloads for NASA and other customers. The Vulcan Centaur rocket will fly in the VC2S configuration with two GEM-63XL solid rocket boosters



OUR MEMBERS IN THE FIELD



Tony Haga and Jay Calvert at the September Launch



Chris Timm and his ShroX style Navaho



Herb Crites after a successful Mach Schnell flight



A trio of Der Red Max's - Al de la Iglesia, Mark Chrumka, and Mark Gryn



Prez Scott Miller