

# THE FLIGHT PLAN

The Newsletter of AIAA Albuquerque Section  
The American Institute of Aeronautics and Astronautics

## AUGUST 2020 SECTION MEETING: BIOINSPIRATION, BIOMIMETICS, AND DRONES.

Mostafa Hassanalain, PhD.




Autonomous Flight and Aquatic Systems Laboratory (AFASL), New Mexico Tech

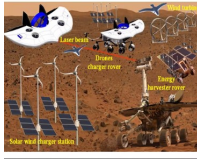
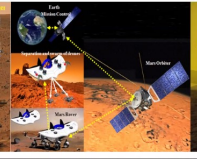

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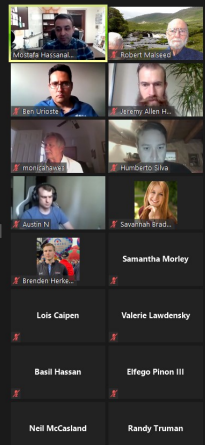
### Drones and planetary exploration

- Space drones for planetary exploration
  - Venus, Mars, and Titan
  - ❖ Design of solar drone for Venus exploration
  - ❖ Mission define and design of fixed wing drones for Mars
  - ❖ Design of morphing and VTOL drones for Mars
  - ❖ Research on high performance airfoils for low Reynolds numbers
  - ❖ Design of flapping wing for Mars exploration
  - ❖ Investigation the performance of natural birds on Mars
  - ❖ Swarming flight on Mars
  - ❖ Energy harvesting in Mars, Venues, and Titan for space drones
  - ❖ Mission define and design of soaring fixed wing drones for Titan

Hassanalain, M., Rice, D. and Abdelkefi, A., 2018. Evolution of space drones for planetary exploration: A review. Progress in Aerospace Sciences, 97, pp.61–105.





### NEXT MEETINGS:

#### THIS MONTH:

**24 September.** See page 3.

#### NEXT MONTH:

**16 October** – Dr. Paul Delgado, SNL – “Low Speed Wind Tunnel Design and The Zia Initiative”

In the section's second virtual meeting (via ZOOM) Dr. Hassanalain spoke about NM Tech's research that involves using biomimicry to solve many complex tasks in aerospace applications. Nature's biological systems already deal with issues such as drag reduction techniques, locomotion, navigation, control, and sensing. Today, there is a growing need for flying drones with diverse capabilities for both civilian and military applications. There is also a significant interest in the development of novel drones, which can autonomously fly in different environments and locations and can perform various missions. In the past decade, the broad spectrum of applications of these drones has received a great deal of attention, which led to the invention of a large variety of drones of different sizes and weights. Depending on the flight missions of the drones, the size and type of installed equipment are different. Considerable advantages afforded by the drones

(Continued on page 2)

## CALENDAR

### Local Section Events

Next General meeting 17 September 2020

Virtual Meeting Via Zoom

Start 6:00 pm

End 7:30 pm

#### Upcoming U.S. Launches

Sep Delta 4-Heavy • NROL-44

10/11 Sep Rocket 3.1 • Test Flight

Sep Falcon 9 • Starlink 12

Sep Falcon 9 • Starlink 13

29/30 Sep Antares • NG-14

30 Sep/1 Oct Falcon 9 • GPS 3 SV04

Oct Atlas 5 • NROL-101

29/30 Sep Antares • NG-14

Oct Falcon 9 • Starlink 14

Nov Falcon 9 • Space X CRS 21

TBD Falcon 9 • SXM 7

TBD LauncherOne • ELaNa-20

### National AIAA Events

[2020 Integrated Communications Navigation and Surveillance Conference \(ICNS\)](#)

9 SEPTEMBER - 11 SEPTEMBER 2020

[AIAA Aerospace Recruitment Series: The Aerospace Corporation](#)

15 SEPTEMBER 2020 1230 - 1330 (EASTERN DAYLIGHT TIME)

[To the Moon with Dynetics: The Importance of Lunar Exploration and Utilization](#)

15 SEPTEMBER 2020 1300 - 1430 (EASTERN DAYLIGHT TIME)

[ASCENDxSummit: National Security Space](#)

17 SEPTEMBER 2020 1000 - 1400 (EASTERN DAYLIGHT TIME)

[39th Digital Avionics Systems Conference \(DASC\)](#)

11 OCTOBER - 15 OCTOBER 2020

[71st International Astronautical Congress – The CyberSpace Edition](#)

12 OCTOBER - 14 OCTOBER 2020

[2020 AIAA Young Professionals, Students, and Educators \(YPSE\) Conference](#)

15 OCTOBER - 16 OCTOBER 2020

### AUGUST 2020 SECTION MEETING: (CONTINUED)

have led to a myriad of studies focusing on the optimization and enhancement of the drone's performances. According to the mentioned characteristics, drones benefit from the potential to carry out the variety of operations, including reconnaissance, patrolling, protection, transportation of loads, and aerology. They can carry various sensors: visual, acoustic, chemical, and biological. Drones often vary widely in their configurations, depending on the platform and mission. Drones can perform both outdoor and indoor missions in very challenging environments. The applications of drones can be categorized in different ways. It can be based on the type of missions (military/civil), type of the flight zones (outdoor/indoor), and type of the environments (underwater/on the water/ground/air/space).

## ALBUQUERQUE SECTION MEETING 24 SEPTEMBER

**Experimental Studies of Fluid-Structure Interactions in High-Speed Flow***Katya Casper, PhD, Sandia National Laboratories*

Sandia National Laboratories is responsible for predicting the vibrational response of many structures to high speed flow. This talk will give an overview of experimental efforts aimed at better understanding these fluid-structure interactions. During atmospheric reentry, hypersonic vehicles are subjected to high levels of boundary-layer pressure fluctuations that can cause vibration of internal components. Experiments were conducted to correlate the unsteady loading from turbulent spots in the transitional hypersonic boundary layer to the dominant vibrational response of a thin panel. Experiments have also been conducted to better understand fluid-structure interactions in subsonic and supersonic cavity flows. Work focused on determining if the resonant tones of these cavities can drive a large vibration of internal structures when matching a structural natural frequency. This talk will also discuss efforts to improve the modeling of jointed structures. Nonlinear structures are currently being subjected to well-characterized impulsive shock loading to test the fidelity of existing nonlinear structural dynamics models, which are often calibrated using mechanical methods quite different from the fluid forcing. This talk will also briefly cover the use of time-resolved particle image velocity (TR-PIV), digital image correlation (DIC), and pressure-sensitive paint (PSP) to capture both the fluid loading and structural response with both temporal and spatial resolution.

**Speaker Bio:**

Dr. Katya Casper is a principal member of the technical staff at Sandia National Laboratories in Albuquerque, NM. She develops, conducts, and manages wind tunnel experiments in support of Sandia's programs. Her work centers on high-speed experimental fluid dynamics, with a focus in hypersonic boundary-layer transition, hypersonic fluid-structure interactions, as well as fluid-structure interactions in subsonic/supersonic cavity flows. She also works to apply traditional wind-tunnel diagnostics to novel applications and testing environments at Sandia. She received her B.S. in Aerospace Engineering from North Carolina State University in 2007, her M.S. from Purdue University in 2009, and completed her Ph.D. at Purdue University in Aeronautics and Astronautics in 2012. She is the 2019 recipient of the AIAA Lawrence Sperry Award.

**When: Sept 24, 2020 (Thursday)****Where: On-line via Zoom****5:45 – 6:00 Virtual meet and greet****6:00 ~ 7:00 Presentation & Discussion**[Join Zoom Meeting](#)<https://us02web.zoom.us/j/83679884728?pwd=R0l4TkJadSs1Vjl6YnZZMkNDSk5VZz09>**Meeting ID: 836 7988 4728; Passcode: 874994**[Click Here to RSVP](#)[https://docs.google.com/forms/d/1T8z2aAe\\_WIRsgoNVZi2iKleXjwtdPPE07VXuNhhCM/viewform](https://docs.google.com/forms/d/1T8z2aAe_WIRsgoNVZi2iKleXjwtdPPE07VXuNhhCM/viewform)



## MECHANICAL ENGINEERING NEWS

### UNM M.E. DEPT. HOSTS GRADUATE STUDENT SEMINARS

The University of New Mexico Department of Mechanical Engineering hosts graduate student seminars every Friday at 3.30 p.m. during the semester. The announcement of upcoming presentations are available at the website: <https://me.unm.edu/seminars/graduate-seminars.html> and in this Fall, the presentations are from NASA Langley, SANDIA NL, LANL, Lockheed Martin, NREL, and National Institute of Aeronautics and Space.

This year all seminars are on Zoom and if you are interested in joining in, please send the request to Prof. Svetlana Poroseva ([poroseva@unm.edu](mailto:poroseva@unm.edu)) and she will share the link with you.

We also invite those who would like to make a presentation about interesting research to our students in Spring (February-April). Presentations from labs and industry are welcome.





## STUDENT BRANCH NEWS



## 2021 REGIONAL STUDENT CONFERENCE INFORMATION



Michael Lagana University Programs Manager  
American Institute of Aeronautics and Astronautics, Reston VA

4 September 2020

The AIAA Regional Student Conference season begins NOW! Yesterday, we launched our abstract solicitation for this upcoming student conference season, and we couldn't be more excited to see what our student members have been up to.

If you are unfamiliar with this program, student members submit their papers via our online system (abstracts and then final manuscripts). The papers go through a **technical** judging process, where they receive one set of scores from technical judges and then student present at their regional conferences for an **oral** score based on their presentation. The two scores are then combined to determine our 1st, 2nd, and 3rd place winners in each category.

1st Place winners get \$500 (total for the team) + a trip to the 2022 AIAA SciTech Forum to present at the International Student Paper Conference.

2nd Place winners get \$300 (total for the team)

3rd Place winners get \$250 (total for the team)

The categories are the following:

**Undergraduate** (max of 2 student authors and 1 faculty advisor)

**Masters** (max of 2 student authors and 1 faculty advisor [no Ph.D. students])

**Team** (between 3-10 student authors and 1 faculty advisor - all students should be undergraduates)

For 2021, we opened our solicitations 2 months earlier than normal to give our students extra time to submit their abstracts, given the changing environment, with due dates being in late winter.

**There are no limits on what topic you can submit to the call for papers.** These competitions are open-topic, as long as it relates to aerospace engineering and your paper fits into the formatting restrictions, you are good to go! Check out more information, review the rules and deadlines here:

[AIAA Student Conferences Call for Papers](#)

Want to go straight to the submission site? [Click here!](#)

If you have any questions, please contact me at [michaell@aiaa.org](mailto:michaell@aiaa.org). I am happy to help!

## AIAA SCHOLARSHIPS AND GRADUATE AWARDS

By Robert Malseed—Treasurer

### Undergraduate Scholarships

#### SCHOLARSHIP NAME & AWARD AMOUNT

Daedalus 88 Scholarship: \$10,000\*

*\*Note: Applicants should call out their entrepreneurial spirit by describing their leadership of a student-initiated, hands-on multidisciplinary aerospace engineering project. Applicants must be willing to make a presentation, at a site that is mutually agreeable, on the student-led project in which they participated.*

David and Catherine Thompson Space Technology Scholarship: \$10,000

Vicki and George Muellner Scholarship for Aerospace Engineering: \$5,000

Wernher von Braun Scholarship: \$5,000

Liquid Propulsion Scholarship: \$2,500

#### Digital Avionics Scholarships

Cary Spitzer Digital Avionics Scholarship: \$2,000

Dr. Amy R. Pritchett Digital Avionics Scholarship: \$2,000

Dr. James Rankin Digital Avionics Scholarship: \$2,000

Ellis F. Hitt Digital Avionics Scholarship: \$2,000

Space Transportation Scholarship: \$1,500

Leatrice Gregory Pendray Scholarship: \$1,250\*

*\*Note: This scholarship is available to female applicants only.*

Rocky Mountain Section Scholarship: \$500

### Graduate Awards

#### SCHOLARSHIP NAME & AWARD AMOUNT

Neil Armstrong Graduate Award: \$5,000

Orville and Wilbur Wright Graduate Award (x2): \$5,000

Dr. Hassan A. Hassan Graduate Award in Aerospace Engineering (x2): \$5,000

Luis de Florez Graduate Award: \$3,500

Guidance, Navigation and Control Graduate Award: \$2,500

John Leland Atwood Graduate Award: \$1,250

Martin Summerfield Propellants and Combustion Graduate Award: \$1,250

Gordon C. Oates Air Breathing Propulsion Graduate Award: \$1,000

William T. Piper, Sr. General Aviation Systems Graduate Award: \$1,500 (\$1,000 award, plus \$500 stipend, to attend the AIAA AVIATION Forum)

**Applications accepted from 01 October to 31 January**

Details may be found at:

<https://www.aiaa.org/get-involved/students-educators/scholarships-graduate-awards>

# HONORS & AWARDS FEB 2019—FEB 2020

By AIAA National

AIAA recently released a list of all awards given from Feb 2019 to Feb 2020. Below are Albuquerque Section Members who are on the list. Congratulations to all of you!!

## 2020 Associate Fellows

Jacqueline Chen  
Tucker Lavin  
Humberto Silva III  
Justin Smith

## 25 Yr Members

Dr Srinivasan Arunajatesan  
Mr Jacob P Breeden  
Thomas E Duerr  
Dr Michael J Kaneshige  
Dr Ronald J Lipinski  
Dr John Tam

## 40 Yr Members

Mr Lester Byington

## 51—80 Yr Members

Years	Grade	Name
55	Associate Fellow	Dr James K Cole
55	Senior Member	Dr Stewart W Johnson
56	Fellow	Dr Carl W Peterson
58	Senior Member	Stanley W Moore
58	Associate Fellow	Dr Patrick J Roache
58	Associate Fellow	Dr Leo W Stockham
60	Associate Fellow	Dean F Wolf
61	Senior Member	Charles Martin
62	Senior Member	Dr Martin P Sherman
65	Associate Fellow	Dr William B Brooks
65	Associate Fellow	Dr Peter D Tannen
69	Associate Fellow	Dr Stanley E Logan
80	Associate Fellow	Harold G Behl

## Best Paper - Propulsion and Energy Group

Dr David I Poston      “The Kilopower Reactor Using Stirling TechnologY (KRUSTY) Nuclear Ground Test Results and Lessons Learned” (AIAA 2018-4973)

## Lawrence Sperry Award

Dr Katya M Casper      For outstanding and notable contributions to fundamental understanding of boundary layer transition and fluid-structure interactions in hypersonic flows through novel diagnostics with national program impact

## STAFFORD AIR & SPACE MUSEUM

By Robert Malseed—Treasurer

We have driven by the F-4 aircraft that sits facing I-40 and advertises the Stafford Air & Space Museum in Weatherford, OK, many times.

<https://www.staffordmuseum.org/>

This year we spent a night in Weatherford in our motorhome so that we could visit the museum. It is well worth a visit. There is much to see in this facility at the city airport. (Including items we have never seen displayed in any other Air & Space Museum.) Here a few photos:



General Thomas P. Stafford flew on Gemini 6A & 9A, Apollo 10, and the Apollo-Soyuz Test Project. Artifacts from these missions, along with many other items chronicling the history of air & space from the Wright brothers to the International Space Station are on display.



F-104



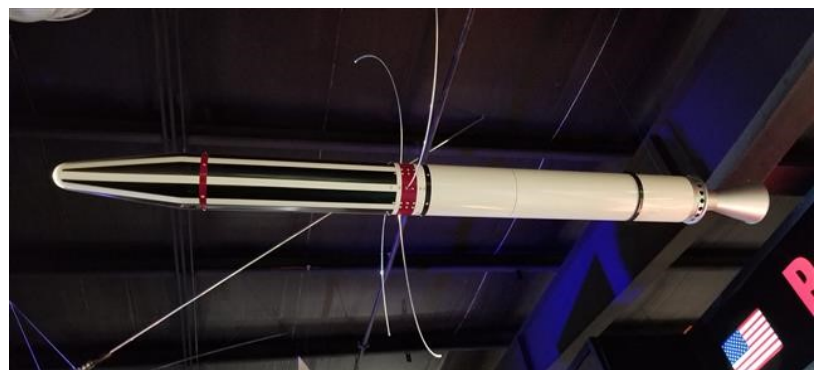
Gen. Stafford's Congressional Space Medal of Honor and his Apollo 10 space suit.



Wright Flyer



Gemini spacecraft.

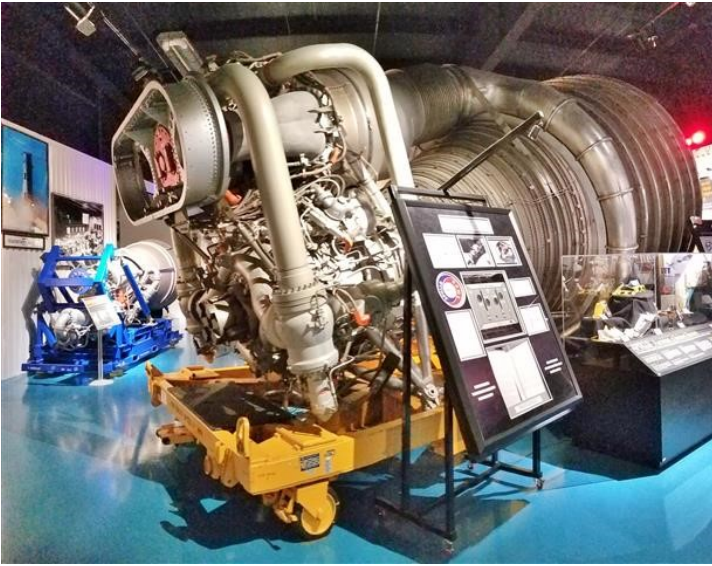


Some of us remember well the launch of Explorer 1 on 31 January 1958.

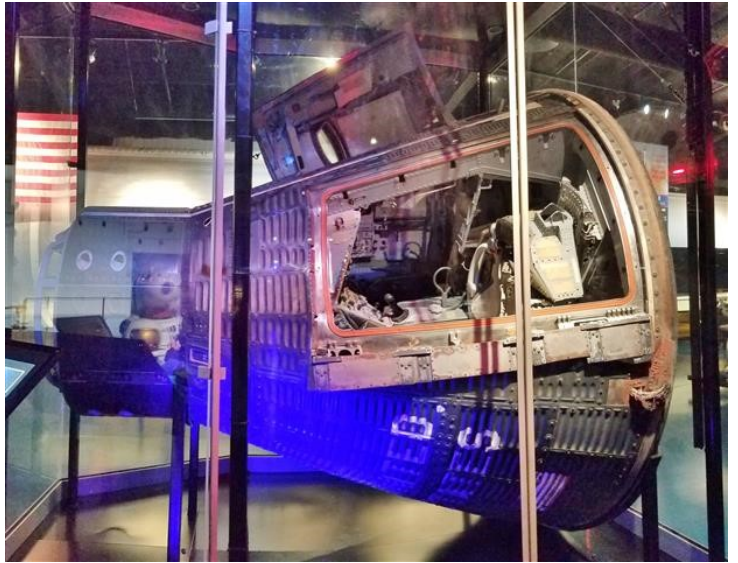


## STAFFORD AIR &amp; SPACE MUSEUM—CONTINUED

By Robert Malseed—Treasurer



In the foreground is an F-1 engine, five of which powered the US Saturn V moon rocket's first stage. In the background is an NK-33 engine, 30 of which powered the Soviet N-1 moon rocket first stage. This is the only place where one can see the two together.



One of General Stafford's Gemini spacecraft.



Apollo Command and Service Module.



Apollo Lunar Module.



Saturn V engines.



Apollo – Soyuz (COI03) Memorabilia.

## JULY, AUGUST, SEPTEMBER IN AIR & SPACE HISTORY

### JULY 2020

#### 410 Years Ago - 1610

July 30: Astronomer Galileo Galilei observes Saturn's Rings.

#### 70 Years Ago - 1950

July 24: First launch from Cape Canaveral, V-2 with Wac Corporal as second stage (Bumper/V-2 Rocket).

#### 65 Years Ago - 1955

July 29: International Geophysical Year (IGY) announced by the White House, Washington, D.C. U.S. plans to launch satellite vehicle as part of its contribution to the effort.

July 30: USSR announces plan to launch an earth satellite as its contribution to the IGY, Copenhagen, Denmark.

#### 60 Years Ago - 1960

July 1: Army Ballistic Missile Agency in Huntsville, AL renamed George C. Marshall Space Flight Center. It officially opened with formal transfer ceremonies and becomes part of NASA.

July 29: Apollo Program named, Washington, D.C.

July 29: MA-1, Mercury Capsule launched, Atlas booster exploded shortly after liftoff, Cape Canaveral, Fla.

#### 55 Years Ago - 1965

July 1: Tiros 10 launched aboard Thor Delta, 11:07 a.m., EST, Cape Canaveral, Fla.

Last of Tiros series of weather satellites.

July 14: Mariner 4 took first close-up photographs of Mars, project managed by the Jet Propulsion Laboratory, Pasadena, CA. First fly-by of Mars.

July 16: 1st Proton Rocket Launch (USSR)

July 18: Zond 3 Launch (USSR Moon Flyby).

July 30: Saturn 10 with Pegasus 3 micrometeoroid satellite as a payload launched from Cape Canaveral, Fla., 8:00 a.m., EST. Apollo Boiler Plate BP-9 also aboard.

#### 50 Years Ago - 1970

July 17: HL-10 made its last flight, Major Peter C. Hoag at the controls, DFRF, CA.

July 23: Intelsat III F-8 launched by Thor Delta, failed to reach proper orbit, 7:23 p.m., EDT, Cape Canaveral, Fla.

#### 45 Years Ago - 1975

July 15: Soyuz 19 launched, 1220 UTC, Baikonur, USSR. Crew of Alexei A. Leonov and Valeri N. Kubasov. This was the Soviet contribution to the Apollo-Soyuz Test Program (ASTP).

July 15: ASTP launched at 3:05 p.m., EDT, Cape Canaveral, Fla. aboard a Saturn 1B. Astronauts Thomas P. Stafford, Vance D. Brand and Donald K. Slayton. Linked with Soyuz 19 on July 17. Last Apollo spacecraft flight. First docking of two nation's spacecraft.

#### 40 Years Ago - 1980

July 18: The Indian Space Research Organisation (ISRO) successfully launched into Earth orbit the Rohini RS-1 test satellite, designed primarily to evaluate the efficiency of the launch vehicle.

## JULY, AUGUST, SEPTEMBER IN AIR & SPACE HISTORY

(Continued from page 10)

### 35 Years Ago – 1985

July 2: Giotto launch Aboard Ariane 1 rocket from French Guiana. (ESA's Comet Halley Mission).

July 29: STS-51F (Space Shuttle *Challenger*), with Spacelab-2 payload in the cargo bay. Launched from KSC at 5:00 p.m., EDT. Crew: Charles G. Fullerton, Roy D. Bridges, Karl G. Henize, Anthony W. England, F. Story Musgrave, Loren W. Acton and John-David E. Bartoe. Landed Edwards Air Force Base, CA on August 6, 3:45 p.m., EDT. Mission Duration: 7 days, 22 hours, 45 minutes.

### 30 Years Ago – 1990

July 25: Combined Release and Radiation Effects satellite (CRRS) launched aboard Atlas 1 rocket from Cape Canaveral, Fla. at 3:21 p.m., EDT to study ionosphere and magnetosphere.

### 25 Years Ago – 1995

July 13: STS-70 (Space Shuttle *Discovery*). Launched at 9:41 a.m. EDT at KSC, Fla. Crew: Terence T. Henricks, Kevin R. Kregel, Nancy Jane Currie, Donald A. Thomas, and Mary Ellen Weber. Deployment of the 7th Tracking Data and Relay Satellite (TDRS). Landed July 22 at 8:02 a.m. EDT at KSC. Mission Duration: 8 days, 22 hours, 20 minutes, 5 seconds.

July 23: Alan Hale's & Tom Bopp's Discovery of Comet Hale-Bopp.

### 20 Years Ago – 2000

July 12: ZVEZDA (meaning Star) is the Russian "service module" that was launched to dock with the International Space Station (ISS) by a Proton-K rocket from Baikonur at 04:56 UTC.

July 16: Launch of European Space Agency (ESA) Cluster II satellites (named Samba and Salsa) to probe the magnetosphere by a Soyuz-Fregat rocket from Baikonur at 12:39 UTC. Cluster I was lost aboard Ariane 5 failed maiden flight.

### 15 Years Ago – 2005

July 9: Suzaku, or Astro-E2 successfully launched with help of Goddard SFC team

from the Uchinoura Space Center in Japan at 11:30 p.m. EDT. It's mission was to fill a gap in our understanding of the X-ray universe.

### 5 Years Ago – 2015

July 22: Soyuz TMA-17M launched at 21:02:00 UTC by a Soyuz FG launch vehicle from Tyuratam (Baikonur Cosmodrome). Crew: Kjell Lindgren, Oleg Kononenko, Kimiya Yui (ISS Expedition 44).

## AUGUST 2020

### 100 Years Ago – 1920

August 22: Science fiction writer Ray Bradbury born in Waukegan, Illinois. Famous for "The Martian Chronicles" published in 1949.

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## JULY, AUGUST, SEPTEMBER IN AIR & SPACE HISTORY

*(Continued from page 11)*

### 90 Years Ago - 1930

August 5: Neil A. Armstrong born, Wapakoneta, OH

### 65 Years Ago - 1955

August 8: X-1A explodes over EAFB, CA, after being jettisoned by B-29 carrier aircraft.

August 16: First Hawk missile launched, White Sands Proving Grounds, NM.

### 60 Years Ago - 1960

August 10: Discoverer 13 (CORONA spy satellite) launched by Thor-Agena, first successful recovery from orbit, 4:38 p.m.. EDT, Vandenberg AFB.

August 12: Echo 1 launched by Thor Delta. 5:30 a.m., EDT, Vandenberg AFB. Reflected radio message from President Eisenhower.

August 18: Discoverer 14 (CORONA Mission 9009) orbited, launched from Vandenberg AFB. This was the first completely successful CORONA mission, recovering photoreconnaissance film from orbit.

August 19: Sputnik 5 (Korabl Sputnik 2) launched, 0838 UTC, from Baikonur. USSR. Five-ton spacecraft recovered with two dogs - "Strelka" and "Belka." World's first biologic payload recovered from orbit.

### 55 Years Ago - 1965

August 21: Gemini 5 (GT-5), launched on a Titan II, 10:00 a.m., EDT, Cape Canaveral, Fla.. Astronauts Gordon L. Cooper, Jr. and Charles "Pete" P. Conrad, Jr. complete an eight day mission.

August 25: OSO-C failed to orbit aboard a Thor Delta., 11:05 a.m., EDT, Cape Canaveral, Fla.

### 50 Years Ago - 1970

August 17: Venera 7 (Venus 7) launched, 0538 UTC, Baikonur, USSR aboard a modified SS-6 (Sapwood) or Molniya. This was the first man-made object to return data after landing on another planet (Venus) – December 15.

August 19: Skynet 1B launched by a Delta, 8:11 a.m., EDT, Cape Canaveral, Fla. Spacecraft lost during apogee motor firing, August 22.

### 45 Years Ago – 1975

August 5: John Manke landed the X-24B proving a shuttle-like vehicle without power could land safely upon return from orbit.

August 20: Viking 1 Mars Orbiter and Lander launched by Titan 3E, 5:22 p.m., EDT, Cape Canaveral, Fla.

August 27: Symphonie B (or 2) launched by a Delta, 9:42 p.m., EDT. Cape Canaveral, Fla. French/German communications satellite.

### 40 Years Ago - 1980

August 7: First flight of solar powered "Gossamer Penguin" piloted by Janice Brown, EAFB, CA.

### 35 Years Ago – 1985

August 27: STS-51L, (Space Shuttle *Discovery*). Launched from KSC at 6:58 a.m., EDT. Crew: Joe H. Engle, Richard O. Covey, James D. Van Hoften, William F. Fisher and John M. Lounge. Shuttle deployed three communications satellites: ASC, AUSSAT-I,

*(Continued on page 13)*



## JULY, AUGUST, SEPTEMBER IN AIR & SPACE HISTORY

*(Continued from page 12)*

and Syncom IV-4. Retrieved, repaired and relaunched Syncom IV-3 (launched originally by STS-51D in April, 1985). Landed at Edwards Air Force Base (EAFB), CA, Sept. 3, 9:16 a.m., EDT. Mission Duration: 7 days, 2 hours, 18 minutes.

### 20 Years Ago – 2000

August 9: Second pair of Cluster II mission satellites named Rumba and Tango, launched aboard Soyuz-Fregat from Baikonur.

### 15 Years Ago – 2005

August 12: MRO (Mars Reconnaissance Orbiter), a remote-sensing planetary probe, was launched by an Atlas 5 rocket from Cape Canaveral AFS at 7:43 am EDT to map the atmospheric, surface and sub-surface features of Mars.

## SEPTEMBER 2020

### 75 Years Ago - 1945

September 20: Dr. Wernher von Braun and other German scientists arrived in the United States, as part of Operation Paperclip.

September 27: First firing of a full WAC Corporal, reaching an altitude of 235,000 feet, WSPG, NM.

### 65 Years Ago - 1955

September 9: Project Vanguard approved by Department of Defense, Washington, D.C.

### 60 Years Ago - 1960

September 8: Marshall Space Flight Center, AL, formally dedicated by President Eisenhower and Mrs. George C. Marshall, Huntsville, AL.

September 13: Discoverer 15 (CORONA Mission 9010) launched By Thor-Agena, 6:13 p.m., EDT, Vandenberg AFB. Identical to Discoverer 13; capsule not recovered due to weather.

September 19: NERV (Nuclear Emulsion Recovery Vehicle) launched on Argo D-8 rocket, reached an altitude of 1,260 miles and was successfully recovered. First NASA launch from Vandenberg AFB.

September 25: Pioneer P-30 (Atlas-Able 5A) failed to orbit, 11:13 a.m., EDT, Cape Canaveral, Fla. It was intended to be a lunar orbiter probe, but the mission failed shortly after launch.

### 55 Years Ago - 1965

September 28: 150th flight of the X-15 (No. 3), pilot John B. McKay, DFRF, CA.

### 50 Years Ago - 1970

September 12: Luna 16 launched by a Proton K rocket. 1326 UTC, Baikonur, USSR. Softlanded on the moon, September 20. First automated lunar sample retrieval and return to Earth – September 24.

### 45 Years Ago - 1975

September 9: Viking 2 Mars orbiter and lander; orbited by Titan 3E, 2:39 p.m., EDT, Cape Canaveral, Fla.

*(Continued on page 14)*

## JULY, AUGUST, SEPTEMBER IN AIR & SPACE HISTORY

(Continued from page 13)

September 26: Intelsat 4A F-1 launched by an Atlas, 8:17 p.m., EDT, Cape Canaveral, Fla. It was an improved satellite with double the capacity of previous Intelsats for COMSAT's global commercial communications network.

### 40 Years Ago - 1980

September 9: GOES-4 orbited by a Delta, 6:27 p.m., EDT, Cape Canaveral, Fla.

### 35 Years Ago - 1985

September 11: International Cometary Explorer (ICE), Comet Giacobini-Zinner Flyby. First comet encounter.

September 29: Intelsat 5A F-12 launched by Atlas G Centaur, 7:36 p.m., EDT, Cape Canaveral, Fla.

### 25 Years Ago – 1995

September 7: STS-69 (Space Shuttle *Endeavour*) launched from KSC at 11:09 a.m., EDT. Crew: David M. Walker, Kenneth D. Cockrell, James S. Voss, James H. Newman, and Michael L. Gernhardt. Second flight of the Wake Shield Facility (WSF). First deployment and retrieval of two satellites on the same mission. The other satellite was SPARTAN 201. Landed at KSC September 18 at 7:37 a.m., EDT. Mission Duration: 10 days, 20 hours, 28 minutes.

### 20 Years Ago – 2000

September 8: STS-106 (Space Shuttle *Atlantis*) launched from KSC at 8:45 a.m. EDT. Crew: Terrence W. Wilcutt, Scott D. Altman, Daniel C. Burbank, Edward T. Lu, Richard A. Mastracchio, Yuri I. Malenchenko (Russia), and Boris V. Morukov (Russia). Prepared International Space Station (ISS) for first crew. Landing at KSC, September 19 at 3:58 a.m. EDT. Mission Duration: 11 days, 19 hours, 12 minutes, 15 seconds.

### 15 Years Ago – 2005

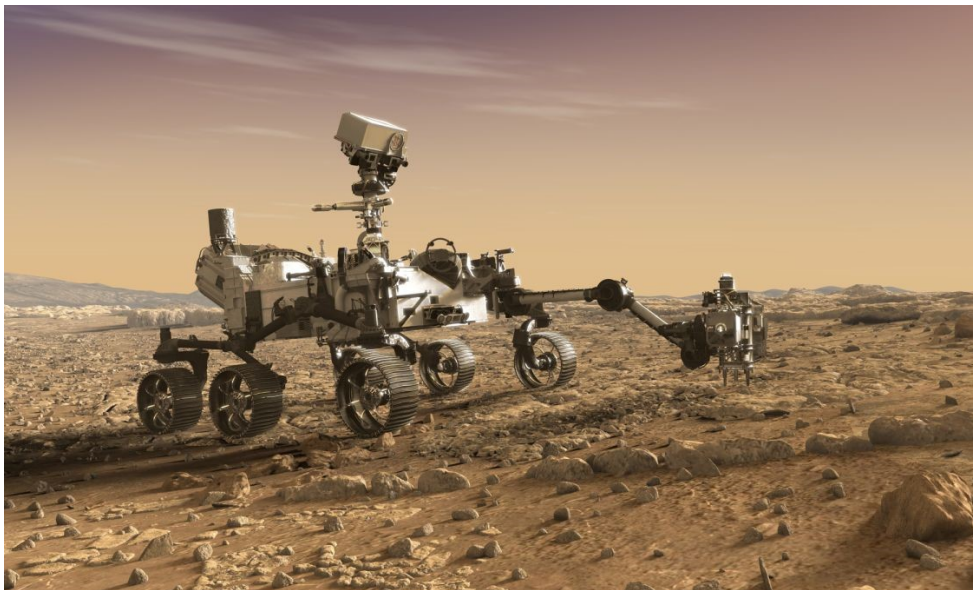
September 30: Soyuz-TMA 7 was launched by a Soyuz-FG rocket 11:55 pm EDT from Baikonur. It carried American William McArthur, Russian, Valery Tokarev and an American tourist, Greg Olsen to the International Space Station (ISS). It docked with the Pirs module at 05:30 UTC on 03 October automatically. The previously docked Soyuz-TMA 6 separated from the ISS, and soft-landed in Kazakhstan on 10 October, returning that tourist and the two previous astronauts who had inhabited the ISS for six months.

### 5 Years Ago – 2015

September 2, 2015: Soyuz TMA-18M was launched by a Soyuz-FG rocket at 04:37:00 UTC from Tyuratam (Baikonur Cosmodrome), Kazakhstan. Crew: Aidyn Aimbetov, Andreas Mogensen, and Sergey Volkov (ISS Expedition 45).

## IMAGES OF THE QUARTER

### Mars 2020 Launch



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## PARTING THOUGHTS

“We will always have STEM with us. Some things will drop out of the public eye and will go away, but there will always be science, engineering, and technology. And there will always, always be mathematics.”

— Katherine Johnson

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*AIAA's mission is to inspire and advance the future of aerospace for the benefit of humanity. AIAA's vision is to be the voice of the aerospace profession through innovation, technical excellence, and global leadership.*