

Historian's Corner

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History on the Road

This issue of Historian Corner includes two "History on the Road" stories as well as the mission events list. History on the Road alternates with Program Profiles in the MARS STAR.

Stafford Air & Space Museum, Weatherford, Oklahoma

In August 2019, Steve and I did a fun Route 66 road trip, exploring the sections of the "Mother Road" between Albuquerque, New Mexico and Tulsa, Oklahoma. One of our planned stops was a visit to the wonderful Stafford Air & Space Museum, located in the small town of Weatherford, Oklahoma, 70 miles west of Oklahoma City.

The Museum originated with a simple display case in the regional airport highlighting the career of Weatherford native son Lt. General Thomas P. Stafford. Stafford was born in 1930, graduated from the US Naval Academy and became a test pilot for the Air Force; he was selected to be an astronaut in 1962 in the second group, and participated in four missions, commanding three of them. The missions include Gemini 6A, Gemini 9, Apollo 10 (final dress rehearsal for the Apollo 11 mission, profiled in the second quarter 2019 MARS STAR) and the Apollo-Soyuz joint US/Soviet mission. After his NASA career, he commanded the Air Force Test Pilot School at Edwards Air Force base and became a deputy Chief of Staff at the Pentagon (Research, Development & Acquisition). After retiring from the Air Force in 1979, he served on several corporate boards and served as a key advisor for NASA on future lunar/Mars missions and development of the International Space Station. As of this writing (October 2019), Stafford is still alive and makes periodic visits to the museum. Stafford is an only child; his father died in 1948, but his mother Mary Ellen lived to see all of Stafford's space missions. She actually migrated to Oklahoma in a covered wagon!

The Stafford Air & Space Museum grew over the years and became a Smithsonian Affiliate in 2010. The simple origins have now expanded to include over 3,500 replica and actual artifacts. As we wandered this museum, we were amazed at the contents, not expecting so many interesting displays. I was especially thrilled to see the Titan II on display. The partial list below of actual artifacts shows the depth of the museum's collections:

- 1) Titan II ICBM (both stages) in flight-ready configuration
- 2) V-2 Rocket Engine

- 3) Gemini 6A spacecraft
- 4) Lunar Sample from Apollo 17 mission
- 5) F-1 Saturn V First Stage Engine
- 6) J-2 Saturn V Upper Stage Engine
- 7) Mission Control Console
- 8) Gemini 6A & Apollo 10 space suits
- 9) Mark 6 nuclear warhead (disarmed)
- 10) Apollo/Soyuz Docking Ring
- 11) Space Shuttle Main Engine
- 12) Shuttle Solid Rocket Booster -- flown segment
- 13) F-86 Sabre
- 14) MIG-21R
- 15) T-38 Talon Trainer
- 16) T-33 Trainer
- 17) B-61 disarmed Thermonuclear bomb
- 18) F-16 Fighting Falcon
- 19) F-104 Starfighter
- 20) F-4 Phantom
- 21) A-10 Warthog

The replicas include early aviation and rocketry full-scale and partial scale models (e.g., Sputnik 1, Explorer 1, Bell X-1, Wright Flyer, Spirit of St. Louis, Apollo Command/Service Module). The museum is nicely laid out, with the first section highlighting the career of Stafford, followed by the aviation and space galleries. A 20,000 square foot addition is being built that will include an F-117 Nighthawk.



Stafford Air & Space Museum Main Entrance with F-104 Starfighter (credit: Steve and Barb Sande)

The Stafford Air & Space Museum is open seven days a week, except for Thanksgiving, Christmas Eve, Christmas Day and New Year's Day. Opening hours are from 9:00 am to 5:00 pm Monday-Saturday and 1:00 pm to 5:00 pm on Sunday.



Titan II ICBM Stage II, Stafford Air & Space Museum (credit: Steve and Barb Sande)

Admission is truly a bargain, at \$5 for seniors over 62 (normal admission is \$7 for adults and \$3 for students; AAA members and military also have \$3 admission). The modern building, adjacent to the regional airport, includes a conference center, an educational center with interactive displays for younger visitors, and a nice gift shop.

Stafford Air & Space Museum, 3000 E. Logan Rd. Weatherford, Oklahoma 73096. 580-772-5871
<https://staffordmuseum.org>

Apollopalooza Events, Wings over the Rockies Museum, Denver, Colorado

Our local aviation and space museum Wings over the Rockies (Lowry location) held a week-long event in July 2019 to commemorate the first Apollo mission. Many members of the AIAA Rocky Mountain Section chapter volunteered that week for activities with visitors, including STEM events with children. Some of those AIAA RM members are also members of MARS Associates, including Sue Janssen, who runs the hiking club for MARS and is retired from ULA. Sue provided some pictures from this event for this article.

Steve and I decided to attend events on the first day (July 13) and the last day (July 20). There were many speakers and events over the week, with the top keynotes by Harrison Schmitt (Geologist, Apollo 17 astronaut and former US Senator), Gene Kranz (former Mission Control Flight Director for the Apollo program) and Joe Engle (X-15 pilot and Commander of the STS-2 and STS-51-I shuttle missions). We were very fortunate to hear the keynote addresses from Schmitt and Engle (we had seen Gene Kranz before at an Apollo 13 gala at the museum in 2015, along with astronauts Jim Lovell and Fred Haise). Gene Kranz actually gave two talks, one at breakfast on July 16 (coinciding with the launch

time of the Apollo 11 mission) and one the evening of July 16. Apollopalooza also included displays of actual and recreated Apollo systems and had fun space simulator adventures.

We attended the big party on July 20 to commemorate the actual time of the first walk on the moon. Sixties attire was encouraged and there was a delicious BBQ buffet, microbrews, 60's music, and lots of fun for all ages. A few pictures from Apollopalooza (one of the largest museum events in the country commemorating Apollo 11) are included below.



Gene Kranz describing the Apollo 11 launch (photo credit Sue Janssen)



Joe Engle at the end of his talk on the X-15 and Shuttle programs (photo credit: Steve and Barb Sande)



Apollo 17 Astronaut Harrison Schmitt describing the lunar landing locations (photo credit: Steve and Barb Sande)



Apollopalooza Activity Table (Photo Credit: Sue Janssen)



Barb Sande and Sue Janssen at the big party! (Photo Credit: Steve Sande)

On This Date in History

This section has milestones retrieved from publicly available information for LM, ULA and heritage programs from 10 to 60 years ago (2009, 1999, 1989, 1979, 1969, 1959). Delta launches prior to the formation of ULA, unless it included an LM or heritage company payload or upper stage, are not listed. No classified programs are identified, even if the program is considered unclassified. The events reflect milestone activity in the quarter previous to the release of the MARS STAR -- where appropriate, key press releases are also included; significant milestones are in bold. There will be gaps if no events occurred in that decadal year for that month (e.g., no 1969 events for December). The list is not intended to be all-inclusive due to historical record inaccuracies.

NOTE: The very bad year of 1999 for LM culminated with the loss of Mars Polar Lander at Cruise Stage Separation or during powered descent to the Mars surface on December 3. MPL was built in Denver and launched in January, 1999. The official failure report identified a probable cause of premature engine shutdown as a software logic error; later evaluations

during the build of Mars Phoenix Lander also identified a more likely probable cause of non-separation from the cruise stage due to cold connector temperatures. There was no live telemetry during separation and powered descent.

Another item of interest: It has now been ten years since the Aries I-X test launch, with an Orion Crew Module simulator!

Events in October (10 to 60 years ago)

- 10/08/2009: WorldView-2 launched by ULA Delta II 7920, SLC-2W, VAFB
- 10/15/2009: LM Press Release Target Missile launched for ATM-48 intercept test, Fort Wingate, NM
- 10/18/2009: LM DMSP-5D3 F18 launched by ULA Atlas V 401, SLC-3E, VAFB
- 10/26/2009: LM Press Release Lockheed Martin awarded \$1 Billion Contract for Aegis Ballistic Missile Defense
- 10/28/2009: LM Press Release Lockheed Martin's Aegis Ballistic Missile Defense System Defeats Target in Japanese Test
- **10/28/2009: LM Orion Crew Module/Launch Abort Simulator launched by Ares 1-X, LC-39B, KSC**
- 10/07/1999: LM GPS IIR-3 launched by Delta II 7925-9.5, SLC-17A, CCAFS
- **10/18/1989: Galileo Jovian mission launched by STS-34 (Atlantis), LC-39B, KSC**
- 10/01/1979: Classified launch by MM Titan IIIC/Transtage, LC-40, CCAFS
- 10/24/1969: Classified launch by Titan IIIB, SLC-42, VAFB
- 10/02/1959: Lockheed UGM-27 Polaris AX launched, LC-25A, CCAFS (failure)
- 10/06/1959: GD Atlas SM-65D launched, LC-11, CCAFS
- 10/10/1959: GD Atlas SM-65D launched, LC-13, CCAFS
- 10/12/1959: Lockheed UGM-27 Polaris A1 launched, LC-29A, CCAFS (failure)
- 10/29/1959: GD Atlas CM-65D launched, LC-11, CCAFS

Events in November (10 to 60 years ago)

- **11/02/2009: Lockheed Martin Press Release Lockheed Martin Team Avionics and Ground Systems Soar on NASA's Ares I-X Successful Flight**
- **11/02/2009: Lockheed Martin Press Release Lockheed Martin-Built GPS Satellite achieves 10 years of on-orbit Operations**
- 11/16/2009: STS-129 (Atlantis) launched, LC-39A, KSC; ISS logistics and assembly

- 11/23/2009: Intelsat 14 launched by ULA Atlas V 431, SLC-41, CCAFS
- 11/10/1999: LM Trident D-5 (two) launched, Eastern Test Range
- 11/23/1999: USA-146 launched by LM Atlas IIA, SLC-36B, CCAFS
- 11/23/1989: USA-48 launched by STS-33 (Discovery), LC-39B, KSC
- 11/21/1979: DSCS 2 13, 2 14 launched by MM Titan IIIC/Transtage, LC-40, CCAFS
- **11/14/1969: Apollo 12 Mission launched by Saturn V, LC-39A, KSC (this mission will be profiled in the next MARS STAR)**
- 11/04/1959: GD Atlas SM-65D launched, LC-13, CCAFS
- 11/07/1959: Discoverer 7 launched by Thor DM-18 Agena-A (Lockheed), LC-75-3-4, VAFB (satellite failure)
- 11/20/1959: Discoverer 8 launched by Thor DM-18 Agena-A (Lockheed), LC-75-3-5, VAFB (launch failure)
- 11/24/1959: GD Atlas SM-65D launched, LC-13, CCAFS
- 11/26/1959: Pioneer P-3 launched by Atlas-Able, LC-14, CCAFS (failure)

Events in December (10 to 60 years ago)

- 12/06/2009: WGS-3 launched by ULA Delta IV-M+ (5,4), SLC-37B, CCAFS. Maiden flight of Delta IV-M+ (5,4)
- 12/14/2009: WISE telescope (with LM components) launched by ULA Delta II 7320, SLC-2W, VAFB
- 12/16/2009: Lockheed Martin Press Release Lockheed Martin Achieves Critical Global Ballistic Missile Defense Milestones in 2009
- 12/19/2009: LM UGM-133 Trident II D5 launched, USS Alaska (130th consecutive successful test flight)
- **12/03/1999: LM Mars Polar Lander (and NASA probes Amundsen and Scott) fails to communicate after arriving at Mars and after the cruise stage separation and powered descent phases**
- 12/12/1999: LM DMSP 5D3 F15 launched by LM Titan II 233G, SLC-4W, VAFB
- 12/18/1999: Terra (NASA) launched by LM Atlas IIAS, SLC-3E, VAFG
- **12/20/1999: STS-103 (Discovery) launched, LC-39B, KSC; third LM Hubble Space Telescope servicing Mission**
- 12/04/1979: Classified launch by Thorad-SLV2H-Agena -D (Lockheed), SLC-3W, VAFB
- 12/07/1979: RCA Satcom 3 launched by Delta 3914, LC-17A, CCAFS (failed during GTO)
- 12/09/1959: GD Atlas SM-65D launched, LC-13, CCAFS
- 12/12/1959: MM Titan I HGM-25A launched, LC-16, CCAFS (failure)
- 12/16/1959: Lockheed UGM-27 Polaris A1 launched, LC-29A, CCAFS (failure)

- 12/17/1959: Lockheed UGM-27 Polaris A1 launched, LC-29A, CCAFS
- 12/19/1959: GD Atlas SM-65D launched, LC-13, CCAFS
- 12/23/1959: Lockheed UGM-27 Polaris A1 launched, LC-25B, CCAFS (failure)

Reference websites:

<https://nssdc.gsfc.nasa.gov/planetary/chronology.html#2014>

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

<https://www.ulalaunch.com/missions>

<https://news.lockheedmartin.com/news-releases?year=2019>

<https://space.skyrocket.de>

<http://www.astronautix.com>

Program Profile

Check back in the next MARS STAR for a story about the second lunar landing, the Apollo 12 mission.

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