Air and Space this Week

Item of the Week

White Sands Missile Range at 75

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This week offers round-number anniversary ties to several important aviation, astronomy, and/or Space exploration events or non-scientific events that provide a historical "touchstone" to them. The topic of the Item below was chosen because of its 75th "birthday" this week and the fact that I covered the 75th anniversary of the first rocket launch at Wallops Island a few weeks ago.

The other topics (the first A-bomb test, the opening of Disneyland, the "Handshake in Space," and a follow-up to the Item on Marconi and Fessenden from a month or so ago, are addressed at the end of this Item.

The date I had uncovered initially (7/13/1945) for the establishment of the **White Sands Missile Range** facility may be incorrect; the WSMR website, which is annoyingly short on historical details, says the establishment was on 7/9, instead. The WSMR was created from land that was originally the Alamogordo Army Airfield and then White Sands Proving Grounds. And regardless of its actual anniversary date, it was 75 years ago and WSMR has been an important test area for rocketry for that entire time. The American rocketry pioneer, Robert Goddard, had begun testing rocket technology there already. At the end of WWII, we had captured a number of V-2 rockets are related equipment, and Wernher von Braun and a number of his team of extremely-capable scientists, called the "Operation Paperclip" gang because their dossiers were marked with a paperclip to signify the importance of those men to the post-War rocketry effort. White Sands would be a good place for them to continue their research away from "distractions." [And a number of OP captures aided other aspects of the US Cold War not related to rocketry…]

But rockets do not always function as planned. On May 29, 1947, a V-2 launched from WSMR went awry, crashing into a hill near the town dump of Juarez, Mexico. Nobody was hurt, and launch procedures **certainly needed tightening up**, but maybe being so close to an international border might not make for the best site to test large missiles. Hence, the launch facility at Cape Canaveral was established not long after the Juarez incident, and the first launch there, *Bumper 8*, a V-2 rocket fitted with a WAC Corporal second stage, took place on July 24, 1950. After that, the larger rockets launched in Florida, but WSMR, like Wallops, has served for missile testing, upper atmospheric research, and many other investigations.

But the "attacks" on Mexico did not completely end with the move to Canaveral and the development of rockets with enough sophistication and strength to take us to the Moon. On

July 11, 1970, an ATHENA V-123-D rocket was launched from the Green River Launch Complex in Utah, targeted for the WSMR. Oops. It overflew the target by more than 200 miles, landing in the Mapimi Desert in Durango state, Mexico. This was a bit more serious, even though nobody was hurt (directly). For some reason I neither find nor fathom, the ATHENA was carrying a "small amount" of radioactive Cobalt 57 (a substance ideal for use in a "dirty bomb," a conventional explosive made more damaging because it is laced with a dangerous radioactive isotope that would be spread broadly by the conventional explosion). Astonishingly, the idea that a launch from GRLC might overfly a near-border target and cause an international incident was **never even considered** during the planning and construction of the GRLC! This incident, and the belated consideration of what might happen now that we were to be testing much longer-ranged missiles than the V-2 or the Athena, made building a launch site on the West Coast (Vandenberg AFB) and a target area way out in the Pacific (Kwajalein) necessary. Duh!

The WSMR had been established only a week or so when the first atomic bomb was tested at the Trinity Site, on the north side of the range, leaving a crater a half-mile wide and only eight feet deep (the bomb was exploded in a 100' tower, not on the ground). A 22-kiloton blast and stratosphere reaching mushroom cloud are impossible to conceal fully, even in a sparsely-populated area, but the cover story that a large ammo dump had exploded quieted suspicion. After the blast, the site was cordoned off until short-lived fallout isotopes decayed sufficiently. Trinity is now a National Historic Landmark, and is open to the public two days a year, the first Saturday in April and the first Saturday in October. Early visitors to the Site collected ***trinitite***, jade-colored glass fused into glass by the blast. The government stopped collection in 1953, but much of it remains in private hands and can be purchased by those interested (e.g. https://www.atomicrockshop.com/index.html). The government removed most of the trinitite remaining after the 1953 closure and bulldozed the surrounding terrain; only occasional shards are exposed by erosion anymore.

During the Cold War, the WSMR was the site of not only testing of the V-2 and a number of its progeny, but also the testing of the Nike/Hercules missile defense system, and other rocketry-related technologies, including escape rockets and other launch-abort hardware. Much of the testing infrastructure for the Nike is now used for testing components of the Patriot missile system.

Today, the WSMR continues research into missile performance and electronic counter-measures. Although the WSMR is an Army facility, it is also home to part of the Air Force Research Laboratory's Directed Energy Directorate, which conducts research into the use of lasers for tracking/destroying enemy missiles. The WSMR is also home to one of the major ground stations for management of the Global Positioning System satellite constellation. The WSMR is also home to the WSMR Museum and Rocket Park, and the White Sands Hall of Fame.

REFERENCES

WSMR history:
https://www.nps.gov/whsa/learn/historyculture/upload/White_Sands_Missile_Range_and_Trinity_Site_04_06_16_-666KB_PDF.pdf

WSMR Museum: http://www.wsmr-history.org/index.htm

WSMR newspaper: http://www.wsmrhistoric.com

Robert Goddard biographical info: https://www.nasa.gov/centers/goddard/about/history/dr_goddard.html

Operation Paperclip: General: https://en.wikipedia.org/wiki/Operation_Paperclip; Recent book: https://www.amazon.com/Operation-Paperclip-Intelligence-Program-Scientists/dp/0316221031; CIA commentary on book: https://www.cia.gov/library/center-for-the-study-of-intelligence/csi-publications/csi-studies/studies/vol-58-no-3/operation-paperclip-the-secret-intelligence-program-to-bring-nazi-scientists-to-america.html

Wernher von Braun's role in WWII and afterword is somewhat of a mixed bag, to say the least. His role for the Nazi war effort makes him an enemy, but his rocketry research helped the USA during the Cold War, and it was his engineering (***and public engagement***) skills that led us to the Moon. He was even considered for the Presidential Medal of Freedom (squelched by Ford advisor David Gergen). For an excellent treatment of his life, see: https://www.pbs.org/wgbh/nova/article/von-braun, or even better, check out NASM's own Michael Neufeld's 2007 book, *Von Braun: Dreamer of Space, Engineer of War*; see also: https://www.nationalww2museum.org/war/articles/wernher-von-braun-and-nazi-rocket-program-interview-michael-neufeld-phd-national-air

Trinity Site: General: https://en.wikipedia.org/wiki/Trinity_%28nuclear_test%29; More: https://www.atomicheritage.org/history/trinity-test-1945; Trinitite: https://en.wikipedia.org/wiki/Trinitite

1947 V-2 hits Mexico incident: http://www.whiteeagleaerospace.com/the-hermes-ii-incident/

Malpimi Desert incident: https://unredacted.com/2015/07/13/usaf-accidentally-launched-rocket-into-mexicos-mapimi-desert-45-years-ago

As for the other calendar items this week mentioned above:

The first A-bomb test at 75 (7/16) was covered somewhat in the WSMR item above.

Disneyland opening 65 years ago (7/17): Kinda hard to mix Disneyland with the WSMR and even more so for Trinity, but the opening of the original Disneyland is a calendar touchstone for the Baby Boom generation, and one might be able to combine the items from that angle. With Disney (and others) more Orlando-centric now, it's difficult to recall the impact the original had on American society (I liked the *Mad Magazine* take-off, Dizzyland, myself… and I actually still have it!)

45th of "Handshake in Space" (7/18): This was an important event in the Perestroika/Glasnost era, requiring some sophisticated engineering (to make the docking adapter), and was the last time US astronauts have used an ocean splashdown to return to Earth. See: https://www.nasa.gov/feature/45-years-ago-one-week-until-apollo-soyuz; https://www.nasa.gov/apollo-soyuz/overview; and, of course: https://airandspace.si.edu/stories/editorial/apollo-soyuz-test-project

Marconi Follow-up: The crash of the Italian airship Italia had an impact on our understanding of long-distance radio communication. This is the only other item I'd like to expand upon at this time, although I may make it a separate Item at a later date. Recall in the Item recently about Marconi that he was able to exploit the ionosphere's Heaviside Layer to allow radio waves to reflect over the horizon, enabling trans-Atlantic radio communications.

On April 15, 1928, the Italian dirigible, *Italia*, departed from Milan *en route* to the Svalbard Islands north of Norway. From there, the *Italia* was to attempt to become the second airship to overfly the North Pole (the dirigible *Norge* was first, on May 12, 1926). Earlier, in 1925, Umberto Nobile, an Italian dirigible expert, had been contacted by the famous Antarctic explorer, Roald Amundsen, about the idea of flying a dirigible over the North Pole. Nobile agreed, and arranged for the use of Italian dirigible, *N-1*, and modifications to it to survive polar conditions. The *N-1* was renamed the *Norge*, in honor of Amundsen's home country. After a number of trials and tribulations, the *Norge*, with Nobile in command and Amundsen and 14 others, plus Nobile's little dog, successfully overflew the North Pole.

Nobile would try to overfly the North Pole again with the *Italia*. He sent a radio message on May 24, 1928, that the *Italia*'s overflight had been successful, and they were on their way back to Svalbard. That was the last message from the *Norge* that the Svalbard base ever received.

The *Italia* had crashed on the sea ice north of Svalbard, with nine of its crew of ten surviving. They were only a few hundred miles away from Svalbard, and their radio gear survived the crash OK, but they could not raise base no matter how hard they tried. This was extremely frustrating, because they could easily pick up radio signals from Rome (almost 2500 miles away!). but their transmitter was too weak to reach that far. Ten days after the crash, a young Russian with a homemade radio picked up the *Italia*'s distress call, even though he was almost 1200 miles away, and notified authorities, who actually believed him enough to initiate rescue proceedings. All nine *Italia* crew survived.

The problem was space weather. In spite of Marconi, Fessenden, and others, radio science was still in its infancy, and even though the role of the ionosphere was somewhat understood, the situation was much more complex than a simple one-time reflection. The *Italia* had crashed in a "skip zone," where radio signals could not easily reach, a situation made much worse by turbulent solar activity at that time and its effect on the Earth's magnetosphere. A recent study demonstrated how a confluence of factors reinforced each other to prevent any chance of *Italia*'s signal from getting through to Svalbard, but did not adversely affect the communications with the young Russian. For a summary of this event, see: https://doi.org/10.1029/2020EO146304; for the actual paper in the journal, *Space Weather*, see: https://agupubs.onlinelibrary.wiley.com/doi/full/10.1029/2020SW002459.

Alas, this story has a tragic coda. Amundsen had had a frosty relationship with Nobile from the *Norge* days, but he turned to when the *Italia* went down and participated in an aerial search-and-rescue mission. He and five others, along with their French Latham 47 flying boat, were lost somewhere in the Barents Sea, on or about June 18, 1928.

Fans of polar exploration back in the day should check out the stories surrounding the voyage of Ernest Shackleton, and also check out the haunting lyrics of the song, *Antarctica*, by the famed balladeer, Al Stewart; see: https://www.azlyrics.com/lyrics/alstewart/antarctica.html. It's a terrific song, and particularly meaningful to me, since I was an Antarctic field hand almost four decades ago and I, too, have been "haunted by the beauty of its frosty face" ever since.

Last Edited on 14 July 2020