



OFFICE OF THE SECRETARY

February 28, 1968


Dear Lt Colonel Deranian

I appreciate your note of January 2, to which you attached a Space Systems Division news release, "100th THOR Launch." I presume it is from the list of THOR "firsts," on page 3 of the release, that you developed the reference to "first photographs of the earth from space," which was previously included in the text of your space briefing.

In the interest of historical accuracy, two comments should be made. The THOR did not take the first photographs of the earth from space. Credit for this achievement goes to V-2 No. 13, which flew at White Sands on October 24, 1946. Secondly, a word about the nature of the photographs taken from THOR (and ATLAS). The camera instrumentation to which your press release refers had, as its sole objective, the documentation of missile performance, with emphasis on the separation phases of the flight. This point is best illustrated by a film, which I am forwarding for your enjoyment. Your school may keep it.

I trust that you continue to find pleasure in presenting the DOD space story to our fellow officers.

Sincerely,


PAUL E. WORTHEMAN
Colonel, USAF
Deputy Director
Office of Space Systems

Lt Colonel G. G. Deranian
Director of Space
Warfare Systems School
The Air University

MEMO ROUTING SLIP

Never *Concurrent* for

Approved for Release: 2019/05/02 C05107348

ACTION

1 TO SAFSS (Col Worthman)	INITIALS	CIRCULATE
	DATE	COORDINATION
2		FILE
		INFORMATION
3		NOTE AND RETURN
		PER CON-VERSATION
4		SEE ME
		SIGNATURE

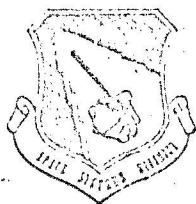
REMARKS

Note page 3 in accordance with our conversation.

FROM <i>G. G. Deranian</i>	DATE 2 Jan 68
G. G. DERANIAN, Lt Col, USAF Director of Space, Warfare Systems Sch	PHONE 3205

DD FORM 95 1 OCT 60 Replaces DD Form 94, 1 Feb 50, and DD Form 648-10-78279-2 GPO 95, 1 Feb 50, which will be used until exhausted.

AU GAFB, ALA. (672 005) 360M



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REL 62-66

FOR RELEASE 1200 PST
12 DEC 1962

100TH THOR LAUNCHED

Another successful launch was made recently from Vandenberg Air Force Base, California, marking the 100th launching of a United States Space vehicle with the versatile Air Force Thor space booster.

In 93 of the 100 launches conducted from both Vandenberg AFB on the West Coast and Cape Canaveral in the East the Thor employed as the first stage of the launch combination has performed successfully.

Translated into the vernacular of baseball this represents a batting average of .930.

Besides the 100 Thor space launches, 62 additional Thors have been launched in support of other military and scientific programs.

Overall management of the Thor space booster program as well as all Air Force programs using the SEN III is the responsibility of Major General Ben E. Funk, Commander of Space Systems Division.

Developed from the Air Force Thor intermediate range ballistic missile now on alert in the United Kingdom with the Royal Air Force, the Thor space booster's enviable reliability record began with a failure on August 17, 1958. Combined with a modified Vanguard second stage and a solid propellant third stage to form a launch vehicle known as the Thor Able 1, the Thor lifted off from Cape Canaveral in an attempt to

(more)

NEWS RELEASE

put a scientific satellite around the moon. A malfunction destroyed the vehicle 77 seconds after launch.

A little more than a month later a second Thor Able 1 lifted off hurling the Pioneer I spacecraft 71,300 miles into space -- the deepest penetration of space accomplished up to that time. This probe confirmed the existence of the Van Allen radiation belt and provided more valuable data on this phenomena.

Today, a little more than four years later, the Air Force Thor space launch vehicle has launched more satellites and probes into space than all other boosters of all nations combined.

On August 7, 1959, as the Thor Able (the modified Vanguard upper stage became identified as the Able stage), the booster launched Explorer VI into a highly elliptical earth orbit extending as far as 24,000 miles from the earth. Explorer VI was the most highly instrumented spacecraft of its day. Functioning with near perfection it radioed back to earth data from a half score of complex scientific experiments.

Pioneer V launched into a solar orbit on March 11, 1960 by a Thor Able established a world's record for radio communications -- 22,000,000 miles.

The National Aeronautics and Space Administration's (NASA) weather satellite Tiros I was launched by Air Force Thor Able April 1, 1960. Further modified by NASA the Thor Able now is known as the Thor Delta. As the Delta it has launched Echo I, OSO I, Aerial, Telstar and four more Tiros satellites.

Also in 1960 the Air Force developed another upper stage, one having a restart capability known as the Ablestar. Teamed with the reliable Thor this booster has launched a series of navigational satellites for the Navy, communications satellites for the Army and performed with similar success launching a project ANNA satellite, a joint Air Force-Army-Navy-NASA geodetic project.

The Thor was combined in an Air Force program with a versatile USAF vehicle, the Agena, which doubles in brass as both upper stage and satellite. From February 1959 thru February 1962 the Air Force achieved numerous world technical firsts. Among these are:

-first satellite to achieve polar orbit.
-first capsule to be recovered from earth orbit.
-first capsule to be recovered in mid-air.

The success of this program was due in part to the reliable performance of the Thor booster.

In addition to these technical firsts in this program, the Thor has also been instrumental in achieving other major scientific milestones.

These include:

-first successful re-entry at intercontinental ranges and speeds.
-first recovery of a re-entry vehicle after an ICBM flight.
-recovery of first data capsule which contained the taped "memory" of a re-entry vehicle in flight.
- ✓.....first photographs of the earth from space. ✓
-launch of the first weather and navigational satellites.

Teamed with the Thor, the Agena as an upper stage, recently orbited

the Canadian-built Alouette topside sounder satellite for NASA.

The SLV II standardized Air Force Thor space launch vehicle is produced for the Air Force Systems Command's (AFSC) Space Systems Division (SSD) by a team of associate prime contractors including the Douglas Aircraft Company, the Rocketdyne Division of North American Aviation, Bell Telephone Laboratories and Remington-Rand UNIVAC.

Air Force Thor space launches are conducted by Douglas crews under the direction of SSD's 6595th Aerospace Test Wing, Vandenberg AFB, or the 6555th Aerospace Test Wing, Patrick AFB, both of Air Force Systems Command.

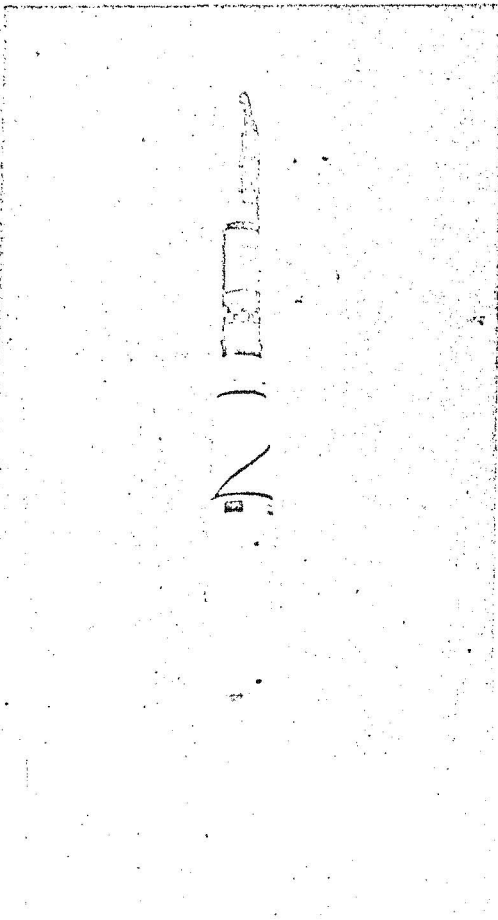
At SSD Colonel Clayton E. Evans is System Program Director for the SLV II.

FACT SHEET



UNITED STATES AIR FORCE

SPACE SYSTEMS DIVISION OF THE AIR FORCE SYSTEMS COMMAND



AIR FORCE THOR STANDARD SPACE LAUNCH VEHICLE
SLV-2

PROGRAM MANAGER: Air Force Systems
Command's Space Systems Division,
Los Angeles Air Force Station, Calif.

MAJOR ASSOCIATE CONTRACTORS: Douglas
Aircraft Corporation -- Airframe.

Rocketdyne Division of North American and
Thiokol Chemical Corporation -- Propulsion.

Aerospace Corporation -- Technical surveil-
lance.

A thrust Augmented Thor, developed by the
Air Force Space Systems Division, soars
into space from Vandenberg AFB, Calif. It
carries a standard Agena upper stage and
with the addition of three strapped on
Thiokol solid rocket engines, has a total
thrust of approximately 330,000 pounds.

OFFICE OF INFORMATION (SSE), SPACE SYSTEMS DIVISION, LOS ANGELES AFS, CALIF. 90045 (213) 643-0254

SLV-2 -- 2

PROPULSION: Single liquid fuel rocket engine burning liquid oxygen and kerosene. Two vernier engines for fine thrust adjustment and roll control during launch.

THRUST: Total (nominal) at sea level for the main engine approximately 170,000 pounds. One thousand pounds at sea level for each vernier engine. Total, 172,000 pounds.

GUIDANCE: Radio command.

SIZE: 55 feet, 11 inches high (long), 8 feet in diameter.

WEIGHT: Approximately 6,500 pounds without fuel and approximately 99,800 pounds fuelled.

PAYLOAD: Thor can accommodate a variety of upper stages and space vehicles including the Agena.

BACKGROUND: The successful story of Thor as a space booster began with failure on August 17, 1958 when it was combined with a modified Vanguard second stage and a solid propellant third stage to form a launch vehicle known as the Thor Able I. This Thor Able was launched from Cape Canaveral in an attempt to put a scientific satellite around the moon but a malfunction destroyed the vehicle 77 seconds after launch.

More than a month later a second Thor Able I boosted Pioneer I spacecraft and confirmed the existence of the Van Allen radiation belt and provided more valuable data on this phenomena.

On August 7, 1959 as the Thor Able (the modified Vanguard upper stage became identified as the Able stage), the booster launched the Explorer VI experiment satellite into a highly elliptical earth orbit extending as far as 24,000 miles from the earth.

Pioneer V launched into a solar orbit on March 11, 1960 by a Thor Able established what was then a world's record for radio communications -- 22,000,000 miles.

Further modified by NASA, the Thor Able now is known as the Thor Delta and as the Delta it has launched Echo I, Orbiting Scientific Observatory (OSO) I, Aerial, Telestar and a number of Tiros weather satellites.

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(more)

SLV-2 -- 3

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- First successful re-entry at intercontinental ranges and speeds.
- First recovery of a re-entry vehicle after an ICBM range flight.
- Recovery of first data capsule which contained the taped "memory" of a re-entry in flight.
- First photographs of the earth from space.

In 1965 Thor completed its second straight year of 100% reliability in space launches. Since August 1958, it has performed with 96% reliability in more than 200 launches.

THRUST AUGMENTED THOR (TAT): This version of the Air Force Thor space booster combines liquid and solid propellant technologies to increase the Thor's thrust from 172,000 pounds to approximately 330,000 pounds, and has been developed by the Douglas Aircraft Company.

Three Thiokol solid propellant rocket engines are mounted around the Thor airframe. The solid motors are ignited on the ground when the Rocketdyne liquid propellant engine approaches lift-off thrust. With all four motors burning, the vehicle has a payload capability considerably in excess of the standard USAF Thor space booster, and approaches the capabilities of the Standard Atlas launch vehicle.

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SLV-2 -- 4

LONG TANK THOR: In 1965 a new development of the Thor was initiated by the Air Force. The new addition to the Thor family, the Long Tank Thor, is capable of lifting 20% heavier payloads into space, due to a longer burn time for the main engine.

The new vehicle is approximately 70 feet long, compared to 56 feet for previous models. The liquid oxygen tank has been extended and the conical upper section of the booster has been changed to a straight cylinder of the same diameter as the rest of the airframe. This diameter -- 8 feet -- is the same as the widest diameter of the standard Thor configuration.

The total thrust of 330,000 pounds of the Long Tank Thor is essentially the same as that for the thrust augmented configuration.

Combined with various upper stages, the Long Tank Thor is expected to shoulder the majority of Air Force space programs at Vandenberg Air Force Base, California.

Today the Air Force Thor space launch vehicle has launched more satellites and probes into space than any other booster of all nations.

Air Force Thor space launches are conducted by Douglas crews under the direction of Space Systems Division's 6595th Aerospace Test Wing, Vandenberg Air Force Base, California, of the Air Force Systems Command.

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As of: January 3, 1967