

Satellite Scoreboard . . . US and USSR

BOX SCORE FOR UNITED STATES SPACE PROGRAMS

Program	Attempts	Achieved Orbit	Failed to Achieve Orbit	Still in Orbit 3/8/62
Mercury	5	3	2	0
Discoverer	38	26	12	6
		(+ Oscar)		
Midas	4	3	1	3
Samos	3	1	2	1
Vanguard	11	3	8	3
Explorer	19	11	8	7
Pioneer	9	2	7	2
		(both solar orbit)		(solar orbit)
Beacon	2	0	2	0
Ranger	3	3	0	1
		(1 in solar orbit)		(solar orbit)
Composite	1	0	1	0
OSO	1	1	0	1
Score	1	1	0	0
Echo	2	1	1	1
Courier	2	1	1	1
Transit	7	5	2	4 + 3
		(+ Greb I; Greb III-Injun; TRAAC)		
Tiros	4	4	0	4
TOTALS	112	69	47	37
		(includes solar orbits)		(includes solar orbits)

FOUR and a half years ago Sputnik I first blazed through the sky, heralding the Space Age. Since that October day in 1957 space has become a busy place: We have successfully launched sixty-six machines of incredible complexity—one carrying a man—into earth orbit and another three satellites into solar orbit; the Soviets have sent thirteen vehicles whirling around the earth—two with men aboard, others with dogs—and two other satellites into orbit around the sun. They have also planted the flag of the Soviet Union on the moon.

In contrast, the first four and a half years of the Air Age were not so filled with activity: By May 1907—at the time of his graduation from West Point—Henry H. Arnold, who was to become the wartime commander of history's greatest air force, still did not know what the Wright brothers had done at Kitty Hawk, N. C., during his plebe year. We may be sure that the commander of tomorrow's Space Force—who could well be graduating this spring from the Air Force Academy—has followed the news of Sputnik I, Gagarin, Titov, Glenn, and all the rest with interest and understanding.

For him and all others who share his interest in the new age, AIR FORCE/SPACE DIGEST presents on the following pages summaries of the satellite and space-probe launches to date. The star preceding the notes under program results indicates that the vehicle (or vehicles, in cases of multiple payloads) achieved orbit.

—RICHARD M. SKINNER

MERCURY: America's man-in-space program.

No.	Launch Date	Place	Launch Vehicle	Project Direction	Program Result
MA-3	4/25/61	Canaveral	Atlas	NASA	Orbit not achieved for unmanned vehicle; Atlas did not follow programed flight path and had to be destroyed after 40 seconds at 16,400 ft. by range safety officer; space capsule lifted clear by escape system and was recovered from the ocean.
MA-4	9/13/61	Canaveral	Atlas	NASA	* Achieved orbit, reentry, and recovery from sea 161 miles east of Bermuda of unmanned capsule which contained crewman simulator to test environmental control equipment on McDonnell Mercury space capsule; perigee, 100 mi.; apogee, 158.6 mi.; velocity, 17,519 mph; duration, 1 hr., 49 min.
MS-1	11/1/61	Canaveral	Scout	NASA	Orbit not achieved in attempt to put satellite in orbit to test Mercury tracking and communications facilities; vehicle destroyed by range safety officer after about 30 seconds of flight.
MA-5	11/29/61	Canaveral	Atlas	NASA	* Achieved orbit, reentry, and recovery 250 mi. from Bermuda after 2 orbits of 37½-lb., 5½-year-old chimpanzee Enos; trouble with Mercury capsule control system prevented third orbit; perigee, 99.6 mi.; apogee, 147.5 mi.; velocity, about 17,500 mph; duration, 3 hr., 21 min.; rocket body down 11/30/61.
MA-6	2/20/62	Canaveral	Atlas	NASA	* Achieved orbit, reentry, and recovery from sea near Grand Turk Island in the Bahamas after 3 orbits of Mercury Astronaut, Marine Lt. Col. John H. Glenn, Jr., in McDonnell capsule Friendship 7; Astronaut experienced persistent control problems but demonstrated the value of a man in the cockpit; perigee, 97.6 mi.; apogee, 159.5 mi.; velocity, 17,545 mph; duration, 4 hrs., 56 min.; weightless, 4 hrs., 40 min.; rocket body down 2/21/62.

NOTE: Two earlier Mercury Astronauts made successful suborbital flights before Colonel Glenn's three-orbit mission. Details below with other high-lights of the Mercury program:

MA-1	9/9/59	Canaveral	Atlas	NASA	Preliminary model of Mercury space capsule sent 1,300 mi. downrange and landed safely in the sea.
(none)	10/4/59	Wallops	Little Joe	NASA	First of series of 7 firings from NASA's Wallops Island Station off Virginia coast to test Mercury capsule or its escape system. Rhesus monkeys rode the capsule in some cases. Series ended 4/28/61.
(none)	7/29/60	Canaveral	Atlas	NASA	First test firing of Atlas-Mercury combination; the Atlas exploded after 64 seconds of flight.
(none)	11/21/60	Canaveral	Redstone	NASA	First firing of Redstone-Mercury combination; Redstone's main engine cut off after the rocket had risen only one inch from launch pad; escape rocket functioned normally and the capsule parachuted safely into the sea.

MR-1	12/19/60	Canaveral	Redstone	NASA
MR-2	1/31/61	Canaveral	Redstone	NASA
MA-2	2/21/61	Canaveral	Atlas	NASA
MA-3	4/25/61	Canaveral	Atlas	NASA
MR-3	5/5/61	Canaveral	Redstone	NASA
MR-4	7/21/61	Canaveral	Redstone	NASA

Repeat of the previous shot, using the recovered capsule; launch was successful and capsule was recovered from the sea 236 mi. downrange. Similar to shot of 12/19/60 except 37-lb. chimpanzee Ham was aboard; Ham recovered from the sea after 16½-min. flight 414 mi. downrange, 120 miles farther than expected.

Atlas-boosted capsule successfully fired 1,425 mi.; intentionally brought back into the atmosphere at a steep angle to test effects of maximum reentry heating.
(See details above.)

Successful suborbital flight of Mercury Astronaut, Navy Cmdr. Alan B. Shepard, Jr., in McDonnell capsule Freedom 7, to altitude of 115 mi. at 5,280 mph in 15-min. flight; recovered from the sea 302 mi. downrange.

Successful suborbital flight of Mercury Astronaut, USAF Capt. Virgil I. Grissom, in McDonnell capsule Liberty Bell 7, to altitude of 118 mi. at 5,310 mph in 16-min. flight; Astronaut recovered from the sea 303 mi. downrange though capsule was lost when escape hatch was accidentally opened prematurely.



From left: America's first man in orbit, Colonel Glenn enters Mercury capsule; MA-6 vehicle shown atop Atlas booster; liftoff of Atlas and Glenn's Friendship 7 spacecraft, February 20, 1962, on 3-orbit flight; recovery of Colonel Glenn's capsule as the spacecraft is hoisted aboard destroyer *Nautilus*.

DISCOVERER: Systems evaluation of launch techniques, orbital performance, recovery techniques, and advanced engineering test.

No.	Launch Date	Place	Launch Vehicle	Project Direction	Program Result
I	2/28/59	Vandenberg	Thor-Agena-A	ARPA-USAF	* Achieved orbit; down 3/5/59.
II	4/13/59	Vandenberg	Thor-Agena-A	ARPA-USAF	* Achieved orbit; timer malfunction prevented capsule recovery; down 4/26/59.
III	6/3/59	Vandenberg	Thor-Agena-A	ARPA-USAF	Orbit not achieved.
IV	6/25/59	Vandenberg	Thor-Agena-A	ARPA-USAF	Orbit not achieved.
V	8/13/59	Vandenberg	Thor-Agena-A	ARPA-USAF	* Achieved orbit; rocket carrier down 9/28/59; capsule down 2/11/61.
VI	8/19/59	Vandenberg	Thor-Agena-A	ARPA-USAF	* Achieved orbit; capsule ejected but not recovered; rocket carrier down 10/20/59.
VII	11/7/59	Vandenberg	Thor-Agena-A	ARPA-USAF	* Achieved orbit; capsule could not be separated; down 11/26/59.
VIII	11/20/59	Vandenberg	Thor-Agena-A	USAF	* Achieved orbit; capsule ejected but could not be located; carrier rocket down 3/8/60.
IX	2/4/60	Vandenberg	Thor-Agena-A	USAF	Orbit not achieved.
X	2/19/60	Vandenberg	Thor-Agena-A	USAF	Orbit not achieved.
XI	4/15/60	Vandenberg	Thor-Agena-A	USAF	* Achieved orbit; capsule ejected but not observed; down 4/26/60.
XII	6/29/60	Vandenberg	Thor-Agena-A	USAF	Orbit not achieved.
XIII	8/10/60	Vandenberg	Thor-Agena-A	USAF	* Achieved orbit; capsule successfully recovered from ocean 8/11/60; carrier rocket down 11/14/60.
XIV	8/18/60	Vandenberg	Thor-Agena-A	USAF	* Achieved orbit; capsule recovered from midair by C-119 8/19/60; carrier rocket down 9/16/60.
XV	9/13/60	Vandenberg	Thor-Agena-A	USAF	* Achieved orbit; capsule ejected and sighted 9/15/60, but not recovered; carrier rocket down 10/18/60.
XVI	10/26/60	Vandenberg	Thor-Agena-A	USAF	Orbit not achieved.
XVII	11/12/60	Vandenberg	Thor-Agena-B	USAF	* Achieved orbit; capsule recovered from midair by C-119 11/14/60; carrier rocket down 12/29/60.
XVIII	12/7/60	Vandenberg	Thor-Agena-B	USAF	* Achieved orbit; capsule recovered from midair 12/10/60 by C-119 after 48 orbits; carrier rocket down 4/2/61.
XIX	12/20/60	Vandenberg	Thor-Agena-B	USAF	* Achieved orbit; no recovery capsule; mission to collect infrared data in support of such programs as Midas; down 1/23/61.
XX	2/17/61	Vandenberg	Thor-Agena-B	USAF	* Achieved orbit; malfunction prevented release of capsule; no recovery attempt; still in orbit 3/5/62; associated objects down 3/30, 4/2, 4/20, and 10/31/61.
XXI	2/18/61	Vandenberg	Thor-Agena-B	USAF	* Achieved orbit; no recovery capsule; Agena engine successfully restarted in space; carried instruments to measure and radio back earth's temperature; still in orbit 3/5/62.

(Continued on following page)

DISCOVERER (Continued):

No.	Launch Date	Place	Launch Vehicle	Project Direction	Program Result
XXII	3/30/61	Vandenberg	Thor-Agena-B	USAF	Orbit not achieved.
XXIII	4/8/61	Vandenberg	Thor-Agena-B	USAF	* Achieved orbit; capsule separated on 31st pass but failed to reenter; satellite and capsule still in orbit 3/5/62; associated object down 9/10/61.
XXIV	6/8/61	Vandenberg	Thor-Agena-B	USAF	Orbit not achieved.
XXV	6/16/61	Vandenberg	Thor-Agena-B	USAF	* Achieved orbit; capsule recovered from ocean 6/18/61; carrier rocket down 7/12/61.
XXVI	7/7/61	Vandenberg	Thor-Agena-B	USAF	* Achieved orbit; capsule recovered from midair 7/9/61; carrier rocket down 12/5/61.
XXVII	7/21/61	Vandenberg	Thor-Agena-B	USAF	Orbit not achieved.
XXVIII	8/3/61	Vandenberg	Thor-Agena-B	USAF	Orbit not achieved.
XXIX	8/30/61	Vandenberg	Thor-Agena-B	USAF	* Achieved orbit; capsule recovered from ocean 9/1/61; carrier rocket down 9/10/61.
XXX	9/12/61	Vandenberg	Thor-Agena-B	USAF	* Achieved orbit; capsule recovered from midair 9/14/61; associated metal objects down 9/18 and 9/28/61; carrier rocket down 12/11/61.
XXXI	9/17/61	Vandenberg	Thor-Agena-B	USAF	* Achieved orbit; second stage and capsule apparently failed to separate; down 10/26/61.
XXXII	10/13/61	Vandenberg	Thor-Agena-B	USAF	* Achieved orbit; capsule contained experiments to study radiation effects and a transmitter to study ionospheric effects; capsule recovered from midair 10/14/61; associated metal objects down 10/16 and 10/25/61; carrier rocket down 11/13/61.
XXXIII	10/23/61	Vandenberg	Thor-Agena-B	USAF	Orbit not achieved.
XXXIV	11/5/61	Vandenberg	Thor-Agena-B	USAF	* Achieved orbit; on-orbit malfunction prevented capsule recovery; associated metal objects down 11/30, 12/9, 12/10, and 12/12/61; still in orbit 3/5/62.
XXXV	11/15/61	Vandenberg	Thor-Agena-B	USAF	* Achieved orbit; capsule recovered from midair 11/16/61; associated metal object down 11/23/61; carrier rocket down 12/3/61.
XXXVI	12/12/61	Vandenberg	Thor-Agena-B	USAF	** Achieved orbit; capsule contained device to study nuclear-explosion detection, biopack to study radiation effects; capsule recovered from ocean 12/16/61; associated metal object down 12/20/61; carrier rocket still in orbit, still transmitting 3/5/62; secondary payload was "Oscar," small radio satellite to broadcast signals for ham operators worldwide; "Oscar" down 1/31/62.
XXXVII	1/13/62	Vandenberg	Thor-Agena-B	USAF	Orbit not achieved.
XXXVIII	2/27/62	Vandenberg	Thor-Agena-B	USAF	* Achieved orbit; no details given on satellite's altitude, period, or payload; payload may have included test components for Midas and Samos programs; capsule recovered from midair 3/3/62, the eighth Discoverer capsule caught by C-119 or C-130 aircraft, with 4 others recovered from the ocean in Discoverer program to date; carrier rocket still in orbit 3/5/62.



From left: Discoverer XXXV; Midas; Vanguard III; Explorer VI "Paddlewheel"; launch of Explorer XI with gamma-ray telescope; Explorer XIII satellite; and the Pioneer V planetoid.

MIDAS: Systems test to detect missile launchings with infrared sensors.

No.	Launch Date	Place	Launch Vehicle	Project Direction	Program Result
I	2/26/60	Canaveral	Atlas-Agena-A	USAF	Orbit not achieved.
II	5/24/60	Canaveral	Atlas-Agena-A	USAF	* Achieved orbit; transmissions ceased two days after launch; associated metal object down 12/5/60; satellite lifetime estimated 40 months; still in orbit 3/5/62.
III	7/12/61	Pt. Arguello	Atlas-Agena-B	USAF	* Achieved orbit; first developmental missile-alarm satellite to pass over USSR; no payload details released; associated metal object down 7/24/61; two other such objects still in orbit; satellite still in orbit 3/5/62.
IV	10/21/61	Pt. Arguello	Atlas-Agena-B	USAF	* Achieved orbit; no payload details released but 4 days after launch Midas IV detected launch from Cape Canaveral of Titan test vehicle; nose fairing down 12/5/61; satellite still in orbit 3/5/62; in same launch, packet of millions of tiny copper wires was carried into space in Project West Ford, communications experiment; filaments failed to release.

NOTE: On 11/22/61, 12/22/61, and 3/7/62 USAF launched Atlas-Agena satellites from Pt. Arguello, Calif., bordering Vandenberg AFB, and on 2/21/62 a Thor-Agena satellite from Vandenberg. These launchings were closed to the press. No further information is available, though it is presumed that these satellites are associated with the Midas or Samos (see below) programs.

SAMOS: Observation satellites in polar orbits.

No.	Launch Date	Place	Launch Vehicle	Project Direction	Program Result
I	10/11/60	Pt. Arguello	Atlas-Agena-A	USAF	Orbit not achieved.
II	1/31/61	Pt. Arguello	Atlas-Agena-A	USAF	* Achieved near-circular polar orbit; satellite and associated metal object still in orbit 3/5/62.
III	9/9/61	Pt. Arguello	Atlas-Agena-B	USAF	Orbit not achieved.

VANGUARD: Test of launch vehicle for US-International Geophysical Year earth-satellite program.

No.	Launch Date	Place	Launch Vehicle	Project Direction	Program Result
(none)	12/6/57	Canaveral	Vanguard	Navy	Orbit not achieved.
(none)	2/5/58	Canaveral	Vanguard	Navy	Orbit not achieved.
I	3/17/58	Canaveral	Vanguard	Navy	* Achieved orbit; revealed earth to be pear shaped; one transmitter still operating; estimated lifetime of 200-1,000 years; satellite and rocket body still in orbit 3/5/62.
(none)	4/28/58	Canaveral	Vanguard	Navy	Orbit not achieved.
(none)	5/27/58	Canaveral	Vanguard	Navy	Orbit not achieved.
(none)	6/26/58	Canaveral	Vanguard	Navy	Orbit not achieved.
(none)	9/26/58	Canaveral	Vanguard	Navy	Orbit not achieved.
II	2/17/59	Canaveral	Vanguard	NASA	* Achieved orbit; wobble prevented interpretation of cloud-cover data; estimated lifetime of 10-100 years; satellite and rocket body still in orbit 3/5/62.
(none)	4/13/59	Canaveral	Vanguard	NASA	Orbit not achieved.
(none)	6/22/59	Canaveral	Vanguard	NASA	Orbit not achieved.
III	9/18/59	Canaveral	Vanguard	NASA	* Achieved orbit; surveyed earth's magnetic field; located lower edge of Van Allen radiation belt; estimated lifetime of 30-40 years; satellite still in orbit 3/5/62.

EXPLORER: Early US satellite program, still going on, to conduct various studies.

No.	Launch Date	Place	Launch Vehicle	Project Direction	Program Result
I	1/31/58	Canaveral	Jupiter-C	Army	* Achieved orbit; first US satellite; discovered Van Allen radiation belt; estimated lifetime 7-10 years; still in orbit 3/5/62.
II	3/5/58	Canaveral	Jupiter-C	Army	Orbit not achieved.
III	3/26/58	Canaveral	Jupiter-C	Army	* Achieved orbit; yielded data on radiation belts and micrometeor impacts; down 6/27/58.
IV	7/26/58	Canaveral	Jupiter-C	ARPA-Army	* Achieved orbit; provided data on radiation and analysis of earth's magnetic field; down 10/23/59.
V	8/24/58	Canaveral	Jupiter-C	ARPA-Army	Orbit not achieved.
(none)	7/16/59	Canaveral	Juno II	NASA	Orbit not achieved.
VI	8/7/59	Canaveral	Thor-Able	NASA	* Achieved orbit; obtained television pictures of cloud cover; mapped Van Allen radiation belt; estimated lifetime 2 years; "Paddlewheel" satellite and rocket body down presumably before July 1961.
VII	10/13/59	Canaveral	Juno II	NASA	* Achieved orbit; provided data on radiation and magnetic storms; first micrometeorite penetration of a sensor in flight; estimated lifetime 20-30 years; satellite and rocket body still in orbit 3/5/62.
(none)	3/23/60	Canaveral	Juno II	NASA	Orbit not achieved.
VIII	11/3/60	Canaveral	Juno II	NASA	* Achieved orbit; provided data on the ionosphere and micrometeorites; estimated lifetime of 10 years; satellite, rocket body, and 2 associated objects still in orbit 3/5/62.
(none)	12/4/60	Wallops	Scout	NASA	Orbit not achieved.
IX	2/16/61	Wallops	Scout	NASA	* Achieved orbit; successful orbit launch with solid-fuel rocket; 12-foot polka-dot sphere was to determine atmospheric density; relatively short lifetime expected; satellite, rocket body, and 2 associated objects still in orbit 3/5/62.
(none)	2/24/61	Canaveral	Juno II	NASA	Orbit not achieved.
X	3/25/61	Canaveral	Thor-Delta	NASA	* Achieved highly elliptical, short-lifetime orbit designed to explore magnetic fields and solar winds out 120,000 miles from earth; still in orbit 3/5/62, though position uncertain.
XI	4/27/61	Canaveral	Juno II	NASA	* Achieved orbit; payload included 7½-foot-long gamma-ray telescope; data successfully relayed to earth; estimated lifetime of 1.3 years; still in orbit 3/5/62.
(none)	5/24/61	Canaveral	Juno II	NASA	Orbit not achieved.
(none)	6/30/61	Wallops	Scout	NASA	Orbit not achieved.
XII	8/15/61	Canaveral	Thor-Delta	NASA	* Achieved orbit; provided data on solar wind, magnetic fields, and high-energy particles; still in orbit 3/5/62.
XIII	8/25/61	Wallops	Scout	NASA	* Achieved short-term orbit; designed to investigate nature and effects of micrometeorites; estimated lifetime was predicted to be 1 year but orbit surprisingly delayed on third day; down 8/28/61.

PIONEER: Various deep-space probes.

No.	Launch Date	Place	Launch Vehicle	Project Direction	Program Result
(none)	8/17/58	Canaveral	Thor-Able	ARPA-USAF	Lunar probe; first-stage engine failure after 77 seconds of flight caused explosion between 40,000 and 70,000 feet altitude.
I	10/11/58	Canaveral	Thor-Able	NASA-USAF	Lunar probe; unable to escape earth's magnetic field after reaching 70,700 miles; reentered 10/12/58; provided first measurements of interplanetary magnetic field.

(Continued on following page)

SATELLITE SCOREBOARD

CONTINUED

PIONEER (Continued):

No.	Launch Date	Place	Launch Vehicle	Project Direction	Program Result
II	11/8/58	Canaveral	Thor-Able	NASA-USAF	Lunar probe; third stage failed to ignite; reached peak altitude of 963 miles before reentry and destruction.
III	12/6/58	Canaveral	Juno II	NASA-Army	Deep-space probe; failed to reach escape velocity; peak altitude of 63,580 miles; discovered second radiation belt around earth; down 12/7/58.
IV	3/3/59	Canaveral	Juno II	NASA-Army	* Achieved earth-moon trajectory and yielded radiation data; in 398-day solar orbit; expected lifetime of millions of years; still in orbit 3/5/62.
(none)	11/26/59	Canaveral	Atlas-Able	NASA-USAF	Lunar probe; payload shroud fairing broke away after 45 seconds of flight.
V	3/11/60	Canaveral	Thor-Able IV	NASA-USAF	* "Paddlewheel" satellite; set long-distance transmission record from 22.5 million miles 6/26/60; in 311.64-day solar orbit; expected lifetime of millions of years; still in orbit 3/5/62.
(none)	9/25/60	Canaveral	Atlas-Able	NASA-USAF	Lunar probe; failed to achieve necessary velocity; vehicle destroyed on reentry.
(none)	12/15/60	Canaveral	Atlas-Able	NASA-USAF	Lunar probe; explosion destroyed vehicle at about 40,000 feet after 70 seconds of flight.

BEACON: Place inflatable sphere in orbit to study atmospheric density.

No.	Launch Date	Place	Launch Vehicle	Project Direction	Program Result
(none)	10/23/58	Canaveral	Jupiter-C	NASA	Orbit not achieved.
(none)	8/14/59	Canaveral	Juno II	NASA	Orbit not achieved.

RANGER: Development of spacecraft systems for lunar and interplanetary mission.

No.	Launch Date	Place	Launch Vehicle	Project Direction	Program Result
I	8/23/61	Canaveral	Atlas-Agena-B	NASA	* Achieved low earth orbit rather than deep-space orbit programmed; satellite down 8/30/61; rocket body down 9/3/61.
II	11/18/61	Canaveral	Atlas-Agena-B	NASA	* Achieved low earth orbit rather than deep-space orbit programmed; down 11/20/61.
III	1/26/62	Canaveral	Atlas-Agena-B	NASA	* Achieved successful "parking orbit" for Agena-B which fired again at proper time to start 727-lb. Ranger unit toward moon; too great velocity caused Ranger to miss moon by 22,862 miles, despite midcourse correction made by Ranger 100,398 miles from earth; television pictures taken from 30,000 miles from the moon were not successfully transmitted to earth; Ranger III now in solar orbit of 406.4 days; still in orbit 3/5/62.

COMPOSITE: Various scientific missions.

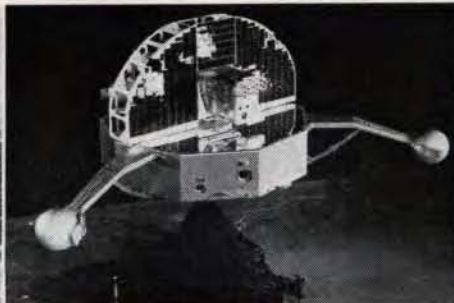
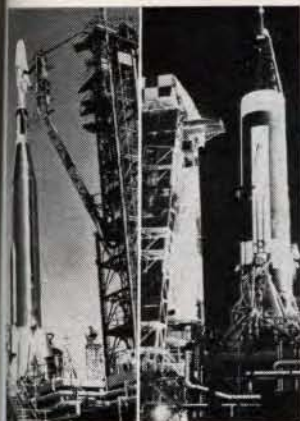
No.	Launch Date	Place	Launch Vehicle	Project Direction	Program Result
I	1/24/62	Canaveral	Thor-Able-Star	Navy	Orbit not achieved for five-satellite package which included 3 Naval Research Lab satellites, 1 designed by State Univ. of Iowa, and 1 for Army Corps of Engineers: (1) 58-lb. Greb IV to measure intensity of solar X-ray radiation; (2) 58-lb. Lofti II (for Low Frequency Trans-Ionospheric) to study ionospheric transmissions; (3) 8-lb. Surcal (for Surveillance Calibration) to calibrate accuracy of Navy's space surveillance system; (4) 59-lb. Injun II to provide data on Van Allen radiation belt; and (5) 36-lb. Army calibration sphere previously called Secor to provide range calibration data; Composite I (also called Buckshot) reached 50-mi. altitude after Thor first stage functioned properly; malfunction thought to have been caused by Able Star second stage.

ORBITING SOLAR OBSERVATORY (OSO): Observational payloads to obtain solar data.

No.	Launch Date	Place	Launch Vehicle	Project Direction	Program Result
I	3/7/62	Canaveral	Thor-Delta	NASA	* Achieved orbit for 458-lb. laboratory designed to conduct a variety of experiments to measure broad range of electromagnetic radiation from the sun, energy and density of interplanetary dust, erosion of materials in space, density of neutrons in space, and hoping to develop technique for predicting solar flares in attempt to determine "safe periods" for manned flights to the moon; first of a series of similar observatories scheduled during at least the next 11 years to study full cycle of sunspot activity; initial perigee 340 mi., apogee 370 mi.; useful lifetime of 6 months expected; still in orbit, still transmitting 3/7/62.

SCORE: Test of reliability of Atlas as space vehicle and feasibility of voice and teletype relay via satellite.

No.	Launch Date	Place	Launch Vehicle	Project Direction	Program Result
(none)	12/18/58	Canaveral	Atlas ICBM	ARPA-USAF	* Achieved orbit; first satellite known to have been guided into orbit by radio-inertial system; first time a human voice beamed from outer space; remained in orbit 34 days; down 1/21/59.



From left: Ranger III ready for launch; Score "talking satellite"; Echo atop Thor-Delta booster; the newly launched OSO; and Tiros.

ECHO: Place 100-foot inflatable sphere in orbit as reflector in communications experiments.

No.	Launch Date	Place	Launch Vehicle	Project Direction	Program Result
(none)	5/13/60	Canaveral	Thor-Delta	NASA	Orbit not achieved.
I	8/12/60	Canaveral	Thor-Delta	NASA	* Achieved orbit; successful voice transmission from Goldstone, Calif., to Holmdel, N. J.; sphere no longer fully inflated but still in orbit 3/5/62; rocket body and 3 associated metal objects still in orbit 3/5/62.

COURIER: Feasibility study for global military communications.

No.	Launch Date	Place	Launch Vehicle	Project Direction	Program Result
I-A	8/18/60	Canaveral	Thor-Able-Star	ARPA-Army	Orbit not achieved.
I-B	10/4/60	Canaveral	Thor-Able-Star	Army	* Achieved orbit; estimated lifetime of several years; satellite still in orbit, still transmitting 3/5/62; rocket body still in orbit 3/5/62.

TRANSIT: Provide basis for global all-weather navigation for ships and aircraft.

No.	Launch Date	Place	Launch Vehicle	Project Direction	Program Result
I-A	9/17/59	Canaveral	Thor-Able	Navy	Orbit not achieved.
I-B	4/13/60	Canaveral	Thor-Able-Star	Navy	* Achieved orbit; indicating feasibility of such a navigational system; satellite and associated metal object still in orbit 3/5/62; rocket body down 8/18/60; associated metal object down 7/60.
II-A	6/22/60	Canaveral	Thor-Able-Star	Navy	** Achieved orbit, also placing in orbit Naval Research Lab solar-radiation satellite (Greb I) marking first time two satellites were launched with a single vehicle; Transit II-A still transmitting; expected lifetime of each about 50 years; Transit II-A, Greb I, and rocket body still in orbit 3/5/62.
III-A	11/30/60	Canaveral	Thor-Able-Star	Navy	Orbit not achieved; second payload was NRL solar-radiation satellite Greb II.
III-B	2/21/61	Canaveral	Thor-Able-Star	Navy	* Achieved highly elliptical, short-lifetime orbit; also placed in orbit Lofti I satellite, for Low Frequency Trans-Ionospheric, designed to measure very-low-frequency signal intensities; satellite and Lofti failed to separate as planned; both down 3/30/61.
IV-A	6/29/61	Canaveral	Thor-Able-Star	Navy	** Achieved orbit with 3 satellites: Transit IV-A, Greb III (to measure solar X-ray radiation), and Injun I (to measure cosmic radiation); Greb and Injun did not separate; all satellites still in orbit 3/5/62, still transmitting; 73 associated metal objects still in orbit 3/5/62; 1 such metal object down 1/29/62.
IV-B	11/15/61	Canaveral	Thor-Able-Star	Navy	** Achieved orbit with 2 satellites: Transit IV-B and TRAAC (for Transit Research and Attitude Control) to test gravity system for satellite attitude control; both satellites still in orbit 3/5/62, still transmitting; rocket body still in orbit 3/5/62.

TIROS: Meteorological satellites using television and infrared equipment.

No.	Launch Date	Place	Launch Vehicle	Project Direction	Program Result
I	4/1/60	Canaveral	Thor-Able	NASA	* Achieved near-circular orbit; video system relayed some 22,000 pictures of cloud cover during 78-day useful lifetime; expected to remain in orbit 50-100 years; satellite, rocket body, and 2 associated metal objects still in orbit 3/5/62.
II	11/23/60	Canaveral	Thor-Delta	NASA	* Achieved orbit; good data from narrow-angle camera and infrared instrumentation; expected to remain in orbit 50-100 years; satellite, rocket body, and 2 associated metal objects still in orbit 3/5/62.
III	7/12/61	Canaveral	Thor-Delta	NASA	* Achieved orbit; transmitted usable photos of earth's cloud cover; still in orbit, still transmitting 3/5/62, third stage and 2 associated metal objects still in orbit 3/5/62.
IV	2/8/62	Canaveral	Thor-Delta	NASA	* Achieved orbit; transmitting excellent pictures of cloud formation; estimated useful lifetime of 4 months; still in orbit, still transmitting 3/5/62; rocket body and two associated metal objects still in orbit 3/5/62.

(Soviet satellite data will be found on page 117)

SATELLITE SCOREBOARD . . . USSR CONTINUED

VOSTOK: Soviet program to place manned space vehicles in earth orbit and recover them.

No.	Launch Date	Program Result
I	4/12/61	First successful manned orbital flight; Maj. Yuri A. Gagarin launched by rocket with estimated 800,000-lb. thrust, made single orbit at apogee of 187.8 mi., perigee of 109.5 mi., speed of 17,400 mph, was weightless 89.1 min. in 108-min. flight; Vostok estimated to weigh 14,418 lb.; booster rocket down 4/16/61.
II	8/6/61	First successful manned multiorbital flight; Maj. Gherman S. Titov launched by rocket with estimated 800,000-lb. thrust, made 17 orbits at apogee of 159.6 mi., perigee of 110.3 mi., speed of 17,750 mph, was weightless 24 hr. 59 min., during 25-hr. 18-min. flight; Vostok estimated to weigh 14,430 lb.; booster rocket down 8/9/61.

SOVIET DEEP-SPACE PROBES: Includes Luniks and Venus space probe

No.	Launch Date	Program Result
Lunik I	1/2/59	Known as "Mechta" or "dream"; total weight reported to be 3,245 lb.; went into 443-day solar orbit; expected lifetime millions of years; still in orbit 3/5/62.
Lunik II	9/12/59	Payload weight estimated at 858.4 lb.; impacted moon 9/13/59 after traveling 236,865 miles in 35 hours.
Lunik III	10/4/59	Payload weight of 4,037 lb. including 614-lb. scientific satellite and last-stage rocket casing of 3,423 lb. carrying 345 lb. of scientific equipment; photographed 70 percent of moon's far side from 40,000 miles distance; pictures transmitted to earth; after passing once around the moon, satellite went into earth orbit; down 4/20/60.
Venus Probe	2/12/61	"Automatic interplanetary station" launched from Sputnik VIII in earth orbit in unsuccessful attempt to reach vicinity of Venus; radio contact with earth lost shortly after launch; went into 300-day solar orbit; still in orbit 3/5/62.

SPUTNIK: General name for Soviet Union earth-satellite program.

No.	Launch Date	Program Result
I	10/4/57	First earth satellite; payload weight of 184 lb.; provided new information on density and temperature of upper atmosphere; rocket case down 12/1/57; satellite down 1/4/58.
II	11/3/57	Payload weight of 1,120 lb. included dog Laika; provided ionospheric, cosmic-ray, and biomedical data; down 4/14/58.
III	5/15/58	Total weight in orbit, including 2,925-lb. payload estimated at 3½ tons; rocket case down 12/3/58; payload down 4/6/60.
IV	5/15/60	Placed spacecabin and "dummy spaceman" in orbit in test of life-support systems; payload weight of 10,008 lb.; recovery failed when craft went into lopsided orbit instead of reentering; satellite and 2 associated metal objects still in orbit 3/5/62; rocket body down 7/17/60; 5 other associated objects down Sept.-Oct. 1960.
V	8/19/60	Test of capsule and recovery system for ultimate manned spaceflight; payload weight of 10,120 lb.; capsule reported to contain two dogs, rats, mice, flies, plants, fungi, seeds; reported to have been recovered on 18th orbit, 8/20/60, after traveling 437,500 mi.; rocket body down 9/23/60.
VI	12/1/60	Test of equipment for ultimate manned spaceflight; 10,060-lb. payload reported to include 2 dogs, other animal and plant life; vehicle descended on uncalculable trajectory when signaled to return to earth and was destroyed on reentry 12/2/60; rocket body down 12/2/60.
VII	2/4/61	Achieved orbit for 7.1-ton vehicle, heaviest satellite to date; no recovery attempt; down 2/26/61; rocket body down 2/12-13/61; associated metal object down 3/17/61.
VIII	2/12/61	First satellite to launch another vehicle from orbit; also on 2/12/61, a 1,419-lb. "automatic interplanetary station" was launched from the Sputnik toward vicinity of Venus (see above); satellite down 2/25/61; rocket body down 2/18/61; associated metal object down mid-Feb. 1961.
IX	3/9/61	Five-ton vehicle; contained dog named Chernushka (Blackie); successfully brought back on command to preselected area; 2 associated metal objects down 3/10/61.
X	3/25/61	Five-ton vehicle; contained dog named Zvesdochka (Little Star); successfully brought back on command to preselected area; rocket body and associated metal object down 3/26/61.