

PROJECT  
GEMINI

*...two steps into space*



by DONALD O. SCHULTZ



GRISSOM - YOUNG

McDIVITT - WHITE

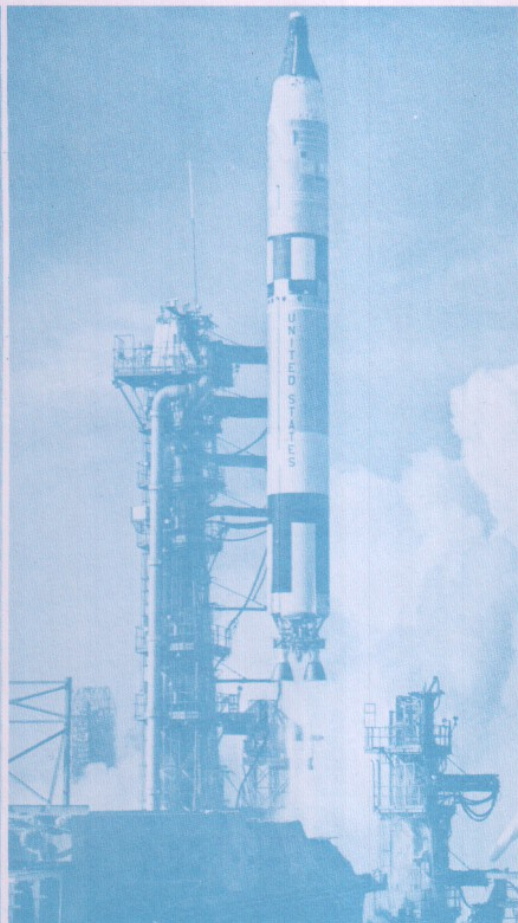
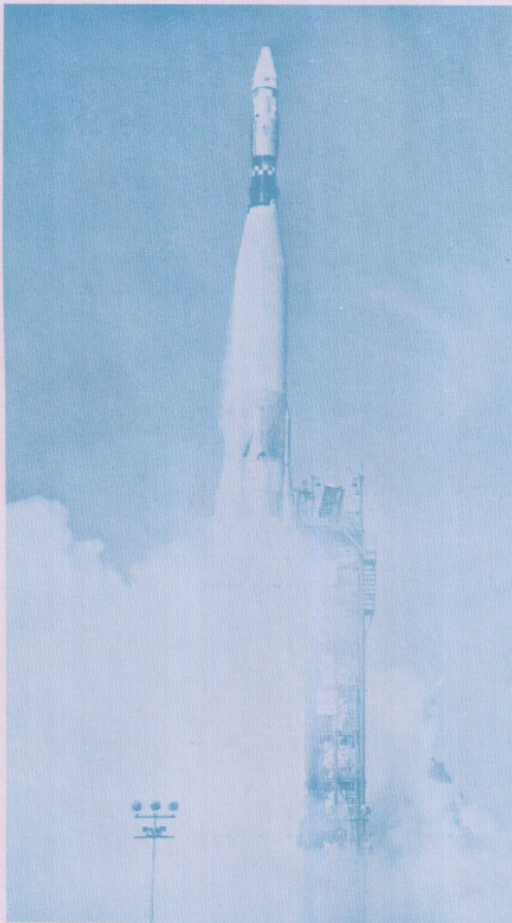
COOPER - CONRAD

SCHIRRA - STAFFORD

AGENA

GEMINI

ARMSTRONG  
—  
SCOTT



BORMAN  
—  
LOVELL

NASA

STAFFORD - CERNAN

YOUNG - COLLINS

CONRAD - GORDON

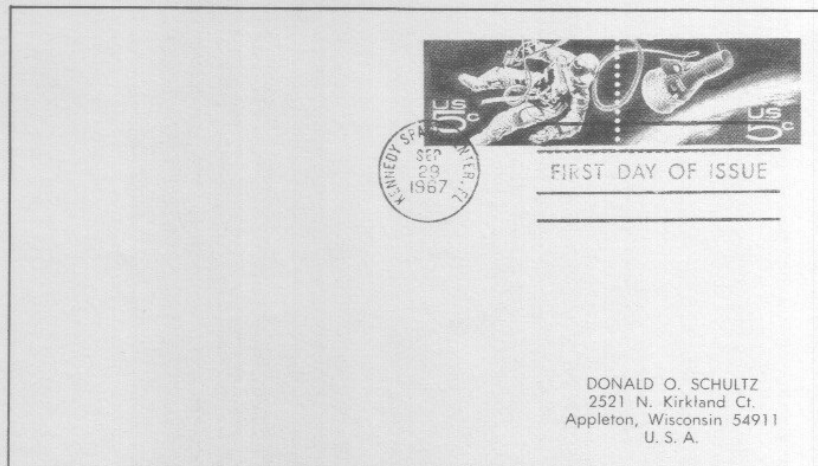
LOVELL - ALDRIN

# PROJECT GEMINI

*...two steps into space*

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*To  
Nancy  
with best wishes  
Don Schultz 11-10-67*



Published by  
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## FOREWORD

President John F. Kennedy and Congress have set the landing of an American on the moon in this decade as a major National goal. The United States program directed toward achieving this goal includes three projects: MERCURY, GEMINI, and APOLLO. Each of these programs will lay a sound foundation for the next. Hence, PROJECT GEMINI, Two Steps Into Space, is an attempt to record all the important naval and space information of America's Step Two in Space Exploration.

PROJECT GEMINI, Two Steps Into Space follows in the same vein as my first record, PROJECT MERCURY, One Step Into Space. I have continued with America's second space project without deleting any important record or event to give the reader a clear picture of Project Gemini.

This writer has received valuable assistance in compiling and form of this record from F. Kent Loomis, Capt. USN, Retired, Asst. Director Naval History, Washington, D.C.; John C. Stonesifer, Head, Current Operations Section, Landing and Recovery Division, Manned Space Flight Center, Houston, Texas; Howard Benedict, Associated Press, Cape Kennedy Bureau; Public Affairs Officer, Task Force One Four Zero, Norfolk, Virginia; and many Public Affairs Officers on board individual ships to whom I addressed correspondence.

Even as this booklet goes to press, there were four Apollo flights flown, I have not listed those events in this compilation because when Project Apollo is finally completed into the 1970's, I have hopes to add a third volume to America's space program of One, Two, Three, and the Moon. I have listed the first flight of MOL to show the military application of manned space flight as these flights have no ending.

All data set down here is accurate with reference to each event unless in the course of recording or printing, a human error occurred.



Donald O. Schultz



CAPE CANAVERAL - CAPE KENNEDY

On November 28, 1963, Lyndon B. Johnson, President of the United States of America announced that the NASA and Air Force facilities in the Cape Canaveral area would be renamed. Cape Canaveral Missile Test Annex became Cape Kennedy Air Force Station, effective January 22, 1964. NASA's Launch Operations Center was changed to John F. Kennedy Space Center, NASA effective December 20, 1963, and the overall name of Station One of the AMR & NASA's Merritt Island facilities were changed to read: "JOHN F. KENNEDY SPACE CENTER" per Executive Order No. 11129, dated November 29, 1963.

IN MEMORIAM

JOHN FITZGERALD KENNEDY  
1917-1963



## GEMINI

There were four major goals to carry out in this project. To determine man's performance and behavior during prolonged orbital flight including his ability to control and pilot the craft; to develop and perfect techniques for orbital rendezvous and docking; to carry out scientific investigations of space requiring participation and supervision of men aboard the spacecraft; and to demonstrate controlled entry into the atmosphere with landing at a selected site. All of these major goals were achieved in Project Gemini.

Although the Gemini spacecraft resembled Mercury, it is 1-1/2 feet wider than Mercury at the base and lengthened proportionately. It has 50 percent more cabin space and compares to Mercury 3,000 pounds to 7,000 pounds. The Gemini vehicle is made up of three parts: Re-entry module (capsule); retrograde module directly behind the re-entry module; and equipment module. A fourth section could be named if one counted the Agena Docking Structure which was launched separately ahead of Gemini.

The equipment and retrograde modules together were called the adapter section weighing 2,200 pounds. The equipment module contained fuel, fuel cells, oxygen for breathing, and a propulsion system for orbital attitude control and maneuvers. The retrograde section sandwiched between the re-entry module and equipment module contained braking rockets that decelerate Gemini and enabled it to descend from orbit. Both equipment and retrograde modules were jettisoned before re-entry.

The re-entry module equipment included docking apparatus; a life support system for maintaining pressure, temperature and atmospheric composition of the cabin; instruments to collect, transmit, and record data on crew and craft; guidance and controls to aid in navigation, rendezvous, and re-entry; radar to aid in rendezvous operations; and recovery aids such as beacons, flashing lights, and two-way voice radios. Two windshields, one for each astronaut, supplant the single porthole of Mercury.

Since Gemini is flown by a crew of two astronauts, the Project was named GEMINI for the twins which have been in the sky since the beginning of time. Gemini is the third constellation in the zodiac, and shown in pictorial maps as the twins Castor and Pollux, sitting together.



MISSION: GEMINI/TITAN I (GT-1)

SCHEDULED DATE OF LAUNCH: 8 April 1964  
ACTUAL DATE OF LAUNCH: 8 April 1964  
DATE OF LANDING:  
LENGTH OF FLIGHT:  
NO. OF REVS: 64  
POSIT. OF LANDING: Burned up entering Earth's atmosphere  
DIST. FROM PRS:  
TIME TO RECOVER ASTROS:  
TIME TO RECOVER S/C:  
LAUNCHED FROM: Cape Kennedy, Fla.  
RECOVERED BY:  
ASTRONAUTS: Unmanned

UNITS ATLANTIC:

NONE

UNITS PACIFIC:

NONE

SIGNIFICANT MISSION CHANGES AFFECTING LAUNCHING/LANDING: NONE  
Not scheduled for recovery.

MISSION DESCRIPTION: Primary objectives of the mission were to check the structural integrity of the spacecraft during the launch phase and compatibility of the spacecraft and the launch vehicle.

NOTES: The spacecraft was not separated from the second stage of the launch vehicle. The spacecraft was placed in an orbit with a perigee of 100 miles and apogee of 205 miles. The spacecraft entered the Earth's atmosphere during the 64th orbit over the South Atlantic, and was burned up.

In addition to achieving its major objectives, this flight demonstrated the performance of the tracking network, training for flight personnel, and the operational facilities. Launch occurred at 11:01:69 A.M., EST.

MISSION: GEMINI/TITAN 2 (GT-2)

SCHEDULED DATE OF LAUNCH:	9 December 1964
ACTUAL DATE OF LAUNCH:	19 January 1965
DATE OF LANDING:	19 January 1965
LENGTH OF FLIGHT:	18 min., 16 sec.
NO. OF REVS:	Sub-orbital
POSIT. OF LANDING:	16-31.9N, 49-46.8W
DIST. FROM PRS:	25 nautical miles
TIME TO RECOVER ASTROS:	
TIME TO RECOVER S/C:	1 hr., 30 min.
LAUNCHED FROM:	Cape Kennedy, Fla.
RECOVERED BY:	LAKE CHAMPLAIN CVS 39
ASTRONAUTS:	Unmanned

UNITS ATLANTIC:

LAKE CHAMPLAIN CVS 39 (PRS)  
O'HARE DD 889  
HOLDER DD 819  
VOGELGESANG DD 862  
PUTNAM DD 757  
FOREST ROYAL DD 872  
EUGENE A. GREENE DD 711  
AGILE MSO 421  
BULWARK MSO 425  
PAIUTE ATF 159

UNITS PACIFIC:

NONE

SIGNIFICANT MISSION CHANGES AFFECTING LAUNCH/LANDING: NONE

MISSION DESCRIPTION: The primary objectives were threefold: to demonstrate the adequacy of the re-entry module's heat protection equipment; to test the structural integrity and capability of the spacecraft from lift-off through recovery; and to demonstrate satisfactory performance of the spacecraft systems.

NOTES: The sub-orbital flight was launched at 9:03:59 A.M., EST. During the brief flight, GT-2 attained an altitude of 98.9 miles.

Originally scheduled for launch on 9 December 1964, when countdown reached zero and the stage one engines were ignited, the vehicle's Malfunction Detection System noted technical troubles due to loss of hydraulic pressure. The System automatically shut down the engines about one second later. The mission was rescheduled to the January date.



MISSION: GEMINI/TITAN 3 (GT-3)

SCHEDULED DATE OF LAUNCH:	23 March 1965
ACTUAL DATE OF LAUNCH:	23 March 1965
DATE OF LANDING:	23 March 1965
LENGTH OF FLIGHT:	4 hr., 52 min.
NO. OF REVS:	3
POSIT. OF LANDING:	22-26N, 70-51W
DIST. FROM PRS:	60 nautical miles
TIME TO RECOVER ASTROS:	1 hr., 12 min.
TIME TO RECOVER S/C:	2 hr., 47 min.
LAUNCHED FROM:	Cape Kennedy, Fla.
RECOVERED BY:	Helo to INTREPID CVS 11
ASTRONAUTS:	VIRGIL I. GRISSOM, Major, U.S.A.F. JOHN W. YOUNG, Lieutenant Commander, U.S.N.

UNITS ATLANTIC:

INTREPID CVS 11 (PRS)  
SARFIELD DD 837  
ROBERT A. OWENS DD 827  
BIGELOW DD 942  
DOUGLAS H. FOX DD 779  
ROBERT L. WILSON DD 847  
BOSTON CAG 1  
HARWOOD DD 861  
KANKAKEE AO 39  
RICH DD 820  
CONY DD 508  
AULT DD 698  
HAROLD J. ELLISON DD 864  
JOHN PAUL JONES DD 932  
MULLINNIX DD 944  
SWERVE MSO 495  
STURDY MSO 494  
NIPMUC ATF 157  
VIGILANT WPC 617  
DILIGENCE WPC 616

UNITS PACIFIC:

NONE

SIGNIFICANT MISSION CHANGES AFFECTING LAUNCH/LANDING: NONE

MISSION DESCRIPTION: First manned qualification of the Gemini spacecraft. First spacecraft to alter its own orbit.

NOTES: Command Pilot Grissom and Pilot Young were launched at 9:24 A.M., EST. An orbital maneuver over Texas during the first orbit changed the orbital path of a manned spacecraft for the first time. Forward and aft thrusters were fired in series of maneuvers to accomplish minute changes in the orbital path. This occurred during the second orbit over the Indian Ocean. The maximum perigee was 100.05 miles with the apogee of 139.15 miles.

Gemini 3 landed at 2:16:31 P.M., EST and crew recovery was made at 3:28 P.M. The spacecraft was picked up at 5:03 P.M. EST.

MISSION: GEMINI/TITAN 4 (GT-4)

SCHEDULED DATE OF LAUNCH:	3 June 1965
ACTUAL DATE OF LAUNCH:	3 June 1965
DATE OF LANDING:	7 June 1965
LENGTH OF FLIGHT:	4 days
NO. OF REVS:	62
POSIT. OF LANDING:	27-44N, 74-14W
DIST. FROM PRS:	48 nautical miles
TIME TO RECOVER ASTROS:	57 min.
TIME TO RECOVER S/C:	2 hr., 16 min.
LAUNCHED FROM:	Cape Kennedy, Fla.
RECOVERED BY:	Helo to WASP CVS 18
ASTRONAUTS:	JAMES A. MC DIVITT, Major, U.S.A.F. EDWARD H. WHITE II, Major, U.S.A.F.

UNITS ATLANTIC:

WASP CVS 18 (PRS)  
SKILL MSO 471  
NIMBLE MSO 459  
HOIST ARS 40  
HAWKINS DD 873  
BARRY DD 933  
CHARLES S. SPERRY DD 697  
RICH DD 820  
FURSE DD 882  
CHUKAWAN AO 100  
BLANDY DD 943  
ROBERT A. OWENS DD 827

UNITS PACIFIC:

LEONARD F. MASON DD 852  
RUPERTUS DD 851  
ORLECK DD 886  
HIGBEE DD 806  
GOLDSBOROUGH DDG 20  
PONCHATOU LA AO 148

SIGNIFICANT MISSION CHANGES AFFECTING LAUNCH/LANDING: NONE

MISSION DESCRIPTION: Demonstrate EVA and system performance for 4 days in space; to evaluate the effects of prolonged exposure to space environment in preparation for missions of longer duration; and execute 11 experiments.

NOTES: Launch occurred at 11:16 A.M., EDT for Command Pilot McDivitt and Pilot White. Gemini 4 was the first American crew to open a spacecraft hatch and have one member participate in extravehicular activity (EVA). White was the first astronaut to use a "space gun" to maneuver in space. GT-4 failed to rendezvous with the expended second stage of its launch vehicle because of lack of sufficient propellant. Major White's EVA lasted 22 minutes.

Gemini 4 attained a maximum apogee of 180 miles and a perigee of 103 miles. Splash-down occurred in the Atlantic at 1:12:12 P.M., EDT, on 7 June. The crew was recovered at 2:09 P.M., and the spacecraft effected at 3:28 P.M., EDT. Malfunction in the Inertial Guidance System required the crew to perform zero-lift re-entry.

Mission control was made for the first time at the Manned Space Flight Center at Houston, Texas.



MISSION: GEMINI/TITAN 5 (GT-5)

SCHEDULED DATE OF LAUNCH:	19 August 1965
ACTUAL DATE OF LAUNCH:	21 August 1965
DATE OF LANDING:	29 August 1965
LENGTH OF FLIGHT:	8 days
NO. OF REVS:	120
POSIT. OF LANDING:	29-47N, 69-45W
DIST. FROM PRS:	91 nautical miles
TIME TO RECOVER ASTROS:	1 hr., 31 min.
TIME TO RECOVER S/C:	3 hr., 55 min.
LAUNCHED FROM:	Cape Kennedy, Fla.
RECOVERED BY:	Helo to LAKE CHAMPLAIN CVS 39
ASTRONAUTS:	L. GORDON COOPER, Lieutenant Colonel, U.S.A.F. CHARLES CONRAD JR., Lieutenant Commander, U.S.N.

UNITS ATLANTIC:

LAKE CHAMPLAIN CVS 39 (PRS)  
AVENGE MSO 423  
EXULTANT MSO 441  
PRESERVER ARS 8  
DUPONT DD 941  
JOHN W. WEEKS DD 701  
NEW DD 818  
JAMES C. OWENS DD 776  
NEOSHO AO 143  
MANLEY DD 940  
WALDRON DD 699  
CVSG 54

UNITS PACIFIC:

GOLDSBOROUGH DDG 20  
TAYLOR DD 468  
LEONARD F. MASON DD 852  
GEO. K. MACKENZIE DD 836  
CHIPOLA AO 63

**SIGNIFICANT MISSION CHANGES AFFECTING LAUNCH/LANDING:** Flight almost cut short by fuel cell failure. Two days prior to end of mission, NASA officials increased the priority for recovery of the R & R section in view of fuller evaluation of the radar and other R & R components. Splash was near DUPONT 91 nautical miles from LAKE CHAMPLAIN because of inaccurate data fed its computer from the ground. A search for the R & R section proved negative and orders from CTF 140 to deploy pararescuemen and recovery by DUPONT was countermanded by DOD Manager at MCC Houston. Scheduled for 19 August but due to problems in the power system and heavy thunderstorms, GT-5 was postponed for two days.

**MISSION DESCRIPTION:** An 8 day manned mission which demonstrated long-duration space flight, rendezvous radar capabilities, and rendezvous maneuvers together with 17 experiments were assigned to the flight. This was the first time fuel cells were used to provide electrical power.

**NOTES:** Gemini 5 was launched at 10:00 A.M., EDT, with Cooper as Command Pilot and Conrad as Pilot. Early phases of the flight went as planned but a rapid drop in pressure in the cryogenic storage tanks which supplied the fuel cells required that many of the planned activities had to be curtailed and abandoned. On the third day, GT-5 crew was instructed to rendezvous with a "Phantom Agena Target Vehicle." This was done and ground control placed the spacecraft within three-tenths of a mile of that target.

The craft attained an apogee of 217.4 miles and perigee of 100.6 miles. Splash was made at 8:55:14 A.M., EDT with crew recovery at 10.26 A.M. and the spacecraft recovery by LAKE CHAMPLAIN at 12:50 A.M., EDT.

MISSION: GEMINI/TITAN 6 (GT-6)

SCHEDULED DATE OF LAUNCH: 25 October 1965  
ACTUAL DATE OF LAUNCH: Scrubbed

DATE OF LANDING:

LENGTH OF FLIGHT:

NO. OF REVS:

POSIT. OF LANDING:

DIST. FROM PRS:

TIME TO RECOVER ASTROS:

TIME TO RECOVER S/C:

LAUNCHED FROM:

RECOVERED BY:

ASTRONAUTS:

WALTER M. SCHIRRA, Captain, U.S.N.  
THOMAS P. STAFFORD, Major, U.S.A.F.

UNITS ATLANTIC:

WASP CVS 18 (PRS)  
PAIUTE ATF 159  
FEARLESS MSO 442  
FIDELITY MSO 443  
BASILONE DD 824  
INGRAM DD 938  
MASSEY DD 778  
AUCILLA AO 56  
STICKELL DD 888  
NOA DD 841  
CVSG 52  
AEWRON 4

UNITS PACIFIC:

COCHRANE DDG 21  
RENSHAW DD 499  
RUPERTUS DD 851  
GEO. K. MACKENZIE DD 836

SIGNIFICANT MISSION CHANGES AFFECTING LAUNCH/LANDING: Mission canceled after failure of Agena target vehicle.

MISSION DESCRIPTION: Scheduled as a 2-day rendezvous mission to demonstrate dual countdown procedures, flight performance of target launch vehicle and the flight readiness of the Gemini Agena Target Vehicle secondary propulsion system.

NOTES: The Gemini Agena Target Vehicle launch came at 10:00:04 A.M., EST and at that same time the astronauts were participating in a countdown inside the Gemini spacecraft. Six minutes and 16 seconds after the Agena lift-off, a propulsion failure occurred and a subsequent breakup of the target vehicle occurred. GT-6 was postponed and later rescheduled to fly during the time Gemini 7 was in space.



MISSION: GEMINI/TITAN 6A (GT-6A)

SCHEDULED DATE OF LAUNCH:	25 October 1965
ACTUAL DATE OF LAUNCH:	15 December 1965
DATE OF LANDING:	16 December 1965
LENGTH OF FLIGHT:	1 day
NO. OF REVS:	16
POSIT. OF LANDING:	23-42N, 67-48W
DIST. FROM PRS:	11 nautical miles
TIME TO RECOVER ASTROS:	1 hr., 04 min.
TIME TO RECOVER S/C:	1 hr., 04 min.
LAUNCHED FROM:	Cape Kennedy, Fla.
RECOVERED BY:	WASP CVS 18
ASTRONAUTS:	WALTER M. SCHIRRA, Captain, U.S.N. THOMAS P. STAFFORD, Major, U.S.A.F.

UNITS ATLANTIC:

WASP CVS 18 (PRS)  
ABILITY MSO 519  
PAIUTE ATF 159  
POWER DD 839  
WALDRON DD 699  
KENNEDY DD 850  
AUCILLA AO 56  
MEREDITH DD 890  
WACCAMAW AO 109  
CVSG 52

UNITS PACIFIC:

COCHRANE DDG 21  
RENSHAW DD 499  
GEO. K. MACKENZIE DD 836  
RUPERTUS DD 851  
PONCHATOU LA AO 148

SIGNIFICANT MISSION CHANGES AFFECTING LAUNCH/LANDING: October launch canceled after rendezvous target failed to orbit; rescheduled to coincide with Gemini 7. Encountered subsequent three-day delay because of malfunction of electrical connection and non-removal of dust cap from oxidizer port.

MISSION DESCRIPTION: Manned 1-day flight that demonstrated on-time launch procedures, close-loop rendezvous capability, and station keeping with Gemini 7. Live TV coverage in the recoveries of GT-6A and GT-7 was highly successful.

NOTES: Command Pilot Schirra and Pilot Stafford was launched at 8:37:26 A.M., EST, with the main objective to rendezvous with GT-7 during the fourth orbit of GT-6A. Schirra maneuvered GT-6A to within one foot of GT-7 and performed keeping exercises with 7, five hours and 56 minutes after lift-off. During the station keeping period which lasted five hours and 18 minutes and 29 seconds, perfect control was maintained. The apogee reached was 161 miles and perigee 100 miles.

Three days earlier, while the two astronauts were awaiting the count to reach zero, the ignition came on time at 9:54:06 A.M. but 1.2 seconds later shut down. Schirra and Stafford correctly assessed the situation and stayed with the spacecraft. It was later determined that a small electric plug in the tail of the spacecraft had dropped out and the plastic dust cover had obstructed the oxidizer inlet line of a gas generator. Either of these events would have prevented a lift-off.

Touch-down occurred at 10:28 A.M., EST and crew recovery was made at 11:32 A.M., EST. Both Schirra and Stafford elected to stay with the spacecraft until it was picked up by the WASP.

MISSION: GEMINI/TITAN 7 (GT-7)

SCHEDULED DATE OF LAUNCH:	4 December 1965
ACTUAL DATE OF LAUNCH:	4 December 1965
DATE OF LANDING:	18 December 1965
LENGTH OF FLIGHT:	14 days
NO. OF REVS:	205
POSIT. OF LANDING:	25-25N, 70-07W
DIST. FROM PRS:	12 nautical miles
TIME TO RECOVER ASTROS:	32 min.
TIME TO RECOVER S/C:	1 hr., 04 min.
LAUNCHED FROM:	Cape Kennedy, Fla.
RECOVERED BY:	Helo to WASP CVS 18
ASTRONAUTS:	FRANK BORMAN, Lieutenant Colonel, U.S.A.F. JAMES A LOVELL, JR., Commander, U.S.N.

UNITS ATLANTIC:

WASP CVS 18 (PRS)  
ABILITY MSO 519  
PAIUTE ATF 159  
WALDRON DD 699  
KENNEDY DD 850  
AUCILLA AO 56  
MEREDITH DD 890  
WACCAMAW AO 109  
POWER DD 839  
CVSG 52

UNITS PACIFIC:

COCHRANE DDG 21  
RENSHAW DD 499  
GEO. K. MACKENZIE DD 836  
RUPERTUS DD 851  
PONCHATOULA AO 148

SIGNIFICANT MISSION CHANGES AFFECTING LAUNCH/LANDING: Splash-down was 45 hours, 37 minutes after GT-6A, which required quick repositioning of the Prime Recovery Ship (PRS).

MISSION DESCRIPTION: Demonstrated 2-week duration flight and station keeping with GLV stage II, evaluated "shirt sleeve" environment, acted as the rendezvous target for GT-6A and demonstrated a controlled re-entry to within 7 miles of the planned landing point. Set manned space flight record of 13 days, 18 hours, 35 minutes. Crew carried out 20 experiments, including a full series of medical tests.

NOTES: Gemini 7 was launched at 2:30:03 P.M., EST, with Col. Borman as Command Pilot and Cdr. Lovell as Pilot. During the flight, GT-7 attained a maximum apogee of 204 miles and a low perigee of 100 miles. Lovell removed his pressure suit on the second day and from that time until the end of the flight either one or both of the crewmen were out of their suits most of the time. The total elapsed time of the flight was about twice that anticipated necessary for a lunar flight.

Touchdown was just 6.6 miles from the landing point at 9:05:34 A.M., EST. The crew went aboard WASP at 9:37 A.M. and the spacecraft was taken aboard at 10:08 A.M., EST.



MISSION: GEMINI/TITAN/AGENA 8 (GTA-8)

SCHEDULED DATE OF LAUNCH: 15 March 1966  
ACTUAL DATE OF LAUNCH: 16 March 1966  
DATE OF LANDING: 16 March 1966  
LENGTH OF FLIGHT: 10 hr., 41 min.  
NO. OF REVS: 7  
POSIT. OF LANDING: 25-12N, 136-05E  
DIST. FROM PRS: 167 nautical miles from MASON DD 852  
TIME TO RECOVER ASTROS: 3 hr., 6 min.  
TIME TO RECOVER S/C: 4 hr., 15 min.  
LAUNCHED FROM: Cape Kennedy, Fla.  
RECOVERED BY: LEONARD F. MASON DD 852  
ASTRONAUTS: NEIL A. ARMSTRONG, Civilian  
DAVID R. SCOTT, Major, U.S.A.F.

UNITS ATLANTIC:

BOXER LPH 4 (PRS)  
FIDELITY MSO 443  
NOA DD 841  
GOODRICH DD 831  
C. P. CECIL DD 835  
CALOOSAHATCHEE AO 98  
M. C. FOX DD 829  
PAIUTE ATF 159  
VP-16  
HS-5

UNITS PACIFIC:

LEONARD F. MASON DD 852  
(Recovered)  
COCHRANE DDG 21  
GEO. K. MACKENZIE DD 836  
HASSAYAMPA AO 145

SIGNIFICANT MISSION CHANGES AFFECTING LAUNCH/LANDING: Mission terminated early in 7th revolution because of an electrical short in the control system and was brought down in the Western Pacific. In the Atlantic, M. C. FOX responded to a distress signal of M/V PALMA before launch, joined later by CALOOSAHATCHEE and C. P. CECIL. These ships spent entire mission in successful fire fighting aboard PALMA. Originally scheduled for the 15th, postponement came when minor problems developed in the Atlas launch vehicle.

MISSION DESCRIPTION: Mission planned for a 3-day duration to perfect rendezvous and docking techniques. Made first space docking when linked with Agena target vehicle.

NOTES: The Agena target vehicle was launched at 10:00:03 A.M., EST, followed by Gemini 8 at 11:41:02 A.M. as scheduled. Six hours after lift-off the rendezvous was effected between space vehicles. This was followed by first docking of two vehicles in space. The elapsed flight of this event was six hours, 33 minutes and 22 seconds after lift-off. Approximately 27 minutes after docking, the spacecraft-target combination encountered greater than expected yaw and roll rates. The crewmen gave several commands to the target vehicle and when it became evident this was not effective, the astronauts suspected some part of the control system might be involved. The rates increased to a point where the mission might be in jeopardy, so they undocked from the target vehicle and backed away as soon as possible. After completing this maneuver it was evident that the spacecraft attitude control system had caused the problem. Roll and yaw rates extend was almost one full revolution per second. The roll was brought under control by deactivating the orbital attitude system and by activating the re-entry control system. Flight Director John D. Hodge ordered mission termination during the 7th revolution in the Pacific.

GTA-8 touched down east of Okinawa 1.4 miles south of the planned landing area at 10:22:28 P.M., EST. The crew was picked up by LEONARD MASON at 1:28 A.M., EST, March 17th, and the spacecraft was hoisted aboard 1 hour and nine minutes later.

MISSION: GEMINI/TITAN/AGENA 9A (GTA-9A)

SCHEDULED DATE OF LAUNCH:	17 May 1966 (1 June 1966)
ACTUAL DATE OF LAUNCH:	3 June 1966
DATE OF LANDING:	6 June 1966
LENGTH OF FLIGHT:	3 days
NO. OF REVS:	45
POSIT. OF LANDING:	27-52N, 75-04W
DIST. FROM PRS:	2.5 nautical miles
TIME TO RECOVER ASTROS:	53 minutes
TIME TO RECOVER S/C:	53 minutes
LAUNCHED FROM:	Cape Kennedy, Fla.
RECOVERED BY:	WASP CVS 18
ASTRONAUTS:	THOMAS P. STAFFORD, Lieutenant Colonel, U.S.A.F. EUGENE A. CERNAN, Lieutenant Commander, U.S.N.

UNITS ATLANTIC:

WASPCVS 18 (PRS)  
PAPAGO ATF 160  
NUMBLE MSO 459  
MCCAFFERY DD 860  
BORDELON DD 881  
WILSON DD 847  
W. C. LAWE DD 763  
CHIKASKIA AO 54  
OPPORTUNE ARS 41  
SABINE AO 25  
HS 11  
CVSG 52

UNITS PACIFIC:

EPPERSON DD 719  
RUPERTUS DD 851  
GEO. K. MACKENZIE DD 836  
HASSAYAMPA AO 145

SIGNIFICANT MISSION CHANGES AFFECTING LAUNCH/LANDING: Launch delayed due to target vehicle's failure to enter orbit.

MISSION DESCRIPTION: Mission of approximately 3-day duration designed to perfect rendezvous and docking techniques. Three rendezvous with Augmented Target Docking Adapter, but no docking because shroud over target's adapter failed to separate. Astronaut CERNAN made 2-hour, 10 minute space walk; exhaustion forced him to abandon attempt to use rocket-powered Astronaut Maneuvering Unit.

NOTES: Gemini 9 originally scheduled for launch on 17 May started with the Agena target launch on 17 May at 10:15:03 A.M., EST. The target booster engine number two was lost two minutes and one second after lift-off and GTA-9 was terminated. The flight was rescheduled for 1 June.

On 1 June, the target adapter vehicle was launched at 10:00:02 A.M., EST and placed into orbit with an apogee of 184 miles and a perigee of 190 miles. The GTA-9A crew was participating in countdown when a hold initiated at T minus one minute 40 seconds was made. The count was recycled to T minus 3 minutes. Control announced that the guidance system update of the spacecraft computer could not be transferred from ground equipment to the spacecraft. Then after two additional holds, the launch attempt was rescheduled for 3 June.



The countdown went smoothly on 3 June and GTA-9A was launched at 8:39:33 A.M., EST, with Command Pilot Stafford and Pilot Cernan. The crew rendezvous on the third orbit and again on the fourth. On the 12th orbit, they made rendezvous from above the target vehicle. Rendezvous with ATDA was made four hours and 15 minutes after lift-off and performed keeping activities 46 minutes. Then re-rendezvoused after six hours and 36 minutes elapsed time. The keeping period for this period lasted 39 minutes. The rendezvous from above was difficult because of the terrain in the background. This was made 21 hours and 42 minutes into the flight and station keeping lasted one hour and 17 minutes.

EVA was started 49 hours and 23 minutes after lift-off and closed after 51 hours and 30 minutes for a total of two hours and seven minutes extravehicular time.

Gemini 9 splash in the Atlantic was made at 9:00:33 A.M., EST about .37 nautical miles from the planned point. GTA-9A reached a high apogee of 166 miles and low perigee of 99 miles. The crew was recovered at 9:53 A.M., EST.

MISSION: GEMINI/TITAN/AGENA (GTA-10)

SCHEDULED DATE OF LAUNCH:	18 July 1966
ACTUAL DATE OF LAUNCH:	18 July 1966
DATE OF LANDING:	21 July 1966
LENGTH OF FLIGHT:	3 days
NO. OF REVS:	44
POSIT. OF LANDING:	26-45N, 71-57W
DIST. FROM PRS:	7 nautical miles
TIME TO RECOVER ASTROS:	27 min.
TIME TO RECOVER S/C:	52 min.
LAUNCHED FROM:	Cape Kennedy, Fla.
RECOVERED BY:	Helo to GUADALCANAL LPH 7
ASTRONAUTS:	JOHN W. YOUNG, Commander, U.S.N. MICHAEL COLLINS, Major, U.S.A.F.

UNITS ATLANTIC:

GUADALCANAL LPH 7 (PRS)  
SUMNER DD 692  
NORRIS DD 859  
W. C. LAWE DD 763  
SEVERN AO 61  
VP 49  
HS 3

UNITS PACIFIC:

BENJAMIN STODDERT DDG 22  
DEHAVEN DD 727  
COLLETT DD 730  
KAWISHIWI AO 146

SIGNIFICANT MISSION CHANGES AFFECTING LAUNCH/LANDING: The recovery of GTA-10 by GUADALCANAL marked the first time a manned spacecraft was recovered by an LPH.

MISSION DESCRIPTION: Mission of 3 days duration designed to perfect rendezvous and docking techniques. Set altitude record of 476 miles; rendezvoused with two Agena targets docking with one. Astronaut COLLINS became the first spaceman to travel to another craft while in space. He picked up an experiment from the exterior surface of one Agena.

NOTES: The Agena target was launched at 4:39:46 P.M., EDT followed by the Gemini launch at 6:20:26 P.M. with Command Pilot Young and Pilot Collins. The spacecraft rendezvoused with Agena five hours and 21 minutes later with docking 31 minutes later. Both craft remained docked for 38 hours and 47 minutes. During this docked period, they performed six maneuvers, three using Agena's propulsion primary and three using Agena's secondary propulsion system. Also during this period, EVA was made 23 hours and 24 minutes after lift-off for 49 minutes. A standing EVA was terminated when both crew members experienced eye irritation. The second EVA started 48 hours and 41 minutes after lift-off with an umbilical control for COLLINS lasting 39 minutes. COLLINS retrieved an experiment package attached to Gemini 8 since March 1966. The crew undocked with Agena 10 target vehicle 44 hours and 40 minutes into the flight and rendezvous with Agena 8 target vehicle which had been in a parking orbit since 16 March.

An apogee of 168 miles and 100 perigee was reached on the flight. Touchdown was in the Atlantic at 5:07:06 P.M., EDT from an estimate 2.5 planned impact point.



MISSION: GEMINI/TITAN/AGENA 11 (GTA-11)

SCHEDULED DATE OF LAUNCH:	9 September 1966
ACTUAL DATE OF LAUNCH:	12 September 1966
DATE OF LANDING:	15 September 1966
LENGTH OF FLIGHT:	3 days
NO. OF REVS:	44
POSIT. OF LANDING:	24-15.08N, 70-01.01W
DIST. FROM PRS:	2.6 nautical miles
TIME TO RECOVER ASTROS:	24 minutes
TIME TO RECOVER S/C:	1 hour
LAUNCHED FROM:	Cape Kennedy, Fla.
RECOVERED BY:	Helo to GUAM LPH 9
ASTRONAUTS:	CHARLES CONRAD, Commander, U.S.N. RICHARD GORDON, Lieutenant Commander, U.S.N.

UNITS ATLANTIC:

GUAM LPH 9 (PRS)  
FORREST ROYAL DD 872  
LIND DD 703  
MC CAFFERY DD 860  
SEVERN AO 61  
NIPMUC ATF 157  
VP 49  
HS 3

UNITS PACIFIC:

O'BANNON DD 450  
MANSFIELD DD 728  
CHANDLER DD 717  
KAWISHIWI AO 146

**SIGNIFICANT MISSION CHANGES AFFECTING LAUNCH/LANDING:** Launch delay due to leak in the Titan booster fuel tank and suspected faulty auto-pilot in the Agena. This was the first mission in which the Gemini flotation collar failed to inflate in the usual time of 4 to 5 minutes. This malfunction was due to an improper fitting between collar connector and the bottle trigger assembly. Full inflation took 9 minutes.

**MISSION DESCRIPTION:** Develop and demonstrate techniques for the rendezvous of two vehicles. First orbit rendezvous was achieved following launch in the second launch window. Astronauts achieved the highest altitude to date and made the first automatic controlled re-entry. R & R section sank despite efforts of the second swim team. (Swimmers were dragged down to 120').

**NOTES:** Command Pilot Conrad and Pilot Gordon were launched at 9:42:26.5 A.M., EST after the Agena Target Vehicle was launched at 8:05:01 A.M. The maximum altitude to date was achieved with 850 miles during the second day while docked with Agena and using the Agena primary propulsion system. Gordon EVA lasted 33 minutes.

On the third day while tethered to Agena after undocking, successfully made two revolutions around the Earth. Other notable achievements made was the first on board computations for rendezvous. Docking practice was carried out twice for the first time in space. The first automatic re-entry was made over Canton Island at elapsed time of 70 hours and 41 minutes, 36 seconds. Touch down was 35 minutes later.

GTA-11 originally scheduled for 8 September, was postponed until the 10th when a hole of .002 of an inch was discovered in the first stage. This was patched and the mission rescheduled. On the 10th, the mission was delayed 48 hours because a sensitive piece of equipment misread vibrations of the autopilot as not working properly.

MISSION: GEMINI/TITAN/AGENA 12 (GTA-12)

SCHEDULED DATE OF LAUNCH:	9 November 1966
ACTUAL DATE OF LAUNCH:	11 November 1966
DATE OF LANDING:	15 November 1966
LENGTH OF FLIGHT:	4 days
NO. OF REVS:	60
POSIT. OF LANDING:	24-36N, 69-56W
DIST. FROM PRS:	4 nautical miles
TIME TO RECOVER ASTROS:	29 minutes
TIME TO RECOVER S/C:	1 hr., 7 min.
LAUNCHED FROM:	Cape Kennedy, Fla.
RECOVERED BY:	Helo to WASP CVS 18
ASTRONAUTS:	JAMES A. LOVELL, JR., Captain, U.S.N. EDWIN E. ALDRIN, JR., Major, U.S.A.F.

UNITS ATLANTIC:

WASP CVS 18 (PRS)  
CHARLES H. ROAN DD 853  
JOSEPH P. KENNEDY DD 850  
LLOYD THOMAS DD 764  
CANISTEO AO 99  
PRESERVER ARS 8  
KANKAKEE AO 39  
VP 49  
HS 11

UNITS PACIFIC:

JOSEPH STRAUSS DDG 16  
HOLLISTER DD 788  
OZBOURN DD 846  
KAWISHIWI AO 146

SIGNIFICANT MISSION CHANGES AFFECTING LAUNCH/LANDING: Launch delay caused by auto-pilot problems on the Titan booster.

MISSION DESCRIPTION: To study man's capability to work in the weightless environment of space without exhaustion. To demonstrate rendezvous and docking.

NOTES: The Agena Target Vehicle was launched at 2:07:58 P.M., EST. Gemini 12 was launched at 3:46:33 P.M., EST with Command Pilot Lovell and Pilot Aldrin.

In addition to achieving all objectives, individual records were made. Lovell has logged more time in space than any other man - 425 hours, ten minutes, and two seconds. Aldrin logged more EVA time than any other man - two hours, 27 minutes standup EVA; and another two hour and 8 minute umbilical EVA; and another 51 minute standup EVA for a total of five hours and 26 minutes.

There were 14 experiments performed in the four day space ride. With the use of handrails, foot restraints, and waist tethers during EVA proved most effective and Aldrin was able to complete all 19 tasks assigned.

Retrofire was initiated over Canton Island at 93 hours, 59 minutes, and 58 seconds into the flight. Splash occurred in the Atlantic at 2:21:04 P.M., EST and both Astronauts were flown to the deck of WASP by helo.



## COMPLEX 19

The Air Force Titan II Gemini launch complex 19 is a converted Titan I ICBM complex used for 14 research and development launches. Construction began in May 1957, with the first launch of a Titan I from this pad on August 14, 1959. Modification work to convert to the Titan II Gemini began February 1962 and was completed in August 1963.

The complex consists of a blockhouse, propellant storage, astronaut recovery area, decontamination building, water flumeway, skimming basin and a launch stand which contains the umbilical towers and erector.

The erector-service tower is 138 feet in height with a 50 foot tall "white-room." The erector, which lifts the Titan II into position on the thrust mount over the flame bucket, has eight movable platforms extending up the erector giving the ground crew access to systems in the booster and spacecraft.

The propellant storage has two propellant transfer systems. There are two 20,000 gallon tanks for each system, one for fuel and one for oxidizer, with temperature conditioning units to lower the temperature of the propellants. A system for venting the fumes from propellants installed is available. Propellants flow into the stage I tanks at a rate of 200 gallons per minute and 90 gallons per minute into the stage II tanks. Oxidizer is always loaded first as most loading problems occur during this operation and it is desirable to discover and correct any problems before the vehicle is fully loaded.

The umbilical tower stands at 102 feet and also contains fuel, hydraulic, pneumatic, and cryogenic lines.

The launch stand is three stories high which supports the umbilical tower, erector, thrust mount and flame bucket. Beneath the launch deck are housed an upper equipment room for erector control, a lower equipment power distribution substation room, a transfer room where cabling from the blockhouse joins umbilical tower lines, a guidance ground equipment room, winch pit and motors for the erector, an environmental control instrumentation room, and an actuator room for the steel arms which raise and lower the erector. The stand contains 80 water nozzles for fire safety purposes and a cooling system which sends 23,500 gallons of water per minute through the flame bucket. The skimming basin near the base of the stand can hold half million gallons of liquid.

The two floor blockhouse is of concrete, sand, and steel 156 feet in diameter, 50 feet tall, and has 20 foot thick walls. The building is air-conditioned and has two escape tunnels leading out below the first level, one to the northwest and the other to the southwest. The tunnels are 355 feet in length lead into an open field outside the complex. The first floor contains offices, communication equipment, air-conditioning, and some instrumentation consoles. The second floor is the launch operations center housing consoles to monitor guidance, flight controls, propellants, and space craft systems. There is also a glassed-in VIP viewing room which can accommodate 25 people.

The Atlas-Agena launch complex was detailed in PROJECT MERCURY, One Step Into Space. It was from Complex 14 that Mercury flights were launched. When Mercury was completed, Complex 14 was intensively modified for the Atlas-Agena for use in the Gemini program.

## ATLAS-AGENA

### Atlas-Agena overall

Length	103.6 feet
Weight (At liftoff)	281,922 pounds

### Agena Target Vehicle

Length	25.5 feet
Diameter	5.0 feet
Total weight with fuel	18,084 pounds
Weight at separation	17,673 pounds
Fuel primary	UDMH (Unsymmetrical Dimethyl-hydrazine mix & hydrazine)
Oxidizer primary	IRFNA (Inhibited Red Fuming Nitric Acid)
Thrust at altitude, prim.	16,000 pounds
Fuel secondary	UDMH
Oxidizer secondary	MON (Multiple Oxides Nitrogen)
Thrust - 2 engines	200 pounds each
2 engines	16 pounds each
Development team	U.S.A.F. Systems Command's Space Systems Div.
Prime contractor	Lockheed Missiles and Space Company
Propulsion systems	Bell Aerosystems Company

### Atlas - SLV-3 (Standard Launch Vehicle - 3)

Length	78 feet
Diameter	10 feet
Weight at liftoff	263,838 pounds
Propellants	Liquid oxygen
	RP-1 (kerosene)
Thrust at liftoff	388,340 pounds
Development team	U.S.A.F. Systems Command's Space Systems Div.
Prime contractor	General Dynamics Corp/Convair
Propulsion systems	Rocketdyne Division, North American Aviation, Inc.
Radio-inertial guidance	General Electric Company

## TITAN II

Length: Stage I	71 feet
Stage II	19 feet
With Spacecraft	19 feet
Total	109 feet
Diameter outside	100 feet
Weight at liftoff	340,682 pounds
Propellants (both	UDMH
primary & secondary)	Oxidizer - nitrogen tetroxide
	(Propellants are hypergolic meaning they burn on contact with each other thus eliminating the need for an ignition system)
THRUST: Stage I	430,000 pounds at lift off
Stage II	100,000 pounds at altitude
Development team	U.S.A.F. Systems Command's Space System Div.
Systems & Technical Dir.	Aerospace Corp.
Airframe & Systems	The Martin Company
Propulsion systems	Aerojet-General Corp.
Radio-inertial guidance	General Electric Company



## SPACE TRACKING

The ground services required by spacecraft depend on the spacecraft's mission. Missions fall into four general categories: The Sounding Rocket, or up-down flights from 35 to 1,300 miles; The Earth Satellite, orbiting from 100 to 1,000 miles from Earth; Deep Space Probes, to the Moon and beyond; and Manned Space Flight, such as Mercury, Gemini, and Apollo.

NASA has set-up three basic networks for these missions: The Manned Space Flight Network, The Deep Space Network, and STADAN (Satellite Tracking and Data Acquisition Network) which includes 12 stations optical tracking and 16 electronic stations.

This writer will list all of these stations as noted in NASA Bulletin EP-28 Tracking, showing their general use and location. And will list the Manned Space Flight Network as used for the Gemini Program. It has been reported that all the networks have contributed to the Manned Space Programs. Mission Control Center is denoted by (MCC) and important Control Centers as (CC).

## DEEP SPACE NETWORK

The Deep Space Network supports lunar and planetary missions. 85-foot diameter parabolic antennas are used to receive data and to direct space vehicles. The stations are located 120 degree intervals of longitude apart. When this network was set-up, there was only three stations, work load showed that more was needed, so there are now 6 in the network. The network is operated by the Jet Propulsion Laboratory of the California Institute of Technology commonly known as JPL.

JPL, Pasadena, California (MCC)	Goldstone, California (two stations)
Woomera, Australia	Krugersdorp, (near Johannesburg), S. Africa
Canberra, Australia	Madrid, Spain

## STADAN SAO / OPTICAL TRACKING NETWORK

The Smithsonian Astrophysical Observatory's Optical Tracking Network operated under a grant from NASA consists of 12 tracking cameras named after two scientists Baker-Nunn who designed them. They have photographed the 6-inch Vanguard sphere at 3,500 miles and OGO at 23,000 miles.

Maui, Hawaii	Organ Pass, New Mexico	Aeroquipa, Peru
Curacao, West Indies	Villa Delores, Argentina	Tokyo, Japan
San Fernando, Spain	Olifantsfontein, S. Africa	Jupiter, Florida
Naini Tal, India	Woomera, Australia	Shiraz, Iran

## STADAN MINITRACK NETWORK

Minitrack (Minimum Weight Tracking) characterized by an antenna of steel rails lying parallel to the ground. This technique is known as the interferometer principle which can be likened to someone passing through a photo-electric eye which opens a door when the beam of light is broken. The Mission Control Center and 16 stations are:

Blossom, Maryland	Goddard Space Flight Center, Greenbelt, Maryland (MCC)	Fort Meyers, Florida
Santiago, Chile	University of Alaska, Anchorage	Canberra, Australia
Quito, Ecuador	Johannesburg, South Africa	Gilmore Creek, Alaska
Lima, Peru	Goldstone Lake, California	Woomera, Australia
Winkfield, England	Rosman, North Carolina	St. Johns, Newfoundland
	East Grand Forks, Minnesota	
	Tananarive, Malagasy Republic	

STADAN  
DISH NETWORK

Another STADAN network is the dish antenna which is a sensitive receiver and powerful transmitter. Unlike Minitrack which lies in a permanent position, the dish antenna can sweep the sky. The dish stations are:

Rosman, North Carolina (MCC)  
Johannesburg, South Africa

Canberra, Australia  
Fairbanks, Alaska

Quito, Ecuador  
Santiago, Chile

MANNED SPACE FLIGHT NETWORK

Project Gemini astronauts were served by tracking and support ships according to the needs of the mission. In addition to these stations are communication stations in the U.S.A. and foreign countries. Mission Control Center was located at the Manned Spacecraft Center at Houston, Texas with assistance from Goddard Space Flight Center at Greenbelt, Maryland. One might also say that Wallops Island be mentioned for training. The sites and site equipment for Gemini were as follows:

STATION	RADAR		PCM TELEMETRY	COMMAND		REMOTE SITE DATA PROCESSOR
	C	S		DCS UNIT	RF XMTR	
Atlantic Missile Range						
1. Mila	*					
2. Patrick AFB	*					
3. Cape Kennedy	*	*	*	*	*	3
4. Grand-Bahama	*	*	*		*	1
5. Eleuthra						
6. Valkaria						
7. Antigua	*		*		*	1
8. Ascension	*		*			
9. Grand Turk	*	*	*		*	1
Bermuda	*	*	*		*	1
Canary Island	*	*	*	*	*	1
Kano, Nigeria			*			
Pretoria, S. Africa	*		*			
Tananarive, Malagasy						
Carnarvon, Australia	*	*	*	*	*	1
Canton Island			*			
Kauai, Hawaii	*	*	*	*	*	1
Pt. Arguello, Cal.	*	*				
Guaymas, Mexico		*	*			
White Sands, N.M.	*					
Corpus Christi, Tex.		*	*		*	1
Elgin AFB, Fla.	*					
Ships						
Rose Knot			*	*	*	1
Coastal Sentry			*	*	*	1
Range Tracker	*		*			



UNITED STATES SPACE FLIGHT LOG  
MERCURY - GEMINI

MISSION	PILOTS	DATE(S)	ELAPSED TIME	TOTAL MANNED HOURS IN SPACE
Mercury-Redstone 3	Shepard	05-05-61	00:15:22	00:15:22
Mercury-Redstone 4	Grissom	07-21-61	00:15:37	00:30:59
Mercury-Atlas 6	Glenn	02-20-62	04:55:23	05:26:22
Mercury-Atlas 7	Carpenter	05-24-62	04:56:05	10:22:27
Mercury-Atlas 8	Schirra	10-03-62	09:13:11	19:35:38
Mercury-Atlas 9	Cooper	05-15-16-63	34:19:49	53:55:27
Gemini-Titan 3	Grissom-Young	03-23-65	04:53:00	63:41:27*
Gemini-Titan 4	McDivitt-White	06-03-07-65	97:56:11	259:33:49*
Gemini-Titan 5	Cooper-Conrad	08-21-29-65	190:55:14	641:24:17*
Gemini-Titan 6A	Schirra-Stafford	12-15-16-65	25:51:24	693:07:05*
Gemini-Titan 7	Borman-Lovell	12-04-18-65	330:35:31	1354:18:07*
Gemini-Titan-Agena 8	Armstrong-Scott	03-16-66	10:41:26	1375:40:59*
Gemini-Titan-Agena 9A	Stafford-Cernan	06-03-06-66	72:21:00	1520:22:59*
Gemini-Titan-Agena 10	Young-Collins	07-18-21-66	70:46:39	1661:56:17*
Gemini-Titan-Agena 11	Conrad-Gordon	09-12-15-66	71:17:08	1804:30:33*
Gemini-Titan-Agena 12	Lovell-Aldrin	11-11-15-66	94:34:31	1993:39:35*

\* Total manned hours in space is arrived at by doubling each Gemini elapsed time.  
Each Gemini flight carried two men.

U.S.S.R. SPACE FLIGHT LOG

Vostok I	Maj. Yuri Gagarin	04-12-61	01:48:*	01:48:*
Vostok II	Maj. Gherman Titov	08-06-07-61	25:18:*	27:06:*
Vostok III	Maj. Andrian Nikolayev	08-11-15-62	94:35:**	122:41:**
Vostok IV	Lt. Col. Pavel Popovich	08-12-15-62	70:57:*	193:38:*
Vostok V	Lt. Col. Valery Bykovsky	06-14-19-63	119:06:*	312:44:*
Vostok VI	Lt. Valentina Tereshkova	06-16-19-63	70:50:*	383:34:*
Voskhod I	Col. Vladimir Konarov Boris Yegorov Konstantin Feoktistov	10-12-13-64	24:17:*	456:25:***
Voskhod II	Col. Pavel Belyayev Lt. Col. Alexei Leonov	03-18-19-65	26:02:*	508:29:***
Soyuz I	Col. Vladimir Konarov #	04-23-24-67	26:45:*	535:14:*

\* Total manned hours in space is approximate as seconds are not listed by the U.S.S.R.

\*\* Vostok III elapsed time listed as 35 minutes in several publications and 22 and 27 in several others.  
This writer gives the additional minutes as it also checks with the Associated Press recorded time.

\*\*\* Total elapsed time for multiple manned flights is arrived at by the number of pilots.

# Konarov was killed upon crash landing of Soyuz I.

All manned Russian space flights were made from Tyuratam Missile Base, Baikonur, U.S.S.R. Each flight terminated over land.

NAVAL RECOVERY  
DISTANCES AND TIMES

MISSION	RECOVERY DATE	SPLASHDOWN DISTANCES - NM		RECOVERY TIMES - HRS:MIN	
		FROM AIMPOINT	FROM PRS	ASTRONAUTS	SPACECRAFT
GT-1	Not scheduled for recovery				
GT-2	01-19-65	14	25	----	1:30
GT-3	03-23-65	64	60	1:12	2:47
GT-4	06-07-65	47	48	:57	2:16
GT-5	08-29-65	97	91	1:31	3:55
GT-6A	12-16-65	7	11	1:04	1:04
GT-7	12-18-65	6.6	12	:32	1:04
GTA-8	03-16-66	1.4	167*	3:06	3:15
GTA-9A	06-06-66	.37	2.5	:53	:53
GTA-10	07-21-66	2.5	7	:27	:52
GTA-11	09-15-66	2.5	2.6	:24	1:00
GTA-12	11-15-66	2.7	4	:29	1:07

\* Secondary Recovery Area in Pacific

NASA  
MISSION DATA

MISSION	IGNITION	LIFTOFF	BOOSTER CUTOFF	SUSTAINER CUTOFF	RETROFIRE	MPH	PERIGEE	APOGEE
						INSERTION VELOCITY	STATUTE MILES	STATUTE MILES
GT-1		11:01:69	11:04:43	11:07:48		17,578	100	205
GT-2		09:03:59	09:06:31	09:09:35		16,708.9	Suborbital	
GT-3	09:23:57	09:24:00	09:26:32	09:29:34	13:57:00	16,600	100.05	139.15
GT-4	10:15:57	10:16:00	10:18:35	10:21:36	23:56:00	17,549	103	180
GT-5	08:59:57	09:00:00	09:02:34	09:05:33	07:27:38	17,595	100.6	217.4
GT-6A	08:37:23	08:37:26	08:40:03	08:43:05	09:53:21	17,542	100	161
GT-7	14:30:00	14:30:03	14:32:39	14:35:40	08:28:56	17,588	100	204
Agena-8	10:00:00	10:00:03	10:02:14	10:04:42		17,294.9	184.3	185.7
GTA-8	11:40:59	11:41:02	11:43:36	11:46:39	21:46:00	17,547	100	185
ATDA-9	09:59:58	10:00:02	10:02:00	10:05:49		17,294	184	190
GTA-9A	08:39:30	08:39:33	08:42:05	08:45:13	08:26:17	17,529	99	166
Agena-10	15:39:43	15:39:46	15:41:56	15:44:25		17,294	183	188
GTA-10	17:20:23	17:20:26	17:22:59	17:26:07	15:31:00	17,531	100	168
Agena-11	08:04:58	08:05:01	08:07:14	08:09:40		17,294	178	187
GTA-11	09:42:23	09:42:26	09:44:59	09:48:06	08:24:02	17,526	100	174
Agena-12	14:07:55	14:07:58	14:10:09	14:14:49		17,403	182	193
GTA-12	15:46:30	15:46:33	15:49:08	15:52:17	13:46:34	17,536	100	173.6

All times listed are Eastern Standard. See individual missions for dates of ignition and retrofire.



### PHILATELIC DISCREPANCIES


NAME OF SHIP	FLIGHT	DISCREPANCY	PARTICIPATION	COMMENTS
CHARLES R. WARE DD 862	GT-2	Commemorative	Did not take part in GT-2	WARE on tentative list. (Atlantic)
TURNER DDR 834	GT-3	Commemorative	Did not take part in GT-3	(Atlantic)
BORIE DD 704	GT-6	Commemorative	Not on final list before flight scrub	Official Record shows BORIE not assigned. GT-6 scrubbed. (Atlantic)
R. E. KRAUS DD 849	GT-6	Commemorative	Not active	KRAUS assigned import standby ship. (Atlantic)

### INFORMATION DISCREPANCIES


There were several misspellings of ship names on the Official Records as I had found in the records of Project Mercury, but no serious misplacing of ships in the wrong ocean. Therefore, these small discrepancies are not listed as these can occur in transcribing. I did find some data errors concerning latitude and longitude between the Naval and NASA records; and apogee and perigee mileage differences also. I resolved this by taking Naval records for recovery position and NASA records for spacecraft data. I feel that each should be experts in their field.

The only surprise that was found in the Naval Records was on GTA-12. The records show that LLOYD THOMAS DD 764 was duly assigned to the recovery force (Atlantic). For those of you who follow this author's flight information after each flight will remember I wrote to the P.A.O. on the THOMAS concerning the ship's participation. Lt. j. g. J.W. BERRY answered, ".....the WASP and other ships constituted Task Group 140.3 while the LLOYD THOMAS, assigned solely as plane guard for the WASP, did not in fact constitute a part of Task Force 140. We belonged only to the WASP, and did not possess any recovery gear of our own....." However, as the Official Record now points out the LLOYD THOMAS was indeed part of GTA-12 recovery force, although not in the sense of recovery, but in fact of assignment.

FLIGHT NO. 1



UNMANNED TRIP  
INTO ORBIT  
FROM  
CAPE  
KENNEDY



Inaugurates  
America's second  
Astronaut program  
**PROJECT GEMINI**


LAUNCHED BY  
TITAN-2 BOOSTER  
11:00 A.M. EST

CAPE CANAVERAL  
APR  
8  
A.M.  
1964  
FLA.




BOX 2206, HUNTINGTON, W. Va.

GT-1 (Unmanned)  
(Not Scheduled for Recovery)



PROJECT GEMINI  
U.S. NAVY RECOVERY FORCE

U.S.S.  
LAKE  
CHAMPLAIN (CVS-34)  
JAN  
19  
P.M.  
1965



DONALD O. SCHULTZ  
1225 E. Marquette St.  
Appleton, Wis. 54914, USA

GT-2 (Unmanned)  
Prime Recovery Ship



FIRST MANNED FLIGHT  
GEMINI  
U.S. NAVY RECOVERY FORCE  
GT-3

U.S.S. INTREPID  
AM  
MAR 25  
1965  
CVS-11




DONALD O. SCHULTZ  
1225 E. Marquette Street  
Appleton, Wisconsin

GT-3 Grissom-Young  
Prime Recovery Ship

**GEMINI  
MANNED  
FLIGHT**


GT-4  
*To Don*

ATLANTIC  
U.S. NAVY  
RECOVERY  
FORCE



*Best Wishes,  
Edward H. White  
USAF*

U.S.S. WABE  
JUN 7  
PM  
1965  
CVS-18



DONALD O. SCHULTZ  
1225 E. Marquette Street  
Appleton, Wisconsin 54914

GT-4 White-McDivitt  
Prime Recovery Ship



**GEMINI  
GT-4**



**USS WASP, RECOVERY SHIP**

Latitude 27-48.3 N Longitude 74-23.2 W

1515 Q  
7 JUNE 1965

*John Longen*  
COMMANDING OFFICER

DONALD O. SCHULTZ  
1225 E. Marquette St.  
Appleton, Wis. 54914, USA

GT-4 White-McDivitt  
Prime Recovery Ship

*Borden Cooper*



DONALD O. SCHULTZ  
1225 E. Marquette Street  
Appleton, Wisconsin

GT-5 Cooper-Conrad  
Prime Recovery Ship

*Carl Schirra*



DONALD O. SCHULTZ  
2521 N. Kirkland Ct.  
Appleton, Wisconsin 54914  
U. S. A.

GT-6A Schirra-Stafford  
Prime Recovery Ship



DONALD O. SCHULTZ  
2521 N. Kirkland Ct.  
Appleton, Wisconsin 54914

GT-6A Schirra-Stafford  
Prime Recovery Ship



*Frank Borman*



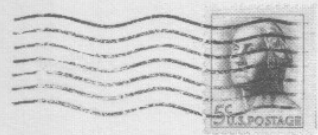
DONALD O. SCHULTZ  
2521 N. Kirkland Ct.  
Appleton, Wisconsin 54911  
U. S. A.

GT-7 Borman-Lovell  
Prime Recovery Ship



DONALD O. SCHULTZ  
2521 N. Kirkland Ct.  
Appleton, Wisconsin 54914

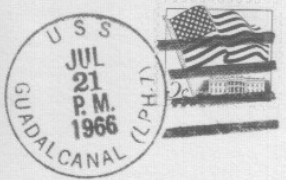
GTA-8 Armstrong-Scott  
Recovery Ship  
(see GTA-8, page 13)



DONALD O. SCHULTZ  
2521 N. Kirkland Ct.  
Appleton, Wisconsin 54914  
U. S. A.

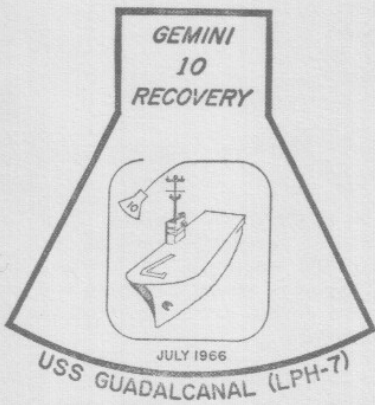
GTA-9A Stafford-Cernan  
Prime Recovery Ship

*Michael Collins*



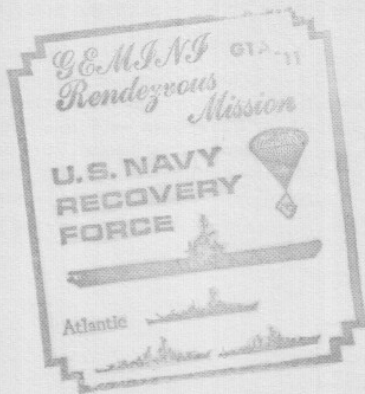
DONALD O. SCHULTZ  
2521 N. Kirkland Ct.  
Appleton, Wisconsin 54914  
U. S. A.

GTA-10 Young-Collins  
Prime Recovery Ship



DONALD O. SCHULTZ  
2521 N. Kirkland Ct.  
Appleton, Wisconsin 54914  
U. S. A.

GTA-10 Young-Collins  
Prime Recovery Ship



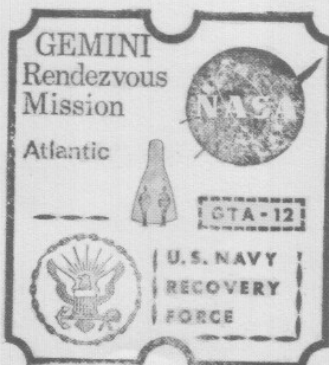
DONALD O. SCHULTZ  
2521 N. Kirkland Ct.  
Appleton, Wisconsin 54911  
U. S. A.

GTA-11 Conrad-Gordon  
Prime Recovery Ship



GTA-11 Conrad-Gordon  
Back of Prime Recovery  
Ship Cover Showing Cachet

*Edwin E. Aldrin Jr*



DONALD O. SCHULTZ  
2521 N. Kirkland Ct.  
Appleton, Wisconsin 54911  
U. S. A.

GTA-12 Lovell-Aldrin  
Prime Recovery Ship

KENNEDY SPACE CENTER, FLORIDA 32815

Kennedy Space Center Contract Post Office, Florida 32815 is a branch of Orlando, Florida, Post Office. The branch is run by JAMES E. MOOREHEAD for the sum of \$1.00 per year. Since KSC is a contract branch post office, Mr. Moorehead is a civilian rather than a postal employee. He draws his salary from Trans World Airlines. The branch post office handles all types of postal services and supplies which is expected from any postal facility. The physical facility is located on the ground floor of the Kennedy Space Center Headquarters Building which is provided by NASA.

Space collectors have and most likely will continue to dispute what postmark is the most desirable for philatelic covers of a missile launch. Among those mentioned are: Patrick Air Force Base and Cape Canaveral, Florida (which was not renamed along with the Missile Facilities). Now with the new KSC contract Post Office in operation, perhaps this dispute will be settled.

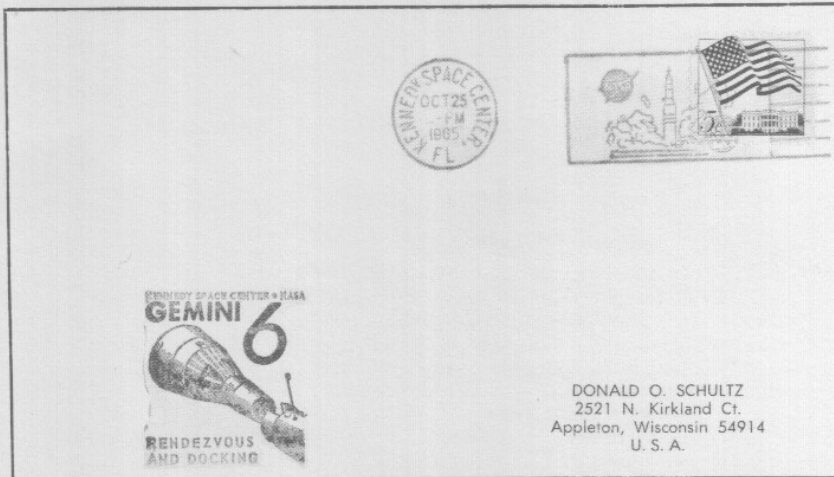
KSC Contract Post Office was opened on 1 July 1965. Mr. Moorehead furnished a cachet to denote the First Day of Postal Service. The station had its own post office cancellation with a wavy line flag die. On 30 July 1965, the Post Office received a new die with a missile launch in its slogan and this was used for the launching of the Saturn SA-10 on that day. Mr. Moorehead began to supply a cachet for certain space flights starting with the GT-5 launch on 21 August 1965 and this was continued through the remaining Gemini program and others since. The following photos show the complete KSC collection of Gemini cachets including Gemini 6 which was scrubbed on 25 October 1965.



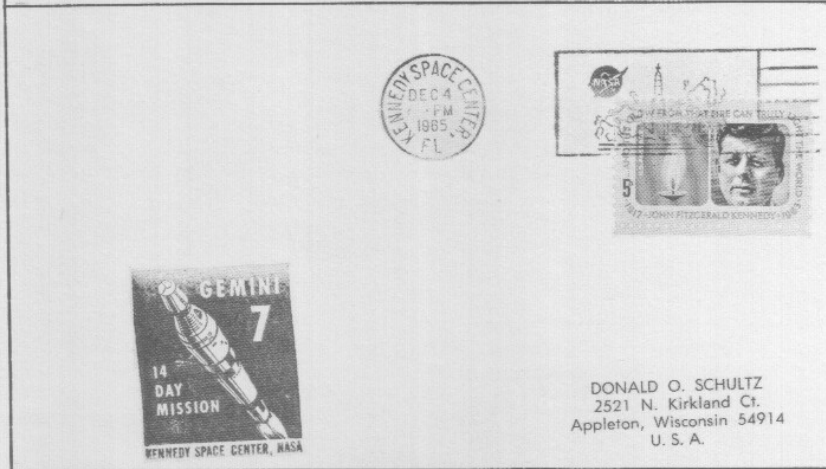
First Day  
Postal Service

GT-5





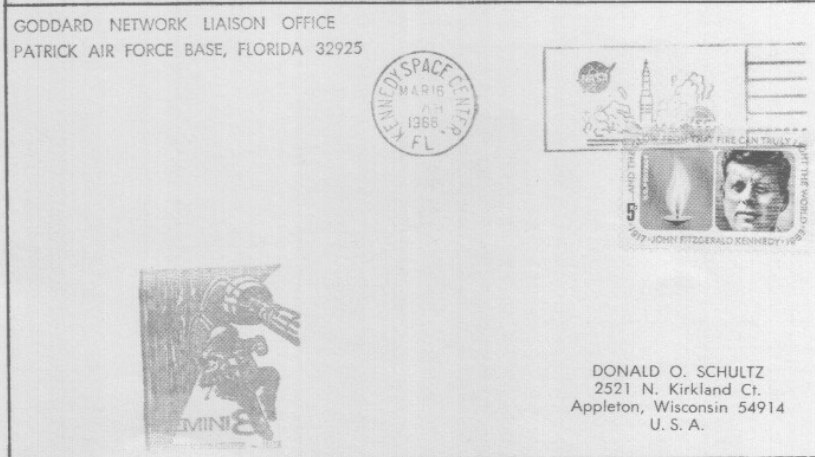
GT-6 (Scrubbed)



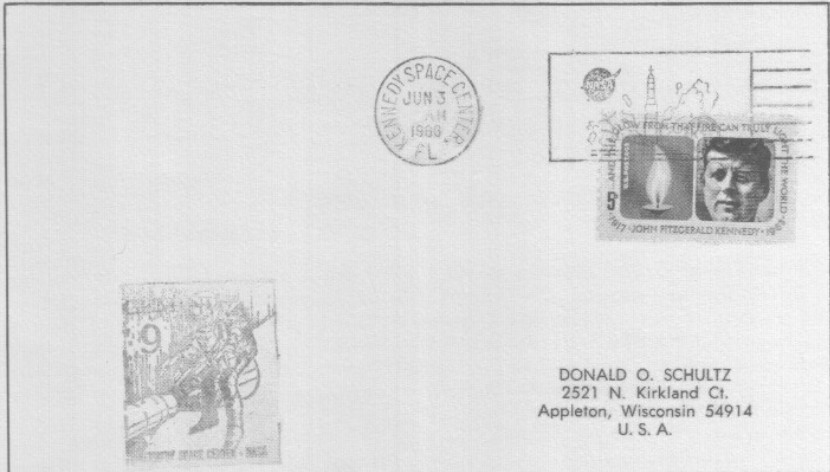
GT-7



GT-6A (GT-7/6)

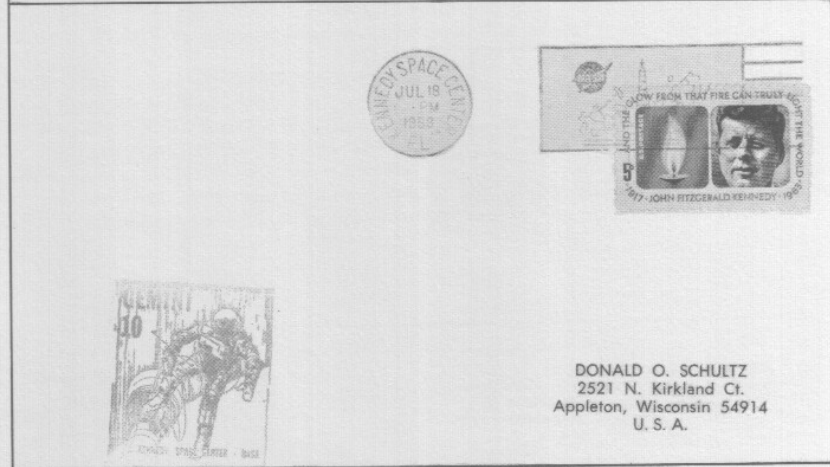


GTA-8



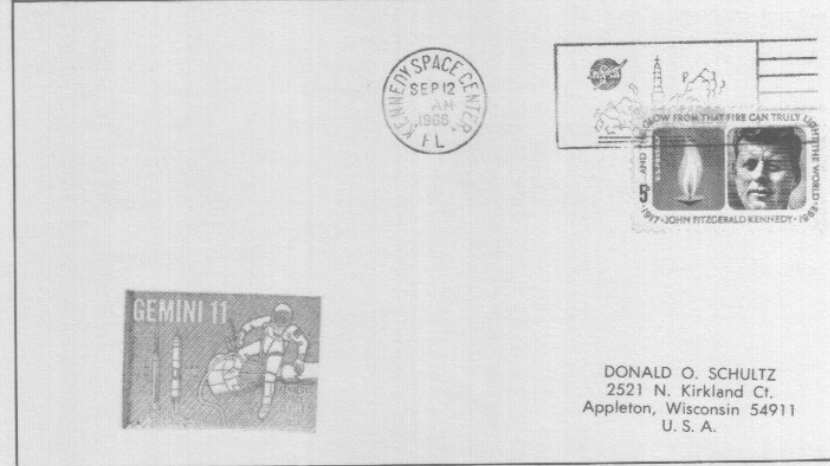
DONALD O. SCHULTZ  
 2521 N. Kirkland Ct.  
 Appleton, Wisconsin 54914  
 U. S. A.

GTA-9A



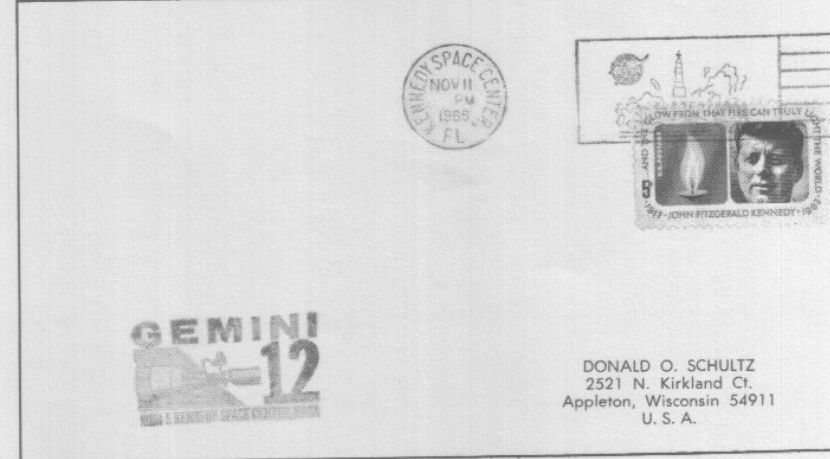
DONALD O. SCHULTZ  
 2521 N. Kirkland Ct.  
 Appleton, Wisconsin 54914  
 U. S. A.

GTA-10



DONALD O. SCHULTZ  
 2521 N. Kirkland Ct.  
 Appleton, Wisconsin 54911  
 U. S. A.

GTA-11



DONALD O. SCHULTZ  
 2521 N. Kirkland Ct.  
 Appleton, Wisconsin 54911  
 U. S. A.

GTA-12

## MANNED ORBITING LABORATORY (MOL)

On 3 November 1966, the first successful launching of the Manned Orbiting Laboratory (MOL) heat shield test was made from Cape Kennedy, Florida facilities. The test used a Titan III C booster and an uprated Gemini capsule. This launching was the first of many MOL flights that will evidently place astronauts in space for support of many military programs of 30 days or more.

Construction has started on the West Coast Manned Launch Facility at Vandenberg Air Force base which will allow for future growth of MOL and its uprated Titan III M launch vehicle. The basic Complex 6 is expected to be completed about 15 July 1968 on the Vandenberg Ranch property consisting of a 32 story mobile service tower, an umbilical tower, a concrete launch deck and flame bucket, a launch control center and support facilities necessary for the complex. Mission Control for MOL flights will be located at the Air Force Satellite Test Center, Sunnyvale, California.

The first flights are expected to take place late in 1969 or early 1970. Already in mid-1967, there are 16 candidates selected for what is termed, "Aerospace Research Pilots," for the MOL program. In the first selection, 12 men were selected and the second, 4 were made including the first Negro to be made an astronaut.

Thus MOL will open up the military application of space adventure.



MISSION: TITAN III-C/HST (HEAT SHIELD TEST) (MANNED ORBITING LABORATORY-MOL)

SCHEDULED DATE OF LAUNCH: 3 November 1966  
ACTUAL DATE OF LAUNCH: 3 November 1966  
DATE OF LANDING: 3 November 1966  
LENGTH OF FLIGHT: 32 min.  
NO. OF REVS: Suborbital  
POSIT. OF LANDING: 09-06S, 14-15W  
DIST. FROM PRS: 40 nautical miles  
TIME TO RECOVER ASTROS: Unmanned  
TIME TO RECOVER S/C: 2 hr., 57 min.  
LAUNCHED FROM: Cape Kennedy, Fla.  
RECOVERED BY: LA SALLE LPD 3  
ASTRONAUTS: Unmanned

UNITS ATLANTIC:

LA SALLE LPD 3 (PRS)  
FT. SNELLING LSD 30  
AUCILLA AO 56  
VP 49  
HS 9

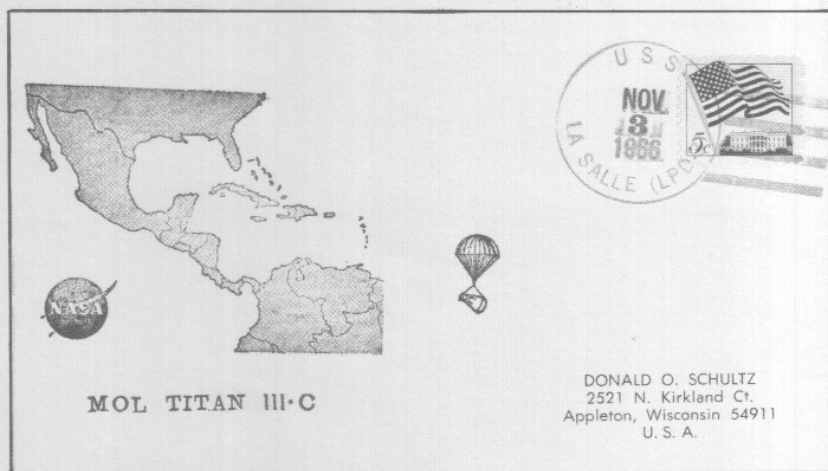
UNITS PACIFIC:

NONE

SIGNIFICANT MISSION CHANGES AFFECTING LAUNCH/LANDING: Slight delay to await more favorable upper winds at launch site. Due to steam casualty of AUCILLA, ships were in process of repositioning within the planned landing area. LA SALLE was opening the aimpoint during splashdown. Spacecraft landed two nautical miles from aimpoint.

MISSION DESCRIPTION: An unmanned suborbital flight of 32 minutes duration designed to test the performance of the heat shield during re-entry.

NOTES: Lift-off came at 8:50 A.M., EST.



Cachet applied by author as ship had none

## CONCLUSION

The preceding pages of cover photos are only of the Prime Manned Gemini Recovery Ships and pertinent related events. Although the covers are important to show the Gemini story, they are only a small part of what is available. And, this is not mentioning the fine tie-in material and memorabilia. The covers shown are those in my collection which have the clearest postmarks and cachets even though I do have astronaut signatures on others not as clear.

Again as what was asked of Project Mercury, does anyone have all the Project Gemini Naval Recovery covers? The answer is again, NO. The reason is the same. Last minute replacement ships were at sea and covers could not be transferred to them in time. Again, as in the Mercury program, some recovery ships did not transfer covers to others when their ship was dropped from the force. These ships postmarked and cacheted covers in spite of not participating in the recovery. I have listed those discrepancies for reference as commemorative.

During the duration of Project Gemini, America took a giant step forward in space exploration with space walks, rendezvous and docking, space "guns" and tools, and showed man could adapt to space. We also had tragedy with the death of President JOHN F. KENNEDY who had set our Moon goal by 1970. President Kennedy was killed shortly before the first Gemini flight was launched. It seemed very fitting that the Eastern Missile Range should be named in his memory. All Gemini flights were launched from the renamed facility.

During the Gemini program, further military application of space was made. Command Pilot Borman and Pilot Lovell on GT-7 saw a 31-foot Polaris missile fired near Cape Kennedy streaking over some two thousand miles. The Polaris was launched by the nuclear submarine, U.S.S. BENJAMIN FRANKLIN SSBN 640, on 6 December 1965. It is said that with clear vision, one could see a ship's wake from a spacecraft. No doubt a few military experiments were made to lay a foundation for military protection of our country from outer space.

Thus, Project Gemini concluded, is one more step in man's quest to master space. We no longer must wait years for history to be made. Each and every day is a new chapter of important events. There will be errors. There will be set-backs. But man will persevere, for it is written that anything a man can dream of, is possible.

REFERENCES:	NASA, Gemini Program Summary	(space data)
	T.F. 140, Recovery Mission Chronology	(confirmation)
	Manned Space Flight Center, Houston, Texas	(space data)
	Howard Benedict, Associated Press	(space data)
	Joseph Fitzpatrick	(JFK data)
	Lester Winick	(astronaut data)
	Division of Naval History, Washington, D.C.	(naval data)
	James E. Moorehead	(KSC Post Office data)

All data and information set forth was gathered from above references and full credit is given. The author claims only bringing all sources together with comments and story added.

Project Apollo, Three Steps & The Moon, is to be written upon completion of Project Apollo during the 1970's.

## UNITED STATES ASTRONAUTS

### IN MEMORIAM

Captain Theodore C. Freeman	02-18-30 - 10-31-64
Captain Charles A. Bassett, II	12-30-31 - 02-28-66
Mr. Elliot M. See, Jr.	07-23-27 - 02-28-66
Lt. Col. Virgil I. Grissom	04-03-26 - 01-27-67
Lt. Col. Edward H. White, II	11-14-30 - 01-27-67
Lt. Cmdr. Roger B. Chaffee	02-15-35 - 01-27-67
Major Edward G. Givens, Jr.	01-05-30 - 06-06-67
Major Clifton C. Williams, Jr.	09-26-32 - 10-05-67

Air Force Captain Freeman was a member of the third group of astronauts selected for the Space Program. He was killed at 10:50 A.M., Saturday, October 31, 1964 when he ejected from his T-38 supersonic jet training plane near Houston, Texas. The aircraft was 300-500 feet above the ground when he ejected and his parachute did not have time to completely open. Captain Freeman was buried with full military honors at Arlington National Cemetery.

Captain Bassett was one of the 14 astronauts along with Captain Freeman selected in the third group. He was scheduled to take a 90 minute walk in space for Gemini 9. Mr. See was one of nine men selected in the second group to become astronauts. He was chosen to be the Command Pilot for Gemini 9. Bassett and See were enroute from Houston, Texas to the McDonnell Aircraft Corp. at St. Louis, Missouri. Their twin jet T-38 plane was attempting an instrument landing since the ceiling was only 800 feet at St. Louis. The plane missed the approach, turned, circled the field and crashed on the second landing attempt. Both astronauts were buried at Arlington National Cemetery.

Col. Grissom was one of the original Mercury astronauts and was selected as the Command Pilot for the first manned Gemini flight as well as the Command Pilot for the first manned Apollo flight. Col. White was the first American to "walk" in space. This was to be the first flight for Cmdr. Chaffee. The three astronauts died in their Apollo spacecraft while rehearsing for the first manned Apollo flight. The flash fire was touched off by a spark which ignited oxygen in the spacecraft. The fire broke out at 6:31 P.M. on 27 January 1967. Col. Grissom and Cmdr. Chaffee were buried in Arlington National Cemetery. Col. White was buried at West Point in the U.S. Military Academy Cemetery.

Major Givens, one of the newest astronauts, was killed when he missed a sharp left turn on a road near Pearland, Texas. He had just left a meeting of the Quiet Bird, an aviation society. Major Givens joined the astronaut team in May 1966. Prior to that, he was a Project Officer for Astronaut Maneuvering Units at Houston. He was the first Astronaut to die while off duty. Major Givens was buried on June 9th at Quanah, Texas with full military rites.

Marine Corps Major Williams, a third generation astronaut was flying alone from Cape Kennedy to Houston MSC by way of Mobile, Alabama to visit a sick father. Major Williams radioed a distress signal from his T-38 jet about 2:00 P.M. and 14 minutes later a helo arrived at the scene on a plantation near Miccosukee, Fla. to find the plane and pilot had disintegrated.