



NATIONAL AERONAUTICS AND SPACE ADMINISTRATION

NASA PROGRAM GEMINI WORKING PAPER NO. 5053

GEMINI PROGRAM CORRECTIVE ACTION LISTING

GEMINI I THROUGH XII

(NASA-TM-X-66796) GEMINI PROGRAM CORRECTIVE
ACTION LISTING GEMINI 1 THROUGH 12 (NASA)
150 p

N79-76517

Unclass

00/18 11689

GROUP 4
Downgraded at 3-year
intervals; declassified
after 12 years

CLASSIFIED DOCUMENT - TITLE UNCLASSIFIED

This material contains information affecting the national defense of the United States within the meaning of the espionage laws, Title 18, U.S.C., Secs. 793 and 794, the transmission or revelation of which in any manner to an unauthorized person is prohibited by law.

DISTRIBUTION AND REFERENCING

This paper is not suitable for general distribution or referencing. It may be referenced only in other working correspondence and documents by participating organizations.



MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

January 31, 1967

UNCLASSIFIED

CLASSIFICATION CHANGE

To UNCLASSIFIED

By authority of GDS- Po 4612
Classified by AMH/Hubbard Date 12/31/73
Classified by Robert Foster Conrad Station, NASA
Scientific and Technical Information Facility

NASA PROGRAM GEMINI WORKING PAPER NO. 5053

GEMINI PROGRAM CORRECTIVE ACTION LISTING

GEMINI I THROUGH XII

Gemini Test Evaluation Office

Prepared by:

Submitted by:

Approved by:

Authorized by:

Scott H. Simpson
Scott H. Simpson
Gemini Test Operations

Charles W. Mathews
Charles W. Mathews
Manager, Gemini Program Office

George M. Low
George M. Low
Deputy Director

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION

MANNED SPACECRAFT CENTER

HOUSTON, TEXAS

Prepared: January 1967

Distributed: June 1967

UNCLASSIFIED

CONTENTS

Section	Page
Gemini I	1
Gemini II	8
Gemini III	15
Gemini IV	24
Gemini V	39
Gemini VI	50
Gemini VI-A	53
Gemini VII	61
Gemini VIII	71
Gemini IX	80
Gemini IX-A	82
Gemini X	94
Gemini XI	101
Gemini XII	112
References	120

ABBREVIATIONS

A	Aerospace Report* (when used in reference column)
ATM	auxiliary tape memory
AG	Aerojet-General Corporation
A/G	air-to-ground
ACME	attitude control and maneuvering electronics
AFB	Air Force Base
AGAVE	automatic gimbaled-antenna vectoring
AGE	aerospace ground equipment
ANT	Antigua tracking station
APS	auxiliary power system
BDA	Bermuda tracking station
BECO	booster engine cutoff (TLV) first stage engine cutoff (GLV)
CADFISS	computer and data flow integrating subsystem
CAL	California tracking station
CNV	Cape Kennedy tracking station

*The specific report for each mission is called out in the reference list.

UNCLASSIFIED

cps	cycles per second
CRO	Carnarvon tracking station
CSD	Crew System Division (when used in reference column, a change document for Crew System Division furnished equipment)
CSQ	Coastal Sentry Quebec tracking ship
CYI	Canary Island tracking station
dc	direct current
DCS	digital command system
DF	direction finding
DRED	data routing and error detection
ECS	environmental control system
ECP	engineering change proposal
ETR (AFETR)	Air Force Eastern Test Range
EVA	extravehicular activity
FDI	flight director indicator
fps	feet per second
g	an acceleration equal to that caused by the force of gravity (32.2 ft/sec^2)
GAATV	Gemini Atlas-Agena Target Vehicle

UNCLASSIFIED

UNCLASSIFIED

GATV	Gemini Agena Target Vehicle
GBI	Grand Bahama Island tracking station
G.E.	General Electric Company
g.e.t.	ground elapsed time (from lift-off of GLV/spacecraft)
GLV	Gemini Launch Vehicle
GMCF	guided missile computer facility
G.m.t.	Greenwich mean time
GSFC	Goddard Space Flight Center Report*
GTK	Grand Turk Island tracking station
GYM	Guaymas tracking station
H ₂	hydrogen
HAW	Hawaii tracking station
He	helium
HF	high frequency
H ₂ O	water
IGS	inertial guidance system
IP	impact predictor

*The specific report for each mission is called out in the reference list.

UNCLASSIFIED

UNCLASSIFIED

IPS	instrumentation power system
kc	kilocycles
LO	lift-off
MAC	McDonnell Aircraft Corporation
MAX	maximum
MC	Martin Company Report*
MCC-C	Mission Control Center - Cape Kennedy
MCC-H	Mission Control Center - Houston
MDCS	master digital command system
MDF	mild detonating fuse
MDIU	manual data insertion unit
MDS	malfunction detection system
MISTRAM	missile trajectory measuring system
mm	millimeter
Mod	modification
MOC	mission operational computer
MR	Gemini Program Mission Report*

*The specific report for each mission is called out in the reference list.

UNCLASSIFIED

UNCLASSIFIED

MSFN	Manned Space Flight Network
O ₂	oxygen
OAME	orbital attitude and maneuvering electronics
OAMS	orbital attitude and maneuvering system
PCM	pulse code modulation (telemetry system)
POGO	longitudinal oscillations
psi	pounds per square inch
psia	pounds per square inch absolute
RCA	Radio Corporation of America
RCS	reentry control system
RF	radio frequency
RFI	radio frequency interference
RGS	radio guidance system
RKV	Rose Knot Victor tracking ship
R&R	rendezvous and recovery
RSS	reactant supply system
S/C	spacecraft
SA	subassembly

UNCLASSIFIED

SECO	Atlas sustainer engine or GLV stage II-engine cutoff
SPADATS	North American Air Defense Command Space Acquisition and Detection Tracking System
SSI	San Salvador Island tracking station
STR	spacecraft test request
TAN	Tananarive tracking station
TCA	thrust chamber assembly
TDA	target docking adapter
t.e.t.	target vehicle elapsed time (from lift-off of the GAATV)
TEX	Texas tracking station
TLV	target launch vehicle
TPI	terminal phase initiate
T _r	time to retrofire
TRS	time reference system
T _x	time to equipment reset
VCC	voice control center
VIP	very important person
VHF	very high frequency
WMSL	wet mock simulated launch

~~CONFIDENTIAL~~

Problem	Cause or remarks	Resolution and mission effectivity	Reference document
<u>Launch Complex</u>			
1. Input level of tape recorder 2, located at launch complex 19, decreased at T-200 minutes.	Faulty rectifier tube in the connecting chassis power supply.	Replaced defective tube.	MR 5.2.7.2
2. One channel of a Sanborn recorder at launch complex 19 was unbalanced before countdown.	Recorder was not adjusted.	Channel was adjusted and recalibrated before the countdown began.	MR 5.2.7.2
3. At T-80 minutes the only elevator to the spacecraft level was inoperative.	A gate was jarred open causing safety circuit to close.	Closed elevator door. Elevator operational at T-60 minutes.	MR 6.1.2
4. Late in the count, AGE caused an erroneous readout of GLV roll valve-drive amplifier.	Unknown.	Operation of amplifier was confirmed by telemetry prior to lift-off.	MR 6.1.2
5. The spacecraft reentry-section umbilical cable snagged the coolant umbilical lanyard causing a 2.5-second premature release.	Spacecraft umbilicals were not released at the same time.	On future spacecraft this cannot occur due to a simultaneous release of umbilicals.	MR 5.1.2.4

Gemini I - Launch Complex

~~CONFIDENTIAL~~

~~CONFIDENTIAL~~

Problem	Cause or remarks	Resolution and mission effectivity	Reference document
<u>Gemini Launch Vehicle</u>			
1. Differential temperature problem in the GLV propellant transfer and pressurization system on F-1 day.	Propellant temperature exceeded limits (stage-I 1.5° and stage-II 3.3° higher than acceptable limit).	Plastic film covering provided over tank barrel section until time for erector lowering.	Gemini I MR 5.2.2.4
2. Secondary hydraulic pressure transients during engine ignition (system compatibility firing).	Undesirable overshoot characteristic of stage I hydraulic pump.	Pump has been redesigned per ECP MM-331.	Gemini II MR 5.2.3.2
3. High oxidizer temperature at completion of loading.	Error in determining oxidizer temperature in the ready-storage vessel before loading.	Redundant temperature probes installed in flowmeter lines and probes redesigned in ready-storage vessel per ECP MM-311.	Gemini II A III Table III-1 A IV-K-3-a
4. Calculation of payload capability not exact due to unexpected differential propellant temperatures.	Payload capability is a function of propellant temperatures which were not accurately determined.	Improved temperature instrumentation installed per ECP MM-311.	Gemini II A III Table III-1 A IV-B-1
5. Radar tracking data indicated that the velocity gained between SECO and insertion was 35 ft/sec higher than expected.	Factors contributing to overspeed are as follows: a. Thrust upsurge before SECO. b. Acceleration-dependent radar bias in lateral rate channel. c. 1 σ radar noise. d. Stage II pitch drift 90°/hour. e. Larger than expected ΔV after 91FS2.	GLV guidance equations were biased to compensate for apparent errors.	Gemini II MR 4.1 A IV-F-2-a

~~CONFIDENTIAL~~

~~CONFIDENTIAL~~

Problem	Cause or remarks	Resolution and mission effectivity	Reference document
6. Acceleration data during stage II tail-off indicated a gain in velocity in excess of that predicted.	Same as 5.	Same as 5. Gemini II	MR 4.2 A IV-F-2-a
7. Apogee was 11 miles higher than predicted.	Same as 5.	Same as 5. Gemini II	MR 4.2
8. Performances of GIV flight control and guidance systems indicate misalignment of stage II thrust vector with vehicle center of gravity.	Lateral center of gravity shift due to fuel depletion.	Guidance equations revised to include center of gravity shift. Gemini II	MR 5.0 A IV-F-2-a
9. Transient occurred approximately 11 seconds after stage II engine cutoff.	Characteristic of GIV propulsion system.	Spacecraft OAMS rate control initiation delayed 2 seconds to insure spacecraft will not contact stage II. Gemini II only	MR 5.0 A IV-G-2-c
10. During stage I powered flight, stage II oxidizer suction pressure (parameter 510) gradually rose to the limit of the measurement and remained there until BECO.	Combined effect of vehicle acceleration and ullage pressure on the liquid head.	No resolution deemed necessary as this condition was observed on previous Titan flights. --	MR 5.2.2.3
11. The oxidizer pressurant orifice inlet pressure (parameter 26) showed a rise in pressure at lift-off +141 seconds.	Theorized to be due to an instrumentation malfunction.	No resolution deemed necessary. --	MR 5.2.2.4
12. Level sensors on the stage I fuel tank were erratic in operation.	Sensors indicated covered when they were uncovered.	Shield installed on prism per ECP MM-356. Gemini II only	MR 5.2.2.4
13. Gradual change in pitch, yaw, and roll error signals occurred during stage II flight.	Theorized to be due to a change in center of gravity location associated with depletion of propellants.	Drift compensator added to guidance equations. Gemini II	MR 5.2.3.1 A IV-F-2-d

~~CONFIDENTIAL~~

~~CONFIDENTIAL~~

Problem	Cause or remarks	Resolution and mission effectivity		Reference document
14. Stage I rate gyros were slightly noisier than stage II rate gyros.	Noise is a peculiarity of rate gyro telemetry signals.	Telemetry circuits redesigned.	Gemini II	MR 5.2.3.1
15. Pressure in the secondary hydraulic system was undesirably high 1 second after the start of stage I engine. Hydraulic pressure increased to 4500 psia as compared to the normal pressure of 3000 psia.	Undesirable overshoot characteristic of stage I hydraulic pump.	Pump has been redesigned per ECP MM-331.	Gemini II	MR 5.2.3.2
16. Piston motion indicator for fuel surge chamber became erratic at lift-off.	Wheel slippage on piston shaft.	Transducer redesigned per ECP MM-307.	Gemini II	MR 5.2.7 A III Table III-1
17. Tandem actuator axial vibration measurement lost at lift-off +119 seconds.	Unknown.	None required, special instrumentation.	--	MR 5.2.7
18. At SECO +20 seconds the roll was observed to oscillate at about 2 cycles per minute.	Theorized to be due to pressure blow down through roll nozzle.	None required, no adverse effect.	--	MR 6.2.1.2
19. At SECO there was a cross-range velocity of 70 fps to the left.	Yaw velocity error of 70 fps which occurred during last 30 seconds of powered flight.	Drift compensation factor added to guidance equations.	Gemini II	MR 6.2.1.2
20. Thrust chamber pressure overshoot at stage II ignition.	Greater than expected thrust chamber pressure; similar pressure overshoots observed on Titan II flights.	None required, normal.	--	A III Table III-1 A IV-C-3-c
21. Damped pressure oscillations indicated on stage I and stage II engines after initial ignition spikes.	Induced by instrumentation circuitry.	None required, reference measurement.	--	A IV-C-3-b
22. Multiple small objects were detected near the spacecraft on the second revolution.	Parts of GLV sustainer engine were inserted into orbit. These are believed to be portions of the engine ablative skirt.	None required, no adverse effect.	--	MR 4.3

~~CONFIDENTIAL~~

Problem	Cause or remarks	Resolution and mission effectivity	Reference document
<u>Spacecraft</u> 1. Adapter-retrograde-section thermo-couple was inoperative prior to Final Simulated Flight. 2. Vibration pickup mounted in area of ECS pump exceeded full scale indication during maximum dynamic pressure resulting in loss of data.	Unknown. Vibration level exceeded rating of accelerometer. (Vibration level acceptable for spacecraft operation.)	None required, fly as is, other instrumentation sufficed. None required because this particular accelerometer is not used on succeeding Gemini missions.	MR 5.1.2.2 MR 5.1.2.2

~~CONFIDENTIAL~~

Problem	Cause or remarks	Resolution and mission effectivity	Reference document
<u>Flight Control and Network</u>			
1. From T-138 to T-121 minutes manual fuel cutoff and destruct command indications were received at GLV systems engineer's console in MCC-C.	These commands were a part of the command setup checks performed by the Supervisor for Range Operations (SRO).	Contractor and MCC-C personnel were informed of normal range operating procedures.	MR 6.2.1
2. Phase problems associated with the MISTRAM II tracking system on Eleuthera Island were encountered at T-38 minutes.	Poor propagation conditions associated with heavy rainfall in area.	The rain stopped at T-20 minutes and good data were received.	MR 6.2.1
3. BDA had two cases of frequency interference after T-180 seconds.	Kindley AFB tower was transmitting in the same frequency range.	Kindley AFB changed frequency resolving one problem. The other was tolerated, but unresolved.	MR 6.3
4. BDA experienced an unexpected 300 kc RF carrier deviation on the acquisition aid system at launch.	Acquisition of radar track was late but no loss of telemetry data was encountered.	--	MR 6.2.1.2
5. BDA reported interference on 259.7 mc telemetry.	Theorized to be emitting from Texas tower near BDA.	None required, minor effect on mission.	MR 6.3.2.5
6. GBI and SSI radars failed CADFISS slew tests causing necessity for rerun without time allocation in countdown.	CADFISS slew tests were rerun using one communication circuit.	None required, no effect on mission.	MR 6.2.1
7. At T-15 minutes CRO lost communications with worldwide network.	Lightning struck line 65 miles south of station.	Communications were relayed to worldwide network by amateur radio stations in area.	MR 6.2.1
8. In attempting to switch from the impact predictor (IP) source to the GMCF No. 1 source, the computer failed to perform the switch on command.	Time delays in data used at GSFC produced difficulty in computer logic.	Modification of computer logic.	MR 6.3.2.7

~~CONFIDENTIAL~~

~~CONFIDENTIAL~~

Problem	Cause or Remarks	Resolution and mission effectivity	Reference document
9. Insertion conditions provided by GMCF indicated a slightly excessive velocity.	Unknown.	BDA tracking data corrected insertion conditions.	MR 6.3.1.7
10. Cyl voice communications were not operational from 5:00 a.m. e.s.t. to 8:00 a.m. e.s.t. on launch day.	Local commercial carrier equipment problems.	Made contractor aware of necessity to meet requirements.	MR 6.3.2.5
11. California reported low-level frequency interference at 12:10 p.m. e.s.t.	Voice transmission from local Air Defense Command station.	Cleared locally.	MR 6.3.2.5
12. AGAVE acquisition aid was not satisfactory at most worldwide network stations.	Excessive deviation of the signal transmitted from the spacecraft.	None required as only minor difficulty was experienced, no effect on mission.	MR 6.3.2.3

~~CONFIDENTIAL~~

~~CONFIDENTIAL~~

Problem	Cause or remarks	Resolution and mission effectivity	Reference document
<u>Launch Complex</u>			
1. GLV propellant loading delays on first launch attempt.	Incorrect reading on stage II oxidizer flowmeter. Faulty stage II oxidizer pump discharge pressure gage.	Special operation procedures involving calibration and replacement of flowmeter in matched sets. Redesigned flowmeter for Gemini VI-A.	Gemini III Gemini VI-A MR 13.4.1
2. Stage II oxidizer load pump cut off.	Overloading of pump motors.	Controlled flow so that motors would not overload.	Gemini III MR 6.1.2.1
3. Stage I fuel secondary counter did not record properly.	Counter jamming.	Replaced counter.	Gemini III MC XIII.B.2 MR 6.1.2.1
4. Stage I preset counter did not shut off during fueling operations.	Digits on primary counter out of alignment (manual set prior to loading).	Cutoff by other means.	Gemini II MC XIII.B.2 MR 6.1.2.1
5. Incorrect azimuth update sent by RGS during countdown.		Corrected prior to launch.	Gemini II MR 6.1.2.2
6. Mod III-G RGS computer bias in G.m.t. data during countdown.	Synchronizing to G.m.t. prior to switching to "flight ready" mode.	Corrected prior to launch.	Gemini II MR 5.2.5.2
7. MISTRAM unlock during countdown.	Multipath on microwave subsystem.	Not a flight problem.	-- MR 5.2.9.1
8. RSS oxygen 64 percent loaded.	Inoperative blockhouse O ₂ pressure indicator.	Indicator replaced prior to next mission using fuel cells.	Gemini V MR 6.1.1
9. MCC-C power loss at T-164 minutes and at lift-off +306 seconds.	Overloaded circuit breaker on secondary critical bus.	Uninterruptable power service system installed.	Gemini III MR 5.1.3 MR 6.2.2.1 MR 6.2.1.4 MR 6.3 GSFC 3.5
10. Dropouts in GLV oscillograph at Tel II.	Unknown.	None required, no effect on flight.	-- MR 5.2.7.2

~~CONFIDENTIAL~~

~~CONFIDENTIAL~~

Problem	Cause or remarks	Resolution and mission effectivity	Reference document
<u>Gemini Launch Vehicle</u>			
1. Launch vehicle automatic shutdown on first launch attempt.	Hydraulic-tandem-actuator servo-valve failed following high-start transient.	Redesigned servo-valve housing; rechecked actuator system design and incorporated several minor changes.	Gemini II MR 13.2.1
2. Stage I hydraulic pressure decay at engine ignition.	Contamination of pump compensator assumed.	Better inspection of pump compensator prior to assembly. Additional functional test of compensator prior to launch.	Gemini III MR 5.2.4.1 MR 5.2.4.4 MC V.C. A 5 A 6.5.1
3. Vehicle crossed 3σ locus of instantaneous impact points.	Use of September wind profile rather than December.	Use wind profile for proper month.	Gemini III MR 5.2.9.1
4. Fuel tank level-sensor operation erratic.	Filming of sensor prism by auto-geneous gas.	Added shield to sensor prisms.	Gemini III MR 5.2.2.6
5. High first-stage trajectory.	Stage I thrust and specific impulse higher than nominal.	Corrected by Radio Guidance System during stage II flight.	Gemini III A 4.3 A 5 MR 4.1 MR 5.2.5.1
6. Thrust chamber pressure overshoot at stage I and stage II ignition.	Similar pressure overshoots observed on Gemini I and Titan II flights.	None required, normal.	-- MR 5.2.2.3 MR 5.2.2.4 A 5 A 6.2.1
7. RGS guidance initiation delayed.	Apparent delay for radar validity check. Caused by high first-stage trajectory.	None required, normal.	-- MR 6.2.2.1 MC V.1.A.4.a.
8. Stage II MDS oxidizer tank pressure sensor "B" intermittent.	Oil level in sensor not sufficient to cover contact in certain installed positions.	New calibration check. Review filling and installation procedures.	Gemini III MR 5.2.8 MR 5.2.8.2 MC X.D.2
9. Transient occurred approximately 6.6 seconds after stage II engine cutoff.	Characteristic of GLV propulsion system.	None required, normal.	-- MR 5.2.1.5 A 6.2.2

~~CONFIDENTIAL~~

Problem	Cause or remarks	Resolution and mission effectivity		Reference document
10. Large variation in IPS and APS power at spacecraft separation.	Spacecraft pyrocutter shorted signal leads.	Installed current limiting resistors.	Gemini III	MR 5.2.6.3

~~CONFIDENTIAL~~

Problem	Cause or remarks	Resolution and mission effectivity	Reference document
<u>Spacecraft</u>			
1. Difficulty in closing and securing spacecraft left-hand hatch prior to launch.	Inside handle would not stay in neutral position - gears could not be engaged.	Hatch design change and assembly procedure change.	Gemini IV MR 6.1.1.1
2. Shingle burn through.	High local heating due to most windward adapter-interconnect fairing configuration.	Increased shingle thickness. Reduced trim angle of attack.	Gemini III MR 5.1.1.1.1 MR 5.1.2.4
3. Stub antenna damaged (R&R section).	Damaged by pilot parachute bridle at deployment.	Redesign antenna to allow bending without affecting operation.	Gemini III MR 5.1.1.2 MR 12.6(e) MR 12.6.2.3
4. R&R shingle cracked.	Probable cause - recovery handling.	None required, no effect on mission.	-- MR 5.1.1.2
5. Two RCS shingles cracked.	Probable cause - recovery handling.	None required, no effect on mission.	-- MR 5.1.1.2
6. Recovery light failed to deploy.	Door jammed.	Fit check prior to launch.	Gemini III MR 5.1.2.5 MR 6.4.3
7. Gouges on heat shield.	Caused by divers during recovery.	Instruct divers.	Gemini III MR 5.1.1.2
8. Intermittent telemetry from R&R separation to single point release.	Descent antenna not extended until single point release.	None required, normal.	-- MR 6.2.2.2
9. Poor HF transmission postlanding in DF and voice mode.	Salt water immersion of antenna and subsequent leakage.	Redesign seal to preclude water leakage. Redesign seal mechanism.	Gemini III STR 10 ECP 341 MR 5.1.2.3
10. Indication of spacecraft adapter separation not received.	Sensing switch actuation mechanism failed (assumption).	Deleted switch mechanism. Crew observation on manned flight.	Gemini III MR 6.2.2.2 MR 12.6(g) MR 12.6.2.6
11. Three instrumentation parameters not measured (DE05, BD06, QD09).	DE05, QD09 known to be spacecraft wiring problems prior to launch.	None required, no effect on mission.	-- MR 5.1.3 MR 6.2.2.1 STR 25

~~CONFIDENTIAL~~

~~CONFIDENTIAL~~

Problem	Cause or remarks	Resolution and mission effectivity	Reference document
12. ACME 26 Vac indicated 24.5 Vac.	Unknown - no effect on flight.	Not investigated since this was on lower end of specification.	MR 5.1.5.8
13. Inertial Measuring Unit X-accelerometer malfunction.	Accelerometer saturated; erroneous readings at acceleration levels above approximately 5g.	Accelerometer gain changed and circuits redesigned.	MR 5.1.5.1 MR 5.1.5.2 MR 5.1.5.9 MAC Report No. B624 STR No. 11
14. Bank angle commanded prematurely.	Reentry guidance computations initialized prematurely.	Threshold acceleration increased.	MR 5.1.5.1 MR 5.1.5.9
15. G.m.t. clock calendar dial did not start.	Setting of clock backwards caused gear damage.	Redesign of clock to allow setting in either direction.	MR 5.1.6.2 STR No. 27
16. O ₂ and H ₂ tank pressure decreased after launch.	Temperature stratification (assumption).	None required, normal.	MR 5.1.7.3
17. Fuel cell could not be activated on first launch attempt.	Leak in O ₂ to H ₂ differential pressure regulator because of corrosion due to high-acidity fuel-cell product water.	Redesigned system to eliminate flow of fuel-cell water through regulator.	MR 13.3.1
18. Fuel cell not activated for flight.	No flow through (H ₂) purge valve. Fuel cell water caused corrosion.	Procedural changes introduced to reduce the time that system is exposed to product water.	MR 5.1.7 MR 6.1.1
19. Moisture in fuse block assembly after recovery.	Sea water.	Pot fuse block.	MR 5.1.7.4
20. OAMS fuel loss between first launch attempt and launch.	Through drain lines.	Drain lines not to be connected on future flights until dump is required.	MR 13.3.2
21. Unexpected torque disturbance at Retrorocket no. 1 firing.	Retrorocket misalignment (within specification).	No change - correction required was within the capability of one-ring RCS operation.	MR 5.1.5.7 MR 5.1.8.3

~~CONFIDENTIAL~~

~~CONFIDENTIAL~~

Problem	Cause or remarks	Resolution and mission effectivity	Reference document
22. Inadvertent RCS TCA operation or leakage after landing.	Salt water immersion closed ground circuits of TCA's.	Install motor-operated shut off valves - change procedure to shut off TCA power prior to landing.	MR 5.1.8.2
23. Wire bundle guillotine failure.	Low energy cartridge failed to sever wire bundle.	Use higher energy cartridges.	MR 5.1.9 MAC Report No. 626 STR 20
24. GLV stage II fuel-pressure meter in the spacecraft failed 1 second after lift-off.	Short circuit of movable coil.	Isolated case of poor quality. Manufacturer notified.	MR 5.3 STR 9

~~CONFIDENTIAL~~

~~CONFIDENTIAL~~

Problem	Cause or remarks	Resolution and mission effectivity	Reference document
<u>Flight Control and Network</u> 1. CSQ had interference at frequency of real-time telemetry link on first launch attempt. 2. RKV remote site data processor input data buffer not updated after lift-off +339 seconds. 3. Low-signal strength at RKV.	 Radars on recovery ship. RKV operational problem. RKV operational problem.	 Position ships to avoid CSQ telemetry antenna pointing in the direction of recovery ships. Avoid carrier radar transmission during critical periods. Rework procedures. Improve methods of antenna pointing.	 MR 6.3.2.3 MR 13.4.2.1 MR 6.3.2.1 MR 5.1.2.2

~~CONFIDENTIAL~~

~~CONFIDENTIAL~~

Problem	Cause or remarks	Resolution and mission effectivity	Reference document
<u>Gemini Launch Vehicle</u> 1. A leak was detected at the stage II oxidizer fill and drain disconnect pressure cap on the GLV. 2. An oxidizer leak was noted on engine sub-assembly no. 1 between jamnut and bulkhead elbow of the oxygen discharge pressure transducer.	 Failure analysis revealed small metallic particles lodged under the seal. Caused a short hold during the final countdown.	 Cap replaced. Back off nut and retorque to 350 inch-pounds.	 Gemini III MR 6.1.2 Gemini III MR 6.1.2

~~CONFIDENTIAL~~

Problem	Cause or remarks	Resolution and mission effectivity	Reference document
<u>Spacecraft</u>			
1. Nose fairing tabs vibrated violently.	Maximum vibration period of launch.	Analysis revealed no problem.	MR 5.1.1.4
2. The spacecraft experienced a continuous yaw-left condition for approximately the first 44 minutes of flight.	Due to overboard venting of steam from the launch cooling heat exchanger.	This was not considered a significant problem and a considerable redesign to correct would be required. A training procedure was established to tolerate temporary yaw condition.	MR 5.1.4.2
3. Excessive ascent navigational error in comparisons of IGS computations and ground tracking data.	Analysis indicates gyro drift type malfunction. Malfunction was "g" sensitive drift in gyro, caused by bubbles in damping fluid.	Tests designed to detect this malfunction have been incorporated in (ape space-craft testing and vendor predelivery tests.	MR 5.1.5.1 STR 3013
4. Excessive number of horizon sensor loss of track indications reported by the pilots.	Causes were as follows: a. Normal warmup necessary for switching from primary to secondary sensors. b. Horizon not in view of sensor. c. Sun in field of view of sensor.	Gemini IV was instrumented to investigate the problem but problem did not appear again in any other mission.	MR 5.1.5.1 STR 3522
5. Primary dc-dc converter failed.	Improper use of lockwasher allowed nut to back off and cause short.	Use of epoxy to bond all lock nuts on dc-dc converters and biomedical power supplies.	MR 5.1.3 STR 3504
6. When the crew placed sequential lights test switch to "AMBER" the telemetry indication of attitude malfunction was changed to the "ON" state.	A diode in the onboard lights test circuitry failed.	Problem was known prior to flight and was of little consequence.	MR 5.1.7 STR 3534

~~CONFIDENTIAL~~

Problem	Cause or remarks	Resolution and mission effectivity	Reference document
7. Inability of spacecraft to achieve desired landing point.	Actual reentry trim angle was approximately 4 degrees lower than predicted and reduced maneuver ability by 33 percent.	Rework computer math flow to handle situation and accept smaller footprint.	MR 5.1.1.1.3
8. The fresh-air door actuator functioned but the redundant cartridge did not fire.	Peculiarity of drogue deploy switch.	Manufacturing and quality procedures revised.	MR 5.1.1.9 STR 3520 STR 3531 STR 3525
9. Coating peeled off outer glass surface during reentry heating.	Later missions confirmed that this was burning off of film deposited on glass during launch and orbital flight.	No immediate action taken. See Gemini IV, spacecraft item 23.	STR 3012 STR 3016 STR 3528
10. Postlanding exercise of HF equipment in both voice and DF modes was a failure.	Possibly water in antenna well.	Redesign seal to preclude water leakage.	MR 5.1.2.1 STR 3000 STR 3011 ECP 341
11. HF antenna would not retract.	Extend limit switch actuator failed.	Redesigned antenna mechanism. Installed second HF antenna in adapter for use in orbit.	MR 5.1.2.2 STR 3000 STR 3519 ECP 299
12. Fuse blocks contained water after flight.	Connections exposed to salt water after landing.	Fuse blocks potted.	MR 5.1.7 STR 3523
13. Pilot had difficulty in inserting the blood pressure bulb into the water tank pressurizing adapter to pressurize the water tank.	Limited accessibility.	Adapter changed to aid in insertion and sealing.	MR 5.1.10.5
14. Static firing of A-ring TCA's during deactivation procedure of RCS after recovery.	Problem suspected in either the spacecraft or ground-control box electrical system.	RCS deactivation ACE control box modified.	MR 5.1.8.2 STR 3535

~~CONFIDENTIAL~~

~~CONFIDENTIAL~~

Problem	Cause or remarks	Resolution and mission effectivity	Reference document
15. Flush fluids leaking from thruster 2 of ring A after recovery.	Leaking noticed after application of 25 psi nitrogen blanket.	Flushing procedures revised.	MR 5.1.8.2 STR 3018 STR 3005 STR 3529 STR 3536
16. Oxidizer vapor reported by astronauts after impact.	Possibilities indicated to be oxidizer fumes from RCS and smoke emanating from hot shingles.	Initiated procedural change for pilots to keep visor closed and use oxygen high rate until after purging interior of cabin.	MR 7.1.2.2 MR 7.1.2.1 STR 3511
17. Poor readability of the G.m.t. clock hampered its use for any purpose.		Put in Accutron clock.	MR 5.1.10.2 ECP 343

~~CONFIDENTIAL~~

Problem	Cause or remarks	Resolution and mission effectivity	Reference document
<u>Experiment</u> 1. Experiment S-2 (sea urchin eggs) - objectives not achieved.	Primarily mechanical failure.	S-3 frog eggs experiment package designed to prevent breaking of handle shaft. (Successful) S-2 (sea urchin eggs) not scheduled to fly again.	MR 8.1.3

~~CONFIDENTIAL~~

Problem	Cause or remarks	Resolution and mission effectivity	Reference document
<u>Flight Crew and Equipment</u>			
1. Ballooning of urine collection bag after insertion caused difficulty in removal and storage.	Normal cabin pressure decrease during launch phase.	Improved evacuation technique prior to donning of suit.	Gemini IV MR 5.1.10.5
2. Pilot was unable to burst disinfected bag of defecation device.	Heat seal stronger than specification value.	Method of sealing bag changed to eliminate this problem.	Gemini IV MR 5.1.10.5
3. Pilot experienced difficulty in handling and disposing of paper packed with the defecation bag.	Paper tended to float away.	Deleted paper from defecation bag. Tissue dispenser now used.	Gemini IV MR 5.1.10.5
4. Pilot reported considerable manual dexterity required to accomplish rehydration process of food packages while wearing space suit gloves.		Package size changed to aid in rehydration.	Gemini VIII MR 5.1.10.5
5. Pilot had difficulty in removing the germicide pill and inserting it into the food bags.	Clumsy operation with gloves.	None.	-- MR 5.1.10.5
6. Grapefruit juice leaked out of food bag after rolling up feeding end.	Seal not adequate to hold fluid.	New procedure incorporated to tape bags to stop leakage.	Gemini IV MR 5.1.10.5
7. Both pilots had difficulty in disposing of dry waste.	Neither pilot could reach the side food box extensions.	Use of storage pouches as waste containers on later flights.	Gemini IV MR 5.1.10.6
8. The command pilot was unable to insert the blood pressure bulb adapter into the space suit fitting.	No definite cause given, but attributed to poor light conditions and the use of a new device with which the command pilot was not familiar.	Adapter was modified to aid in insertion and sealing.	Gemini IV MR 5.1.10.7

~~CONFIDENTIAL~~

Problem	Cause or remarks	Resolution and mission effectivity	Reference document
9. Sun visor on command pilot's space suit helmet was marked by rubbing on the underside of the hatch.	No clearance.	Changed hatch design to give increased clearance. Redesigned survival pack to lower astronaut.	MR 5.1.10.3 ECP 247 ECP 267A ECP 269A
10. The optical ring sight of Hasselblad camera not considered satisfactory.	The reticle pattern was not bright enough and the sight, because of its size, interfered with vision outside of window.	Deleted ring sight as not required.	MR 5.1.10.4
11. 16mm photography was a failure.	Proper lens settings for low intensity lighting conditions for photography not given to crew.	Crew to be made aware of the proper lens settings.	MR 5.1.10.4
12. Forces attendant with repositioning the spacecraft to the two-point landing attitude caused the heads of the crew to rotate forward and strike the window area.	Crew not made aware of the magnitude of the forces involved.	New procedure established and tested to avoid this problem.	MR 5.1.11
13. The cabin lighting was poor for orbital operations on the dark side of the earth.	Light intensity required to illuminate center panel destroyed crew members night adaptation.	Replaced one of two lights to give selection of bright or dim light for the center panel.	MR 5.1.10.1 ECP 345
14. The voice tape recorder controls on the voice control center (VCC) caused operational inconvenience.	When either pilot selected "record" he could not transmit to ground.	Voice recorder control removed from VCC to remote or separate toggle switch.	MR 5.1.10.2 ECP 387
15. Finger-tip lights broken.	Location of finger-tip lights on first joint of fingers make them vulnerable to damage during operation of cockpit switches. Switches also susceptible to inadvertent operation.	Lights moved back between first and second joint, also lens on light changed to a more durable material to prevent breakage.	MR 5.1.10.3
16. Structural tab on forward end of the main suit zipper interfered with urine receiver.	Pilot cut tab to eliminate interference.	Procedural change required.	MR 5.1.10.3

~~CONFIDENTIAL~~

Problem	Cause or remarks	Resolution and mission effectivity	Reference document
17. Flight crew unable to determine if voice recorder was operating properly after a tape cartridge was inserted.	Recorder cannot be seen and pilot has difficulty recognizing that door is closed with a gloved hand.	End-of-tape light moved from recorder to instrument panel. Also, cartridges have been marked to aid crew in determining operation of recorder.	MR 5.1.10.4
18. Command Pilot reported an error in the roll attitude of the vehicle as displayed on the ADG (8-ball) Attitude Display Group when checked against the horizon. This error was a function of orbital travel.	Analysis showed that the platform alignment period used prior to this attitude check was shorter than that specified in the system requirements. The initial misalignment in yaw appeared as a cyclic roll error with orbital travel.	Platform alignment should be continued for the full length of time specified even though the indicated roll and pitch errors are very close to zero early in the alignment period.	MR 7.1.2.1 MR 5.1.5.2

~~CONFIDENTIAL~~

~~CONFIDENTIAL~~

Problem	Cause or remarks	Resolution and mission effectivity		Reference document
<u>Flight Control and Network</u> 1. Documentation for bio-medical instrumentation not available. 2. CSQ transmitted a T _x (time-to-equipment reset) and received a spacecraft reject. Retransmitted several times, but no confirmation received. 3. X-axis acceleration could not be displayed on monitor. 4. Real-time telemetry data transmitted from ANT to MCC-H on the third orbital pass contained invalid subframe data.	Not available prior to flight controllers departure for stations approximately 23 days prior to launch.	Appropriate manuals distributed to network stations.	Gemini IV	MR 6.3.2
	Unknown.	Separate recorder being installed on CSQ and RKV stations so that radiated signals can be recorded in the future.	Gemini IV	MR 6.3.2 GSFC 4.3
	Documentation called for patching the wrong word gate.	Patching instructions corrected by instrumentation specification instruction.	Gemini III	MR 6.3.2
	Low temperature in receivers.	Air conditioning turned off until temperature rose.	Gemini III	MR 6.3.2

~~CONFIDENTIAL~~

~~CONFIDENTIAL~~

Problem	Cause or remarks	Resolution and mission effectivity		Reference document
<u>Launch Complex</u> 1. AGE check valve leaked during stage II tanking. 2. Erector lowering delayed. 3. Stage II fuel indication by flowmeter was 6 pounds below tolerance at Hi-Lite.	Insufficient preventative maintenance.	Refurbishment plan initiated.	Gemini V	MR 5.2.10
	J-box wired incorrectly during maintenance.	Wiring corrected.	Gemini IV	MR 5.2.10
	Flowmeter automatic temperature compensator (ATC) assembly was the cause of discrepancy between Hi-Lite volumes and flowmeter volumes.	K factor/ratio method was used to complete the load. Considerable confidence had been established in the validity of Hi-Lite measuring system.	Gemini IV	MR 5.2.10

~~CONFIDENTIAL~~

Problem	Cause or remarks	Resolution and mission effectivity	Reference document
<u>Gemini Launch Vehicle</u>			
1. Steering signal differences between IGS and RGS.	Nominal TARS programmer drift, gimbal cross coupling, initial bias between systems, and difference in roll programs. Also, due to high trajectory flown.	None required, normal.	MR 5.1.5.2
2. Pressurant orifice inlet temperature was 40° F higher than predicted.	Assumed to be a leak in the hot gas cooler.	None	MR 5.2.2.3
3. Indeterminacy of performance.	Flight Safety Review showed margin to be -51 pounds (-3σ) while actual capability was +270 pounds (-3σ).	None, within normal engine performance variations.	MR 5.2.2.4
4. Stage I fuel vent topping line umbilical disconnect did not release, disconnect occurred due to tension after 27 feet of travel.	Release mechanism in quick disconnect is actuated by a release cable which did not function properly. Suspected dust cap left in cavity and jammed release mechanism.	Dust caps brought to test conductor prior to launch.	MR 5.2.1.0
5. Acoustic level of GLV compartment no. 1 was above acceptable level.	Level was 167 db, acceptable level is 154 db.	None required, no equipment in compartment no. 1.	MR 5.2.1.3
6. Fuel depletion shutdown (stage I) (oxidizer remaining was 620 pounds, predicted as 567 pounds).	Colder propellant temperatures and higher fuel pump inlet pressures than expected cause mixture ratio error of -1.34 percent.	None required, within expected tolerance.	MR 5.2.2.1
7. Thrust chamber pressure overshoot at stage I and stage II ignition.	Similar pressure overshoots observed on previous Gemini and Titan II flights.	None required, normal.	MR 5.2.2.2

~~CONFIDENTIAL~~

Problem	Cause or remarks	Resolution and mission effectivity	Reference document
8. Decrease in stage II gas generator oxidizer injector pressure at 91FS1 +160 seconds (lift-off +313 seconds).	Possible oxidizer leak in the gas generator feedline between the venturi and the injector.	None required, no effect on performance.	MR 5.2.2.2
9. Night sighting of GLV.	Tumbling of second stage caused loss of visibility of one of the lights. Range and range rate were hard to define.	Four lights were installed 90° apart around the circumference and near the center of the GLV.	MR 7.1.2.4
10. Range Safety receiver had low signal at 10 +316 seconds.	Antenna pattern characteristics of GLV command antenna.	None required, adequate coverage when needed.	MR 5.2.9.1

~~CONFIDENTIAL~~

~~CONFIDENTIAL~~

Problem	Cause or remarks	Resolution and mission effectivity	Reference document
<u>Spacecraft</u>			
1. Voice Control Center volume control did not function properly.	Control not secured adequately to panel.	Assembly procedures modified.	Gemini V MR 5.1.1.2 MR 5.1.1.0.2 STR 4037
2. Altimeter incorrect at landing.	Altimeter was not set for local sea level barometric pressure.	Flight procedure will include setting of altimeter.	Gemini V MR 5.1.1.0.2
3. Drogue parachute mortar safety pins on ejection seat difficult to install after launch.	Difficult operation for crew to perform due to poor visibility.	Changed design to include guide and lanyard.	Gemini V MR 5.1.1.0.1 ECP 419 NASA/MAC Management Meeting 6-21-65
4. Two voice tape recorder cartridges failed during rewind.	One was corroded due to mishandling, and the other was caused by bad bearing.	Tapes were placed in new cartridges, gave good reproduction in both cases. Contractor instructed to look at bearing design.	-- STR 4001 MR 12.6.1.6
5. PCM recorder stopped at 97:54:09 g.e.t. (2000 feet altitude on main parachute).	Ball bearing between playback clutch and shaft seized. Foreign matter resulting from bearing dust shield cutting into aluminum shoulder.	Shoulder cut down to eliminate interference - shoulder material hardened.	Gemini VIII (Not known until after failure analysis on Gemini VI-A and VII) MR 5.1.1.3 MR 12.6.1.6 ECP 732 STR 8014 STR 4033
6. Hoist loop failed to deploy.	Interference with the phenolic filler in the parachute bridle stowage trough.	Prelaunch inspection verification of proper clearance.	Gemini V MR 5.1.1.1 MR 5.1.1.12 STR 4517

~~CONFIDENTIAL~~

~~CONFIDENTIAL~~

Problem	Cause or remarks	Resolution and mission effectivity	Reference document
7. High roll rate on reentry.	TCA 5B was inoperative due to a broken wire in a connector between the ACME and the TCA solenoid. This failure and the offset center of gravity due to EVA equipment being onboard plus the fact that the roll rate gyros were off caused cross coupling which caused the induced roll rate to increase the yaw rate. Attempts to null the yaw rates would then increase the roll rate further.	Insure that all rate gyros are on for reentry; modification of procedures for handling of spacecraft wiring during installation and inspection.	MR 5.1.5.3
8. High RCS fuel consumption.	Failure of TCA 5B plus the offset of center of gravity and the roll rate gyro being off caused the high yaw rate as a result of the high roll rate. The almost constant activity of TCA's 7 and 8, used in an attempt to null the yaw rate, actually increased the yaw rate causing the high fuel consumption.	Gemini V	MR 5.1.5.3
9. Computer start-circuit failure.	Computer could not be powered down by on/off switch; power was removed by taking IGS bus off-line. This caused changes in memory core. Extensive testing of computer and associated equipment revealed the only possible cause for this malfunction was contamination in the computer on/off switch.	Gemini V Manual power down switch incorporated.	MR 5.1.5.1 ECP 417 STR 4006 STR 4009 STR 4010
10. Horizon scanner lost track.	Sun in field of view.	None required, normal.	MR 5.1.5.1

~~CONFIDENTIAL~~

~~CONFIDENTIAL~~

Problem	Cause or remarks	Resolution and mission effectivity	Reference document
11. Failure to station keep with stage II.	An actual closing velocity with the stage II was not established immediately after separation. The range to target became excessive for the available propellants.	Crew procedures for station keeping modified to: a. Initially establish a clearly perceptible closing rate with the target, and b. Again, establish a perceptible closing rate any time the range to the target becomes larger than 60 feet.	MR 4.3.1.1.3 MR 7.1.1.1.3 MR 7.1.2.4
12. Intermittent thrust produced by TCA 9 during station keeping.	Probable cause - interrupted propellant flow. (TCA 9 apparently performed normally during preretrofire OAMS burn).	No resolution.	MR 5.1.8.1
13. Decay of pressure in primary oxygen tank from 935 to 835 psi.	Temperature stratification.	None required, normal.	MR 5.1.4
14. Operation of primary-oxygen-pressure automatic relief valve could not be verified.	Instrumentation range of pressure transducer was 0 to 1000 psia. Relief valve set at 1000 psia.	Primary oxygen was vented from 960 to 920 psi every 4 hours to prevent pressure from going over scale. Changed transducer range to 0 to 1200 psia.	Gemini IV MR 5.1.4 MR 5.1.10.1
15. Hatch difficult to lock after EVA.	Failure of the drive pawl return in the hatch latching mechanism.	Redesign of ratchet mechanism. Pilot worked pawl by hand in order to latch the right-hand door after EVA.	Gemini V STR 4016 MR 5.1.1.1 ECP 404 STR 4031 STR 4504
16. Cabin was crowded and center of gravity was displaced slightly for reentry.	EVA equipment was not jettisoned because of difficulties in closing hatch after EVA.	See item 15 above.	--
17. MDF interconnect from MDF manifold on right-hand ejection seat was found loose.	Insufficient bonding material used.	Manufacturing and quality verification methods revised.	Gemini V STR 4511 ECP 509

~~CONFIDENTIAL~~

~~CONFIDENTIAL~~

Problem	Cause or remarks	Resolution and mission effectivity	Reference document
18. Right-hand actuator rod was galled.	Excessive operation prior to launch.	The number of prelaunch extend/retract cycles limited.	STR 4513
19. Corrosion on blocking arms of aneroid mechanisms found in post-flight inspection.	Inadequate protection.	Procedural change introduced to reduce the time of exposure to humid atmosphere.	MR 5.1.9 STR 4000A ECP 397
20. T _r initiated 1.3 seconds early.	Unknown.	--	MR 5.1.6
21. Event data not received: a. ADO3 b. ADO6 c. AE13	a. Indication was displayed in cabin. b. PCM dropout in time period. c. Occurred after telemetry was shut-off.	No resolution, no effect on mission.	MR 5.1.7
22. Cabin coolant-control valve was found stuck in postflight inspection.	Corrosion after landing. Reported OK by crew while in flight.	None required, no effect on mission.	MR 5.1.4
23. Film on external surface of window.	Chemical analysis indicates considerable silicone, probably from nose and horizon fairing and heat shield.	Installation of transparent window covers to be jettisoned after launch.	MR 6.3.4. ECP 744 STR 4017 STR 4508
24. Communication volume could not be turned off for sleeping.	VCC has no switch position for off.	Communication harness was disconnected at neck ring. Sleep switch installed for later flights - one astronaut at a time.	MR 5.1.2.1 MR 5.1.10.1 MR 5.1.10.2 ECP 400
25. Degraded A/G UHF communications.	Antenna pattern and attempts to use UHF at too low a look angle.	Reentry stub antenna found to give better coverage.	MR 6.1.2.2

~~CONFIDENTIAL~~

~~CONFIDENTIAL~~

Problem	Cause or remarks	Resolution and mission effectivity	Reference document
26. Intensity of reticle illumination in optical sight was too low.	Intensity of lights in sight was too low at the periphery.	A light diffuser was incorporated to increase the uniformity of the light.	MR 5.1.10.5
27. Tape recorder controls inadequate.	VCC configured such that tape recorder could not be used when crewmember was transmitting to ground.	Switch added to VCC to allow the use of either momentarily or continuously record mode without interfering with other controls of VCC.	MR 5.1.10.2 ECP 387

~~CONFIDENTIAL~~

~~CONFIDENTIAL~~

Problem	Cause or remarks	Resolution and mission effectivity	Reference document
<u>Experiments</u>			
1. D-8 experiment cord not long enough.	Cord length was not designed for command pilot to use.	Longer cord utilized for Gemini VI-A.	--
2. Electrostatic charge (MSC-1) indicated charge of 2.4 million volts.	Sensor was responding to RFI.	Wire screen installed on Gemini V to screen out electrostatic charge, voltage was found to be due almost entirely to RFI.	--
3. Exerciser latex sheet (M-3) failed (bungee cord cover).	Deterioration of latex.	Cover changed to nylon.	MR 8.9.4

~~CONFIDENTIAL~~

~~CONFIDENTIAL~~

Problem	Cause or remarks	Resolution and mission effectivity	Reference document
<u>Flight Crew and Equipment</u>			
1. Difficulty in accurately reading propellant tank pressure gages.	Parallax associated with reading gage made reading difficult; overlay decal covered needles at lower end of meter scales.	Training procedures modified.	MR 5.1.10.2
2. Water hose would kink and surface of hose appeared cracked.	Deterioration of hose.	Hose ends reinforced by RTV 60 and a spring was added to prevent kinking.	MR 5.1.10.6 ECP 434
3. Urine spillage.	Inadequate sealing at entrance to urine receiver.	Urine receptacle redesigned.	MR 5.1.10.6
4. Failure of tissue dispenser.	Zipper tore away at plow. Tissue dispenser overfilled.	New procedure for filling to prevent recurrence.	MR 5.1.10.6
5. Urine dump system failed at 92 hours.	Possible line blockage; solenoid valve opened only slightly. During postflight testing, the blockage was removed by activating the solenoid several times.	New procedure instituted to ensure that system is free of contaminants before launch. New design of urine receiver and line assembly incorporated.	MR 5.1.4 STR 4022 ECP 434
6. Eye irritation.	Lithium hydroxide deposits in the ECS ducts induced by water in LiOH canister during pre-launch activities.	Improved prelaunch procedures to prevent water entering the ECS and to remove any dust by vacuum cleaning.	MR 5.1.4 MR 7.2.2.2 STR 4013 STR 4500 MR 5.1.10.1
7. Flight data books were hard to use.	Rings opened too easily; paper tore easily because it was lightweight paper.	Increased tension of spring in rings, paper thickness increased.	MR 5.1.10.5

~~CONFIDENTIAL~~

~~CONFIDENTIAL~~

Problem	Cause or remarks	Resolution and mission effectivity	Reference document
8. Problems with food consumption.	Orange drink bags leaked around valves; peanut bars and toast crumbled.	Procedures revised.	MR 5.1.10.6
9. Drinking-water gun would stick open.	Trigger guide appeared worn.	Gun redesigned to add more strength.	MR 5.1.10.6 ECP 610
10. Damaged and burned-out fingertip lights on command pilot's gloves; discomfort due to position (command pilot's only).	Location of lights caused damage.	Protective cover on bulbs; lights are to be located between fingertip and the first joint.	MR 5.1.10.3
11. Blood pressure port would not retain the blood pressure bulb on the command pilot's suit.	The retention ring within the port was worn and deformed.	"O"-ring material was changed for Gemini V to gain additional locking strength.	MR 5.1.10.3 CSD 15 CSD 32
12. Scratched visors.	Susceptibility of plexiglass to scratching; rough edges in spacecraft.	Configuration change of lock to positive ball and groove-type lock on Gemini VI-A and up.	MR 5.1.10.3
13. Pilot was overheated during peak work loads during the EVA.	Inadequate flow rate for work load.	No positive resolution. No other material available that will not scratch.	MR 5.1.10.3
14. Roller flight plan was useless.	Updates in flight plan made it incorrect, contained only a small amount of information, anyway.	Flow rate will be increased for EVA by use of ELSS.	MR 5.1.10.3
15. Readability of right G.m.t. clock was poor.	Position on instrument panel.	Unit removed from subsequent spacecraft.	MR 5.1.10.2 ECP 425A
16. No method available to read mission elapsed time; confusion between G.m.t. and g.e.t.	No elapsed timer of long duration.	None. Installed g.e.t. digital clock.	MR 5.1.10.2 ECP 425A

~~CONFIDENTIAL~~

~~CONFIDENTIAL~~

Problem	Cause or remarks	Resolution and mission effectivity	Reference document
17. No knowledge of amount of water consumed.	No measurement of water made via telemetry or onboard.	Pressure of pressurant on drinking water monitored on telemetry by flight controllers. Calibrated drink dispenser provided on spacecraft 6 and up.	Gemini IV MR 5.1.10.2 ECP 610
18. Pilot was too warm; interfered with sleep.	Overgarment for EVA increased insulating capability of suit.	Both suit compressors were used and the pilot's face plate was left open while sleeping.	Gemini VI-A MR 5.1.10.3
19. One crewmember could not sleep when OAMS was being fired by the other crewmember or by automatic mode.	Problem seems to be an individual one; some crews complain that they cannot hear the OAMS.	Sleep periods are now with OAMS off, in drifting flight, or docked using GATV attitude control.	Gemini V MR 5.1.10.3
20. Lighting of cabin was poor, especially in area of water managment panel.	Intensity of certain cabin lights was too low.	Install parabolic reflectors on utility light to increase illumination.	Gemini V MR 5.1.10.1 ECP 439
21. Loss of voice recorded data.	End-of-tape light is not readily visible, went unnoticed while voice recordings were attempted.	Relocation of end-of-tape light to the annunciator panel.	Gemini V MR 5.1.10.2 ECP 431
22. Air in reconstitutuable food bags.	Air mixed in with water.	Prelaunch servicing procedure revised.	Gemini V MR 5.1.1.4
23. Corrosion of crotch main zipper.	Spillage of urine from ill-fitting urine receptacle.	Redesign of urine receptacle.	Gemini V MR 5.1.10.3 ECP 434
24. Drogue deployed late, at 4CK rather than at 5OK, resulting in large spacecraft oscillations.	Command pilot choice.	Training.	Gemini V --
25. Nauseating smell, postlanding.	Due to odors from heat shield.	Open hatch to get fresh air.	Gemini V MR 5.1.1.4
26. Intermittent failure of the 16mm camera.	Switch actuator was worn. Reduced effective travel available to activate switch.	Parts refurbished before reuse of camera. New 16mm camera available for Gemini VI-A and up.	Gemini V MR 5.1.10.5 STR 4026 Gemini VI-A

~~CONFIDENTIAL~~

~~CONFIDENTIAL~~

Problem	Cause or remarks	Resolution and mission effectivity	Reference document
27. Failure of one 16mm film pack to produce usable pictures.	Slipping clutch.	See item 26.	MR 5.1.10.5
28. Failure of 70mm film cartridges to take up film; only 10 of 60 photographs were usable.	Film was not loaded properly with a clip on the take-up spool in the cartridge. This did not allow the film to feed properly.	Changed design of clip on take-up spool of cartridge.	MR 5.1.10.5
29. Photograph event indicator malfunctioned when used with 70mm camera.	Cable apparently was too tight and interfered with shutter operation.	Photograph event indicator will not be used with this camera on future missions.	MR 5.1.10.5

~~CONFIDENTIAL~~

~~CONFIDENTIAL~~

Problem	Cause or remarks	Resolution and mission effectivity	Reference document
<u>Flight Control and Network</u>			
1. CYI had inaccurate radar data.	Site location error caused position bias.	Information corrected.	Gemini V MR 6.2.2.1
2. Communication quality in VIP room at MCC-H was poor.	Insufficient time for checkout and adjustment of equipment.	Premission checkout and adjustment given more emphasis.	Gemini V MR 6.2.2.3
3. Intermittent C-band track on revolutions 7 and 13 at Hawaii and Canary Island.	Spacecraft attitude caused beacon reception to be poor during tape dump.	None required, beacon good at other times.	-- MR 5.1.2.3
4. TEX DCS inoperative for 5 hours.	Faulty air valve which controls switching of RF to antennas.	Replaced faulty items.	Gemini IV MR 6.2.2.1
5. CSQ FRW-2 transmitter disabled for 2 hours.	Teflon ring short circuit.	Replaced faulty items.	Gemini IV MR 6.2.2.1
6. CSQ experienced 7-minute power failure during revolution 20.	On-site problem.	Repaired faulty equipment.	Gemini IV MR 6.2.2.1
7. Off-line computers in buildings 12 and 30 were disabled twice.	Interruptions caused a loss of and changes to data and programs in core memory. Power surge damaged transistors.	Emergency generators are available and replace commercial power source when required. Replacement of power source can only be accomplished after power interruption has affected data and programs in core memory. Several circuit board replacements were required.	Gemini IV MR 6.2.2.2
8. Communications to GTK and ANT (no DCS capability).	Subcable broken (May 27 through June 5, 1966).	Spacecraft communication via commercial cable, seven telemetry channels remoted to Cape from ANT via leased lines.	Gemini IV MR 6.2.2.3
9. TAN local power outages.	Local power sources.	On-site power generating station planned.	-- MR 6.2.2.3

~~CONFIDENTIAL~~

~~CONFIDENTIAL~~

Problem	Cause or remarks	Resolution and mission effectivity	Reference document
10. Unlock of one MISTRAM receiver at central site.	No 100K west-leg rate data were available (10K was used) due to faulty connector at central site.	Repair of faulty equipment.	Gemini V MR 5.2.9.2
11. Computer loads from MDSCS in MCC-H were not accepted by DRED at Cape Kennedy.	Loading was shifted to the other MDSCS. First MDSCS checked out and put back on line; apparently an operational error.	Operator training.	Gemini IV MR 6.2.2.10
12. Bermuda high-speed radar data not accepted at MCC-H.	MCC-H computation facility input buffers overflowed. Flight Dynamics Officer rejected the Bermuda data.	MCC-H computation procedure was modified.	Gemini V MR 6.1.2.1
13. Interference with spacecraft during helicopter pickup of crew.	Liferaft was too close to spacecraft.	Reposition the liferaft.	Gemini V --
14. HF-DF not received by recovery forces.	Range of direct transmission over water is not over 15 miles.	None required.	MR 5.1.7 MR 6.3.3.2

~~CONFIDENTIAL~~

~~CONFIDENTIAL~~

Problem	Cause or remarks	Resolution and mission effectivity	Reference document
<u>Launch Complex</u>			
1. Vibration introduced in vehicle during erector lowering preparation.	Roller going into notch (lock) in erector.	Redesigned so that roller would not fall into notch.	Gemini VI-A MR 5.2.10.3
2. RCA sequencer did not turn on hold fire circuit at T-35 minutes.	Poor solder connection.	For launch - circuit was operated manually by using the "test" portion of the circuitry.	Gemini V MR 5.2.10.3 A 6.11.2
3. Fuel pressurant differential pressure switch in prelaunch MDS made momentarily 0.83 second prior to making solidly at the expected time.	Probable cause - contamination in sensing line or pressure port.	Test procedure change to ensure inspection when lines are broken for test and include purging of sensing lines.	Gemini VI-A MR 5.2.2.1 A 5 A 6.9 MC X.B.1
4. Unlock of one MISTRAM receiver at central site.	Alternate MISTRAM data used.	None required, no effect on mission.	-- MR 5.2.9.2 A 6.6.7
5. Noisy Mod III-G RGS and IP data at insertion.	Low elevation angles.	None required, normal.	-- MR 4.3.1.1
6. Mod III-G RGS pitch steering rate oscillating near SECO.	Noise in Mod III-G RGS tracking data (see 5 above).	None required, normal.	-- MR Page 4-1 MR 5.2.5.2 A 6.6.4
7. Pressure regulator leak in remote charging system for oxidizer stand pipe.	Metal chips in regulator.	Manual charging procedure used for launch.	Gemini V MR 5.2.10.1 MR 5.2.10.2
8. Erector would not raise at conclusion of wet mock simulated launch.	Separate second stage erector relay failed open. Separate erector used for sequence compatibility firing on Gemini I only.	Crew was removed by cherry picker. Since second stage erector had been removed, circuit was rewired to exclude separate erector circuitry. End to end wiring checks performed. Special team of erector specialists formed to troubleshoot erector problems.	Gemini V

~~CONFIDENTIAL~~

~~CONFIDENTIAL~~

Problem	Cause or remarks	Resolution and mission effectivity	Reference document
<u>Gemini Launch Vehicle</u> 1. High POGO (0.38g filtered). 2. Small flashes in flame after lift-off.	Both stand pipes undercharged due to procedural error in manual charging. Most probable cause is burning of tape used to secure desiccant bags in turbine exhaust stacks. Seen in other Titan II flights.	Change in procedure to increase charge pressure and charging time. New manual charging tool developed. None required - no effect on mission.	MR 5.2.1.1 MR 5.2.2.2 A 6.2.4 MR 5.2.2.1 A 6.2.2

~~CONFIDENTIAL~~

~~CONFIDENTIAL~~

Problem	Cause or remarks	Resolution and mission effectivity	Reference document
<u>Spacecraft</u>			
1. Apparent breakup of nose fairing at separation.	Assumed to be small pieces of aluminized tape, ablative material, and possibly small superficial fiber glass parts which are bonded to the fairing.	The aluminized tape replaced by a more durable RF shielding material on later spacecraft.	Gemini VI-A MR 5.1.1.3 MR 7.1.1.2
2. Water stains inside ECS door (postflight inspection).	Investigation showed no leakage after landing. Water apparently introduced from interior of vehicle.	None required - no effect on mission.	-- MR 5.1.1.3
3. Left-hatch lock-release lever would not stow with hatch closed after landing.	Improper rigging.	A new rigging procedure was incorporated.	Gemini VI-A MR 5.1.10.2 STR 5059
4. Coating on spacecraft windows.	Deposits during launch.	Installation of transparent window cover to be jettisoned after launch.	Gemini IX-A MR 5.1.1.2 STR 5011 ECP 744
5. Real time and delayed time signal strength low during UHF flight tests 3 and 4.	Low elevation angle pass.	None required; low signal strength expected under this condition.	-- MR 5.1.2.6
6. Malfunction detection system stage II fuel pressure indicator failed.	Apparently an open circuit in wiring.	Pilot used redundant indicator.	Gemini V MR 5.10.2.2 STR 5018A
7. Noisy telemetry during launch, orbit maneuvers, and reentry.	Loose terminal connection between programmer and input power lines.	All terminal connections are to be torqued and coated with torque paint.	Gemini VI-A MR 5.1.3.1 MR 6.1.2.1 STR 5001
8. PCM tape recorder (dumps) poor.	Oxide off tape in spots. Loctite spilled during final head alignment at vendor's plant.	Used second half of tape during mission. Eliminate loctite - inspect all recorders for future spacecraft.	Gemini V MR 5.1.3.2 STR 5019
9. Intermittent operation of DCS -18 Vdc monitor.	Relay contacts dirty or making poor contact. (Assumption)	None required, no effect on mission - instrumentation only.	-- MR 5.1.3.3

~~CONFIDENTIAL~~

~~CONFIDENTIAL~~

Problem	Cause or remarks	Resolution and mission effectivity	Reference document
10. Air in drinking water supply.	Air in system during servicing.	New vacuum filling method.	MR 5.1.1.4
11. IGS yaw-command error.	Math flow 6 programing error.	Corrected math flow.	MR 5.1.5.2
12. Primary horizon sensor failure.	Horizon sensor electronics were analyzed but failure not duplicated or explained. Horizon sensor head jettisoned in orbit.	None required, considered random failure; also, secondary horizon sensor functioned correctly during flight.	MR 5.1.5.4 STR's 5007, 5035, 5038, and 5504
13. Radar failed to read out digital range above 24 800 feet.	Failure in radar subsystem due to low temperature (assumption). Radar not recovered.	Test of module at low temperature being conducted to preclude modules prone to temperature failure.	MR 5.1.5.4 STR's 5038, 5039, 5034
14. Radar maximum allowable leak rate exceeded.	Unknown, not resolved as radar was not recovered.	--	MR 5.1.5.4
15. Divergence of estimated and calculated radar range.	Failure to push "start comp" button.	None required, crew training.	MR 5.1.5.2
16. Meaningless counting of Incremental Velocity Indicator while in orbit.	The computer was operated in ascent mode during orbit long enough to calculate a meaningless IVAR correction, which was subsequently displayed on the IVI's when "start comp" was pushed to initiate a calculation after switching to catch-up mode.	None required, crew training.	MR 5.1.5.2
17. FDI less than full scale on high range.	Not designed to reach full scale on high range.	None required, crew training and familiarization.	MR 5.1.5.3 STR 5044
18. Rapid decay in RSS O ₂ pressure.	Supply-tank heater failure.	Cross-over to be installed from O ₂ tank to RSS O ₂ tank to permit restoration of pressure.	Gemini VII

~~CONFIDENTIAL~~

~~CONFIDENTIAL~~

Problem	Cause or remarks	Resolution and mission effectivity	Reference document
19. Spacecraft yaw.	H ₂ venting.	Vent changed so that force of venting gas is through center of gravity of spacecraft.	Gemini VII MR 5.1.7.2 ECP 533
20. Indication of high current drain after landing.	Unknown, probably wave motion affecting meter movement.	Set up special test for post-landing of a subsequent spacecraft.	Gemini VIII MR 5.1.7.3 STR 5064
21. Urine tube heater fuse open after recovery.	Assumed to be salt water.	None - heater functioned normally during flight.	-- MR 5.1.7.3
22. Abnormal differential pressure across fuel cells.	Crew failed to open crossover valve during a purge.	None required, crew training.	Gemini VII MR 5.1.7.1
23. Thrusters 7 and 8 malfunctioned beginning at approximately 75 hours g.e.t.	Unknown - possible heater failure.	Redundant heaters added to OAMS solenoid valves.	Gemini VIII MR 5.1.5.3 MR 5.1.8.1 MR 5.1.8.1 STR 5027 ECP 583
24. Knob broken on variable circular filter, scratches.	Poor bonding of knob, insufficient clearance between stationary and movable disk.	Knob deleted, clearance increased.	Gemini VIII MR 5.1.10.1 STR 5057
25. Drogue safety pin pulled inadvertently while in orbit.	Harness caught pin.	Compromise between length of pin for ease of installation with possibility of snagging on harness.	-- MR 5.1.10.1
26. Right-hand utility light broken.	High force required to remove light from holder.	Mounting bracket modified.	Gemini VI-A MR 5.1.10.1 STR 5040 ECP 560
27. Excessive heat from cabin light assembly.	Tightly enclosed lamp overheated.	Mounting configuration changed.	Gemini VI-A MR 5.1.10.1 STR 5056 ECP 604
28. Fuel cell O ₂ purge switch too hard to hold.	Greater effort required under zero g than under one g conditions.	Added holding device.	Gemini VII MR 5.1.10.2

~~CONFIDENTIAL~~

~~CONFIDENTIAL~~

Problem	Cause or remarks	Resolution and mission effectivity	Reference document
29. Window reference marks not adequately identified.	Pilot's preference.	Changed window markings.	MR 5.1.10.2
30. Optical sight reticle malfunctioned.	Utility cord wire open.	Strain relief incorporated on both ends of cord.	MR 5.1.10.4 STR 5022 ECP 598
31. Optical sight voltage regulator cable adapter loose.	Cable connector housing became loose and rotated in the voltage regulator housing.	Changed design to incorporate a positive lock to prevent rotation.	MR 5.1.10.4 STR 5041
32. Optical sight had objectionable reflections from sun and cockpit lights.	Collimating mirror reflections.	Glare shield installed.	MR 5.1.10.4 STR 5037 ECP 558
33. Optical sight difficult to stow.	Stowage location could not be seen and was hard to reach.	Loosened tolerances on mounting bracket.	MR 5.1.10.1
34. Cabin temperature gage failed.	Bent pin in connector.	None required.	MR 5.1.10.2
35. Voice recorder failed in third day.	Broken belt.	Higher quality belts with longer life being obtained.	MR 5.1.2 STR 5026
36. Crew did not see DCS indicator light after last update.	Most probable cause is that the mechanical iris was in the dim position and obscured the light.	None required.	MR 5.1.10.2 MR 7.1.2.6 STR 5065
37. UHF worked only 14 minutes after landing.	Control bus probably off at that time.	None required.	MR 6.3.3.3
38. HF antenna did not extend after landing.	Pilot may have de-energized control bus.	None required.	MR 5.1.2.6 STR 5021A

~~CONFIDENTIAL~~

~~CONFIDENTIAL~~

Problem	Cause or remarks	Resolution and mission effectivity		Reference document
<u>Experiments</u>				
1. M-1 quit after 4 days.	Ran out of gas (O ₂). Gas usage not calculated correctly.	M-1 to be supplied by ECS primary O ₂ supply.	Gemini VII	MR 8.5.4 STR 5020 ECP 614
2. Sleep difficult.	M-1 noisy.	Isolate noise if possible, for Gemini VII.	Gemini VII	ECP 626
3. D4/D7 radiometer filter wheel failed.	Unit was jettisoned with equipment adapter so postflight inspection was impossible. Analysis confined failure to two possibilities; (1) failure of drive motor, (2) logic circuitry.	Logic circuitry was improved by replacement of two resistors.	Gemini VII	MR 8.3.4 ECP 632

~~CONFIDENTIAL~~

~~CONFIDENTIAL~~

Problem	Cause or remarks	Resolution and mission effectivity	Reference document
<u>Flight Crew and Equipment</u>			
1. Four food bags failed.	Creased during manufacture.	Stepped up quality control.	Gemini VI-A MR 5.1.10.5
2. Excessive dry-waste from food.	Bulk of food overwraps and election of the crew not to eat all food items.	Additional dry-waste storage area provided behind pilot's seat.	Gemini VII MR 5.1.10.5
3. Dry storage bags failed.	Fabric not durable.	Fabric changed to Nylon.	Gemini VI-A MR 5.1.10.1 STR 5042
4. Softening of urine receptacles.	Chemical reaction with urine.	Increase storage quantities to cover increased needs - also made of heavier material.	Gemini VI-A MR 5.1.10.5
5. Blood pressure bulb seal failed.	Sharp radius on outer edge of blood pressure port on suit.	Inflight replacement of "O" ring. Replaced connector with positive ball and groove type lock for later missions.	Gemini V MR 5.1.10.3 STR 5024
6. Dual port manifold block on pilot suit came loose.	No positive means of keeping retaining screw tight.	Deleted on subsequent flights.	Gemini VI-A MR 5.1.10.3 STR 5060
7. Suit neck dams torn.	Material weak.	Stronger material now being used. Spare neck dams being carried.	Gemini VI-A MR 5.1.10.3
8. Sleep isolation cap unsatisfactory.	Ear cups too small, uncomfortable.	Deleted on subsequent missions.	Gemini VI-A MR 5.1.10.3
9. Command pilot's microphone noisy.	Positioned too far from mouth or too near to center of mouth.	Crew adjustment.	-- MR 5.1.2
10. Handheld humidity sensor surface temperature indicator read high.	Sufficient time not allowed for indicator to stabilize.	None - more accurate device flown on subsequent missions.	-- MR 5.1.10.5

~~CONFIDENTIAL~~

~~CONFIDENTIAL~~

Problem	Cause or remarks	Resolution and mission effectivity	Reference document
11. Early drogue chute deploy.	Command pilot error - meant to go to dual ring RCS.	None required, crew training.	MR 5.1.1.1.1 MR 7.1.1.27
12. Blood pressure inflator would not bleed after landing.	Probably operator error.	None required, no effect on mission.	MR 5.1.1.10.6 STR 5061
13. Lighting on center panel and water management panel inadequate for nighttime operation.	Low light level.	Light added to digital clock on center panel. Water panel not used often enough to warrant change.	MR 5.1.1.10.1 MR 7.1.1.2.6
14. Computer start light too bright.	Pilot's preference.	Variable shield added to light.	MR 5.1.1.10.1 ECP 605
15. 35-mm photo event indicator jammed.	Not matched with film transport adapter.	Photo event indicator and film transport adapter to be matched sets on all subsequent flights. (Photo event indicator later determined to be unnecessary.)	MR 5.1.1.10.4 MR 8.4.4 STR 5058

~~CONFIDENTIAL~~

~~CONFIDENTIAL~~

Problem	Cause or remarks	Resolution and mission effectivity	Reference document
<u>Flight Control and Network</u>			
1. MCC-H unable to hear spacecraft during launch.	Remote transmitter at MCC-C keyed on due to operational error.	Operator training.	Gemini VI-A MR 5.1.2.1
2. Ground time-to-retrofire clock did not start at lift-off.	Clock started at LO + 3 minutes with a minus 2 seconds bias.	Clock updated during mission.	Gemini V MR 6.1.2.1
3. MCC-H unable to contact spacecraft for one station pass.	Failed to instruct station to go remote.	None required, procedures and operator training.	-- MR 5.1.2.1
4. Last computer update at CNV not expected by crew.	Ground failed to inform crew of update.	Procedures and operator training.	Gemini VI-A MR 7.1.17
5. Could not accurately predict orbital life time after change to higher orbit.	Required K factor of 0.6 instead of 1.0.	Changed empirical data.	Gemini VI-A MR 6.2.2.2
6. IGS computer incorrectly updated for reentry, landing 90 miles short.	Incorrect navigation coordinate sent to computer due to term omitted in ground computer entry.	Computation at MCC-H corrected. Real-time off-line computer checks will be run on all future missions.	Gemini VI-A MR 6.2.2.2
7. Both ground computers out at same time.	Illegal code entry.	Mission program changed to reject illegal codes - operators instructed in codes.	Gemini VI MR 6.2.2.2
8. MOC and DCS into constant online print condition.		Corrected during mission.	Gemini V MR 6.2.2.2
9. Communication processor had drum memory lock out (4 times).	Pulse-shaping circuit sensitive to a particular data pattern.	Hardware and software changes made after mission.	Gemini VI MR 6.2.2.3
10. CRO radar data unusable much of the time.	Calibration different from expected. Intermittent bias angle error.	Computer program changed. Tracking bias resolved after mission.	Gemini VI-A MR 6.2.21.2 MR 6.2.2.2.1 GSFC 3.1.3.3
11. CSQ DCS out during Revolutions 51 and 52.	Improper voltage applied to modules. Cables damaged by ship-board vibration and operation.	Repaired during mission, operation restored.	Gemini V MR 6.2.2.1 GSFC 3.5.2

~~CONFIDENTIAL~~

~~CONFIDENTIAL~~

Problem	Cause or remarks	Resolution and mission effectivity	Reference document
12. CSQ DCS RF command did not function during Revolution 79.	Circuit breaker internal short to arc shield in ship's power supply.	Repaired during mission.	MR 6.2.2.1 GSFC 3.5.2
13. Some stations had temporary difficulty in generating PCM summary messages.	Hardware and procedural problems.	Procedures modified and hardware repaired.	MR 6.2.2.2 GSFC 3.4.3
14. Houston, Cape and GSFC - Texas communication circuits out for 3 hours.	Cable cut at Oxford, Alabama.	Temporary restoration by microwave link.	MR 6.2.2.3
15. Radar on USS Wheeling failed.	Numerous maintenance problems.	Maintenance procedures reviewed and modified.	MR 6.2.2.1 GSFC 3.1.3.2
16. DCS update remoted from MCC-H thru the Texas station was not fully received and stored by spacecraft computer on Revolution 4.	Ground station transmitted data too fast for spacecraft to store as a result of spurious MAPS resulting when PCM ground station lost sync.	DCS update routine at MCC-H modified to preclude recurrence of this type problem.	MR 5.1.2.4
17. Remoted blood pressure readings did not agree with readout at network station.	Calibration problems plus noise in transmission.	Correct calibration supplied.	MR 7.2.2.1
18. SPADATS vector on rendezvous evaluation pod not usable.	Two objects being tracked. (Probably pod and blanket.)	Blood pressure no longer measured.	MR 6.2.2.2
19. Inability of California and Ascension to receive HF voice communication during conduct of HF air-to-ground tests.	Problem at California probably due to weather disturbances; problem at Ascension probably due to type of antenna used.	None required, situation peculiar to this mission. None required, no effect on mission, California and Ascension only recording HF test data.	MR 5.1.2.2

~~CONFIDENTIAL~~

Problem	Cause or remarks	Resolution and mission effectivity	Reference document
<u>Launch Complex</u> 1. Erector would not lower during simultaneous launch demonstration resulting in 1 hour and 26 minutes hold.	DC motor generator set inoperative due to motor controller being improperly assembled during periodic maintenance.	Motor controller correctly assembled. All erector equipment boxes sealed. Procedure changed to require cycle tests after any maintenance operation. Gemini VI Gemini VI-A	

~~CONFIDENTIAL~~

Problem	Cause or remarks	Resolution and mission effectivity	Reference document
<u>Target Launch Vehicle</u>			
1. A sharp decrease in thrust section ambient temperature in quadrant IV occurred at lift-off +75 seconds.	The most probable cause was determined to be a minor liquid oxygen leak in the thrust section together with unidentified air circulation patterns.	Redesign lox system plumbing to avoid possible leaks.	MR 5.5.2.1
2. Sustainer fuel pump discharge pressure indicated a decay from 900 psia to 690 psia at lift-off +78 seconds, then a recovery to 900 psia in approximately 2 seconds.	The most probable cause was determined to be instrumentation sensing line blockage due to freezing of static fuel in the line. Similar indications have occurred during the flight of nine previous Atlas vehicles.	A special leak check of the liquid oxygen start system was performed after the propellant loading demonstration because of previous fuel sensing line freezing.	MR 5.5.2.1
3. Propellant utilization valve oscillations were noted when the valve was between the nominal position and the closed limit.	Unknown. Remark: Similar valve oscillations have been noted at the factory and launch site during propellant utilization system checkout. These oscillations had no significant effect on propellant utilization system performance.	None required.	MR 5.5.2.2

~~CONFIDENTIAL~~

~~CONFIDENTIAL~~

Problem	Cause or remarks	Resolution and mission effectivity	Reference document
<u>Gemini Agena Target Vehicle</u>			
1. Measurement B-201 (-Y Gas Sphere Pressure) became inoperative prior to launch.	Unknown - demating of the GAIV/TLV would have been required to determine cause.	None required, pressure checked prior to launch.	MR 5.4.7
2. Measurement C-13 (Battery Case Temperature no. 2) became inoperative prior to launch.	Unknown.	Safe battery temperature, prior to launch, was determined with an external probe.	Gemini VI MR 5.4.7
3. Accelerometer measurement A5 (Z no. 2 aft) and A522 (Y no. 2 aft) lost at lift-off plus 305 seconds.	Probable cause due to proximity of transducers to separation pyrotechnics.	Relocation of transducers and shock mounting of associated amplifiers to minimize pyrotechnic shock.	Gemini VIII MR 5.4.7 ECP: LH-545-101PRI
4. Primary propulsion system failed at ignition for the ascent maneuver.	A high pressure detonation occurred in the engine oxidizer cooling passages or thrust chamber. This was caused by an excessive accumulation of fuel due to a fuel lead and resulted in a critical amount of propellants reacting at ignition. The hard start caused damage to electrical and/or mechanical components which caused a premature primary propulsion system shutdown. The helium blowdown pressurization system continued to pressurize the propellant tanks until they burst.	The following action was taken: 1. The primary propulsion system control circuitry changed to provide an oxidizer lead into the combustion chamber. 2. Turbine overspeed shutdown circuitry locked out during ascent. 3. Instrumentation sampling rates changed to provide higher response data in critical areas. 4. High altitude testing of changed start sequence performed to demonstrate flight worthiness.	Gemini VIII MR 5.4.2.3 ECP: LH-545-101PRI LMSC Report: A774454 and Change no. 1

~~CONFIDENTIAL~~

~~CONFIDENTIAL~~

Problem	Cause or remarks	Resolution and mission effectivity	Reference document
<u>Launch Complex</u> 1. After first launch attempt crew could not egress for 92 minutes.	1. Fire at base of missile. 2. Procedures for safing GLV based upon weapons system requirement, and had not been modified for a man rated system.	Procedures modified to optimize time to safe GLV.	

~~CONFIDENTIAL~~

Problem	Cause or remarks	Resolution and mission effectivity	Reference document
<u>Gemini Launch Vehicle</u>			
1. Prior to lift-off an apparent anomaly occurred in the hydraulic system.	False indication from the actuator position transducer that the stage I no. 4 actuator (pitch) had drifted to +1.0 degree.	Instituted better quality control in buildup of transducer.	Gemini VIII MR 5.2.4
2. The first launch attempt was terminated by an engine shutdown command generated by the master operations control set.	The command was the result of the premature separation of electrical umbilical connector 3D1M.	Break-away wires added to increase separation force from 6 pounds to 25 pounds. Connectors were marked with a paint stripe to provide visual reference of mated and locked condition. Aero-dynamic fairing which covers connectors was modified to facilitate visual inspection of mated connectors.	Gemini VI-A MR 5.2.6
3. Examination of launch attempt data showed the drop-off of thrust chamber pressure on the number 2 engine assembly.	Disassembly and inspection of the gas generator revealed that a plastic dust cover had been inadvertently left in the oxidizer inlet port.	Instituted new inspection procedures for better quality control in engine buildup at Martin Baltimore and Aerojet General Corporation.	Gemini VII MR 5.2

~~CONFIDENTIAL~~

~~CONFIDENTIAL~~

Problem	Cause or remarks	Resolution and mission effectivity	Reference document
<u>Spacecraft</u>			
1. Burned residue deposited on windows at staging affected visibility.	Flame enveloped front of spacecraft at GLV staging.	Installation of transparent window cover to be jettisoned after launch.	Gemini IX-A MR 1.0/5.1.1 STR 6008 ECP 744
2. The electrical connector on the cable from the left seat to the command pilot's suit failed to lock at time of crew ingress.	The connector had not been fit-checked with flight hardware after rework.	Locking fingers on Microdot connector have been redesigned.	Gemini VIII MR 5.1.10.1 STR 6039 ECP 686 ECP 827
3. Delayed time telemetry tape recorder failed at 20 hours, 55 minutes ground elapsed time.	Foreign matter resulting from bearing dust shield cutting into aluminum shoulder.	Shoulder cut down to eliminate interference - shoulder material hardened.	Gemini VIII MR 1.2 STR 6020 ECP 732
4. The voice tape recorder failed during the final portion of the second tape.	The motor to reduction wheel drive belt had broken.	Belt tension reduced and alignment of belt checked more carefully.	Gemini VIII MR 5.1.2 STR 6028
5. At 24 minutes 53.4 seconds g.e.t. a group of five PCM parameters in the reentry vehicle low level multiplexer were lost. The parameters returned to normal operation after retrofire.	Lab test at vendor subsequent to mission could not cause failure to repeat.	No possible action, no effect on mission.	-- MR 5.1.3.2 STR 6026
6. The crew reported a substantial amount of lint and dust escaping from the various stowage pouches when they were opened in orbit.	Poor quality control.	Vacuum all stowage pouches inside and outside before packing for flight.	Gemini VIII MR 5.1.10.1.1
7. The center line stowage compartment door was deformed after insertion making it very difficult to close for reentry.	Structural deflection of the large pressure bulkhead when subjected to normal cabin differential pressure.	Increasing the flexibility of the box attachment to structure will permit proper closing of the door despite effects of pressure.	Gemini IX-A MR 5.1.10.1 STR 6031 ECP 855

~~CONFIDENTIAL~~

~~CONFIDENTIAL~~

Problem	Cause or remark	Resolution and mission effectivity	Reference document
8. The lack of any pitch markings in the "8-ball" between 60 degrees and 90 degrees was described as serious deficiency for backup rendezvous procedures.		Future spacecraft will be marked with 1 degree markings from 0 to +60 degrees and 5 degrees markings from +60 to +90 degrees.	Gemini VIII MR 5.1.10.2 ECP 683 ECP 751
9. The new sequence camera failed after 9-1/2 of 10 film magazines had been used.	Jammed magazine caused an overload current to burn out the motor.	Circuit breaker installed in input power circuit.	Gemini VIII MR 5.1.10.4 STR 6022
10. Misalignment of optical sight.	The command pilot noted that the amount of torque applied to tighten the lower attach knob affected the alignment of the optical sight.	Demonstrate alignment repeatability during prelaunch testing and incorporate index marks on thumb screws.	Gemini VIII MR 5.1.10.3
11. The pointer of the flight director indicator shifted from 1/2 pointer-width down to 2-1/2 pointer-widths down during retrofire representing a 12-mile overshoot for landing.	Both FDI's were tested. Both were in specification limits and no anomalies were found.	More thorough preflight calibration has been instituted. Crew familiarization to particular FDI instituted. (Possibly different from GMS.)	Gemini VIII MR 7.1.2.6 STR 6006B STR 6519
12. The lower docking fitting cover of the R&R section failed to slide forward to cover the cavity exposed by the jettisoned docking fitting.	A fiber-glass channel had been improperly repaired. A notch prevented cover from sliding forward.	Improved inspection procedures.	Gemini VIII MR 5.1.1
13. Postflight inspection revealed two leaks in the right-hand secondary oxygen subsystem.	Leakage was due to improper torque applied to union.	New torque values were established.	Gemini VIII MR 5.1.4 STR 6033
14. One group of redundant pairs of pyrotechnic initiators had not fired.	Postflight inspection revealed that the nose fairing jettison switch malfunctioned.	Selective assembly and added checkout procedures were incorporated into the switch assembly procedures.	Gemini VIII MR 5.1.7.2 STR 6507A MR 5.1.9

~~CONFIDENTIAL~~

Problem	Cause or remarks	Resolution and mission effectivity	Reference document
15. Postflight inspection of pyro-switch G, which opens all circuits in the wire bundle from the spacecraft to the launch vehicle prior to separation, indicated a closed circuit.	The glass seals on the piston pins were fractured, loosening the pins. This allowed intermittent contact of the piston pins and connector pins. It was apparent that the piston pins bottomed out approximately 0.01 inch before the piston stop and the piston pins therefore absorbed the force on the piston.	None required - this failure is considered a random tolerance problem.	MR 5.1.9 STR 6511
16. The TBI2 terminal strip was found to have reversed nomenclature.	Poor quality control.	Stepped up quality procedures in this area.	MR 12.6
17. The left-hand biomedical tape recorder failed during the mission; therefore, it was not possible to obtain a complete history of the pilot's respiration rate nor to record the command pilot's blood pressure reading after landing.	The tape had come off the reel during the launch phase, thereby stopping the recorder. The other physiological measurements were recorded on a parallel redundant recorder.	Failure analysis did not reveal the cause of the failure. Assumed to be due to improper initial winding of the magnetic tape on the supply reel. Particular attention to be given this area on future flights.	MR 5.1.10.6 STR 6034

~~CONFIDENTIAL~~

Problem	Cause or remarks	Resolution and mission effectivity	Reference document
<u>Experiments</u> 1. Crew reported the handheld survey instrument came out of the holder during the spacecraft pitchdown to two-point suspension.	It is possible the unit was not properly locked into place after use.	Subsequent testing failed to loosen the instrument from its holder. (D-8 experiment) No action necessary.	MR 8.1.4

~~CONFIDENTIAL~~

~~CONFIDENTIAL~~

Problem	Cause or remarks	Resolution and mission effectivity	Reference document
<u>Flight Crew and Equipment</u>			
1. The crew was uncomfortably warm during flight except for sleep period. They could not exert effort without excessive sweating.	Spacecraft does get slightly warm in the completely powered up configuration.	Postflight testing indicated no malfunction had taken place. Procedure changed. Use two fan operation from lift-off to spacecraft power down.	MR 5.1.10.1 STR 6510 Gemini VIII
2. The pilot complained of a raw place on forehead.	Pushing against pressure suit helmet while writing during first 6 hours of mission.	None.	MR 5.1.10.3
3. The pilot's oral temperature probe inoperative.	Problem discovered after crew ingress; insufficient time for repair.	No discrepancy found; failure attributed to a loose connector inside the helmet.	MR 5.1.10.6 STR 6029
4. Voice communications from the spacecraft were sub-standard during the entire mission.	Noise was caused by air circulation within the pressure suits contacting the helmet microphones.	Crews to be briefed on microphone positioning.	Gemini VIII MR 5.1.2.1 STR 6023A
5. The cabin lighting on the center instrument panel was poor for nighttime operation.		Light added to digital clock.	Gemini VIII MR 5.1.10.1 ECP 727
6. Excessive force was required to mate the quick disconnect coupler on the urine hose to the spacecraft quick disconnect nipple.	Excessive engaging forces due to lack of lubrication and high spring forces.	Spring forces reduced and lubrication applied.	Gemini VIII MR 5.1.10.5 STR 60016
7. The flight crew noted that some urine tended to remain in the urine system receiver area.	A small amount of residual urine is inherent in the current system.	Tissues are provided as supplementary aid.	Gemini VIII MR 5.1.10.5
8. The pilot cracked the visor of his pressure suit helmet at the time of release from single-point suspension.	Pilot reported having left arm in front of head to avoid hitting window frame. Visor probably hit wrist ring.	Visor redesigned to increase structural integrity during EVA.	Gemini VIII MR 5.1.10.1

~~CONFIDENTIAL~~

~~CONFIDENTIAL~~

Problem	Cause or remarks	Resolution and mission effectivity	Reference document
<u>Flight Control and Network</u> 1. Tape-dump OFF command was not validated on revolution 11 over CYI.	Unknown. Remark: A postflight analysis revealed the presence of a message acceptance pulse in the down linked telemetry. Therefore, nonvalidation was attributed to a malfunction in the ground station.	--	MR 5.1.2.4

~~CONFIDENTIAL~~

~~CONFIDENTIAL~~

Problem	Cause or remarks	Resolution and mission effectivity	Reference document
<u>Launch Complex</u> 1. Engine umbilicals 2B1E and 2B2E disconnected out of sequence (no mission effect). 2. Lift-off 3.702 seconds later than planned.	Lanyard rigging not correct. Range sequencer not properly synchronized with range count-down clock.	Changed lanyard length. Procedures firmly established.	MR 5.2.7.1 MC XIII.A.2 MR 4.1

~~CONFIDENTIAL~~

~~CONFIDENTIAL~~

Problem	Cause or remarks	Resolution and mission effectivity	Reference document
<u>Gemini Launch Vehicle</u>			
1. Oxidizer pressurant pressure switch operated near limit conditions.	Back pressure of GLV lines less than on test stand.	Resize back pressure orifice to insure earlier operation.	MR 5.2.2.1 MC III.A.1.f AG III.A.4 A 5 A 6.10.2
2. Temporary loss of PCM data at lift-off +79.5 seconds.	Component failure in onboard PCM multiplexer.	Believed to be random component failure, no further action planned.	MR 5.2.7.2 MC VIII.A.2 A 5
3. Unexpected signal attenuation at BECO +23 seconds.	Suspected cause - antenna deformation due to aerodynamic heating.	Addition of antenna stiffeners.	MR 5.2.7.2 A 5 A 6.9
4. Spike in stage II thrust chamber pressure.	Detonation of propellant in line.	None required.	MR 5.2.2.2 MC III.A.2.b AG III.b.1
5. Venting of GLV second stage after spacecraft separation.		None.	MR 7.1.2.3
6. Slight oscillation in pitch and yaw at end of ground guided flight.	Noise in radar data.	None - condition is characteristic of atmospheric conditions at launch site during late fall and winter.	MR 5.2.5.5

~~CONFIDENTIAL~~

~~CONFIDENTIAL~~

Problem	Cause or remarks	Resolution and mission effectivity	Reference document
<u>Spacecraft</u>			
1. Film on spacecraft windows.	Residue from flame of second stage ignition.	Installation of transparent window cover to be jettisoned after launch.	Gemini IX-A MR 5.1.1.1 MR 6.3.4 MR 7.1.2.2 STR 7013 ECP 744
2. Cord like material on aft edge of equipment adapter.	Material from Z13 shaped charge assembly.	None - no hazard to spacecraft or pilot during EVA.	-- MR 5.1.1.9 MR 9.0.9
3. Difficulty in closing centerline stowage box door while in orbit.	Deformation of large pressure bulkhead due to cabin pressure. This distorts box (box attached to bulkhead).	Redesign door to allow easier closing. Test in altitude chamber.	Gemini VIII MR 5.1.1.1 MR 5.1.10.1 STR 6031 ECP 855
4. Telemetry recorder stopped; ball bearing between playback clutch and shaft seized.	Foreign matter resulting from bearing dust shield cutting into aluminum shoulder.	Shoulder cut down to eliminate interference - shoulder material hardened.	Gemini VIII MR 5.1.3.1 STR 8014 ECP 732
5. RSS measurement of oxygen tank pressure (BAO2) failed on both TM and cabin indicator at approximately 171 hr g.e.t.	Unknown, pressure transducer is located in the adapter equipment section.	Satisfactory automatic heater operation was indicated after 171 hr g.e.t. by observing the expected load variations on the main bus ammeter.	-- MR 5.1.7.3
6. "Average suit inlet air temperature" cabin indicator failed after 267 hr g.e.t.	Failure attributed to penetration of ceramic insulation of the wire caused by long exposure to aluminum hydroxide, sweat, and water.	None required for short duration missions (10 days or less).	-- MR 5.1.4.3 STR 7508
7. Spacecraft tumbling at a high rate of left yaw (8 to 10 deg/sec) and small amount of left roll after sleep period at approximately 158 hr g.e.t.	Venting of water boiler.	Predicted.	-- MR 5.1.4.1
8. Free water from pilot suit inlet hose.	Possible cause is degradation of water separator section of suit heat exchanger or caused by orientation of spacecraft.	Heat exchanger and separator examined. Units within specification.	-- MR 5.1.4.3 STR 7502A

~~CONFIDENTIAL~~

~~CONFIDENTIAL~~

Problem	Cause or remarks	Resolution and mission effectivity	Reference document
9. Cabin temperature too low (60°F) at 158 hr g.e.t.	Undetermined - possible cause, tumbling effects.	Not applicable to other spacecraft. Suits will not be off for subsequent spacecraft.	MR 5.1.4.3
10. Cycling of coolant temperature control valve outlet temperature.	Normal, using "B" coolant loop.	Tested and found to be not detrimental.	MR 5.1.4.3
11. Free water collected on the metal floor immediately in front of both ejection seats, and the insulation on the center pedestal was wet during the last week of flight.	Cabin coolant control valve was opened thus cooling this area below the cabin dew point.	Coolant lines and cabin heat exchanger have been removed for subsequent spacecraft. This will eliminate one heat sink for cabin moisture condensation.	MR 7.1.2.7 ECP 251
12. Electronic Time Reference System time off by 589.46 seconds.	Accidental power shutoff by crew.	Subsequent crews informed to be more cautious.	MR 5.1.6
13. Unanticipated oxygen-to-water differential pressure indications during orbit.	Insufficient data to determine the cause.		MR 5.1.7.24
14. No oxygen-to-hydrogen differential pressure light during purge.	Possible cause - restriction at vent port due to freezing.	Modification of the vent port configuration.	MR 5.1.7.2 ECP 712
15. Buildup of ice on hydrogen vent port on the equipment adapter section.	Possible cause - moisture carried with the hydrogen.	Configuration modification to reduce possible restriction due to ice.	MR 5.1.7.2 ECP 712
16. Fuel cell stack 2A and 2C degraded excessively.	Possible cause - failure to get rid of product water.	Configuration modification to reduce possible restriction due to ice.	MR 5.1.7.2 ECP 712
17. Fuel cell section 2 control circuit breaker tripped.	Unknown. Failure was not located in the reentry assembly items.		MR 5.1.7.1 MR 12.6.1.7 STR 7507
18. Yaw right OAMS thruster (3 and 4) performance poor at 283 hr g.e.t.	Possible cause - obstruction in propellant fuel system.	No action.	MR 5.1.8.1 MR 7.1.2.7

~~CONFIDENTIAL~~

~~CONFIDENTIAL~~

Problem	Cause or remarks	Resolution and mission effectivity	Reference document
19. 400 cps noise on voice recorder.	Noise was attributed to urine measurement system utilizing the voice recorder.	This system of urine measurement was used on Gemini VII only.	MR 12.6.1.1.3
20. Bright setting of optical sight intermittent.	Intermittent connector in one filament of dual filament lamp for reticle.	During mission - tapping of light caused proper operation. Subsequent flights - use of redundant circuit.	MR 5.1.10.4 STR 7026
21. Oscillations of main bus ammeter needle after landing.	Probably due to wave motion affecting meter movement.	None required.	MR 5.1.7.1 MR 7.1.2.5
22. Hole in Rene' shingle forward of right-hand hatch.	Handling after recovery.	None required.	MR 12.6.1.1.1 MR 12.6(g)
23. Shingle around bottom of C-band antenna shifted position to partially cover the antenna.	Unknown.	No effect on mission.	MR 12.6(c)
24. Sticky substance found near ports on rendezvous and recovery separation ring.	Silicone rubber and dry lubricant.	None required, no effect on mission.	MR 12.6(e) STR 7505

~~CONFIDENTIAL~~

~~CONFIDENTIAL~~

Problem	Cause or remarks	Resolution and mission effectivity	Reference document
<u>Experiment</u>			
1. Command pilot electroencephelogram leads became detached (Experiment M-8).	Paste used to stick sensors to scalp had to be of a nonirritating quality and was known to degrade with time and lose its adhesive quality.	Predicted - experiment not flown on subsequent missions.	MR 7.2.2.1 MR 7.1.2.3
2. Experiment M-1 equipment noisy.	Dump valve pinged audibly every time it cycled.	Crew placed towel around experiment package to reduce noise. Experiment not flown on subsequent missions.	MR 7.1.1.2 MR 7.1.1.3
3. Photometer for D5/MSO-12 failed.	Failure of photomultiplier tube due to metal particle from welded lead connections shorting no. 9 dynode to cathode.	Improved quality control at manufacturer - special inspection for metal particles after assembly. X-ray of all photomultiplier tubes to assure that there are no welding flecks in any more tubes.	MR 4.1.8.2 MR 7.1.2.3 MR 8.2.4 STR 7015

~~CONFIDENTIAL~~

~~CONFIDENTIAL~~

Problem	Cause or remarks	Resolution and mission effectivity	Reference document
<u>Flight Crew and Equipment</u>			
1. Voice communications practically unreadable during launch.	Lightweight pressure suit helmet not as effective in reducing engine noise as hard helmet.	Lightweight helmet not being used on subsequent mission.	MR 5.1.2.1
2. Interphone operation noisy with helmet on and closed.	Air noise not attenuated by lightweight helmet.	Same as 1.	MR 5.1.10.3
3. Voice tape recorder inadvertently left running during period of no action or conversation.	No indicator light for record operation.	Addition of light deemed not feasible - no action.	MR 5.1.10.3
4. Polaroid filter did not block sunlight sufficiently for sleep.	Not opaque between circle and edge of window.	During the mission the crew used metal foil from food packages to block sunlight. Reflective shields to cover window made available to crew.	MR 5.1.10.1 MR 7.1.1.3 ECP 774
5. Some disinfectant tablets attached to food bags crumbled prior to use.	Tablet made softer prior to flight.	Methocel wrapping of disinfectant tablets.	MR 5.1.10.5 STR 7023
6. Food bag burst during use.	Extra hand pressure necessary to force larger chunks of rehydratable food through spout.	Larger feeder spout to be provided for bag containing rehydratable foods.	MR 5.1.10.5 STR 7023
7. Bite-size beef crumbled.	Evacuation of overwrap after individual food items packaged.	Coating has been added to bite-size items to prevent crumbling.	MR 5.1.10.5 STR 7023
8. Urine disposal receiver leaked.	a. Improper position of receiver control valve caused a restriction in flow. b. Degradation of latex receivers.	Crew made aware of correct positioning of control valve prior to use of receiver.	MR 5.1.10.5 STR 7028

~~CONFIDENTIAL~~

Problem	Cause or remarks	Resolution and mission effectivity	Reference document
9. Difficulty in connecting urine disposal quick disconnect fitting to water management system.	Contamination due to dried urine products plus an insufficient amount of lubrication.	Spring changed and relubricated. Requirement changed to 19 pounds maximum engaging force and 8 pounds maximum disengaging force.	STR 7028A STR 7510 ECP 738
10. One urine disposal sample bag leaked.	Weak heat seal.	Closer inspection of heat seal for adequacy during proof pressure testing.	MR 5.1.10.5 STR 7023
11. Pilot's auxiliary electrocardiogram input leads reversed.	Cleaning of sensor removed identifying marks.	During mission - reversed input to oscillographs at the ground stations.	MR 5.1.10.6 STR 7033
12. Impedance pneumograph signal from command pilot intermittent.	Output leads from signal conditioner loose.	Repaired by command pilot in flight.	MR 5.1.10.6 MR 7.2.2.1 STR 7033
13. Command pilot upward visibility impaired.	Lightweight helmet visor.	Command pilot removed helmet.	MR 5.1.10.3
14. Pilot's visibility obscured by fumes.	Fumes in suit loop due to opening of snorkel valve.	Open cabin recirculation valve prior to opening snorkel inlet.	MR 7.1.1.7 MR 7.1.1.25
15. Center panel, particularly digital clock, inadequately lighted.		Light added to digital clock.	MR 5.1.10.1 MR 7.1.1.3 ECP 727

~~CONFIDENTIAL~~

Problem	Cause or remarks	Resolution and mission effectivity	Reference document
<u>Flight Control and Network</u>			
1. Early loss of Burroughs steering parameters on Guidance Officer's stripchart recorders.	GSFC switched lines to aeromedical parameters too soon.	Parameters to be routed by direct line from Cape Kennedy to MCC-H.	Gemini VIII MR 6.1.2.1
2. HF voice ground-to-air unreadable except in vicinity of transmitting station.	Not unusual phenomena with HF communications.	None required, normal.	-- MR 5.1.2.2
3. Low signal strength from GLV command transmitter at Grand Turk.	Both airborne and ground equipment were normal. Problem was of a momentary nature.	No effect on mission.	-- MR 5.2.9.1 A 5 A 6.8.1
4. Propellant remaining calculations by RSDP in error.	Programmed to disregard thrust indications during loss of synchronization periods.	Program change.	Gemini VIII MR 6.1.2.2
5. Several DCS commands not validated by spacecraft DCS.	Ground network malfunction: BDA - line noise; ETR - DRED unit malfunction. TEX - momentary loss, did not repeat.	ETR - changed several suspect electronic modules.	Gemini VIII MR 5.1.2.4 MR 6.2.2.1
6. Intermittent error of 4 hours in computation of ground elapsed time at remote sites.	G.m.t. input error.	Corrected manually in real time by individual site during mission.	Gemini VII MR 6.2.2.2
7. TEX station had local RFI problems.	Noise from local industrial plant.	Plant operations curtailed during TEX passes.	Gemini VII MR 5.1.3.2 MR 6.2.2.1 MR 6.2.2.3
8. Problems with early VR 3600 tapes from TEX.	Head misalignment.	Realigned during mission. Improved premission checkout procedures.	Gemini VII MR 6.2.2.1
9. Excessive data loss on HAW dump during Revolution 6.	Initiation of dump at an inadequate signal-to-noise ratio.	Assure adequate signal before starting tape dumps.	Gemini VIII MR 5.1.3.2

~~CONFIDENTIAL~~

~~CONFIDENTIAL~~

Problem	Cause or remarks	Resolution and mission effectivity	Reference document
10. Intermittent range bias in HAW radar data.	Unknown - data were acceptable on later revolutions.	Not detrimental to mission.	MR 6.2.2.1
11. Moisture in preamplifier and hybrid circuits of acquisition aids at HAW and CAL (no data loss).	Heavy rains caused moisture to collect in the systems.	Drying solution used to remove moisture. No effect on mission support.	MR 6.2.2.1
12. Problems with planetary gear on acquisition aid antenna pedestal GYM-CYI (no data loss).	GYM experienced two problems: a. On F-0 days, a shaft sheared on the azimuth pinion drive gear. b. On F-3 days, the azimuth mechanical strip collar froze on the shaft. At CYI, the number 2 planetary drive failed in azimuth.	Equipment repaired on site.	MR 6.2.2.1
13. Large residuals in CYI radar data.	Trouble isolated to a defective elevation drive motor and servo feedback control transformer.	The components replaced and system performed normally.	MR 6.2.2.1
14. RSDP error of 10 hours g.e.t. at CYI and CSQ.	Erroneous updating of G.m.t. by telemetry output buffer. The timing-distribution-frame relay contacts were not reliable over a long period of time.	All stations advised to periodically check these contacts.	MR 6.1.2.2
15. Ground-to-air transmitter failure at Kano on Revolution 176.	The cause of the failure is unknown. Transmitter found to be operative during postflight test.	Station will switch to the standby transmitter if this problem reoccurs.	MR 6.2.2.3

~~CONFIDENTIAL~~

Problem	Cause or remarks	Resolution and mission effectivity	Reference document
<u>Target Launch Vehicle</u> 1. Helium pressure supply to the air-borne bottles indicated 3300 psi; normal pressure is 3000 psi.	Pressure switch in the Aerospace Ground Equipment (AGE) failed to operate.	Helium loading switched to manual control and no count-down hold was required.	Gemini VIII MR 5.5.4.1

Problem	Cause or remarks	Resolution and mission effectivity	Reference document
<u>Gemini Agena Target Vehicle</u>			
1. Yaw error during GATV primary propulsion system burns.	The vehicle center of gravity was offset from the vehicle thrust centerline and the control system response was slow.	Relocation of equipment and addition of ballast to shift center gravity.	Gemini IX MR 5.4.5.3 ECP: LH-545-180ER1
2. Contamination or film reported on the gage dial glasses of the target docking adapter status display panel.	Unknown. Remark: No possible sources of internal contamination were apparent from an examination of instrument specifications.	A Mission Preparation Sheet for each TDA will be written to assure proper cleaning of gages prior to each mission.	Gemini IX MR 5.7
3. Crew reported GATV attitude control system pitch thruster plumes were visible when the attitude control system was thought to be deactivated.	Examination of all data available during this time period revealed no thruster firings.	No action to be taken.	-- MR 7.1.2.9
4. TLV/GATV separation monitor (measurement number A14) failed to provide correct signals for separation and separation rate.	Simulated separation tests conducted postflight revealed switch arm oscillations which cause multiple switch closures.	Switch arm travel limited by addition of a retainer and switch trips rotated to eliminate "buckling" effect.	Gemini IX MR 5.4.7 ECP: LH-545-184CC

~~CONFIDENTIAL~~

Problem	Cause or remarks	Resolution and mission effectivity		Reference document
<u>Gemini Launch Vehicle</u> No failures experienced for this mission.				

~~CONFIDENTIAL~~

~~CONFIDENTIAL~~

Problem	Cause or remarks	Resolution and mission effectivity	Reference document
<u>Spacecraft</u>			
1. GLV IPS and APS stage II oxidizer tank pressure gages on spacecraft instrument panel read low and were off scale during latter part of stage II flight.	Gages were out of calibration during preflight simulations. Remark: No abort requirements were based on these gage readings and recalibration was waived for flight. The tank pressure meter returned to the vendor for failure analysis.	Vendor failure analysis did not disclose the cause for the low meter readings. No additional work being done. Receiving inspection test procedures modified.	MR 5.2.8.3 STR 8026
2. The left shoulder Koch fitting of the right-hand ejection seat in the spacecraft became inoperative prior to launch.	The material causing the problem was analyzed and found to be "Epoxy Type VII." Investigation revealed three repairs were made in this area using this type of material.	The fitting was cleaned before launch. Increased emphasis on checkout procedures.	MR 7.1.2.1 STR 8028
3. Spacecraft upper umbilical connector failed to release by the drop-weight system at lift-off.	Misrigging of the upper and lower lanyards to the drop-weight caused the lower lanyard to exert the major force, thus resulting in an improper pull angle.	The lower lanyard rigging will be changed to provide more slack and insure a positive initial pull by the upper lanyard. Spring force on flight plug will be checked preflight.	MR 5.2.10 STR 8523
4. Ground personnel and flight crew could talk to one another at reduced volume without operating the push-to-talk switch in the voice-control-center keying mode.	Investigation revealed that this is a normal condition and can be duplicated with other spacecraft equipment in laboratory test.	None required.	MR 5.1.2 STR 8018

~~CONFIDENTIAL~~

~~CONFIDENTIAL~~

Problem	Cause or remarks	Resolution and mission effectiveness	Reference document
5. Uncontrolled firing of TCA no. 8.	Probably caused by a short circuit to ground occurring between the positive side of solenoid coils in the thrust chamber valves and common contact of the relay that selects the primary or secondary valve drivers in attitude control electronics. Equipment jettisoned with spacecraft adapter.	Circuitry checked for adequate insulation of crimp joints; OAME circuitry conformally coated with epoxy; inspection procedures intensified; special selection of clamps for wire bundle retention; single switch for OAMS thruster disable installed; flight procedures revised to provide crew with procedures for flight emergencies.	Gemini IX-A MR 5.1.5 MR 5.1.8 STR 8503 STR 8030 STR 8034 NASA Program Gemini Working Paper No. 5050
6. Low main battery voltage prior to equipment adapter separation.	One possible explanation for the low battery voltage could be high resistance in the spacecraft battery voltage test circuit. Postflight evaluation proved satisfactory battery operation.	Tests per STR 8509A indicated proper test circuit operation. Suspect test procedure did not allow time for stabilization of conditions. Procedures changed to allow at least 5 seconds under load. No further investigation being done.	Gemini IX-A MR 5.1.7.1 STR 8509A
7. Non-illumination of the amber indicator retro attitude light at T-256 seconds was reported by the crew.	Unknown. The cause for this discrepancy could not be duplicated by postflight laboratory analysis.	Changes resulting from the analysis include diode product improvement replacement and diode coating with RTV rubber.	Gemini X MR 5.1.7.5 STR 8508B

~~CONFIDENTIAL~~

~~CONFIDENTIAL~~

Problem	Cause or remarks	Resolution and mission effectivity	Reference document
8. The following circuit breakers were open at various times during the flight: a. Auxiliary tape memory unit. b. Fuel cell O ₂ and H ₂ heaters. c. RCS heaters. d. Antenna select relay. e. Orbital attitude and maneuver system.	Unknown. Postflight analysis failed to reveal the cause for these discrepancies.	--	MR 5.1.7.3 STR 8025
9. Initial time to retrofire load caused T _r to count up.	The Time Reference System was loaded with time-to-go to retrofire (T _r) for recovery area 45-1 which was in excess of 3600 minutes. This value overflowed this parameter in the MDIU subroutine. Any value of T _r greater than 1092 minutes will cause an overflow in the MDIU subroutine.	Gemini VIII After update at next network station for recovery area 7-3 the proper value was displayed by the MDIU.	MR 5.1.5.2
10. Initial difficulty encountered in loading module no. 4A in the auxiliary tape memory.	When loading difficulty was encountered the system was recycled and operated properly. Postmission testing of the wiring and the ATM switch indicated normal operation.	-- Suspect procedure, no action taken.	MR 5.1.5.2 STR 8521
11. Cyro mass quantity readout was erratic.	Postflight testing conducted on the reentry vehicle circuitry did not reveal source of the problem.	-- Considered random, none required.	MR 5.1.3.1 STR 8027

~~CONFIDENTIAL~~

Problem	Cause or remarks	Resolution and mission effectivity	Reference document
12. Orbital Attitude and Maneuver System regulated helium pressure indicated zero.	The instrumentation pressure transducer or its associated wiring failed. Satisfactory regulator performance was verified by other instrumentation. (This sensor is located in the adapter section and was jettisoned before reentry).	Considered random, none required.	MR 5.1.1.3 MR 5.1.1.8
13. Crew noticed moisture in spacecraft after impact.	Inspection of the cabin showed indications of water marks around ECS door seal. Laboratory tests of cabin showed leakage rate was within specification.	None required.	MR 5.1.1.1 STR 8023A
14. Crew reported flight director indicator fluctuations from 45 to 25 nautical miles. (radar)	Failure analysis revealed several discrepant conditions in the radar as tested in the postflight conditions. While some of these conditions could have caused the flight anomaly, no likely cause of the flight problem was found.	Inspection procedures and greasing of T14 flight connectors associated with the L-band transponder changed.	MR 5.1.5.2 STR 8037A
15. Crew reported residue appeared to accumulate on windows after stage II ignition.	Removed inner and outer window assembling and shipped to Houston for analysis.	The results of the Gemini VIII window study is presented in "optical evaluation of the GT-8 right-hand and left-hand windows" report. This report gives the chemical analysis of the residue, transmission, scalieren, relative resolution, and interference studies. Installation of transparent window cover to be jettisoned after launch.	MR 7.1.2.2 STR 8002
		Gemini IX-A	ECP 744

~~CONFIDENTIAL~~

Problem	Cause or remarks	Resolution and mission effectivity	Reference document
16. The crew reported difficulty in mating and latching the centerline stowage compartment door.	Fittings in extravehicular life support system were adjusted so the door preloaded the ELSS pack when closed. Suspected deformations resulting from cabin pressurization may have increased preload and caused difficulty.	Redesign stowage box to allow easier closing.	Gemini IX-A MR 5.1.1 MR 5.1.10 STR 8518A STR 8023A ECP 855
17. Drinking water contained large amounts of gas.	The design of the drinking water storage system for this spacecraft precluded use of the vacuum servicing procedures.	Tank outlet will be provided and servicing procedures changed to allow vacuum servicing similar to Gemini VI-A and VII.	Gemini IX-A MR 5.1.4.2 ECP 824
18. Stowage provisions for television monitor, and extravehicular visor for pilot's helmet were unsatisfactory for restowage in orbit.	The retention strap was too short to be engaged readily and it was difficult to hold the TV monitor in its stowage location while attaching the strap.	Alternate stowage provisions are available for the visor if needed. The monitor stowage provisions are being redesigned for Gemini XI.	Gemini XI MR 5.1.10.1

~~CONFIDENTIAL~~

Problem	Cause or remarks	Resolution and mission effectivity	Reference document
<u>Flight Crew and Equipment</u> 1. Crew reported the rehydratable food items were slow to reconstitute. 2. Crew reported that several bite-size items were broken apart.	Crew indicated postflight that they probably used less water than specified in the instructions on the food bag. Postflight evaluation showed particular care was required to avoid breaking the overwraps when separating the bites. There was a high probability of crumbs being produced when breaking the overwraps.	-- --	MR 5.1.10.5 MR 5.1.10.5

Problem	Cause or remarks	Resolution and mission effectivity	Reference document
<u>Target Launch Vehicle</u> 1. Loss of B-2 pitch control on TLV after 120.63 seconds resulting in pitch nose-down acceleration, which continued until BECO, and subsequent failure to place the Gemini Agena Target Vehicle in the required coast ellipse. 2. Apparent large lox residual error using station 6 residual calculation method.	Most probable cause - low impedance short to ground of the B-2 servo amplifier output command signal possibly caused by either cryogenic leakage in the thrust section or vibration. Calculations based upon flow rate during normal trajectory. Variation in flow rates due to abnormal trajectory caused large apparent error.	Additional inspection and tests including (-raying of servo valve, feedback transducer plug, and servo valve torque motor wiring prior to launch, and fiber glass wrapping of certain harnesses. None required. --	MR 12.7 MR 2.0 MR 11.0 MR 12.7 MR 2.0

Problem	Cause or remarks	Resolution and mission effectivity	Reference document
<u>Gemini Agena Target Vehicle</u> 1. Three phase inverter failed.	Arcing due to ionization of air at umbilical plug while target launch vehicle was flying through its own exhaust gases.	None - flight through exhaust gases resulted when vehicle control was lost and is not a normal condition.	MR Supplemental Report No. 7

Problem	Cause or remarks	Resolution and mission effectivity	Reference document
<u>Target Launch Vehicle</u> 1. No failures experienced for this mission.			

~~CONFIDENTIAL~~

Problem	Cause or remarks	Resolution and mission effectivity	Reference document
<u>Augmented Target Docking Adapter</u> 1. ATDA shroud failed to separate. 2. Abnormally high thruster activity beginning approximately 1.6 seconds after system activation causing a high rate of propellant consumption.	Improper installation of electrical connector quick-disconnect lanyards. Probable cause - change in vehicle dynamics due to partially detached shroud.	-- --	MR 5.8.1.1 MR 5.8.4

~~CONFIDENTIAL~~

~~CONFIDENTIAL~~

Problem	Cause or remarks	Resolution and mission effectivity	Reference document
<u>Launch Complex</u> 1. T-3 launch azimuth update failed to reach spacecraft on both launch attempt and launch.	Exact cause undetermined - most probable cause; noise induced in communications line to ground IGS interface buffer (receiving section). Other possible cause - marginal modules in the synchronizing circuitry in the ground IGS interface buffer (transmitting section).	For spacecraft launch - After two days of tracing, the ATDA orbit was defined with sufficient accuracy to allow the spacecraft to be launched using a previous update. New shielded cable pairs installed for communications line. Changed a number of low speed modules to medium speed modules. Changed ground IGS interface buffer detailed system test to include tests found useful during trouble shooting and revolidation of the system following Gemini IX-A. Added recorder to assist in additional trouble shooting. Changed timing in error strobe circuit. Added test with (E/Burroughs complex late in the count. Completed a detailed check of the system at elevated temperature. Added oscilloscope on line to allow viewing of all timing wave-forms to aid in trouble shooting.	Gemini IX-A MR 6.1.2.2 MR 4.1

~~CONFIDENTIAL~~

Problem	Cause or remarks	Resolution and mission effectivity	Reference document
<u>Gemini Launch Vehicle</u> 1. Velocity, altitude and flight path angle were low by 16 ft/sec, 2299 feet and 0.11 degrees respectively at spacecraft separation. 2. Stage I mixture ratio outside 3 sigma limits of run-to-run repeatability.	Drift in P dot lateral rate Mod III radar channel caused by tropospheric effects of low look angle. Oxidizer turbo pump inflight performance changed from ground test performance. (Possible cause - pump cavitation due to entrained gases.) Task team organized to resolve problem. GLV-10 was closely monitored to detect repetition since no serious problem would result from repetition of the problem.	None planned - spacecraft insertion condition within 3 sigma limits. Additional fuel loaded for GLV-11 and again for GLV-12.	MR 5.2.7.2 A 5 A 6.7.1 MR 5.2.7.2 A 5 A 6.4.4

~~CONFIDENTIAL~~

Problem	Cause or remarks	Resolution and mission effectivity	Reference document
<u>Spacecraft</u>			
1. Deposit of residue on spacecraft windows at launch in spite of window covers.	Believed to be partially caused by out gassing from plastic window retainers and seals under heat and vacuum (from Gemini XI analysis).	Nonmetallic portion of window assemblies heated under vacuum prior to assembly.	MR 5.1.1.1 MR 12.6 (a) STR 9015A
2. One general illumination light in adapter failed to illuminate.	Possible cause - pyrotechnic induced shock.	Addition of shock mounts for lights.	MR 5.1.1.1 ECP 911
3. Pilot had difficulty in mounting EVA camera.	Mating part not chamfered sufficiently to cam detent easily.	Chamfer changed.	MR 5.1.1.1
4. Holding characteristics of Velcro on R & R section degraded.	Launch heating.	None required. This use of Velcro was exploratory.	MR 5.1.1.1
5. Paint on pilot's ejection seat and egress kit blistered.	Higher than expected temperatures (in excess of 200°) during open hatch EVA.	Survey of all components in this area to assure that temperatures will not be detrimental. Flight procedures modified. Crew instructed to keep attitude to sun such that heating remains low.	MR 5.1.1.1 MR 12.6 (p)
6. Hatch difficult to open and close during EVA.	Lubrication inadequate.	Change in procedure for lubrication of hatch actuator piston. Block and tackle device added but was not required after lubrication procedure change.	MR 5.1.1.1 STR 9013 ECP 906
7. UHF voice communications weak, broken and distorted during EVA.	Command pilot vox sensitivity setting too low.	Vox mode of operation is not planned for use on future flights, however, procedures were developed for optimum setting of controls prior to launch. Procedures also developed for inflight testing and setting of controls, if necessary.	MR 5.1.2.1 MR 9.0 (11) STR 9020A

~~CONFIDENTIAL~~

~~CONFIDENTIAL~~

Problem	Cause or remarks	Resolution and mission effectivity	Reference document
8. UHF descent antenna bent at base.	Mounting fitting reversed at base causing units holding antenna blades to interfere with parachute bridle at two point suspension.	Fairing of rough ends of rivets with RTV-90. Fitting installed correctly.	MR 5.1.1.1 MR 12.6 STR 9020
9. PCM tape recorder magnetic tape came off one guide roller allowing recorder to operate in record mode only at approximately 6 hours 37 minutes g.e.t.	Probable major cause - metal chip in gear teeth. Contributing causes: a. Negator spring prewound 80 turns rather than 88. b. Loose pinch belt.	New preflight checkout procedure incorporated to checkout tape running path, smoothness of tape stack, negator spring winding of 94 turns, cleanliness of assembly, proper tension of motor drive belt, and a properly sealed recorder case. More realistic testing prior to launch, such as beginning-of-tape to end-of-tape runs, with numerous starts, stops, and playbacks. Tape recorder was run any time power was applied to the spacecraft during prelaunch operations.	MR 5.1.3.1 STR 9010 ECP 919
10. RSS hydrogen cryogenic mass-quantity (parameter CA09) failed at approximately 26 hours 58 minutes g.e.t.	Failure in transducer or adapter wiring (not recovered).	None required, no effect on mission.	MR 5.1.3.2
11. Left-hand suit inlet air temperature (parameter CC03) failed at approximately 69 hours 13 minutes g.e.t.	No cause could be found.	None known; however, not essential to flight and past performance has been good.	MR 5.1.4.2 STR 9018
12. Cabin pressure decayed from 5.1 to 4.68 psi beginning at approximately 66 hours 30 minutes g.e.t.	No cause found during postflight testing. Problem cleared up prior to end-of-mission.	None known; however, past performance has been good.	MR 5.1.4.1 MR 6.1.3 STR 9019 STR 9031
13. Apparent CO ₂ level increase of 1-mm Hg indicated on last revolution.	CO ₂ sensor failure; possible cause, water in sensor.	None required, sensor performance considered satisfactory in past flights. No effect on mission.	MR 5.1.4 STR 9510A

~~CONFIDENTIAL~~

~~CONFIDENTIAL~~

Problem	Cause or remarks	Resolution and mission effectivity	Reference document
14. Water entered cabin at landing.	Entered through cabin pressure relief valve. Procedure had been changed prior to mission to close valve after landing to prevent entrance of fumes into cabin.	Procedure to close valve at 2000-foot level reinstated.	Gemini X MR 5.1.4.4 MR 12.6 b
15. Depletion of drinking water during last revolution.	Check valve failed open due to particles caused by corrosion of aluminum flaresavers allowing leakage after adapter separation. Crack in epoxy band of check valve where it attaches to the water tank.	Prelaunch checks incorporated to detect corrosion. Water left in system to maintain a wet condition to reduce oxidation.	Gemini X MR 5.1.4.5 MR 12.6I, MR 12.6, MR 12.6m STR 9029
16. Pitch and roll FDI indications were reversed during EVA preparation.	Crew inadvertently turned off "horizon scanner heater" circuit breaker which controls the FDI pitch and roll phase reversal circuitry.	Circuit breaker turned to ON position. Checks made of all dual (unlabeled) circuit breakers and list included in flight books.	Gemini IX-A MR 5.1.5.3 MR 6.1.3
17. Faulty indications of depression of computer "start" button during period from 2 hours 21 minutes to 4 hours 1 minute g.e.t.	No cause found in postflight testing. Condition did not recur after 4 hours 5 minutes g.e.t.	Special attention during pre-flight testing to insure computer "start" button does not hang up.	Gemini X MR 5.1.5.4 MR 6.1.3 STR 9022A
18. Large yellowish flame from RCS engine 8 (ring A) and engines 3 and 8 (ring B) after closure of motor operated shut-off valves.	No cause found during postflight testing. Possible cause - oxidizer burning with material of thrust chamber.	None - no effect on mission since occurrence was after closure of motor operated shut-off valves.	MR 5.1.8.2 STR 9027 STR 9023
19. Apparent high mixture ratio in RCS ring B.	No cause found by postflight testing. Possible cause - restriction of lines by system contamination.	None, no effect on mission.	MR 5.1.8.2 STR 9033 STR 9035
20. One pyrotechnic cartridge on hoist-loop door release did not fire.	Postflight testing of pyros and electrical system did not reveal cause of failure. End-to-end circuit test not possible due to previous disconnects in circuitry for other spacecraft testing.	None - redundant pyro fired and hoist-loop door released.	MR 5.1.9 MR 12.6 h STR 9508 STR 9505

~~CONFIDENTIAL~~

~~CONFIDENTIAL~~

Problem	Cause or remarks	Resolution and mission effectivity	Reference document
21. One utility electrical cord failed open.	Broken wire in cord at power end.	Change in design to provide permanent potting - replacement of solder type connectors with crimp type pin connectors.	Gemini X MR 5.1.10.2 MR 12.6.1.9 STR 9503
22. Water metering device trigger could not be fully opened and counter did not operate during a portion of the third day.	Probable cause - trigger lock in partially locked position. Problem cleared itself during mission.	Instruction of crew.	Gemini X MR 5.1.10.2 STR 9026
23. Right-hand gooseneck mirror cracked (observed during post-flight inspection).	Post-recovery handling.	None required.	MR 12.6c
24. Shingle on left hand skidwell door had curled edge.	Probable cause - landing forces (noticed by swimmers prior to attaching collar).	None required. Expected - also occurred in qualification tests.	MR 5.1.1 MR 12.6.2
25. Resistance of 1000 ohms from main bus to spacecraft ground after recovery.	Potting seal on one relay of relay panel broken resulting in low resistance due to water exposure after touchdown.	All relays are to be inspected after potting.	Gemini X MR 12.6k STR 9507
26. Safety pin on pilot's ejection seat hard to install.	Possible cause - burr on safety pin.	All pins for future missions to undergo a rigid inspection.	MR 5.1.10.1 STR 9030
27. Apparent reduced thrust on OAMS engines 1, 3, and 4.	Probable cause - particulate contamination in propellant lines.	None on Gemini - future spacecraft should have filters immediately upstream of the metering orifice.	MR 5.1.8.1
28. Poor timing of voice tape recorder cartridges.	Time was recoverable on all except one cartridge. This cartridge had a foil-like material in gears causing a tape jump which prevented recording of adequate timing pulses.	None - recurrence considered unlikely.	STR 9028

~~CONFIDENTIAL~~

Problem	Cause or remarks	Resolution and mission effectivity		Reference document
<u>Experiments</u> 1. D-14 antenna broken during EVA. Jagged edges of antenna could tear spacesuit. 2. D-14 signals 20 to 30 dB lower than expected. 3. S-11 camera bracket difficult to use.	Ground based test could not duplicate break causing jagged edges.	None - experiment not scheduled on future flights.	--	MR 8.2.4
	Unknown - equipment not recovered.	None - experiment not scheduled on future flights.	--	MR 8.2.4
	Bracket not boresighted with spacecraft centerline.	None - bracket usable and redesign for boresighting impractical.	--	MR 8.6.6

~~CONFIDENTIAL~~

Problem	Cause or remarks	Resolution and mission effectivity	Reference document
<u>Flight Crew</u>			
1. Sever fogging of pilot's visor during EVA.	Pilot's work load higher than anticipated.	Antifog solution provided for use on visors. Work load reduced.	Gemini X MR 5.1.1.4.6 MR 5.1.1.10.5 MR 6.1.1.3 STR 9009A
2. Pilot's suit pressure gage fogged over.	Exposed to suit environment. Pilot's work load higher than anticipated.	Desiccant added inside gage.	Gemini XI MR 5.1.1.10.5
3. ELSS evaporator/condensor dryout.	Pilot's work load higher than anticipated.	Servicing procedure changed to allow more water to be loaded prior to launch.	Gemini X MR 5.1.1.4.6
4. ELSS rode up on pilot's chest during EVA.	Restraint strap system did not hold sufficiently under zero g conditions.	New restraint strap system including a new strap routing.	Gemini XII MR 5.1.1.10.5
5. Command pilot unable to see cockpit displays from one until three minutes g.e.t.	Sun shining through window.	Addition of Velcro-attached sun shield inside command pilot's window.	Gemini XI MR 5.1.1.10 ECP 921
6. 16mm EVA camera stuck in 6 frames/sec mode after EVA.	Lack of sufficient clearance between start button lever and start/stop micro switches.	Pilot corrected by tapping with hand.	Gemini IX-A MR 5.1.1.10.2 STR 9034
7. Thermal cover for 16mm camera hard to attach and remove.	Cover design not adequate.	Clearance increased.	Gemini X MR 5.1.1.10.5
8. Objectionable back pressure in urine receiver.	Postflight inspection revealed no obstruction in system and test could not duplicate objectionable back pressure.	Procedural change to run camera prior to night fall resulted in sufficient heat being generated to allow cover to be deleted. No change.	-- MR 5.1.1.10.3

~~CONFIDENTIAL~~

~~CONFIDENTIAL~~

Problem	Cause or remarks	Resolution and mission effectivity	Reference document
9. Launch day urine collection bags did not seal properly.	Clamp not strong enough.	New procedure for closing bag instituted. Bag folded more times to allow additional mass for cramping.	Gemini X MR 5.1.10.3
10. Extreme heating in localized area of pilot's back during EVA.	Super thermal insulation parted from seam parallel to zipper allowing sunlight to cause overheating.	Zipper and supporting structure fabrication techniques changed to permit post-assembly inspection of stitching.	Gemini X MR 5.1.10.5 STR 9011
11. Small opening in thumb seam of command pilot glove. (Pressure vessel not affected.)	No cause could be determined. Opening was not noticed during EVA preparation checks.	None. Suit operation not affected.	-- MR 5.1.10.4
12. Corrosion of latching dog in right wrist disconnect fitting of command pilot's suit.	Probable cause - post-recovery handling.	None required.	-- MR 5.1.10.4 STR 9011
13. One roll of EVA film and a 5mm wide angle lens for 16mm camera lost during EVA ingress.	Zero g environment.	Tethers added to attach loose items used during EVA.	Gemini XI
14. Pilot could not connect small tether hook for 25-foot operation.	Required a two-handed operation, with body restraints available.	Redesign of tether clamping system for one-handed operations.	Gemini XI ECP 913
15. Quality of film from 16mm sequence camera poor: a. EVA film underexposed. b. Station-keeping film jittery. c. Some terrain photographs overexposed.	Postflight testing of the camera indicated no in-flight anomalies occurred. The apparently jerky sequences taken while station keeping resulted from operating the camera in short bursts. The overexposed photographs resulted from incorrect exposure settings.	Adequate body restraints provided. Crew training. Some equipment change (see Gemini XI).	Gemini XII Gemini X STR 9016 Gemini XII
16. Intercom equipment between swimmers and flight crew did not function the second time it was used.	Small cut in cable allowed salt water to short cable. Cut believed to have occurred prior to entry into water.	Greater care in handling and maintenance of equipment.	Gemini X MR 5.1.2.7 MR 6.3.2 STR 9021

~~CONFIDENTIAL~~

~~CONFIDENTIAL~~

Problem	Cause or remarks	Resolution and mission effectivity	Reference document
<u>Flight Control and Network</u> 1. CYI had no indication of PCM tape recorder tape motion during first station pass on spacecraft revolution 1. 2. CRO had TM dropout of approximately 1 minute during first station pass on spacecraft revolution 1. 3. Intermittent problems with CYI radar. 4. CYI radar data rejected on spacecraft revolution 28. 5. EGL radar did not track ATDA on ATDA revolution 43. 6. Woomera radar data rejection on spacecraft revolution 45.	Tape motion parameter reading 77 percent of full scale. Re-mote sites set up to trigger motion indicator at 90 percent of full scale. Could not switch to PCM ground station no. 2 due to station being configured for Apollo. Bad plug in data formatter. Faulty encoder strobe. Range gear drive motor and digital data power supply problems. Line noise caused data to have an invalid time tag.	Station instructed to trigger indicator at 50 percent of full scale. Temporary fix allowed proper operation for remainder of mission. Replaced plug. Replaced prior to next revolution. Corrected prior to next revolution. Flight controllers instructed in how to recognize problem and take necessary action. Program to be changed for Apollo missions.	Gemini IX-A MR 6.1.3 Gemini IX-A MR 6.2.2.1 Gemini IX-A MR 6.2.2.1 Gemini IX-A MR 6.2.2.1 Gemini X MR 5.2.2.1 Gemini XII

~~CONFIDENTIAL~~

~~CONFIDENTIAL~~

Problem	Cause or remarks	Resolution and mission effectivity	Reference document
<u>Gemini Agena Target Vehicle</u>			
1. Extravehicular pilot unable to stay with work task.	Inadequate hand holds on GATV VIII.	Additional hand holds added on GATV for Gemini XI and XII.	MR 7.1.2.7
2. Agena consistently gaining more velocity than programmed.	A velocity meter negative null torque and early velocity meter enable times.	The velocity meter will be enabled approximately 20 seconds prior to FPS or SPS start.	LMSC Rpt A831532 p. 4-32 p. 5-2
3. Unit II SPS minus Y thruster was low in thrust as indicated from thrust chamber pressure measurement.	Most probable cause was a transducer vent port plugged. All other sources of thruster operation indicate normal performance.	None required. No effect on mission.	LMSC Rpt A831532 p. 4-10
4. High consumption of attitude control gas during D-5 experiment.	Most probable cause was crew attempting to quickly stabilize vehicle.	None required.	MR 6.1.5
5. The bonding agent holding the electrostatic discharge device onto GATV VIII failed.	Exposure to 4 months of space environment.	None required. Electrostatic discharge device to be removed from future vehicles.	MR 5.4

~~CONFIDENTIAL~~

~~CONFIDENTIAL~~

Problem	Cause or remarks	Resolution and mission effectivity	Reference document
<u>Gemini Launch Vehicle</u>			
1. Propellant from the primary ready storage vessel was cooled to a temperature of 19° F at the outlet of the heat exchanger.	Suspected cause was a bad thermocouple in measurement system. There was concern that the UDMH and hydrazine would separate and not recombine after propellant temperature rose.	Propellant was loaded from the backup ready storage vessel.	Martin Rpt ER 13227-10 p. III-23 p. III-20
2. Oxidizer outage at staging was higher than expected.	A shift in the Stage I engine mixture ratio of -1.9 percent from the acceptance test value resulted in a fuel depletion shutdown (oxidizer shutdown is the desired mode).	No corrective action is planned or required since this anomaly did not adversely affect performance of the GLV.	Martin Rpt ER 13227-10 p. III-1
3. The flyaway lanyard of Stage II fuel vent topping disconnect was broken in lift-off. Vent topping disconnect still attached at launch.	Not determined. It appears that the lanyard force did not reach the release collar because of interference with the vent hose.	Lanyard was rerigged to improve operation and reduce interference with the vent hose.	AR TOR 1001 Martin Rpt ER 13227-10 p. XIII-1 p. III-61
4. Stage I oxidizer tank ruptured about 1-1/2 seconds after staging when there was approximately 30 feet of separation.	Not determined. Suspected cause either (1) penetration of forward oxidizer dome by transportation section debris or (2) local buckling of the oxidizer dome.	None - analytical studies conclude no particle of reasonable size could penetrate the Stage II plume and impact Stage II at a separation distance of 30 feet.	Martin Rpt ER 13227-10 p. XII-25

~~CONFIDENTIAL~~

Problem	Cause or remarks	Resolution and mission effectivity	Reference document
<u>Spacecraft</u> 1. Eye irritation reported throughout flight.	Not determined. Extensive investigation of crew equipment and spacecraft components was conducted to determine source of contamination. Oxygen flow across faces of crew and/or LiOH contamination suspected but not verified.	Corrective action planned: a. A single suit fan will be used during EVA to lessen the effect of oxygen flow. b. Cleaning procedures for installation of LiOH canisters will be improved. c. LiOH canister verification tests will be conducted with both suit compressors operating.	MR 5.1.4.2 MR 6.1.3 STR 10009 STR 10012 STR 10014 STR 10015 STR 10016 STR 10016A STR 10017 STR 10018 STR 10501 STR 10501A STR 10504
2. Fuel consumption greater than expected during terminal phase of rendezvous operations.	The actual midcourse corrections applied resulted in nonnominal closing trajectory.	When braking is applied, line-of-sight corrections are required.	MR 4.3.1.2.1 MR 5.1.5.2.2
3. UHF recovery beacon antenna failed to deploy at two point suspension.	The parachute trough cover assembly covering the beacon antennas was not completely removed by the aft parachute bridle at deployment.	A proposed corrective action to insure proper bridle positioning was judged not required due to the probability that abnormal oscillations occurred at the time of two-point suspension. These oscillations were probably caused by a late drogue deployment (40 000 ft instead of 50 000 ft).	MR 5.1.1.1 STR 10011

~~CONFIDENTIAL~~

Problem	Cause or remarks	Resolution and mission effectivity	Reference document
4. Onboard rendezvous navigation data could not be used.	Use of onboard solution would have resulted in a coellipticity error of 9.4 nautical miles. This was in excess of that allowed by the mission rules.	--	MR 6.1.3 MR 5.1.5.2.2
5. Tether lock pin came loose at man end during umbilical EVA.	Not determined. After the spacecraft had been repressurized, it was noted that the retaining pin, which holds the tether metal bracket in place on the left hip, had pulled loose and only the friction of the tight fit was holding the tether in place.	Gemini XI A design change was incorporated so that the retaining pip pin could be loosened only by a pushing action rather than a pulling one.	MR 7.1.2.7.4 MR 5.1.10.5.2
6. TM resets occurred during 2 periods totaling 6 minutes 48 seconds while the pilot was at GATV VIII.	Not determined. Investigation using spacecraft XII failed to establish any possible causes.	-- None required.. No effect on mission.	MR 5.1.3.1
7. Right hand lap belt tangled, could not be fastened for reentry.	Center strap was doubled over in the lap belt adjuster and bound tight due to extra webbing going through adjuster.	Gemini XI A design change to the lap belt incorporated a set of guides on the buckle to orient the belt and prevent it from folding over and binding in the gripping mechanism of the buckle.	STR 10019 STR 10013 GT-11 MR 5.1.10.1
8. Command pilot could not unstow "D" ring for reentry.	Unknown. The pip pin and "D" ring of both right hand and left hand ejection control mechanisms were investigated postflight. No anomalies were found and pins of both seats were installed and removed easily.	-- No further action planned.	STR 10022

~~CONFIDENTIAL~~

~~CONFIDENTIAL~~

Problem	Cause or remarks	Resolution and mission effectivity	Reference document
9. Difficulty installing "D" ring/ safety pin combination.	Two-hand operation; could not reach.	Velcro was added to the seat "D" ring interface to retain "D" ring while installing safety pin. Task was thereby reduced to a one-hand operation.	Gemini XI GT-11 MR 5.1.10.1
10. Rear half of adapter handrail did not deploy properly.	Most probable cause was that the forward end of the handrail released first and deployed upward before the aft end was unlocked.	Design will be changed to provide less engagement of the aft end of the handrail with the hold-down flange to insure release of aft end before forward end.	Gemini XI MR 5.1.1.1.1 MR 5.1.10.5

~~CONFIDENTIAL~~

Problem	Cause or remarks	Resolution and mission effectivity		Reference document
<u>Experiments</u> 1. Remote shutter release on S-13 camera failed. 2. Lost S-12 experiment package.	Cable release broken during camera assembly. Crew believed that S-12 hardware package floated through hatch during EVA. No experimental results were obtainable.	A more suitable release provided for Gemini XI.	Gemini XI	MR 8.13.6
		A tether will be added to the experiment package for Gemini XII.	Gemini XII	MR 8.12.4

~~CONFIDENTIAL~~

Problem	Cause or remarks	Resolution and mission effectivity	Reference document
<u>Flight Crew and Equipment</u>			
1. Forty percent of gold from EVA visor flaked off during flight.	Visor rubbed against interior parts of the spacecraft and equipment.	A visor cover will be used at all times except during launch and EVA to prevent rubbing off of gold coating.	MR 5.1.10.4
2. Lost Hasselblad camera from lanyard.	The camera mounting bracket would not remain engaged in the ELSS keyhole slot. The camera floated free and the lanyard attachment screw backed out during EVA.	A locking feature will be added to the lanyard attach screw.	MR 5.1.10.2
3. The 16mm Maurer camera failed prior to umbilical EVA.	Insufficient clearance between push-button operating lever and microswitches, and insufficient actuation lever return spring tension.	Spring redesigned and tension modified. Actuation lever modified and push-button switch bushing burnished to assure more reliable operation. Microswitches adjusted and bonded in place to insure proper clearance.	MR 5.1.10.2 STR 10008 Maurer Analysis Report dtd 8-3-66
4. Thunderstorm light broken when unstowing ELSS.	Bright-side filament failed from shock when struck with ELSS equipment as it released suddenly from stowage rack.	A special S/C stowage review will be conducted to insure easy removal of ELSS.	MR 5.1.10.1 STR 10020

~~CONFIDENTIAL~~

~~CONFIDENTIAL~~

Problem	Cause or remarks	Resolution and mission effectivity		Reference document
<u>Target Launch Vehicle</u>				
1. Second launch attempt cancelled.	Unexpected output signals from autopilot during final autopilot checks.	None - outputs were valid and normal for the conditions that existed.		MR 12.3.5
2. Low temperature environment in quadrant IV of thrust section.	Suspected leakage of cryogenics (engine system data did not indicate leak).	New design of seals at sustainer engine liquid oxygen elbow-to-dome connection.	Gemini XII	MR 5.5.1 MR 5.5.2
3. Fuel outage (510#) at theoretical liquid oxygen depletion exceeded 3 sigma outage value (410#).	Exact cause undetermined - error is acceptable since excess fuel is preferred to fuel depletion shutdown.	None required.	--	MR 5.5.2
4. Measurement P15T (engine compartment air temp) failed at staging.	Probable cause - sustainer exhaust blow back.	None - data satisfactory during period of primary interest.	--	MR 5.5.7

~~CONFIDENTIAL~~

~~CONFIDENTIAL~~

Problem	Cause or remarks	Resolution and mission effectivity	Reference document
<u>Gemini Agena Target Vehicle</u>			
1. L-band transponder failed.	Probable cause - transponder transmitter cavity lost pressure and failed by arcing.	Check of cavity assemblies to insure an adequate seal.	Gemini XII MR 5.1.5 MR 5.1.5.4 MR 7.1.2.10
2. L-band beacon automatic search did not function properly after tether jettison.	Most probable cause - antenna switching circuit disabled by high voltage arc.	See item 1 above.	Gemini XII MR 6.1.4
3. GATV main clock jumped 4 hours 33 minutes and 4 seconds at approximately 3:00:06 g.e.t.	Probable cause - transient induced by L-band antenna arcing.	See item 1 above.	Gemini XII MR 5.4.3.1 MR 6.1.4
4. Apparent GATV clock jump between revolution 77 and 88.	Possible causes: a. L-band arcing when power was applied at emergency reset timer. (ERT) clock out. b. Ground procedural problem during exercise revolution 77.	See item 1 above.	Gemini XII MR 5.4.3.1
5. TDA latches did not reset at second undocking.	Latch activation limit switch activates two internal switches. One to remove power from actuator and the other to provide current path to docking light and latch reset. Probable cause - actuation of power interrupt switch only.	Crew sent "unrigidize" command by RF. No other action taken since recurrence of failure considered remote.	Gemini XI MR 5.7 MR 6.1.4 MR 7.1.2.9
6. Greater than expected yaw attitude divergence during PPS burns.	Probable cause - improper null point on one engine actuator. Most likely due to improper actuator alignment.	Careful examination of actuator for next mission.	Gemini XII MR 5.4.5.2 MR 7.1.2.1 Supplemental Report No. 6
7. Larger than expected roll attitude excursion during SPS Unit II burns.	Probable cause - unknown - well within acceptable limits.	None required.	MR 5.4.5.2 Supplemental Report No. 6

~~CONFIDENTIAL~~

~~CONFIDENTIAL~~

Problem	Cause or remarks	Resolution and mission effectivity	Reference document
8. Intermittent error transients on roll and pitch horizon sensor outputs.	Possible causes: a. Tether in line of sight of horizon sensor. b. Preamplifier bounce due to intermittent short of capacitor in H/S head or mixer box.	None - recurrence of failure is not considered likely. --	MR 5.4.5.2. MR 6.1.1.4
9. Measurement B-1 (fuel pump inlet pressure) exhibited a linear shift at conclusion of 2nd and 3rd PPS burns.	Similar problem on Gemini X.	None - shift is tolerable. --	MR 5.4.5.7
10. Measurement B212 (SPS Unit I plus Y chamber pressure) failed between revolutions 59 and 75.	Undetermined.	None - measurement usually is good. No effect on mission. --	MR 5.4.5.7
11. Measurement D-46 (control gas valve cluster temperature no. 1) provided intermittent data during revolutions 35 and 36.	Unknown - problem corrected itself and provided good data for remainder of mission.	None required. No effect on mission. --	MR 5.4.5.7
12. Measurement B248 (SPS Unit II plus Y skin temperature) did not indicate peak temperatures during SPS firings.	Apparent cause - improper re-attachment of sensor. Sensor had been broken off and re-welded.	Investigation of techniques of welding, rewelding and inspection. Gemini XII	MR 5.4.5.7
13. Bubbles in paint and aluminum tape used on exterior of vehicle for temperature control.	Expansion of entrapped gases.	None - no apparent effect on thermal control. --	MR 5.4.1

~~CONFIDENTIAL~~

~~CONFIDENTIAL~~

Problem	Cause or remarks	Resolution and mission effectivity	Reference document
<u>Gemini Launch Vehicle</u> 1. First launch attempt cancelled. 2. Fuel depletion shutdown of stage I.	Pin hole leak in GLV oxidizer tank.	Leak plugged with sodium silicate and 1/2-inch square aluminum patch applied over hole with epoxy.	Gemini XI MR 5.2.10.1
	Lower than predicted mixture ratio. Oxidizer outage 1319 pounds (possible cause - pump cavitation due to entrained gases).	Propellant loading biased to load more fuel.	Gemini XII MR 5.2.2.1

~~CONFIDENTIAL~~

~~CONFIDENTIAL~~

Problem	Cause or remarks	Resolution and mission effectivity	Reference document
<u>Spacecraft</u>			
1. Suspected leak in left-hand hatch.	Apparent leak was the result of normal spacecraft venting during prelaunch purging of cabin.	None - count resumed after a 10-minute hold.	MR 6.1.2.3 MR 7.1.2.1
2. Heavy contamination of windows.	Believed to be partially caused by out gassing from plastic windows retainers and seals under heated vacuum.	Nonmetallic portions of window assemblies heated under vacuum prior to assembly.	MR 5.1.1.1 MR 7.1.2.1 MR 12.6.1.1 STR 11017
3. Low hum in earphones when "Cryo Quantity" switch turned to "H ₂ " or "O ₂ " position.	Failure could not be duplicated during postflight testing. (Did not occur on Gemini XII.)	None.	MR 5.1.2 STR 11507
4. Fluctuation in telemetered values of CO ₂ partial pressure at 25:30:04 and 25:32:26 g.e.t.	Probable cause - glitches on input power line due to multiplexer resets.	None - fluctuation normal under these conditions.	MR 5.1.4 MR 7.2.2.2 STR 11502
5. Voice tape recorder operated intermittently.	Seizing of intermediate pulley (idler wheel) bearing resulting from a combination of debris due to fretting corrosion and a slightly bent ball retainer in the bearing.	Special care prior to flight and a special final inspection.	MR 5.1.2 MR 12.6.1.3 STR 11014
6. Left-hand secondary O ₂ pressure transducer was faulty during postflight inspection.	Break in potentiometer resistive-wire element.	None required - failure occurred during postflight handling.	MR 12.6.1.2 STR 11506
7. Fuel cell stack 2C failed at approximately 54:31:00 g.e.t.	Immediate cause - penetration of membrane allowing combustion of hydrogen and oxygen.	None - fuel cell stack subject to this type of failure - provisions to contain and extinguish fire successful. Remaining stacks sufficient to carry electrical load.	MR 5.1.7.2

~~CONFIDENTIAL~~

~~CONFIDENTIAL~~

Problem	Cause or remarks	Resolution and mission effectivity	Reference document
8. Electronic timer off for 3 minutes and 7 seconds at approximately 49 hours and 6 minutes.	Circuit breaker inadvertently turned off by crew.	Circuit breaker turned on.	MR 5.1.6
9. Commands could not be entered into GATV over TAN on revolution 31.	Probable cause - no timing pulse to encoder due to electronic timer circuit breaker being off.	Turned on circuit breaker.	MR 6.1.3
10. Degraded performance of all OAMS attitude engines, particularly engine no. 8 on revolution 11 and engine no. 6 on revolution 43.	Probable cause - particulate contamination in propellant lines.	None on Gemini - future spacecraft should have filter immediately upstream of the metering orifice.	MR 5.1.5.1 MR 5.1.8.1 STR 11009A
11. Apparent low thrust from OAMS maneuvering engine no. 15. (Reported by crew.)	No evidence of degraded performance in telemetry data.	None.	MR 5.7.5.1 MR 5.1.8.1 MR 5.1.5.3 STR 11022
12. Momentary loss of temperature data on propellant temperature/pressure indicator during change of selector switch positions.	No cause found by postflight testing and analysis.	None - recurrence considered unlikely.	MR 5.1.8.1 MR 5.1.10.1 STR 11012
13. One horizon sensor door failed to close prior to reentry.	Fibrite door jammed in frame.	None - failure could not be repeated during postflight testing. No damage to cavity from reentry heating.	MR 5.1.1 MR 6.3.4 MR 12.6.1 STR 11019
14. One-eighth-inch deep gash in heat shield.	Cause - unknown. Not the result of reentry heating.	None - heat shield design sufficient to handle such contingencies.	MR 12.6.1 STR 11501A
15. Tuck in main parachute canopy.	Excessive fullness of lower rings.	None - has negligible effect on parachute performance occurred many times in qualification tests.	MR 5.1.1
16. RCS engine 2, ring B leaked slightly after landing.	No cause found during postflight inspection or testing.	None - no effect on mission.	MR 6.3.4 STR 11013

~~CONFIDENTIAL~~

~~CONFIDENTIAL~~

Problem	Cause or remarks	Resolution and mission effectivity		Reference document
<u>Experiments</u>				
1. Handle on S-9 package did not fully actuate.	Cause not determined (S-9 not flown again).	Pilot completed actuation.	Gemini XI	MR 7.1.2.12
2. D-15 experiment TV monitor display tilted 45 degrees.	No cause established (D-15 not flown again).	Pilot removed monitor from bracket, rotated it to correct orientation, and held between his knees.	Gemini XI	MR 8.2.4 MR 7.1.2.17
3. Bright area near center of screen of D-15 TV monitor.	Probable cause - ion spot beginning to develop in TV camera. Tube 1 year old.	D-15 not flown again.	--	MR 8.2.4
4. Several photographic sequences of D-15 and S-30 taken but not on flight film.	Failure of D-15 camera control equipment. Exact cause undetermined.	D-15 not flown again.	--	MR 8.2.4

~~CONFIDENTIAL~~

~~CONFIDENTIAL~~

Problem	Cause or remarks	Resolution and mission effectivity	Reference document
<u>Flight Crew and Equipment</u>			
1. EVA sun visor difficult to install.	Pressurized suit made right clip hard to install.	Procedural change to install visor prior to pressurization of suit.	MR 5.1.10.5 MR 7.1.1.2 MR 7.1.2.1
2. EVA sun visor cracked.	Most probable cause - difficult installation. Crack not noticed by crew.	No hardware changes.	MR 5.1.10.4 STR 11025
3. Problem with body positioning during EVA.	Lack of restraint system to counteract suit forces.	Design of restraint systems such as waist tether and foot restraints.	MR 5.1.10.5 MR 7.1.2.12 MR 7.1.1.2
4. Tethered EVA activity terminated early.	Pilot fatigue and heavy perspiration probably caused by: a. Overheat condition prior to hatch opening due to visor installation problem. b. Higher than anticipated energy expenditure in the early part of EVA.	Carefully controlled and spaced work task. Equipment designed for easier operation.	MR 5.1.10.5 MR 7.1.1.2 MR 7.1.2.12
5. Left side of pilot's life vest failed to inflate completely.	Faulty "O"-ring in CO ₂ fill valve.	Pilot inflated vest orally.	MR 5.1.10.4 STR 11021
6. Right wrist disconnect of command pilot's suit had a tendency to stick during postflight inspection.	Corrosion due to suit exposure to heavy salt spray during recovery.	None - no effect on mission.	MR 5.1.10.4
7. Light streaks on one 16mm film.	Causes: a. Screw missing from body of magazine. b. Dark side felt light seal creased.	Improve quality control.	MR 5.1.10.2 STR 11016
8. Film in five 16mm magazines underexposed.	The 18mm lens was improperly set. Lens had no detents at F stops.	Procedure change to use F.11 lens setting with 1/250-second shutter speed. Slight error in F stop setting not as critical at this speed.	MR 5.1.10.2 STR 11016

~~CONFIDENTIAL~~

~~CONFIDENTIAL~~

Problem	Cause or remarks	Resolution and mission effectivity	Reference document
9. Film in one 16mm magazine out of focus and smeared.	Spring on magazine door damaged - would not hold film in proper position. Probable cause of spring damage - closing of door with magazine partially inserted in camera. May have occurred during EVA due to reduced crew dexterity in pressurized suits.	Magazine door spring redesigned to provide positive clearance between free end of spring and back of film magazine.	Gemini XII MR 5.1.10.2
10. One 16mm film magazine jammed.	Loose loop of film drawn into metering sprocket.	Guard post added to deflect film away from metering sprocket.	Gemini XII MR 5.1.10.2 STR 11016
11. The 16mm EVA camera hard to install.	Probable cause - expansion of "O"-ring in vacuum environment. "O"-ring made of closed cell material installed after Gemini IX-A.	Elimination of "O"-ring.	Gemini XII MR 5.1.10.5 MR 7.1.1.2
12. EVA camera bracket would not rotate.	Expansion of "O"-ring (see item 11).	See item 11. Additional spring pressure of ball detent more closely checked prior to launch.	Gemini XII MR 7.1.1.2
13. Docking bar clamp difficult to attach.	Lack of friction or other dampening forces.	Redesign of docking bar clamp. New clamp was spring-retained, push-on type which allowed one-handed operation.	Gemini XII MR 5.1.10.5 MR 7.1.1.2

~~CONFIDENTIAL~~

~~CONFIDENTIAL~~

Problem	Cause or remarks	Resolution and mission effectivity	Reference document
<u>Flight Control and Network</u>			
1. Go/no go indication not obtained from BDA for S/C launch.	Radar off track.	None - not considered to be equipment or operational problem.	MR 6.2.2.2
2. Go/no go indication not obtained from impact predictor high-speed sources for S/C launch.	Bias between impact predictor radars at GBI and ANT. Since solutions did not agree, neither could be used.	See item 3.	MR 6.2.2.2
3. ANT radar data revolution 1 gave an erroneous requirement for 100 ft/sec out-of-plane correction at TPI.	A 3.5 mil azimuth bias in radar data. Cleared itself by next pass.	None - exact cause has not been determined.	MR 4.3.1.1 MR 6.1.1.3 MR 6.2.2.3
4. WHE did not acquire track on spacecraft revolution 1 through 3.	Difficulty in using nominal pointing data on a moving ship.	GSFC generated 15-second pointing data.	MR 6.2.2.1
5. WHE radar data not usable during mission.	Station location coordinates in processing equipment not consistent with ship location - coordinates could not be corrected due to program logic.	Program changed to allow coordinates to be updated.	MR 6.2.2.2
6. Communication processor did not acknowledge receipt of a DCS pre-retrofire update.	Unknown.	Receipt verified by backup method.	MR 6.2.2.2
7. GBI radar failed during spacecraft revolution 43 pass.	Moisture in control cable of azimuth servo valve.	Unknown.	Network Controller Mission Report

~~CONFIDENTIAL~~

~~CONFIDENTIAL~~

Problem	Cause or remarks	Resolution and mission effectivity	Reference document
<u>Target Launch Vehicle</u> 1. A decrease in a TLV temperature measurement in the engine compartment.	Probable cause was a minor leak in the liquid oxygen system. Similar occurrences have been noted on other TLV's.	None required. No detrimental flight effect.	MR 5.5.1

~~CONFIDENTIAL~~

~~CONFIDENTIAL~~

Problem	Cause or remarks	Resolution and mission effectivity	Reference document
<u>Gemini Agena Target Vehicle</u>			
1. Momentary engine thrust decay during ascent.	Momentary additional loading in the turbo pump drive assembly. Exact cause of additional loading not determined.	None required for Gemini. Some additional investigation planned by LMSC for standard Agena.	LMSC Report A 849472 Para 4.3.2.5
2. PPS engine overspeed shutdown during GATV activity after spacecraft splashdown.	Failure of the main fuel valve to open because of a problem with the pilot operated solenoid valve (POSV) which controls the main fuel valve. Possible causes are: a. POSV tolerances exceeding specification limits. b. Contamination (i.e., foreign particles or residue) restricting POSV parts movement.	None required. No further Gemini missions planned.	MR 5.4.2.1 MR 5.4.2.1
3. Difficulty docking with GATV on second attempt.	Attributed to a low closing velocity and vehicle misalignment which resulted in engagement of only one TDA latch.	None required. Procedure problem. Third docking attempt with greater closing velocity was successful.	LMSC Report A 849472 Para 4.3.2.5
4. Radar transponder failure caused intermittent radar lockon and lack of MAP's when commanding GATV using L-band.	Most probable cause was a loss in pressure of a sealed component critical to arcing in the radar transponder.	None required. Procedure problem. Third docking attempt with greater closing velocity was successful.	MR 5.7 MR 5.4.1.4
5. Unable to confirm the velocity meter loading for the SPS burn.	Most probable cause was an intermittent problem with the velocity meter readout circuitry rather than the loading circuitry.	A spare transponder was subjected to a series of tests by Westinghouse. No failures were noted. Problem under study.	MR 5.1.5.4 STR 12505
		Velocity meter loading performance previously acceptable. Problem under study.	LMSC Report A 849472 MR 5.4.5.2

~~CONFIDENTIAL~~

Problem	Cause or remarks	Resolution and mission effectivity		Reference document
<u>Gemini Launch Vehicle</u> 1. No problem encountered during this mission.				

~~CONFIDENTIAL~~

Problem	Cause or remarks	Resolution and mission effectivity	Reference document
<u>Spacecraft</u>			
1. Pilot reported the microphone on right side of helmet was inoperative.	Postflight tests revealed a broken wire at the connector external to the helmet and suit harness.	None required - No follow-up on Gemini missions.	MR 5.1.2 STR 12015
2. Beginning at retrofire a failure of the carbon dioxide partial-pressure sensor was noted.	Unknown - the pressure started increasing at retrofire to a maximum of 15.1 mm Hg at 6 minutes after retrofire.	The sensor was removed for failure analysis and the anomaly could not be repaired.	MR 5.1.3 MR 5.1.4 STR 12507
3. Hydrogen pressure rise problem was noted during the sleep period of the 4th day.	Unknown - attempts to correct the pressure rise by removing the power from the hydrogen heater circuitry using the heater switch were unsuccessful and, therefore, the circuit breaker was opened. The heater was not used again during the mission.	Postflight testing revealed no problem with heater switch operation. Lab analysis consisted of X-ray, contact IR drop measurements, switch cycling, dielectric tests, and dissection.	MR 5.1.7.6 STR 12503
4. Individual thruster and a propulsion system (OAMS) general degradation was noted during the mission.	No single cause could be isolated. Most probable causes are: a. Contamination, with attendant blocking of parts and lines. b. Local freezing of propellant lines. c. Iron nitrate deposits. d. Restricted poppet movement in the propellant valves.	MSC Propulsion Division and Contractor are conducting detailed analysis of OAMS systems performance for all Gemini missions.	MR 5.1.8

~~CONFIDENTIAL~~

Problem	Cause or remarks	Resolution and mission effectivity	Reference document
5. RCS ring A regulated pressure rise after activation. 6. Performance of stacks 2A and 2C of the fuel cell was seriously degraded during the last few hours of the mission. Stack 1C failed completely.	The regulator leaked nitrogen pressurant gas internally thus raising the feed system pressure to a maximum of 414 psia (specification is 295 ± 15 psia). Excessive accumulation of water within these fuel cell sections. Most probable reasons for water accumulation in fuel cells were: 1. Blockage of water storage tank inlet. 2. A stuck bladder in the storage tank. 3. Oxygen gas leakage into the storage section.	-- The crew relieved the pressure by periodically firing ring A engines. The regulator was postflight tested and found to be within specifications. No further action taken. Sole regulator anomaly in Gemini program. -- Equipment involved could not be inspected postflight because it was located in the adapter section. The spacecraft contractor is conducting an analysis of the various problems encountered throughout the program that were associated with the Gemini fuel cell system.	MR 5.1.8 MR 5.1.7.2

~~CONFIDENTIAL~~

Problem	Cause or remarks	Resolution and mission effectivity	Reference document
<u>Experiments</u> 1. The 70mm general-purpose camera shutter stuck open during the S-51 sodium cloud experiment.	Postflight inspection showed that one of the iris shutter leaf pins was bent out of position. This was caused by improper inflight camera assembly procedures.	Experiment Program Office directed a camera design change for future camera use.	MR 5.1.10.2 Failure Analysis Report, Exp. Prog. Ofc. to Director, Science and Applications Division dtd 1-20-67 Final Failure Analysis Red Lens FO.95 MSC Photo Lab dtd 1-10-67 Maurer Failure Analysis dtd 12-12-66 contract 63621

~~CONFIDENTIAL~~

~~CONFIDENTIAL~~

Problem	Cause or remarks	Resolution and mission effectivity	Reference document
<u>Flight Crew and Equipment</u>			
1. The 16mm EVA sequence camera in the adapter section failed immediately after it was turned on.	Postflight inspection indicated the shutter mechanism had jammed.	A protective cover for the lens housing area has been recommended for any future camera use.	MR 5.10.2.2 Maurer Failure Analysis Report dtd April 1967
2. The magazine from the 16mm EVA sequence camera jammed when the crew tried to use it in another camera.	Postflight inspection indicated that a chip of metal had become trapped between the shaft and the bushing of the film metering sprocket.	Very reliable operation on other Gemini flights. No corrective action recommended.	MR 5.1.10.2 Maurer Failure Analysis Report dtd April 1967
3. Mounting bracket for the 16mm camera in the adapter section failed during umbilical EVA.	A small pin acting as a pivot for the thumb lever came loose.	EVA pilot was able to install and remove the camera bracket by pressing directly on the ball detent lever with his finger. Gemini peculiar device which will not be used in future programs.	MR 5.1.10.2

~~CONFIDENTIAL~~

Problem	Cause or remarks	Resolution and mission effectivity	Reference document
<u>Flight Control and Network</u> 1. The interrange vectors for the Ascension and Pretoria stations, during the first spacecraft revolution, had a 3-minute time bias resulting in a loss of communications and tracking data due to false antenna pointing commands.	A downrange procedural error.	Phase adjust maneuver up-dates were uplinked through Tananarive. --	MR 6.1.1.3

References

Gemini Program Mission Report

1. MSC-R-G-64-1, dated May 1964 (Gemini I)
2. MSC-G-R-65-1, dated February 1965 (Gemini II)
3. MSC-G-R-65-2, dated April 1965 (Gemini III)
4. MSC-G-R-65-3, dated June 1965 (Gemini IV)
5. MSC-G-R-65-4, dated August 1965 (Gemini V)
6. MSC-G-R-65-5, dated October 1965 (Gemini VI)
7. MSC-G-R-66-2, dated January 1966 (Gemini VI-A)
8. MSC-G-R-66-1, dated January 1966 (Gemini VII)
9. MSC-G-R-66-4, dated April 1966 (Gemini VIII)
10. MSC-G-R-66-6, dated July 1966 (Gemini IX-A)
11. MSC-G-R-66-7, dated August 1966 (Gemini X)
12. MSC-G-R-66-8, dated October 1966 (Gemini XI)
13. MSC-G-R-67-1, dated January 1967 (Gemini XII)

References (Continued)

Martin Company Reports (Also distributed as Supplement No. 2 to Gemini Program Mission Report unless otherwise specified)

1. Launch Vehicle No. 1, Flight Evaluation, Engineering Report 13227-1, dated May 1964 (Distributed as Supplement No. 7 to Gemini Program Mission Report).
2. Launch Vehicle No. 2, Flight Evaluation, Engineering Report 13227-2, dated March 1965 (Distributed as Supplement No. 4 to the Gemini Program Mission Report).
3. Launch Vehicle No. 3, Flight Evaluation, Engineering Report 13227-3, dated May 1965.
4. Launch Vehicle No. 4, Flight Evaluation, Engineering Report 13227-4, dated July 1965.
5. Launch Vehicle No. 5, Flight Evaluation, Engineering Report 13227-5, dated October 1965.
6. Launch Vehicle No. 6, Flight Evaluation, Engineering Report 13227-6, dated February 1966.
7. Launch Vehicle No. 7, Flight Evaluation, Engineering Report 13227-7, dated January 1966.
8. Launch Vehicle No. 8, Flight Evaluation, Engineering Report 13227-8, dated April 1966.
9. Launch Vehicle No. 9, Flight Evaluation, Engineering Report 13227-9, dated July 1966.
10. Launch Vehicle No. 10, Flight Evaluation, Engineering Report 13227-10, dated August 1966.

References (Continued)

Martin Company Reports (Continued)

11. Launch Vehicle No. 11, Flight Evaluation, Engineering Report 13227-11, dated October 1966.
12. Launch Vehicle No. 12, Flight Evaluation, Engineering Report 13227-12, dated December 1966.

Aerospace Corporation (Also distributed as Supplement No. 1 to Gemini Program Mission Report unless otherwise specified)

1. Gemini Launch Vehicle Final Flight Test Evaluation, NASA Mission GT-1, TOR-269 (4126)-27, dated October 1964 (Distributed as Supplements 1, 3, 5, 6, 10, and 11 to Gemini Program Mission Report).
2. Flight Evaluation Report, NASA Mission Gemini/Titan GT-2, TOR-469 (5126-42)-3, dated May 1965 (Distributed as Supplement No. 4 to the Gemini Program Mission Report).
3. Flight Evaluation Report, NASA Mission Gemini/Titan GT-3, TOR-469 (5126-42)-9, dated July 1965.
4. Launch Vehicle Flight Evaluation Report, NASA Mission Gemini/Titan GT-4, TOR-469 (6126-42)-2, dated August 1965.
5. Launch Vehicle Flight Evaluation Report, NASA Mission Gemini/Titan GT-5, TOR-669 (6126-42)-5, dated October 1965.
6. Launch Vehicle Flight Evaluation Report, NASA Mission Gemini/Titan GT-6A, TOR-669 (6126-42)-9, dated February 1966.

References (Continued)

Aerospace Corporation (Continued)

7. Launch Vehicle Flight Evaluation Report, NASA Mission Gemini/Titan GT-7, TOR-669 (6126-42)-10, dated February 1966.
8. Launch Vehicle Flight Evaluation Report, NASA Mission Gemini/Titan GT-8, TOR-669 (6126-42)-14, dated May 1966.
9. Launch Vehicle Flight Evaluation Report, NASA Mission Gemini/Titan GT-9, TOR-669 (6126-42)-18, dated August 1966.
10. Launch Vehicle Flight Evaluation Report, NASA Mission Gemini/Titan GT-10, TOR-1001 (2126-42)-4, dated October 1966.
11. Launch Vehicle Flight Evaluation Report, NASA Mission Gemini/Titan GT-11, TOR-1001 (2126-42)-7, dated November 1966.
12. Launch Vehicle Flight Evaluation Report, NASA Mission Gemini/Titan GT-12, TOR-1001 (2126-42)-8, dated December 1966.

Goddard Space Flight Center Reports (Distributed as Supplement No. 3 to the Gemini Program Mission Report unless otherwise specified)

1. Manned Space Flight Network Performance Analysis for the first Gemini Mission, X-551-64-206, dated May 1, 1964 (Distributed as Supplement No. 12 to the Gemini Program Mission Report).
2. Manned Space Flight Network Performance Analysis for the GT-2 Mission, X-551-65-204, dated May 14, 1965 (Distributed as Supplement No. 5 to the Gemini Program Mission Report).

References (Concluded)

Goddard Space Flight Center Reports (Continued)

3. Manned Space Flight Network Postmission Analysis Report for the GT-3 Mission, X-552-65-424, dated December 22, 1965.
4. Network Performance Analysis for the GT-5 Mission, X-552-66-242, dated June 14, 1966.

UNCLASSIFIED

DISTRIBUTION

Page 125

<u>Addressee</u>	<u>Number of copies</u>
NATIONAL AERONAUTICS AND SPACE ADMINISTRATION	
National Aeronautics and Space Administration Attention: Director, Gemini Program, MG Washington, D.C. 20546	50
National Aeronautics and Space Administration Attention: Library, USS-10 Washington, D.C. 20546	2
National Aeronautics and Space Administration Manned Spacecraft Center Houston, Texas 77058	
Director, AA	1
Deputy Director, AB	1
Special Assistant to the Director, AC	1
Legal Office, AL	1
Director of Medical Research and Operations, DA	1
Biomedical Research Office, DB	1
Flight Experiments Control Office, DB1	1
Space Physiology Branch, DB2	1
Occupational and Environmental Medicine Office, DC	1
Medical Operations Office, DD	2
John F. Kennedy Space Center, NASA Attention: Launch Site Medical Operations, HU111 Kennedy Space Center, Florida 32899	2
Chief of Historical Branch, AP6	1
Flight Safety Office, AR	6

UNCLASSIFIED

UNCLASSIFIED

<u>Addressee</u>	<u>Number of copies</u>
John F. Kennedy Space Center, NASA Attention: Flight Safety Office, HY Kennedy Space Center, Florida 32899	1
Director for Administration	
Forms and Publications Section, BF52	10
Procurement and Contracts Division, BG	1
Gemini and Flight Support Procurement Branch, BG61	1
Photographic Technology Laboratory	
J. R. Brinkman, BL	1
R. W. Underwood, BL4	1
Management Services Division, BM	1
Technical Information Preparation Branch, BM5	3
Technical Information Dissemination Branch, BM6	16
Director for Flight Crew Operations, CA	1
Astronaut Office, CB	50
Flight Crew Support Division, CF	11
John F. Kennedy Space Center, NASA Attention: Cape Simulator Operations Section, HW Kennedy Space Center, Florida 32899	1
Director for Engineering and Development, EA	2
Information Systems Division, EB	5
Crew Systems Division, EC	2
Computation and Analysis Division, ED	2
Instrumentation and Electronics Systems Division, EE	5
Space Sciences Division, EF	5

UNCLASSIFIED

UNCLASSIFIED

<u>Addressee</u>	<u>Number of copies</u>
Guidance and Control Division, EG	5
Propulsion and Power Division, EP	5
Structures and Mechanics Division, ES	5
Advanced Spacecraft Technology Division, ET	5
Director of Science and Applications, TA	2
Test and Operations Office, TF	3
Mission and Data Management Office, TF2	2
Spacecraft Project Engineering Office, TF3	3
Director for Flight Operations, FA	3
Flight Control Division, FF	7
Landing and Recovery Division, FL	4
Mission Planning and Analysis Division, FM	13
Flight Support Division, FS	4
Special Assistant for Gemini, GP	20
National Aeronautics and Space Administration Manned Spacecraft Center Attention: Resident Manager, GM c/o McDonnell Aircraft Corporation Lambert-St. Louis Municipal Airport Post Office Box 516 St. Louis, Missouri 63166	5
Apollo Applications Program Office, KA	20
Apollo Spacecraft Program Office, PA	50
John F. Kennedy Space Center, NASA Attention: Resident Manager, Apollo Spacecraft Program Office, HS Kennedy Space Center, Florida 32899	1

UNCLASSIFIED

UNCLASSIFIED

<u>Addressee</u>	<u>Number of copies</u>	<u>Page</u>
National Aeronautics and Space Administration Resident Manager, Apollo Spacecraft Program Office Massachusetts Institute of Technology 75 Cambridge Parkway Cambridge, Massachusetts 02142	1	128
National Aeronautics and Space Administration Resident Manager, Apollo Spacecraft Program Office AC Electronic Division General Motors Corporation Milwaukee, Wisconsin 53200	1	
Resident Manager, Apollo Spacecraft Program Office NASA Office - Downey 12214 Lakewood Boulevard Downey, California 90241	20	
National Aeronautics and Space Administration Resident Manager, Apollo Spacecraft Program Office Grumman Aircraft Engineering Corporation Bethpage, Long Island, New York 11714	20	
National Aeronautics and Space Administration White Sands Test Facility Attention: Manager, RA Post Office Drawer MM Las Cruces, New Mexico 88001	3	
National Aeronautics and Space Administration Ames Research Center Attention: Director, 200-1 Moffett Field, California 94035	1	
National Aeronautics and Space Administration Ames Research Center Attention: Library, 202-3 Moffett Field, California 94035	5	
National Aeronautics and Space Administration Electronics Research Center Attention: Director 575 Technology Square Cambridge, Massachusetts 02139	1	

UNCLASSIFIED

UNCLASSIFIED

<u>Addressee</u>	<u>Number of copies</u>
National Aeronautics and Space Administration Flight Research Center Attention: Director Post Office Box 273 Edwards, California 93523	1
National Aeronautics and Space Administration Flight Research Center Attention: Library Post Office Box 273 Edwards, California 93523	5
National Aeronautics and Space Administration Goddard Space Flight Center Attention: Director, 100 Greenbelt, Maryland 20771	1
National Aeronautics and Space Administration Goddard Space Flight Center Attention: Library, 252 Greenbelt, Maryland 20771	1
National Aeronautics and Space Administration Goddard Space Flight Center Attention: Chief, Manned Flight Operations Division, 550 Greenbelt, Maryland 20771	1
John F. Kennedy Space Center, NASA Attention: GSFC Launch Operations Kennedy Space Center, Florida 32899	2
National Aeronautics and Space Administration Goddard Space Flight Center Attention: Liaison Representative, GSF-L c/o Manned Spacecraft Center Houston, Texas 77058	1
Jet Propulsion Laboratory Attention: Library (TDS) 4800 Oak Grove Drive Pasadena, California 91103	2

UNCLASSIFIED

UNCLASSIFIED

Addressee

Number of copies

Page 130

John F. Kennedy Space Center, NASA
Kennedy Space Center, Florida 32899

Director, AA 1

Deputy Director, AB 1

Director of Launch Operations, HA 1

KSC Librarian, RC-42 5

Director, Information Systems, PA 1

Director, Spacecraft Operations, KA 10

Quality Surveillance Division, KD 1

Test and Operations Management Office, HC 1

Program Control Office, DC 3

NASA/KSC Data Office, PBL 2

National Aeronautics and Space Administration 1
Langley Research Center
Attention: Director, 106
Langley Station
Hampton, Virginia 23365

National Aeronautics and Space Administration 5
Langley Research Center
Attention: Library, 185
Langley Station
Hampton, Virginia 23365

National Aeronautics and Space Administration 1
Langley Research Center
Attention: Liaison Representative, RAA
c/o Manned Spacecraft Center
Houston, Texas 77058

National Aeronautics and Space Administration 1
Lewis Research Center
Attention: Director, 3-2
21000 Brookpark Road
Cleveland, Ohio 44135

UNCLASSIFIED

UNCLASSIFIED

<u>Addressee</u>	<u>Number of copies</u>	<u>Page</u>
National Aeronautics and Space Administration Lewis Research Center Attention: Library, 3-7 21000 Brookpark Road Cleveland, Ohio 44135	5	131
National Aeronautics and Space Administration George C. Marshall Space Flight Center Attention: Director, DIR Huntsville, Alabama 35812	1	
National Aeronautics and Space Administration George C. Marshall Space Flight Center Attention: Library, MS-IL Huntsville, Alabama 35812	3	
National Aeronautics and Space Administration George C. Marshall Space Flight Center Liaison Representative, RL c/o Manned Spacecraft Center Houston, Texas 77058	1	
John F. Kennedy Space Center, NASA Western Test Range Operations Division Post Office Box 425 Lompoc, California 93436	1	
National Aeronautics and Space Administration Wallops Station Attention: Director Wallops Island, Virginia 23337	1	
National Aeronautics and Space Administration Western Operations Office Attention: Library 150 Pico Boulevard Santa Monica, California 90406	1	
DEPARTMENT OF DEFENSE		
Executive Officer, MOL Program Office, SAF-SL Attention: Col. Richard L. Dennen Headquarters, USAF The Pentagon Room 5E417 Washington, D.C. 20301	1	

UNCLASSIFIED

UNCLASSIFIED

<u>Addressee</u>	<u>Number of copies</u>	Page 132
Department of Defense Representative Liaison Officer, ZR2 c/o Manned Spacecraft Center Houston, Texas 77058	1	
U. S. AIR FORCE		
Commander, Headquarters (SCRG) USAF Systems Command Attention: Department of Defense Manager for Space Flight Support Operations Andrews AFB, Maryland 21605	1	
Commander, ETG Air Force Eastern Test Range USAF Systems Command Patrick AFB, Florida 32922	2	
AFSC (MSFN) Andrews AFB Washington, D.C. 20331	1	
Chief, Patrick Test Site Office, RETPQC Quality Assurance Division, Gemini Program USAF Systems Command P. O. Box 4507 Patrick AFB, Florida 32922	3	
Commander, SSG Headquarters, Space Systems Division USAF Systems Command Los Angeles Air Force Station Air Force Unit Post Office Los Angeles, California 90045	1	
MOL Systems Program Office, SAFSL-7C Attention: Lt. Col. Arthur Torosian Los Angeles Air Force Station Air Force Unit Post Office Los Angeles, California 90045	10	
Deputy for Launch Vehicles, SSV Headquarters, Space Systems Division USAF Systems Command Los Angeles Air Force Station Air Force Unit Post Office Los Angeles, California 90045	2	

UNCLASSIFIED

UNCLASSIFIED

Addressee

Number of copies

Page 133

Program Director, Agena, SSVA
Attention: Col. A. J. Gardner
Headquarters, Space Systems Division
USAF Systems Command
Los Angeles Air Force Station
Air Force Unit Post Office
Los Angeles, California 90045

2

Director, Gemini Launch Vehicles, SSVL
Headquarters, Space Systems Division
USAF Systems Command
Los Angeles Air Force Station
Air Force Unit Post Office
Los Angeles, California 90045

5

Advanced Development Directorate, SSTD
Attention: Maj. Charles M. Waespy
Space Systems Division
USAF Systems Command
El Segundo, California 90245

1

Director, Research and Technology, SS'TR
Headquarters, Space Systems Division
USAF Systems Command
Los Angeles Air Force Station
Air Force Unit Post Office
Los Angeles, California 90045

1

Commander, Detachment 2, ZR1
Headquarters, Space Systems Division
USAF Systems Command Field Office
c/o Manned Spacecraft Center
Houston, Texas 77058

10

Commander, 6555th Aerospace Test Wing, DWG
Space Systems Division
USAF Systems Command
Patrick AFB, Florida 32922

1

Chief, Gemini Launch Vehicle Division, DWD
6555th Aerospace Test Wing
Space Systems Division
USAF Systems Command
Patrick AFB, Florida

5

UNCLASSIFIED

UNCLASSIFIED

Addressee

Number of copies

Page 134

Chief, SLV-III Division, DWC
6555th Aerospace Test Wing
Space Systems Division
USAF Systems Command
Patrick AFB, Florida 32922

1

USAF Systems Command/Air Training Command Office
Liaison Representative, ZR3
c/o Manned Spacecraft Center
Houston, Texas 77058

1

U. S. GENERAL ACCOUNTING OFFICE

U. S. General Accounting Office
Liaison Representative, ZS1
c/o Manned Spacecraft Center
Houston, Texas 77058

1

AEROJET-GENERAL CORPORATION

Mr. R. C. Stiff, Jr.
Vice President and Manager of the
Liquid Rocket Operations
Aerojet-General Corporation
P. O. Box 15847
Sacramento, California 95813

1

Mr. L. D. Wilson
Gemini Program Manager
Liquid Rocket Operations
Aerojet-General Corporation
P. O. Box 15847
Sacramento, California 95813

1

Mr. D. A. Barnes, Gemini Project Manager
Aerojet-General Corporation
Eastern Test Range Office
Hanger U
P. O. Box 4425
Patrick AFB, Florida 32922

1

UNCLASSIFIED

UNCLASSIFIED

Addressee

Number of copies

Page 135

AEROSPACE CORPORATION

Dr. Walter C. Williams, Vice President and
General Manager of Manned Systems Division
Aerospace Corporation
P. O. Box 95085
Los Angeles, California 90045

1

Mr. Bernard A. Hohmann, Group Director
Gemini Launch Systems Directorate
Aerospace Corporation
P. O. Box 95085
Los Angeles, California 90045

20

GENERAL DYNAMICS CORPORATION

Mr. E. R. Peterson
Vice President, Research and Engineering
General Dynamics Corporation
P. O. Box 1128
San Diego, California 92112

1

Mr. R. W. Keehn
Manager, Gemini Target Vehicle Project Office
Convair Division
General Dynamics Corporation
P. O. Box 1128
San Diego, California 92112

10

LOCKHEED MISSILES AND SPACE COMPANY

Mr. R. R. Kearton
Vice President and General Manager
Space Systems Division
Lockheed Missiles and Space Company
P. O. Box 504
Sunnyvale, California 94088

1

Mr. G. H. Putt
Vice President and Assistant General Manager
Space Systems Division
Lockheed Missiles and Space Company
P. O. Box 504
Sunnyvale, California 94088

1

UNCLASSIFIED

UNCLASSIFIED

<u>Addressee</u>	<u>Number of copies</u>
Mr. L. A. Smith Manager, Gemini Program Space Systems Division Lockheed Missiles and Space Company P. O. Box 504 Sunnyvale, California 94088	10
MARTIN COMPANY	
Mr. V. R. Rawlings, Vice President Mail No. 14 Martin-Marietta Corporation Baltimore, Maryland 21203	1
Mr. Bastian Hello Director, Lifting Body Programs Mail No. 3070 Martin-Marietta Corporation Baltimore, Maryland 21203	1
Mr. W. D. Smith Director, Gemini Program Mail No. 3134 Martin-Marietta Corporation Baltimore, Maryland 21203	15
Mr. J. M. Verlander Gemini Program Director Mail No. B-1605 Canaveral Division Martin-Marietta Corporation Cocoa Beach, Florida 32931	4
MCDONNELL DOUGLAS CORPORATION	
Mr. Walter F. Burke Vice President and General Manager Spacecraft and Missiles McDonnell Douglas Corporation Lambert-St. Louis Municipal Airport P. O. Box 516 St. Louis, Missouri 63166	40

UNCLASSIFIED

AddresseeNumber of copies

Mr. R. D. Hill, Jr.
Base Manager
McDonnell Douglas Corporation
P. O. Box M
Cocoa Beach, Florida 32931

5

OTHER CONTRACTORS

Mr. Vincent Sacco
ACF Electronics Division
ACF Industries, Incorporated
11 Park Place
Paramus, New Jersey 07652

1

Mr. A. Jensen
Advanced Technology Laboratory
American Radiator and Standard Sanitary Corporation
369 Whisman Road
Mountain View, California 94042

1

Mr. H. J. Harrington
Cedar Rapids Division
Collins Radio Company
5200 C Avenue, Northeast
Cedar Rapids, Iowa 52400

1

Mr. M. R. Everhart
Electro-Mechanical Research, Incorporated
Post Office Box 3041
Sarasota, Florida 33577

1

Mr. Frank Burkdoll
Explosive Technology, Incorporated
3015 Copper Road
Santa Clara, California 95050

1

Mr. R. C. Nelson
Department 93-19
AiResearch Manufacturing Company
Division of the Garrett Corporation
9815 Sepulveda Boulevard
Torrance, California 90009

1

UNCLASSIFIED

<u>Addressee</u>	<u>Number of copies</u>
Mr. G. H. Kent Director, Aerospace Flight Systems Honeywell, Aeronautical Division 2600 Ridgeway Road Minneapolis, Minnesota 55413	1
Mr. Stewart F. Sando Aeronautical Division Honeywell, Incorporated 13350 U. S. Highway 19 St. Petersburg, Florida 33700	1
Mr. L. W. Hauger Weber Aircraft Corporation 2820 Ontario Street Burbank, California 91500	1
Mr. Stan Friedman Gemini Program Manager Westinghouse Corporation Military Products Baltimore, Maryland 21200	1
Mr. D. J. Kearney Project Director Central Technology, Inc. Herrin, Illinois 16948	1
Mr. George Grogan Vice President of Engineering Northrup Corporation Ventura Division Newbury Park, California 91320	1
Mr. John H. Russell Direct Energy Conversion Operation General Electric Company 950 Western Avenue Lynn, Massachusetts 01901	1
Mr. B. G. McNabb General Electric Company MSVD/SMSD P. O. Box 8661 Philadelphia, Pennsylvania 19100	1

UNCLASSIFIED

UNCLASSIFIED

<u>Addressee</u>	<u>Number of copies</u>	<u>Page</u>
Mr. Ellis Hudes Program Manager, Gemini PCM Tape Recorders RCA Camden, New Jersey 08100	1	139
Mr. Clint Hundley, Program Manager Department 837, Building 201-3 Space Guidance Center Federal Systems Division International Business Machines Corporation Owego, New York 13827	1	
Mr. Charles Estes Western Center Military Electronics Division Motorola, Incorporated 8201 East McDowell Road Scottsdale, Arizona 85251	1	
Mr. L. E. Stewart Department 097, Zone 16 Rocketdyne Division North American Aviation, Incorporated 6633 Canoga Avenue Canoga Park, California 91304	1	
Mr. C. E. Ward Program Manager, Gemini, ETVPD Guided Missiles Range Division Pan American World Airways, Incorporated Mail Unit 802, Building 423 Patrick Air Force Base, Florida 32925	1	
Mr. Joe R. Hrivnak Building G29 Elkton Division Thiokol Chemical Corporation Post Office Box 241 Elkton, Maryland 21921	1	
Mr. P. N. Metzelaar Gemini Project Engineer TRW Systems Building E, Room 3055 Redondo Beach, California 90260	1	

UNCLASSIFIED

UNCLASSIFIED

Addressee

Number of copies

Page 140

Mr. Dale D. Meyers
Apollo Program Manager
North American Aviation, Incorporated
Space Division
12214 Lakewood Boulevard
Downey, California 90240

25

Mr. David Hoag
Director Apollo Programs
Massachusetts Institute of Technology
75 Cambridge Parkway
Cambridge, Massachusetts 02142

5

Mr. Hugh Brady, Dept. 3201
Apollo Program Manager
AC Electronics Division
General Motors Corporation
Milwaukee, Wisconsin 53200

5

Mr. J. G. Gavin
Lunar Module Program Director
Plant 25
Grumman Aircraft Engineering Corporation
Bethpage, Long Island, New York 11714

25

UNCLASSIFIED