LCARS 2401.28

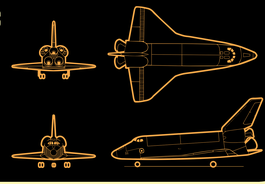
INFORMATION RETRIEVAL

THE CHALLENGER STS-51L ACCIDENT

ON JANUARY 28, 1986, THE SPACE SHUTTLE CHALLENGER BROKE APART 73 SECONDS INTO ITS FLIGHT, KILLING ALL SEVEN CREW MEMBERS ABOARD. THE SPACECRAFT DISINTEGRATED 46,000 FEET (14 KM) ABOVE THE ATLANTIC OCEAN, OFF THE COAST OF CAPE CANAVERAL, FLORIDA, AT 11:39 A.M. EST (16:39 UTC). IT WAS THE FIRST FATAL ACCIDENT INVOLVING AN AMERICAN SPACECRAFT WHILE IN FLIGHT.

KEY
TEST VEHICLE
LOST

SHUTTLES	DESIGNATION	FLIGHTS	FLIGHT TIME	ORBITS
ENTERPRISE	OV-101	005	000 DAYS 000 HOURS 019 MINUTES N/A SECONDS	0000
COLUMBIA	OV-102	028	300 DAYS 017 HOURS 047 MINUTES 015 SECONDS	4,808
CHALLENGER	OV-099	010	062 DAYS 007 HOURS 056 MINUTES 015 SECONDS	0995
DISCOVERY	OV-103	039	364 DAYS 022 HOURS 039 MINUTES 029 SECONDS	5,830
ATLANTIS	OV-104	033	306 DAYS 014 HOURS 012 MINUTES 043 SECONDS	4,848
ENDEAVOUR	OV-105	025	296 DAYS 003 HOURS 034 MINUTES 002 SECONDS	4,677



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INFORMATION RETRIEVAL

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DETAILS

USSTERMINUS@GMAIL.COM

INT

STS-51-L INSIGNIA

FIRST FLIGHT

STS-6 - 4 APRIL 1983

LAST FLIGHT

STS-51-L - 28 JANUARY 1986

INT

SPACE SHUTTLE

FUNCTION: CREWED ORBITAL LAUNCH AND REENTRY
HEIGHT: 56.1 M (184 FT)
MASS: 2,030,000 KG (4,480,000 LB)
STAGES: 1.5: 126, 140
SUCCESS(ES): 133
TOTAL LAUNCHES: 134 TOTAL FLIGHTS: 135

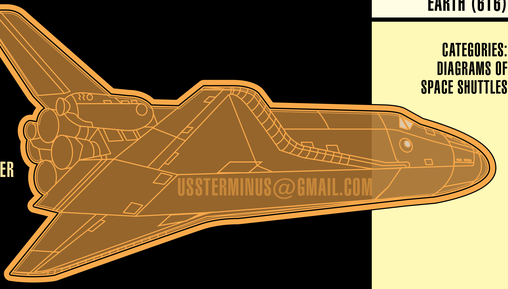
FAILURE(S): 2:
CHALLENGER (LAUNCH FAILURE, 7 FATALITIES);
COLUMBIA (RE-ENTRY FAILURE, 7 FATALITIES)

CHALLENGER'S SOLID ROCKET BOOSTERS FLY UNCONTROLLABLY AFTER THE BREAKUP OF THE EXTERNAL TANK SEPARATED THEM FROM THE SHUTTLE STACK. THE REMAINS OF THE ORBITER AND TANK LEAVE THIN WHITE CONTRAILS AS THEY FALL TOWARD THE ATLANTIC OCEAN.

DATE: JANUARY 28, 1986
TIME: 11:39:13 EST (16:39:13 UTC)
LOCATION: ATLANTIC OCEAN, OFF THE COAST OF FLORIDA
COORDINATES: 28°38'24"N 80°16'48"W
CAUSE: O-RING SEAL FAILURE IN RIGHT SRB DUE TO COLD WEATHER AND WIND SHEARS
OUTCOME: LOSS OF CHALLENGER AND CREW
TEACHER IN SPACE PROJECT AND SUBSEQUENT CIVILIAN SHUTTLE SPACEFLIGHTS CANCELLED
SHUTTLE FLEET GROUNDED FOR IMPLEMENTATION OF SAFETY MEASURES
CONSTRUCTION OF REPLACEMENT ORBITER ENDEAVOUR.

DEATHS:
- F. RICHARD SCOBEE, COMMANDER
- MICHAEL J. SMITH, PILOT
- RONALD MCNAIR, MISSION SPECIALIST
- ELLISON ONIZUKA, MISSION SPECIALIST
- JUDITH RESNIK, MISSION SPECIALIST
- GREGORY JARVIS, PAYLOAD SPECIALIST
- CHRISTA MCAULIFFE, PAYLOAD SPECIALIST, TEACHER

INQUIRIES ROGERS COMMISSION REPORT



STATUS

SPECIFICATIONS

THE STS-51L CREW

SEARCH

THE MISSION, DESIGNATED STS-51-L, WAS THE TENTH FLIGHT FOR THE ORBITER AND THE TWENTY-FIFTH FLIGHT OF THE SPACE SHUTTLE FLEET. THE CREW WAS SCHEDULED TO DEPLOY A COMMUNICATIONS SATELLITE AND STUDY HALLEY'S COMET WHILE THEY WERE IN ORBIT, IN ADDITION TO TAKING SCHOOLTEACHER CHRISTA MCAULIFFE INTO SPACE UNDER THE TEACHER IN SPACE PROGRAM. THE LATTER RESULTED IN A HIGHER-THAN-USUAL MEDIA INTEREST AND COVERAGE OF THE MISSION; THE LAUNCH AND SUBSEQUENT DISASTER WERE SEEN LIVE IN MANY SCHOOLS ACROSS THE UNITED STATES.

THE CAUSE OF THE DISASTER WAS THE FAILURE OF THE PRIMARY AND SECONDARY REDUNDANT O-RING SEALS IN A JOINT IN THE SHUTTLE'S RIGHT SOLID ROCKET BOOSTER (SRB). THE RECORD-LOW TEMPERATURES ON THE MORNING OF THE LAUNCH HAD STIFFENED THE RUBBER O-RINGS, REDUCING THEIR ABILITY TO SEAL THE JOINTS. SHORTLY AFTER LIFTOFF, THE SEALS WERE BREACHED, AND HOT PRESSURIZED GAS FROM WITHIN THE SRB LEAKED THROUGH THE JOINT AND BURNED THROUGH THE AFT ATTACHMENT STRUT CONNECTING IT TO THE EXTERNAL PROPELLANT TANK (ET), THEN INTO THE TANK ITSELF. THE COLLAPSE OF THE ET'S INTERNAL STRUCTURES AND THE ROTATION OF THE SRB THAT FOLLOWED THREW THE SHUTTLE STACK, TRAVELING AT A SPEED OF MACH 1.92, INTO A DIRECTION WHICH ALLOWED AERODYNAMIC FORCES TO TEAR THE ORBITER APART. BOTH SRBS DETACHED FROM THE NOW-DESTROYED ET AND CONTINUED TO FLY UNCONTROLLABLY UNTIL THE RANGE SAFETY OFFICER DESTROYED THEM.

THE CREW COMPARTMENT, HUMAN REMAINS AND MANY OTHER FRAGMENTS FROM THE SHUTTLE WERE RECOVERED FROM THE OCEAN FLOOR AFTER A THREE-MONTH SEARCH-AND-RECOVERY OPERATION. THE EXACT TIMING OF THE DEATHS OF THE CREW IS UNKNOWN, BUT SEVERAL CREW MEMBERS ARE THOUGHT TO HAVE SURVIVED THE INITIAL BREAKUP OF THE SPACECRAFT. THE ORBITER HAD NO ESCAPE SYSTEM, AND THE IMPACT OF THE CREW COMPARTMENT AT TERMINAL VELOCITY WITH THE OCEAN SURFACE WAS TOO VIOLENT TO BE SURVIVABLE.

THE DISASTER RESULTED IN A 32-MONTH HIATUS IN THE SPACE SHUTTLE PROGRAM. PRESIDENT RONALD REAGAN CREATED THE ROGERS COMMISSION TO INVESTIGATE THE ACCIDENT. THE COMMISSION CRITICIZED NASA'S ORGANIZATIONAL CULTURE AND DECISION-MAKING PROCESSES THAT HAD CONTRIBUTED TO THE ACCIDENT. TEST DATA SINCE 1977 DEMONSTRATED A POTENTIALLY CATASTROPHIC FLAW IN THE SRBS' O-RINGS, BUT NEITHER NASA NOR SRB MANUFACTURER MORTON THIOKOL HAD ADDRESSED THIS KNOWN DEFECT. NASA MANAGERS ALSO DISREGARDED ENGINEERS' WARNINGS ABOUT THE DANGERS OF LAUNCHING IN COLD TEMPERATURES AND DID NOT REPORT THESE TECHNICAL CONCERNS TO THEIR SUPERIORS.

AS A RESULT OF THE DISASTER, NASA ESTABLISHED THE OFFICE OF SAFETY, RELIABILITY, AND QUALITY ASSURANCE, AND ARRANGED FOR DEPLOYMENT OF COMMERCIAL SATELLITES FROM EXPENDABLE LAUNCH VEHICLES RATHER THAN FROM A CREWED ORBITER. TO REPLACE CHALLENGER, THE CONSTRUCTION OF A NEW SPACE SHUTTLE ORBITER, ENDEAVOUR, WAS APPROVED IN 1987, AND THE NEW ORBITER FIRST FLEW IN 1992. SUBSEQUENT MISSIONS WERE LAUNCHED WITH REDESIGNED SRBS AND THEIR CREWS WORE PRESSURIZED SUITS DURING ASCENT AND REENTRY.

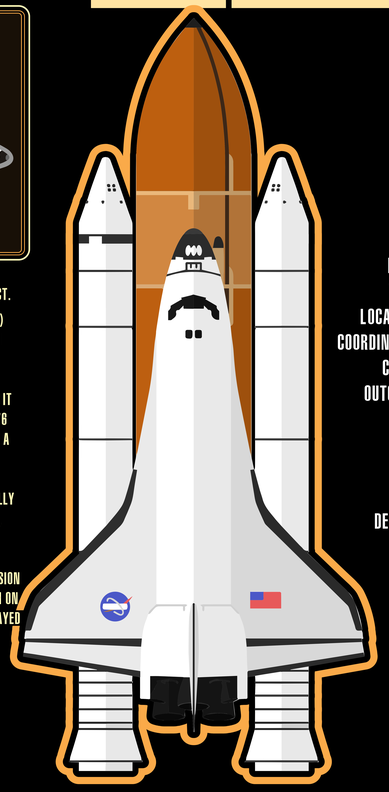
MISSION

THE SPACE SHUTTLE MISSION, NAMED STS-51-L, WAS THE TWENTY-FIFTH SPACE SHUTTLE FLIGHT AND THE TENTH FLIGHT OF CHALLENGER.[1]:8 THE CREW WAS ANNOUNCED ON JANUARY 27, 1985, AND WAS COMMANDED BY DICK SCOBEE. MICHAEL SMITH WAS ASSIGNED AS THE PILOT, AND THE MISSION SPECIALISTS WERE ELLISON ONIZUKA, JUDITH RESNIK, AND RONALD MCNAIR. THE TWO PAYLOAD SPECIALISTS WERE GREGORY JARVIS, WHO WAS ASSIGNED TO CONDUCT RESEARCH FOR THE HUGHES AIRCRAFT COMPANY, AND CHRISTA MCAULIFFE, WHO FLEW AS PART OF THE TEACHER IN SPACE PROJECT.

10–13 THE PRIMARY MISSION OF THE CHALLENGER CREW WAS TO USE AN INERTIAL UPPER STAGE (IUS) TO DEPLOY A TRACKING AND DATA RELAY SATELLITE (TDRS), NAMED TDRS-B, THAT WOULD HAVE BEEN PART OF A CONSTELLATION TO ENABLE CONSTANT COMMUNICATION WITH ORBITING SPACECRAFT. THE CREW ALSO PLANNED TO STUDY HALLEY'S COMET AS IT PASSED NEAR THE SUN,III-76 AND DEPLOY AND RETRIEVE A SPARTAN SATELLITE.

THE MISSION WAS ORIGINALLY SCHEDULED FOR JULY 1985, BUT WAS DELAYED TO NOVEMBER AND THEN TO JANUARY 1986.10 THE MISSION WAS SCHEDULED TO LAUNCH ON JANUARY 22,BUT WAS DELAYED UNTIL JANUARY 28

STS-51-L CREW: (BACK) ONIZUKA, MCAULIFFE, JARVIS, RESNIK; (FRONT) SMITH, SCOBEE, MCNAIR.



CAPE CANAVERAL, FLORIDA, AT 11:39 A.M. EST (16:39 UTC)

SPECIFICATIONS

NASA/BOEING 1981–2011 EARTH (616)

CATEGORIES: DIAGRAMS OF SPACE SHUTTLES