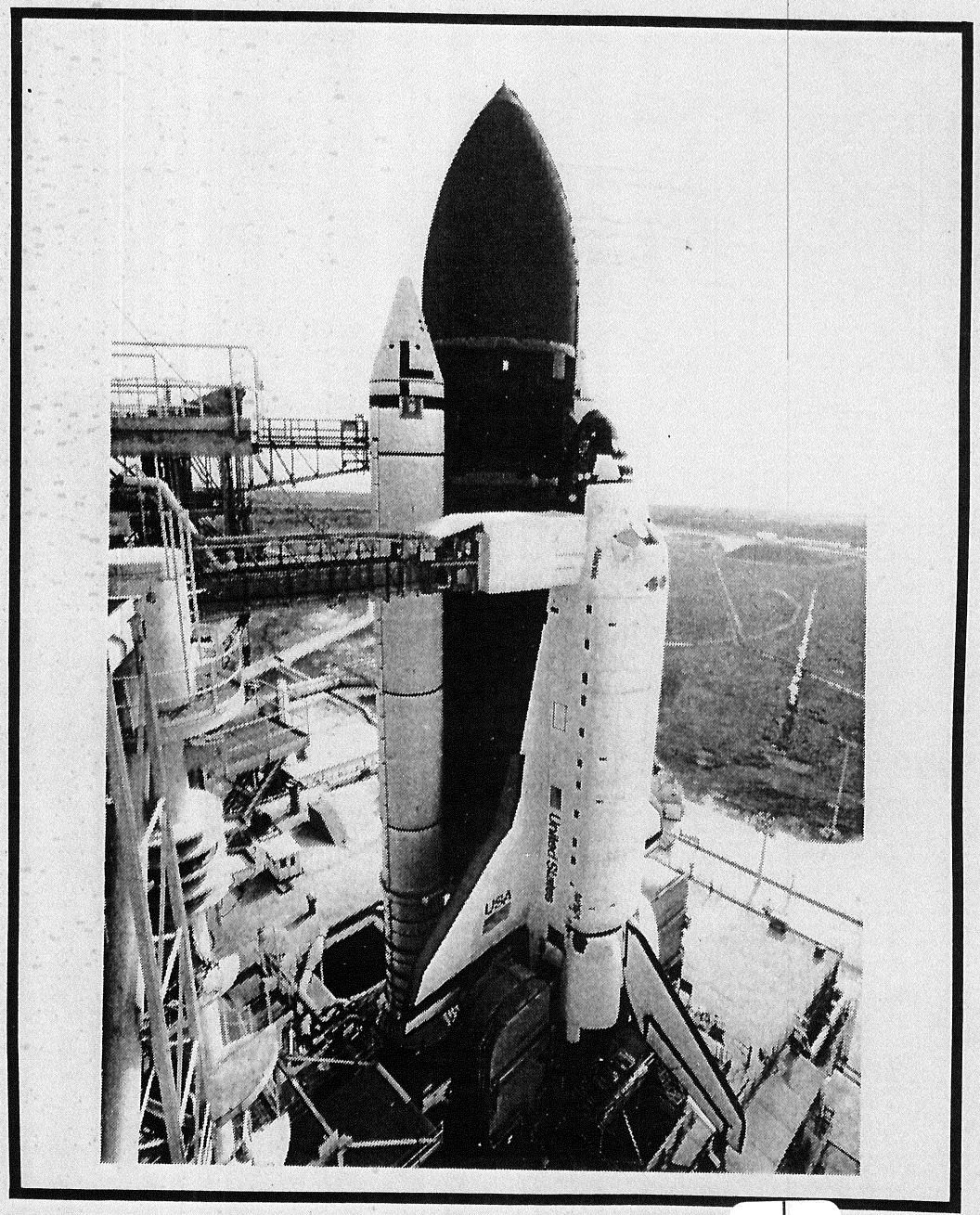


STS - 38
SHUTTLE COUNTDOWN HIGHLIGHTS
OV104

MARSHALL SPACE FLIGHT CENTER

Rockwell International
Space Transportation Systems Division

Huntsville Operations

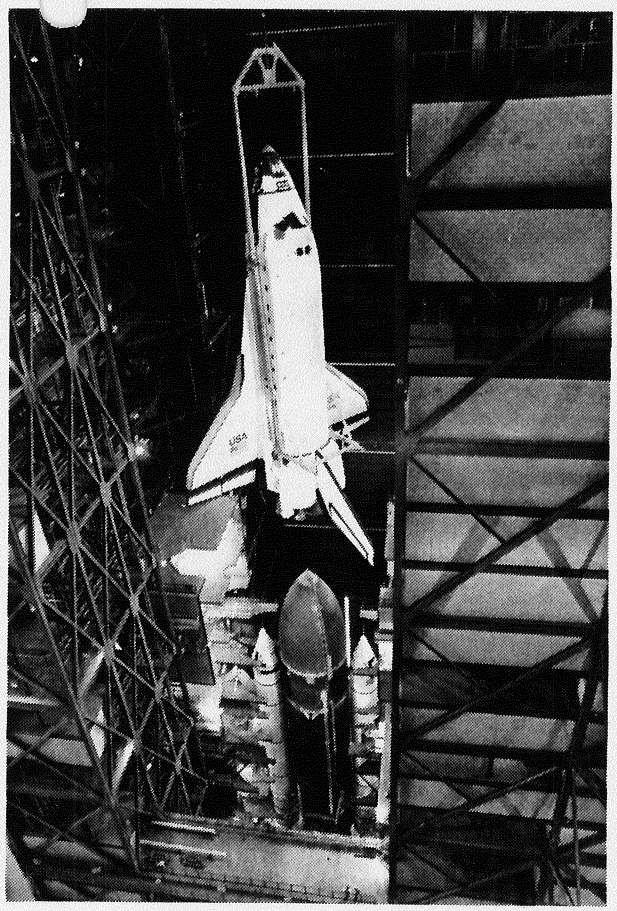
Charles D. Gemar Robert C. Springer Carl J. Meade

Frank L. Culbertson (Pilot) Richard O. Covey (Commander)

OVERVIEW 10

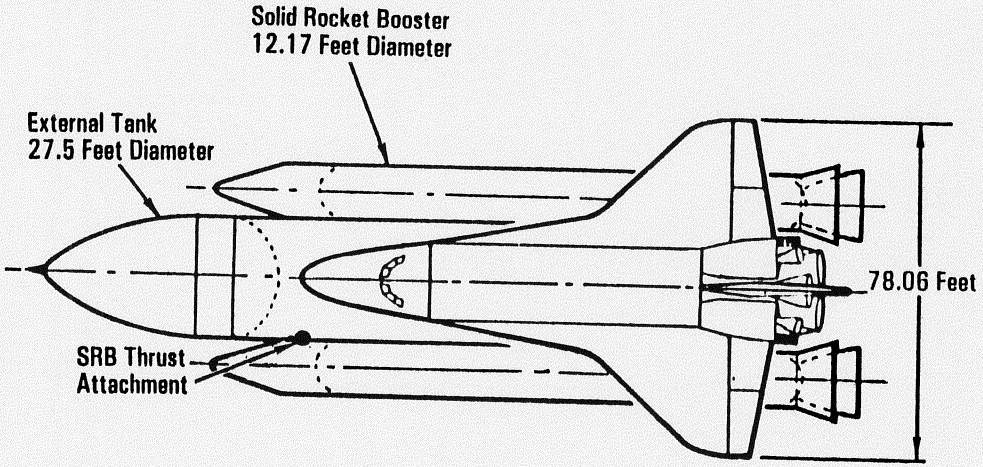
CREW PHOTO

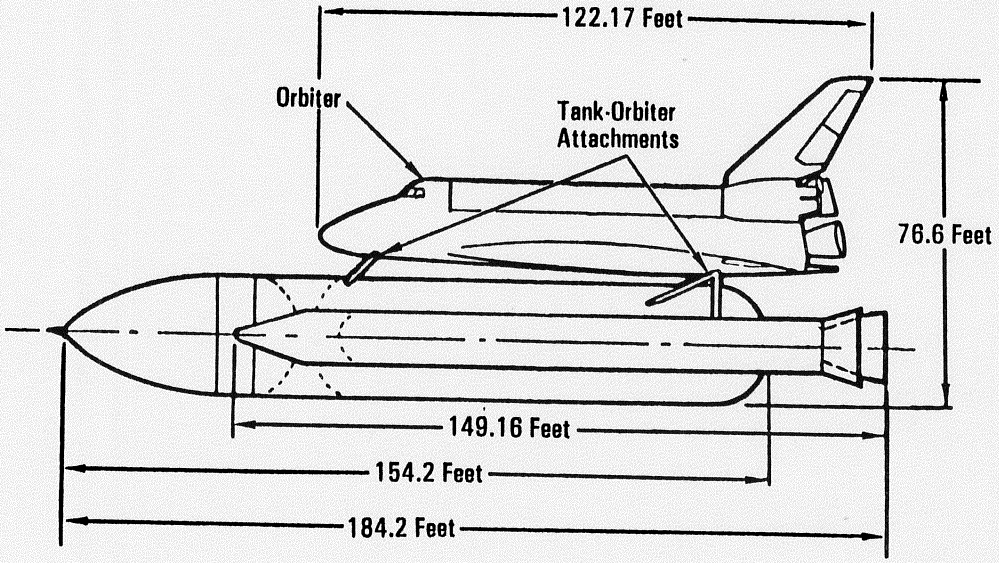
STS-38 CREW INSIGNIA *— The STS-38 patch was designed to represent and pay tribute to all the men and women who contribute to the Space Shuttle program. The top orbiter, with the stylistic Orbital Maneuvering System burn, symbolizes the continuing dynamic nature of the Space Shuttle program. The bottom orbiter, a black and white mirror image, acknowledges the thousands of unheralded individuals who work behind the scenes in support of America's Space Shuttle program. This mirror image symbolizes the importance of their contributions.*



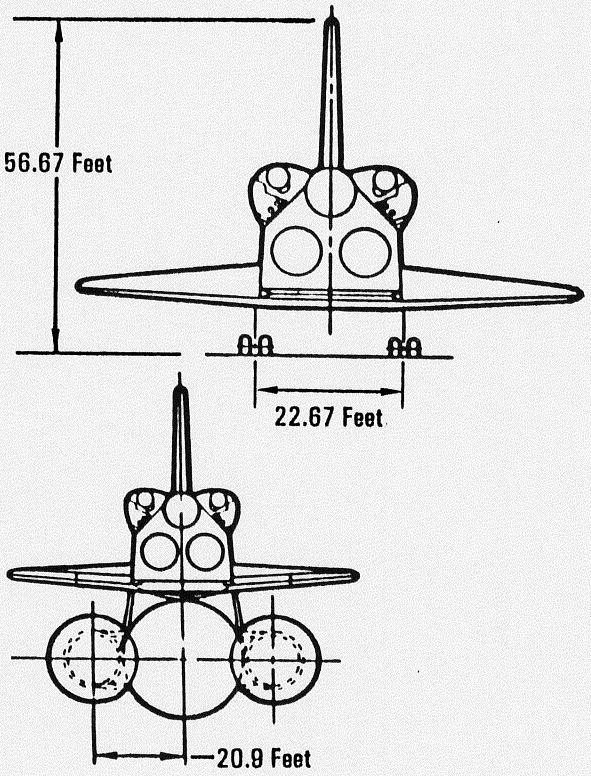
The orbiter Atlantis is hoisted far above the 184-foot Shuttle external tank and solid rocket booster stack, positioned on the mobile launcher platform inside high bay 3 of the Vehicle Assembly Building. The de-mating took place on August 14, after which the orbiter was returned to the Orbiter Processing Facility and preparation for Space Shuttle Mission STS-38. Launch was originally scheduled to occur in July, but was postponed following detection of a liquid hydrogen leak.

The STS-38 crew members receive instructions on emergency escape procedures from the 195-foot level at Launch Pad 39-A during the Terminal Countdown Demonstration Test. It is from this level that the astronauts have access to the orbiter's crew cabin. From left are: Commander Richard Covey, Mission Specialists Carl Meade, Sam Gemar, Pilot Frank Culbertson and Mission Specialist Robert Springer. Atlantis is scheduled to fly STS-38 on a classified Department of Defense mission.





Orbiter Weight in Pounds (Approximate)		
Orbiter Vehicle (OV)	Total Dry Weight With Three Space Shuttle Main Engines	Total Dry Weight Without Three Space Shuttle Main Engines
OV-102 Columbia	178,289	157,289
OV-103 Discovery	171,419	151,419
OV-104 Atlantis	171,205	151,205
Solid Rocket Booster Weights in Pounds (Approximate)		
1,300,000, Each at Launch (Propellant Weight 1,100,000, Each). Inert Weight 192,000, Each.		
External Tank Weight in Pounds (Approximate)		
1,655,600 With Propellants. Inert Weight 66,000.		



SHUTTLE STATISTICS

SPECIAL INTERESTS 2

SRB RETRIEVAL

Associated with space shuttle operations at the Kennedy Space Center is the retrieval and refurbishment of the two reusable solid rocket boosters.

Two specially designed and constructed retrieval vessels recover the boosters and their various components. The Liberty Star and the Freedom Star are 176 feet long, have a beam of 37 feet, have a depth of 15 feet and draw 9 feet of water. Both ships are used on shuttle missions.

Of molded steel hull construction, the recovery vessels have sophisticated electronic communications and navigation equipment, including a global positioning navigation system, search radars, collision-avoidance sonars with transponders, radars, loran C, VHF and single-side-band high-frequency radio systems, direction finders, fathometers and gyro compasses. Each vessel has a diplacement of 1,052 tons.

At sea, propulsion is provided by twin diesel engines with a combined power output of 2,900 horsepower. Maneuvering is provided by a diesel-driven, 425-horsepower bow thruster.

The ships leave their Cape Canaveral Air Force Station berths at Hangar AF about 24 hours before launch and proceed to the predicted impact site. Traveling at a cruising speed of 10 to 12 knots per hour, they reach the area in about 10 hours. In the hours before lift-off, the ships conduct visual and electronic sweeps of the predicted impact area to ensure it is clear.

Each ship recovers one SRB casing, three main parachutes, and a frustum-drogue combination.

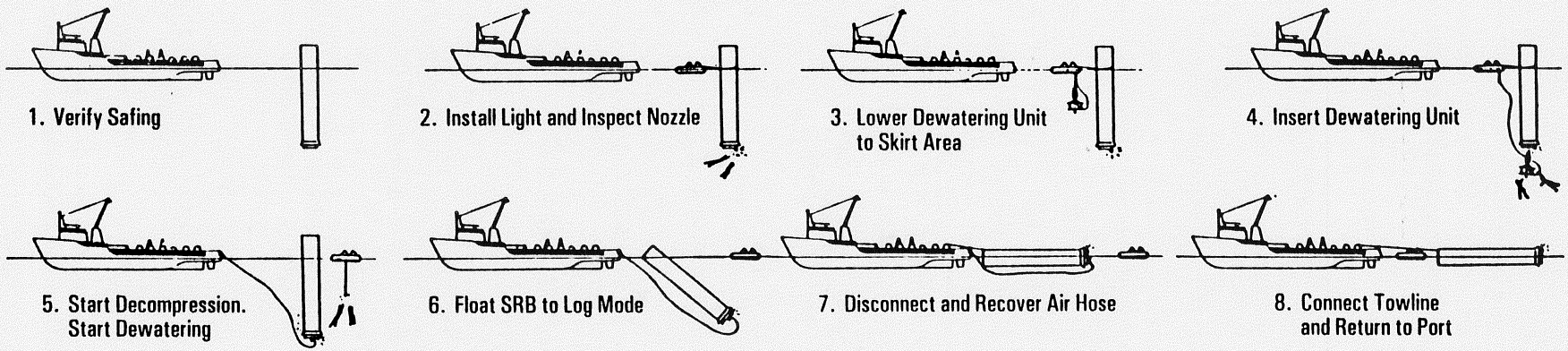
Recovery begins with retrieval of the main parachutes. Each recovery vessel has four large deck reels 5.5 feet across. The reels can hold two parachutes each. The parachutes' winch lines are fed onto the spools, and the parachutes are wound around them like line on a fishing reel.

Retrieval of the frustum-drogue parachute begins in the same way. The drogue parachute is wound around one of the large reels until the 5,000-pound frustum is approximately 100 feet from the ship. The drogue parachute's shroud lines are then rolled in until the frustum can be hoisted out of the water by a 10-ton crane.

SRB RETRIEVAL (CONTINUED)

Recovery of the two spent solid rocket booster casings, the last phase of the recovery mission, is accomplished using a diver-operated plug. The diver descends to a depth of approximately 110 feet and inserts a diver-operated plug in the nozzle of each casing. A 2,000-foot-long air line is attached from the DOP to an air compressor on the retrieval vessel. Air is pumped at a pressure at 120 psi to dewater the booster and permit towing of the casing back to port.

Under optimum sea conditions, booster retrieval operations are completed about five hours and 30 minutes after the launch. The ships then proceed back to Cape Canaveral and up the Banana River to Hangar AF at the Cape Canaveral Air Force Station.



Solid Rocket Booster Recovery Procedure

SHUTTLE FLIGHTS
AS OF OCTOBER 1990
36 TOTAL FLIGHTS

SHOWN IS:

MISSION
DATE OF LIFTOFF
DATE OF LANDING

CHALLENGER OV-099

MISSION	DATE OF LIFTOFF	DATE OF LANDING
51-L	01/28/86	
61-A	10/30/85	11/06/85
51-F	07/29/85	08/06/85
51-B	04/29/85	05/06/85
41-G	10/05/84	10/13/84
41-C	04/06/84	04/13/84
41-B	02/03/84	02/11/84
STS-8	08/30/83	09/05/83
STS-7	06/18/83	06/24/83
STS-6	04/04/83	04/09/83

COLUMBIA OV-102

MISSION	DATE OF LIFTOFF	DATE OF LANDING
STS-32	01/09/90	01/20/90
STS-28	08/08/89	08/13/89
61-C	01/12/86	01/18/86
STS-9	11/28/83	12/08/83
STS-5	11/11/82	11/16/82
STS-4	06/27/82	07/04/82
STS-3	03/22/82	03/30/82
STS-2	11/12/81	11/14/81
STS-1	04/12/81	04/14/81

DISCOVERY OV-103

MISSION	DATE OF LIFTOFF	DATE OF LANDING
STS-41	10/06/90	10/10/90
STS-31	04/24/90	04/29/90
STS-33	11/22/89	11/27/89
STS-29	03/13/89	03/18/89
STS-26	09/29/88	10/03/88
51-I	08/27/85	09/03/85
51-G	06/17/85	06/24/85
51-D	04/12/85	04/19/85
51-C	01/24/85	01/27/85
51-A	11/07/84	11/15/84
41-D	08/30/84	09/04/84

ATLANTIS OV-104

MISSION	DATE OF LIFTOFF	DATE OF LANDING
STS-36	02/28/90	03/04/90
STS-34	10/18/89	10/23/89
STS-30	05/04/89	05/08/89
STS-27	12/02/88	12/06/88
61-B	11/26/85	12/03/85
51-J	10/03/85	10/07/85