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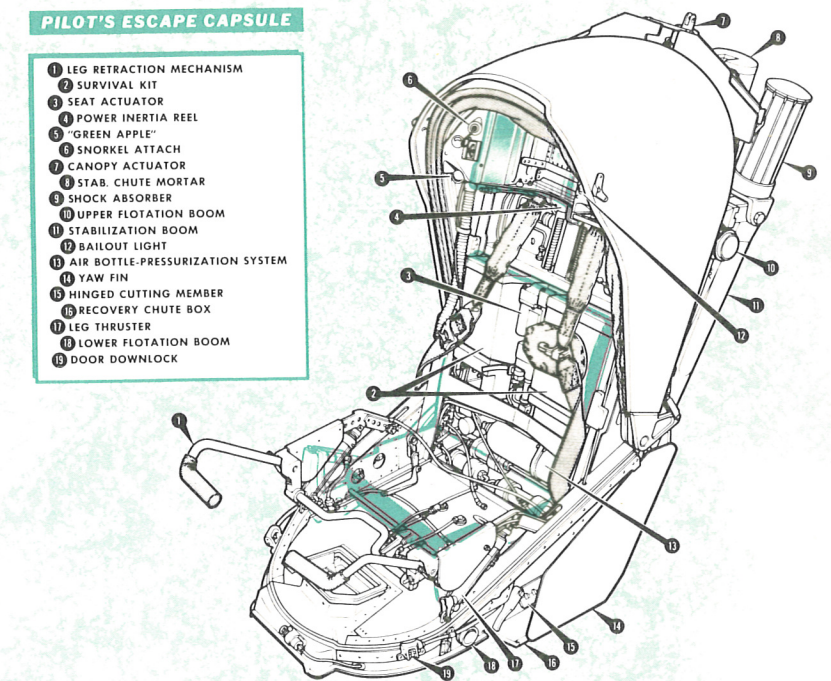
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General Dynamics,

Fort Worth, Texas

# B-58 escape capsule



A new escape system is being developed for the B-58 to keep pace with the Hustler's supersonic speeds. It will represent a significant improvement over the present escape system.

Soon every B-58 crew member will have at his finger tips an escape capsule that will:

- Eject him safely from the aircraft
- Protect him from supersonic wind blasts
- Supply oxygen and pressurization at high altitude
- Accomplish an automatic recovery (with manual override provisions)
- Absorb landing impact
- Provide food and equipment for survival on land, water, or ice

An important feature of the escape capsule is the added comfort and resultant increase in crew efficiency. Many heretofore standard pieces of personal equipment such as the partial-pressure suit, Mae West, exposure suit, personal parachute, etc., will no longer be required. Their functions have been incorporated into the new capsule.

During flight, the crew member is adequately restrained by only a lap belt and torso restraint over his lightweight, flight coveralls. The capsule features a four-point hookup (lap belt, torso restraint, oxygen hose, and intercom wire) as compared to fourteen points on the current B-58 seat system. Thus, the flight crew will be able to more nearly approach "shirt-sleeve comfort" not only in the ready room but during flight as well.

Space was given prime consideration in the es-

cape capsule design. As major B-58 airframe modifications were not feasible, the capsule was made to fit within the same space envelope as the open seat ejection system. Placing extreme emphasis on obtaining all possible room within the capsule, maximum useable space was attained through the manner in which the equipment was arranged.

The capsule is an upward-ejecting escape system that is designed to afford maximum protection throughout the performance range of the Hustler. The B-58 will have three escape capsules—one for each crew station. The crew capsules (2nd and 3rd stations) are operationally and functionally identical. The pilot's capsule (1st station) is similar to the crew capsule but includes a flight control stick and ejects on 3 1/2-degree canted rails which enable the capsule to clear the cockpit enclosure in an emergency, yet permit the pilot to be offset 3 1/2 inches to the left of the airplane centerline for optimum vision and cockpit layout. The crew capsules are ejected on vertical rails.

The crew seat is an integral part of the capsule and is adjustable for accommodating crew members of various physical statures. During flight, the crew member is seated in approximately the same position as with the open ejection seat, but with a noticeably lesser number of troublesome restraint straps, etc.

Basically, the capsule operates in the same manner as an open seat ejection system except that it forms an airtight, pressurized compartment around the crew member prior to ejection. This

extra capability is provided by telescoping doors that are pivoted on each side of the seat and rest above the crew member's head during flight. In an emergency, the doors rotate downward to form a pressure-tight "capsule" around the crew member. The capsule then ejects from the airplane and a recovery parachute automatically deploys to provide a controlled descent. The crew member remains in the capsule until it reaches the earth's surface.

The emergency escape sequence is outlined as follows:

- Body restraint and positioning
- Capsule closure
- Pressurization and oxygen
- Upward ejection
- Capsule stabilization
- Automatic recovery (with manual override provisions)
- Cushioned landing
- Manual chute riser line release and flotation bag inflation
- Manual capsule opening

The various functions of the capsule are actuated

by mechanical linkages, explosive devices, pressure bottles, thermal batteries, etc., located within the capsule. Each capsule is an independently operating unit and does not require any outside power source for emergency escape.

In an emergency, the aircraft commander would alert his crew members either by intercom or an amber flashing light located in each of the crew stations. The amber alert lights are actuated by a switch on the landing gear panel. Should the pilot fail to engage the switch, the alert lights will automatically actuate when the pilot closes his capsule.

When the crew member receives the alert signal, he closes his capsule by raising either or both of the ejection handles—one on each side of the capsule seat. Raising the ejection handle fires a gas generator which actuates the torso-retracting inertia reel and the leg-positioning mechanism. Body restraints draw the occupant back against the seat with his head in the headrest. His legs are raised by the forward part of the seat pan and a bar beneath his thighs near his knees. Cushioned bars then draw his feet back into the capsule.

When the leg-positioning thrusters have completed their stroke, gas pressure is routed to the

door-uplock release and the door-closure thruster. This releases the doors and rotates them downward to form the pressure-tight compartment around the occupant. As the doors close, the capsule pressurization system is actuated and the capsule becomes pressurized to an altitude equivalent of 37,500 feet. The doors close and lock within one-half to one second after the ejection handle is raised. An additional five to seven seconds may be required for pressurization at high altitude.

The closure of the pilot's capsule automatically arms the aircraft communications system for transmittal of Mayday calls. Also, the airplane intercom will continue to operate after the capsules are closed.

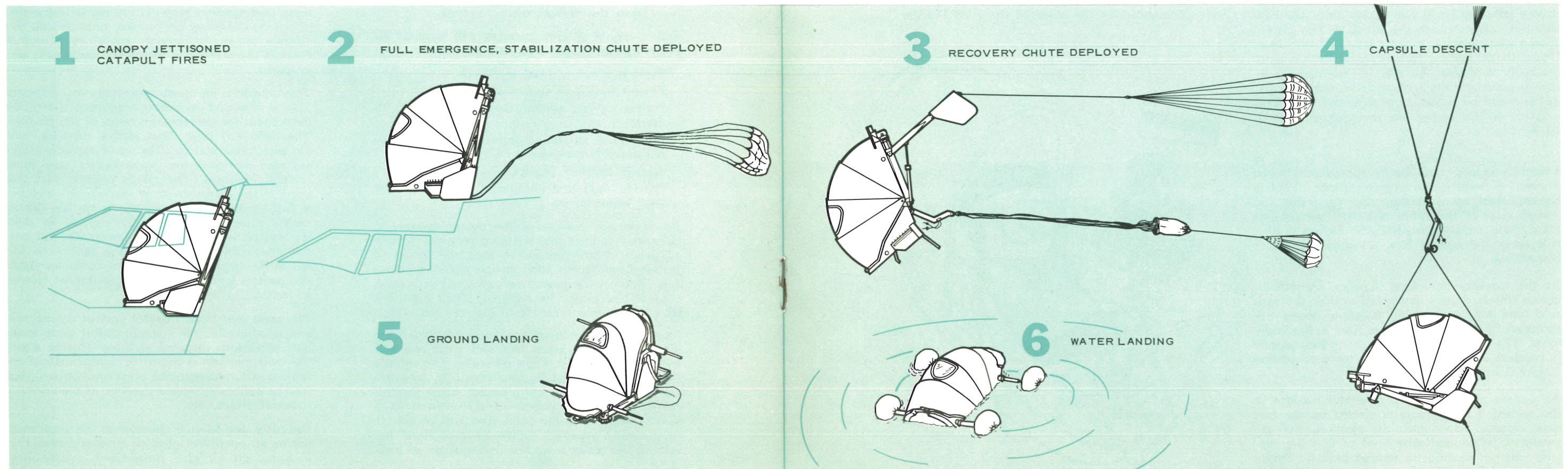
At this point, the pilot may choose to abandon the aircraft; or, if the capsules were closed for emergency pressurization only, he can fly the airplane to a lower altitude, have the crew members reopen their capsules, and continue the flight. To implement the flydown, each capsule has a window that enables the occupant to see the area immediately in front of him. In the pilot's station, this area includes the instruments necessary for the flydown. As the control stick is located inside his capsule, the pilot is able to maintain control of his aircraft. Switches on the control stick enable him to control the airplane's

CG and to retard the engine throttles.

A ten-minute pressurization supply is available for a flydown. The pressurized air for this capability is stored in the Hustler's right main landing gear drag strut. In addition, each capsule includes a separate pressure bottle for use during continued flydown or for capsule descent after ejection. A caution light on the pilot's instrument panel informs the pilot when the air supply from the drag strut has been depleted and the capsule air supply is being used. Also, an oxygen bottle (separate from the airplane's oxygen supply) is in each capsule. It is automatically actuated on capsule ejection and can also be actuated manually.

Should a subsequent emergency arise after a flydown is completed and the capsules have been opened, crew members can close and pressurize their capsules a second time and abandon their aircraft.

When ejection is necessary, the pilot issues the order over the intercom or by means of the bailout switch located on the control stick. This switch energizes red lights in each crew station. Duplicate lights are located both on the control panel and within the capsules. Should the pilot fail to actuate the switch, the eject lights



will energize automatically on ejection of the pilot's capsule. A signal light notifies the pilot when either crew capsule has ejected.

Each crew member ejects his own capsule by squeezing either one or both of the ejection triggers located on the ejection handles (one on each handle). The first portion of travel of the ejection trigger fires the canopy actuator to jettison the canopy. The second portion of travel fires the rocket catapult initiator. A .30-second delay that is built into the rocket catapult, assures adequate time for removal of the canopy. In the event the canopy fails to jettison, the capsule will push off the canopy in the same manner as the present B-58 open seat system.

The dual-unit, manifold rocket catapult produces sufficient thrust to provide a 100-knot, zero altitude ejection capability and insures that the capsule can clear the airplane vertical stabilizer at maximum airplane design speed.

During high speed ejection, capsule stabilization is provided by a stabilization frame and a stabilization parachute. The ballistic deployment of the stabilization parachute is initiated by a lever-trip as the capsule moves up the guide rails. The system is completely deployed within a few milliseconds after the rocket catapult is fired.

If the ejection is made above 15,000 feet, the recovery parachute will not deploy until the capsule has fallen through this altitude. The stabilization system will prevent free-fall tumbling. Under 15,000 feet the recovery parachute is automatically deployed. An override for manual recovery parachute deployment is provided for use in the event the automatic deployment fails. This override is also inoperable above an altitude of 15,000 feet.

Upon deployment, the recovery chute is held in a semi-blossomed condition for approximately two seconds to reduce the opening shock. This is accomplished by a reefing line encircling the bottom edge of the chute canopy. Two seconds after chute deployment, ballistic reefing cutters will sever the reefing line, allowing full chute blossoming.

As the recovery parachute deploys, the stabilization frame retracts downward against the capsule, and four telescoping flotation booms are extended by high pressure gas from ballistic devices. The final descent attitude of the capsule is reached within 10 seconds after the ejection trigger is squeezed.

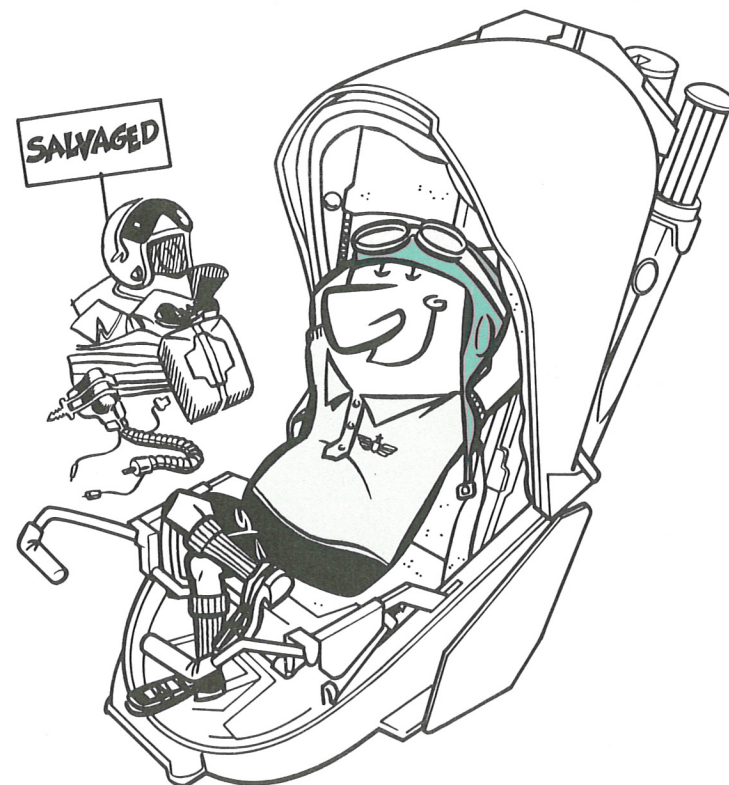
An unfired pre-ejection gas generator remains in the system if the capsule is ejected on the first door closure. After such an ejection, the gas generator is automatically fired so that the capsule will not contain an unfired ballistic device when it lands.

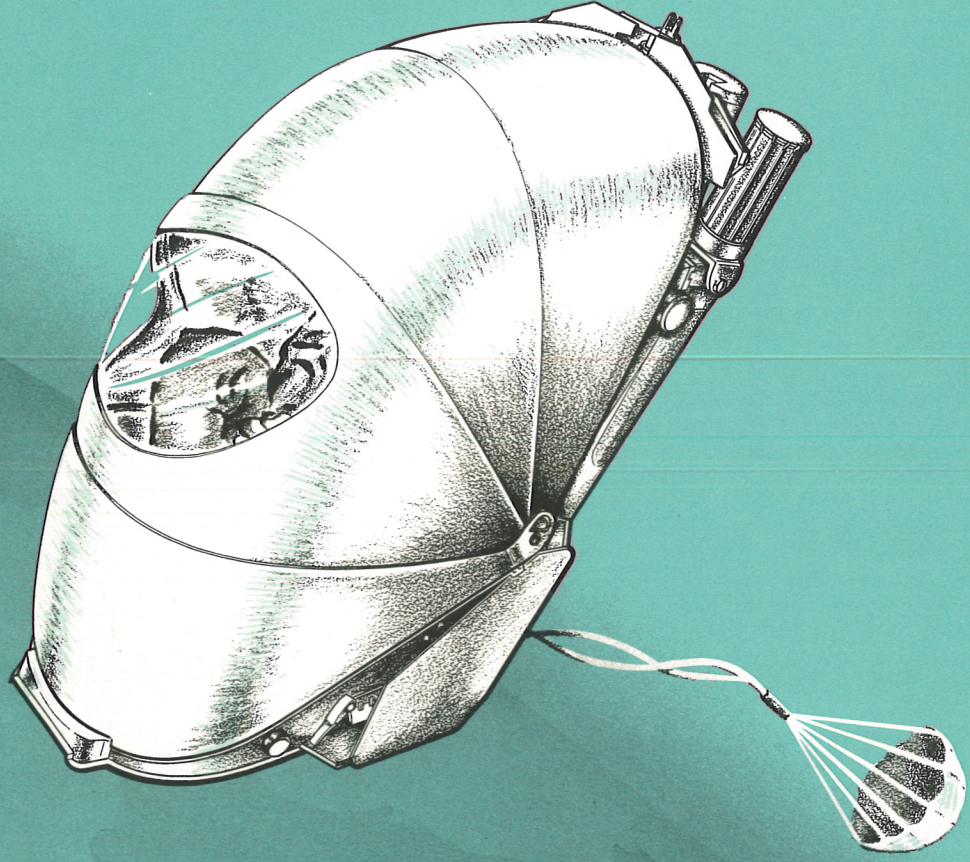
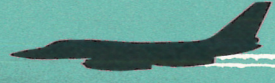
The 41-foot diameter, ring-sail recovery parachute reduces the capsule's descent to a maximum of 28 feet per second. Ground impact force is absorbed by two crushable cylinders that are on the back of the capsule and by the stabilization fins cutting through metal flanges on the sides of the capsule.

Whenever the capsule lands on water, its occupant can inflate the flotation bags on the upper flotation booms from a pressure container. A hand-operated pump is provided for inflating the flotation bags on the two lower flotation booms. The control handle for inflating the upper flotation bags also releases the recovery chute riser lines.

After it has lowered its occupant to the surface, the mission of the escape capsule is far from being complete. It can serve as a shelter from heat or cold or as a life raft. Also, the most critically needed items contained in the 56¾ pounds of packed survival equipment are accessible to the occupant within the closed capsule. As an aid to tracking and rescue operations, the capsule is provided with a chaff dispensing system that is automatically actuated on ejection.

With the introduction of the B-58 escape capsule, a new concept in crew safety and comfort, never before realized, is now becoming a reality. The new capsule will meet the high standard that is demanded by the speed of the B-58 Hustler.





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