

HISTORIC AMERICAN ENGINEERING RECORD

SPACE TRANSPORTATION SYSTEM, MOTOR VESSELS *LIBERTY STAR* & *FREEDOM STAR*

HAER No. TX-116-M

Location: Lyndon B. Johnson Space Center
2101 NASA Parkway
Houston
Harris County
Texas

Motor vessels *Liberty Star* and *Freedom Star* were docked at the Hangar AF Wharf in the Industrial Area of the Cape Canaveral Air Force Station (CCAFS), located at latitude: 28.489342, longitude: -80.588955, during their period of performance with the National Aeronautics and Space Administration (NASA). These coordinates were obtained on August 24, 2012, through Google Earth™. The coordinates' datum are North American Datum 1983.

Dates of Construction: *Liberty Star* was built in 1980 and *Freedom Star* was built in 1981 and delivered as *UTC Liberty* and *UTC Freedom*, respectively. Their corresponding name changes were effective in 1984.¹

Architect/Engineer/Builder: Architect: Rudolph F. Matzer and Associates, Jacksonville, Florida;
Builder: Atlantic Marine Shipyard, Fort George Island, Florida.

Original Owner and Use: Original Owner: United Space Boosters, Inc. (USBI) of Huntsville, Alabama, a subsidiary of United Technologies Corporation (UTC) of Sunnyvale, California.

Original Use: Recovery at sea and towback to Hangar AF of the expended Space Shuttle Solid Rocket Boosters (SRBs)² and their associated flight hardware following launch.

¹ For simplicity's sake, the names *Liberty Star* and *Freedom Star* will be used throughout the document.

² The SRBs, also referred to as the 'booster stacks,' were comprised of four reusable solid rocket motor case segments joined to reusable solid rocket booster forward skirt and aft skirt assemblies. Each SRB also had three main parachutes, one drogue parachute, and one pilot parachute. The main and drogue parachutes were always recovered; the pilot parachute was only recovered when possible.

**Present Owner
And Use:**

Liberty Star and *Freedom Star* were excessed through the U.S. General Services Administration processing system with subsequent transfer to the U.S. Department of Transportation Maritime Administration in September 2012. *Liberty Star* was assigned to the National Defense Reserve Fleet and relocated to the U. S. Merchant Marine Academy in Kings Point, New York, for use as a training vessel for midshipmen. *Freedom Star* was relocated to the Maritime Administration James River facility in Jamestown, Virginia.

Significance:

Liberty Star and *Freedom Star* were designed and constructed specifically for the task of SRB retrieval; each returned one of the two solid rocket boosters (SRBs) (*Liberty Star* retrieved and towed back the right booster stack and *Freedom Star* retrieved and towed back the black-striped forward skirt left booster stack) to CCAFS Hangar AF following launch. In 1998, the task of transporting external tanks (ETs) from Michoud Assembly Facility (MAF) in Louisiana, to the John F. Kennedy Space Center (KSC) was added. In addition, both retrieval vessels participated in the seven-month recovery mission (January 28 through August 28, 1986) following the *Challenger* accident. Their key function as SRB recovery vessels allowed NASA to reuse the boosters, thereby reducing costs and contributing significantly to the on-going operations of the Space Shuttle Program (SSP). Their use in towing the ET-carrying barge also was a NASA cost-saving initiative.

Description:

The specific design of the two retrieval vessels reflects the special needs of the SSP for the retrieval of SRBs and, since 1998, the transport of the ETs from their manufacture plant to the stacking site in the Vehicle Assembly Building. The vessels are identical, with each designed to retrieve one expended SRB. Booster retrieval operations were controlled from the aft bridge of the vessel; the forward area of the bridge was for the operation of the vessel itself. Each retrieval vessel held a maximum of twenty-four persons (ten crew and fourteen others), with a thirty-day food and water provision endurance.

Liberty Star and *Freedom Star* are of molded steel hull construction. They measure approximately 176' in length, 37' in width, and 72' in height, from the base to the top of the mast. The depth, from the main deck to the keel, is 15'; the draft, from waterline to keel bottom, is 12'. Each vessel displaces 1,052 tons, with gross and net tonnages of 484 and 329 tons, respectively; has a 30-ton towing pull capability; and has a cruising range of 6,000 miles and a cruising speed of 15 knots, or 17 miles per hour. The