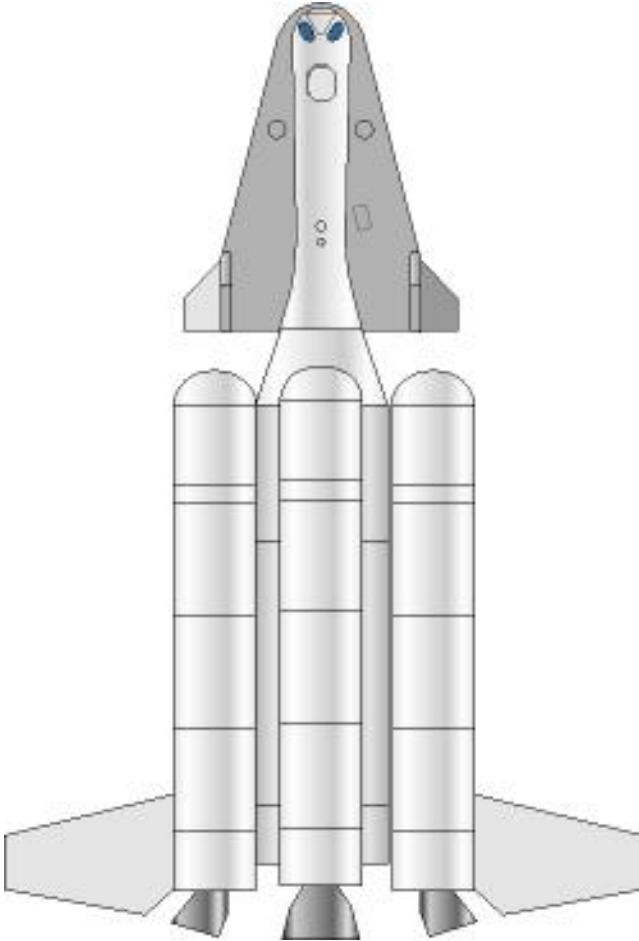


SLS A-410



Orbital launch vehicle. *Year:* 1960. *Family:* [SLS](#). *Country:* USA. *Status:* Study 1961. *Other Designations:* Space Launching System A-410.

The smallest identified member of the SLS family, selected to place the Air Force Lunex lunar lander re-entry vehicle in a low earth orbit for initial tests, was the A-410. This consisted of the 'A' Lox/LH2 stage supplemented by 100-inch diameter solid fuel booster rockets.

Manufacturer: USAF. *LEO Payload:* 9,070 kg (19,990 lb). *to:* 560 km Orbit. *at:* 28.00 degrees. *Liftoff Thrust:* 7,553.000 kN (1,697,981 lbf). *Total Mass:* 420,000 kg (920,000 lb). *Core Diameter:* 7.62 m (24.99 ft). *Total Length:* 27.00 m (88.00 ft). *Span:* 18.60 m (61.00 ft).

Stage Data - SLS A-410

- *Stage Number:* 1. 4 x *Stage:* [SLS SRB 388](#). *Gross Mass:* 88,000 kg (194,000 lb). *Empty Mass:* 13,000 kg (28,000 lb). *Thrust (vac):* 2,083.900 kN (468,479 lbf).

Isp: 260 sec. Burn time: 90 sec. Isp(sl): 235 sec. Diameter: 2.58 m (8.46 ft). Span: 2.58 m (8.46 ft). Length: 16.40 m (53.80 ft). Propellants: Solid. No Engines: 1. Status: Study 1961. Booster for SLS A series launch vehicles.

- *Stage Number: 2. 1 x Stage: SLS Stage A. Gross Mass: 59,000 kg (130,000 lb). Empty Mass: 6,000 kg (13,200 lb). Thrust (vac): 889.325 kN (199,928 lbf). Isp: 424 sec. Burn time: 250 sec. Diameter: 4.28 m (14.04 ft). Span: 4.28 m (14.04 ft). Length: 15.00 m (49.00 ft). Propellants: Lox/LH2. No Engines: 1. Engine: J-2. Status: Study 1961. Smallest Lox/LH2 stage planned for SLS series. Empty mass estimated. Sized for rail transport within USA.*

SLS A-410 Chronology

1961 - Launch Vehicle: [SLS A-410](#), [SLS AB-825](#), [SLS BC-2720](#).

- **Air Force completed studies on a family of advanced heavy-lift launch vehicles for use in the late 1960's** *Nation: USA.* The launchers used solid rocket boosters together with Lox/LH2 upper stages. The modular stages could be combined in various ways to achieve a range of launch vehicles (as for the USAF Lunex lunar base project). These studies would provide the basis for the later Titan derivatives and, eventually, the final space shuttle design.