Vertical Engine Test Stand (VETS)

The VETS test facility was designed and built in the 1960s to evaluate variable thrust engine characteristics, combustion efficiency and stability, specific impulse, thrust chamber life, nozzle performance, and other operational and reliability aspects of rocket engines and components.

Engines tested at VETS can be tested at sea level or at altitude using the VETS steam ejector system to simulate altitude during rocket engine testing.

In the mid 1970s the VETS area was selected as the location for high energy chemical laser testing. Three laser test facilities were constructed in the VETS area to take advantage of the existing steam ejectors system.

VETS Pressure Recovery Assembly

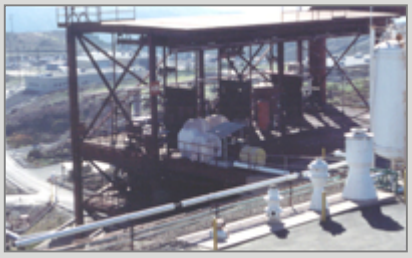
The VETS pressure recovery assembly is a two-stage ejector system with an intercondenser. The system consists of two "Z" ejectors coupled to a common collector chamber and a single "Y" ejector. The "Z" ejectors are rated at 75 lb/sec and 45 lb/sec FDAE respectively and they maintain full nozzle flow during steady state and transient conditions. The ejector steam is produced from six 7000-gallon hot water vessels operating at 450°F and 450 psi, making possible, run periods of up to 400 seconds of operation. Large diameter vacuum ducting is interconnected to all three, laser facilities.

VETS Steam Plant

VETS Rocket Test Area

The Vertical Engine Test Stand (VETS) is a high strength steel I-beam structure with a work area that is 74 ft. wide by 25 ft deep and extends 40 feet to the floor of the canyon below. The structure has four rocket engine test positions on the upper level of the test stand. Each test cell is 18 ft. wide by 25 ft. deep by 22 ft. high. Steel grating blast wall separates each cell. There is drive up access to the test cells and a 5-ton overhead monorail crane, which spans all four test cells.

The thrust level rating at each test position is 50,000 pounds. Two positions are equipped to test engines up to 10,500 pounds rated thrust at simulated altitudes of 45,000 feet. Two positions are equipped to test engines at sea level. The stand can be modified to withstand 200,000 pound thrust levels for sustained engine test runs.



VETS Rocket Test Area

A-1 Test Position

The A-1 test cell is an altitude test position. Engines tested in the A-1 test cell are fired vertically in a vacuum capsule. The main reactants to the A-1 test cell are hydrazine (N2H4), RP-1 and nitrogen tetroxide (N2O4). The reactant supply pressure is 750 psi max. The vacuum capsule measures approximately 72" diameter by 72" high.

A-2 Test Position

The A-2 test cell is an altitude test position. Engines tested in the A-2 test cell are fired vertically in a vacuum capsule. The main reactants to the A-2 test cell are hydrazine (N2H4), RP-1 and nitrogen tetroxide (N2O4). The reactant supply pressure is 750 psi max. The vacuum capsule measures approximately 72" diameter by 72" high.

B-1 Test Position

The B-1 test cell is a sea-level test position. Engines tested in the B-1 test cell are fired vertically. The main reactants to the B-1 test cell are hydrazine (N2H4), RP-1 and nitrogen tetroxide (N2O4). The reactant supply pressure is 750 psi max.

B-2 Test Position

The B-2 test cell is a sea-level test position. Engines tested in the B-2 test cell are fired vertically. The main reactants to the B-2 test cell are hydrazine (N2H4), RP-1 and nitrogen tetroxide (N2O4). The reactant supply pressure is 750 psi max.

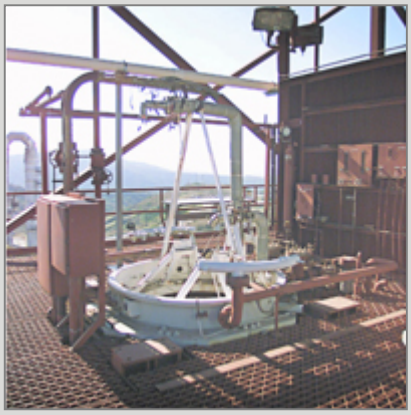
VETS – Laser Test Area

The VETS laser testing complex consists of four buildings. Three buildings house laser experiments and are interconnected to the VETS steam ejector system. The fourth building is used for optical diagnostic and beam propagation experiments. The laser area contains a common laser reactant storage area consisting of high-pressure gaseous helium, nitrogen, hydrogen, deuterium, nitrogen trifluoride, and cryogenic fluorine. Gaseous nitrogen, gaseous helium, cooling water, and de-ionized water are available for pressurization, purging, cooling, and flushing during testing. Mechanical vacuum pumps are also available in the area to evacuate components in the laser facilities.

Advanced Coil Test Facility (ACTF)

The ACTF facility was constructed for single and dual laser module testing on the Airborne Laser Program (ABL). The building is 30 ft. wide by 35ft. deep by 25 ft. high. The building contains a 33 ft. by 18 ft. long by 22 ft. deep pit below grade that was required to accommodate a laser module, which exhausts vertically downward into a 78 in. diameter vacuum duct at the bottom of the pit. The vacuum duct exits the building vertically and

A-1 Test Position



B-2 Test Position

ACTF Facility

Main Control Facility

ties into a 60 in. vacuum duct overhead.