

Shuttle engines are best ever

United Press International
CANOGA PARK, Calif. — The three engines that will power America's space shuttle into orbit being built in the Santa Susana mountains near a pass where gunsmoke is used to wait for the famed Butte field stagecoach.

They are modern mechanical wonders and when fired during ground tests, their roar bounces off peaceful slopes that once were a favorite location for old western films. Now, it's still a popular film location site, but for science fiction movies.

The shuttle's main engines are the most advanced ever built for flight and they have had their share of development problems.

A recent explosion during a ground test at the space agency's Mississippi test center is expected to delay the shuttle's maiden orbital flight late this year by six to eight weeks.

But despite the engine troubles, NASA shuttle program manager Robert Thompson said in Houston that the engines have generally performed well and he was not overly concerned with the development problems.

Such troubles had to be expected, Thompson said, when the space agency and the engine manufacturer, the Rocketdyne Division of Rockwell International, undertook development of such an advanced engine.

The engines, designed to be reusable for flight after flight, are things of extremes.

They operate at greater temperatures than any mechanical system in use. But the fuel is the second coldest liquid on Earth — liquid hydrogen at 423 degrees Fahrenheit below zero.

But when that is mixed with frigid oxygen and burned, the temperature in the main combustion chamber soars to 6,000 degrees, hotter than the boiling point of iron.

The engine weighs one-seventh as much as one railroad diesel engine. But its hydrogen turbine pump alone delivers as much power as 28 diesel locomotives. Its high pressure oxygen pump delivers enough power for 11 cars.

The energy released by the three engines in one space shuttle at full power is equivalent in watts to the output of 23 Hoover Dams.

You could pump water at the rate of 100 million gallons per minute into the three engines, an average family-size swimming pool could be emptied in seconds.

The pump develops the same pressure as that felt by a submarine at 100 miles deep.

The engine turbopump develops such torque as 18 v-8 automobile engines.

Each engine has one fuel pump and one oxygen pump from two of the three engines in a shuttle and they would stop enough horsepower to operate a 91,700-ton Nimitz class aircraft carrier at cruising speed.

The pumps from all three engines would power the battleship Iowa and have enough horsepower left over for 12 submarines.

One of the engines has enough thrust to keep two and one-half Boeing 747s in the air.

When the space shuttle lifts off for its maiden flight, now expected in November, it will release energy greater than all the nuclear power plants in nine foreign countries, or five times the power of seven nuclear plants in the United States.

'Super' stadium security

United Press International
MIAMI — Police are readying a strike force of two dozen anti-terrorist experts in the event of possible trouble at the Orange Bowl during Sunday's Super Bowl football game.

"The threat is there; you have the potential," said Capt. Mike Cosgrove, who heads the strike force. "The whole point of terrorism is publicity. A disruption of the Super Bowl would be a big plus for any of the terrorist groups."

The team is undergoing intensive training this week in sniper and bomb detection, hostage negotiation, kidnapping prevention, dignitary protection and demonstration control.

As for arms and equipment, Cosgrove said the group — composed mostly of members of the department's SWAT team he commands — will have "everything — the whole nine yards."

"You're looking at semiautomatic weapons, rappelling devices, helicopters, 130-foot ropes, personnel in SWAT ready-response uniforms, the whole thing," Cosgrove said.

The team will consist of about 10 plain-clothes intelligence officers trained to recognize terrorists who will filter through the crowd and another 10 to 15 members who will station themselves near danger spots, including the playing field.

In addition, he said, a hostage negotiation team will be at the stadium and a helicopter will be "stashed away" within seconds of the Orange Bowl.

The anti-terrorist team will not concern itself with routine police matters such as drunks and fights, he said, leaving those to the 130 uniformed policemen who will be at the bowl.

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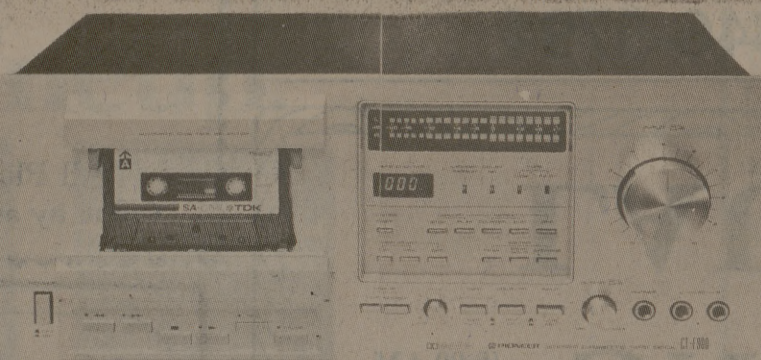
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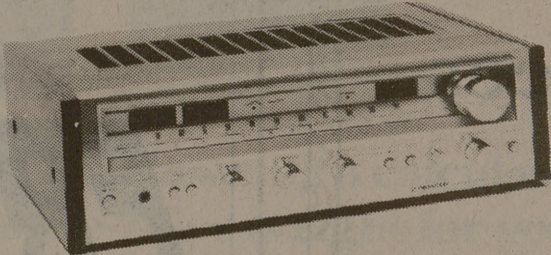


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