Closing Vandenberg would stop SDI

Marsha Gallagher suggests that Senator Sasser be more honest, and say outright that he is opposed to U.S. national security.

Over the past month, a furor has arisen on Capitol Hill over the plan to bring a Space Shuttle launch facility at the Vandenberg Air Force Base in California into operation. The public argument being made, most loudly by Sen. James Sasser (D-Tenn.), is that $400 million per year could be "saved" by mothballing the facility on which nearly $3 billion has already been spent, and that with a three-orbiter Shuttle fleet, there could only be minimal use of the facility, anyway.

Though the case being made for shutting the Vandenberg Shuttle launch facility appears to be strictly for the purpose of saving the taxpayers' money, according to the study done by the minority Democratic staff of the Military Construction subcommittee of the Senate Committee on Appropriations, which made the recommendation, "other observers have pointed out that Space Shuttle launches from Vandenberg, dedicated solely to military missions, would not become necessary, unless a Strategic Defense Initiative (SDI) were to be deployed."

Aside from the idiotic idea of shutting down a facility that is nearly complete and has cost nearly $3 billion to build and equip, the proposal to do so should be viewed as a witting attempt to cripple this country's national security. The Vandenberg launch facility provides the complete control and security precautions that military payloads require. In addition, if the nation has only one launch facility for its only manned space system, any intentional or unintentional destruction of that launch pad shuts down the entire program.

Air Force Secretary Aldridge has stated that if such a series of shutdown decisions were made, it would take three years to take the facility out of mothball, at great cost. Any public official supporting this supposed big "budget-saving" recommendation can only justify it as a way to shut down the testing, development, and deployment of the SDI.

Why Vandenberg is needed

It is true that launching from the West Coast while the orbiter fleet numbers only three, could reduce the number of missions possible per year because of the time lost in carrying the orbiters back and forth across the country, if they have to be shared by both launch facilities. Nonetheless, this may very well have to be done, as important SDI-related and other crucial military payloads can only be launched by the Shuttle, according to Defense Secretary Weinberger, and in contrast to what Senator Sasser and his staff report have stated.

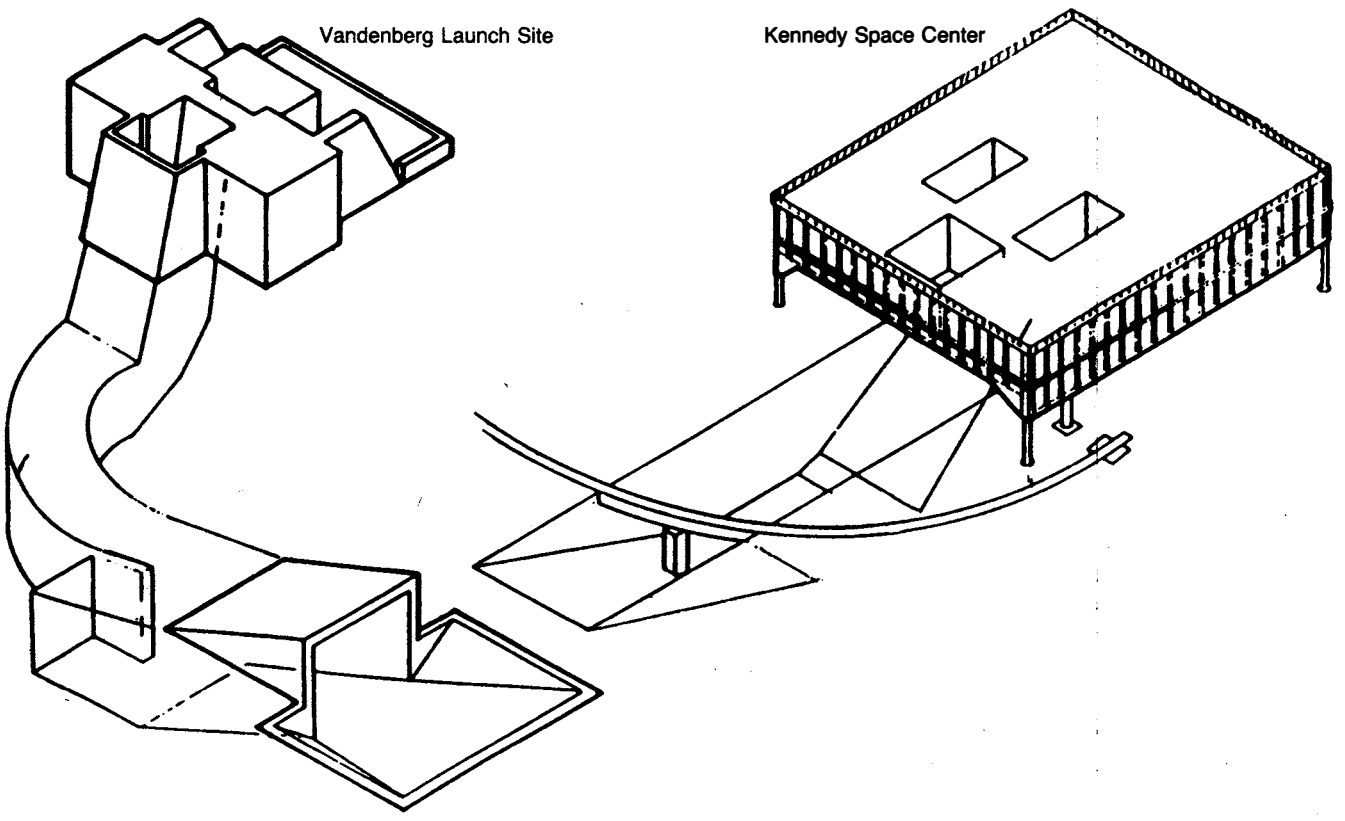
Military and certain civilian payloads have been launched on expendable rockets for years from Vandenberg, because it is the only U.S. launch site that can be used to orbit payloads onto a polar rather than equatorial path. Payloads launched from Florida's Cape Canaveral would have to fly over heavily populated areas, such as New York, in order to go either north or south, into a polar orbit. From Vandenberg, the vehicle and its payload go only over the ocean.

Polar orbiting spacecraft are needed when the mission requires a complete view of the Earth. The spacecraft stays virtually still, while the Earth turns from west to east underneath it. Satellites launched from Florida are generally put into an orbit that is inclined 28 degrees to the equator, which is the latitude of the launch site. Nothing north or south of 28 degrees, which includes all of the Soviet Union, can be seen from this inclination. A series of polar-orbiting spacecraft, that can be directly north-south, and also inclined relative to the poles, combined with satellites orbiting relative to the equator, give the United States a constant global view.

For the military, polar-orbiting capabilities are key for reconnaissance, which will include the testing of certain kinds of technologies for the SDI. Many of these payloads have already been designed for the payload bay of the Shuttle orbiters, and cannot be reconfigured to fit atop expendable rockets. In addition, all astronauts, from the beginning of the manned space program, have reported that there is no photographic technique that has yet been developed which is able to replicate what can be seen by the human eye, looking from space down at the Earth.

In order to take the polar route, the Shuttle has to expend more fuel than in an equatorial launch from Florida. This is due to the fact that when launching from Cape Canaveral, the

FIGURE 1
Space Shuttle Main Engine ducts



Shuttle picks up a boost from the west to east rotation of the Earth. Consequently, the payload capability from a Vandenberg launch will be considerably less than the 65,000-pound design for the Florida Shuttle launches.

The congressional staff report has made the case that the Shuttle will not be able to carry too much more in weight than the projected 32,000-pound capacity of the Titan 34D7 rocket, which is under development. They neglect to mention, however, that the Titan will only be able to deliver that payload to a 100-mile orbit, while the Shuttle orbit is at a less energy-consuming orbit between 250-300 miles. What the Titan will be able to deliver to a Shuttle-equivalent orbit, will be less than half of the 32,000 pounds.

However, the most important thing that you can put inside the Shuttle and not on an expendable rocket, is the crew. The Shuttle is a reusable testbed for technologies. If an experiment malfunctions after it has been launched on an expendable booster, you have just lost a multi-million dollar project. On the Shuttle, even if the crew cannot fix a malfunctioning experiment in orbit, they can bring it back to be repaired on the ground, and reflown.

In addition, there will be certain military payloads, such as the neutral particle beam experiment, which will be deployed by the Shuttle, and retrieved and brought back to Earth for examination. The payload can be retrieved on the same Shuttle mission, or on a subsequent one, depending upon the requirement.

The time and money saved in testing new sensing, pointing, tracking, communications, and other technologies for the SDI by using the Shuttle, will pay for building the Vandenberg facility many times over. The first payload that has been scheduled to be launched from Vandenberg is the Air Force P-888 satellite with the Teal Ruby infrared space surveillance experiment, and other instruments. That launch is also supposed to include an experimental support system pallet carrying six experiments, including the cryogenic infrared radiance instrument for the Shuttle. When SDI systems are ready to start deployment, there will be no launch alternative to the Shuttle for many of the components.

In addition, there will likely be an important role for manned reconnaissance in the future. The Air Force Manned Orbiting Laboratory (MOL), which was cancelled in 1969, was to have been such a military space station, occupied for up to 30 days by a two-man crew. As the civilian space agency develops the hardware and systems for the NASA space station, it is likely that the military will make use of that technology for Shuttle-dependent polar-orbiting manned facilities.

Penny wise and pound foolish

One of the most popular Capitol Hill diatribes against the Vandenberg facility is the series of "cost-overruns" that have accumulated since the construction project was started in 1979. The subcommittee staff report is quite revealing in demonstrating how doing a job in a way that is supposed to "save money," rarely does.

When the Congress was hearing testimony on the construction of the proposed Shuttle orbiter processing and launch system at Vendenberg, the Air Force stated that between $100 and $300 million could be "saved" by utilizing the abandoned MOL launch pad, which was nearly complete when the program was cancelled, a decade earlier.

One of the left-over systems used in the Shuttle pad construction; was the main engine ducts which are needed during Shuttle operations to vent the exhaust from the engines during lift-off, and also during launch aborts on the pad, which has happened on two Shuttle launches. Pad launch aborts have occurred when the Shuttle's main liquid engines have been ignited, but shut down by the computers before the solid rocket boosters were lit.

The problem with using the old launch pad, was that the MOL was designed to be launched on a Titan III expendable rocket. The Titan does not use liquid hydrogen engines, and like all launch vehicles except the Shuttle, it has no capability to be shut down after ignition. On the two Shuttle launch aborts, engineers unexpectedly found that some gaseous hydrogen became trapped in the launch duct.

The exhaust ducts at the Shuttle launch pad in Florida are open, and the vehicle is raised on a mobile launch platform, so pad modifications to prevent a problem with trapped hydrogen in the exhaust duct was minimal. At Vandenberg, the ducts are closed, and the exhaust travels through a tunnel to special open ports that have been built for the Shuttle launches. These three flame ducts are 50 feet high and 70 feet wide (see **Figure 1**).

In the event of the build-up of hydrogen from either a pad launch abort and engine shut-down, or from just engine testing on the pad, engineers fear that the entrapped hydrogen could explode and cause an overpressure that might damage the end of the orbiter.

The Air Force is now considering 28 options for solving this potential hydrogen entrapment problem, but they clearly did not save any money, or time, in modifying 10-year-old pad facilities rather than constructing new ones specially designed for the Shuttle.

Another "cost-saving" option implemented by the Air Force, was to use the launch control center blockhouse that had been built for the MOL. According to the subcommittee minority staff report, "When the SLC-6 (Space Launch Complex-6) project was justified to Congress, the Air Force indicated that substantial sums of money could be saved by converting this facility to support shuttle launches."

The problem is that this control center is less than 1,200-feet away from the launch pad itself. "Although the walls and ceilings have been reinforced with two-foot concrete," according to the report, "the proximity of the Launch Control Center to the pad could create an extreme hazard, if there should be an explosion on liftoff." The launch control center for Space Launch Complex-4, where a Titan 34D exploded shortly after liftoff last spring, was damaged, although it is 200 feet farther away than the Shuttle center.

During that explosion, the staff states that Vandenberg officials told them that "debris came down over a wider area than computer models had shown would happen." Essential personnel critical to missiom support number over 175, according to the report. If there were a Shuttle explosion on launch, there is uncertainty whether the control center could withstand a direct hit from debris.

Once again, "saving money" by using existing facilities will likely end up increasing the cost, as the Air Force is now considering moving some of the computer launch facilities further away from the launch pad.

When the Vandenberg launch project was examined by the General Accounting Office in 1977, the total cost was estimated to be $1.17 billion. This included the construction of two Shuttle launch pads. The Congress authorized construction of only one pad, in 1979. About $2.8 billion has been spent so far.

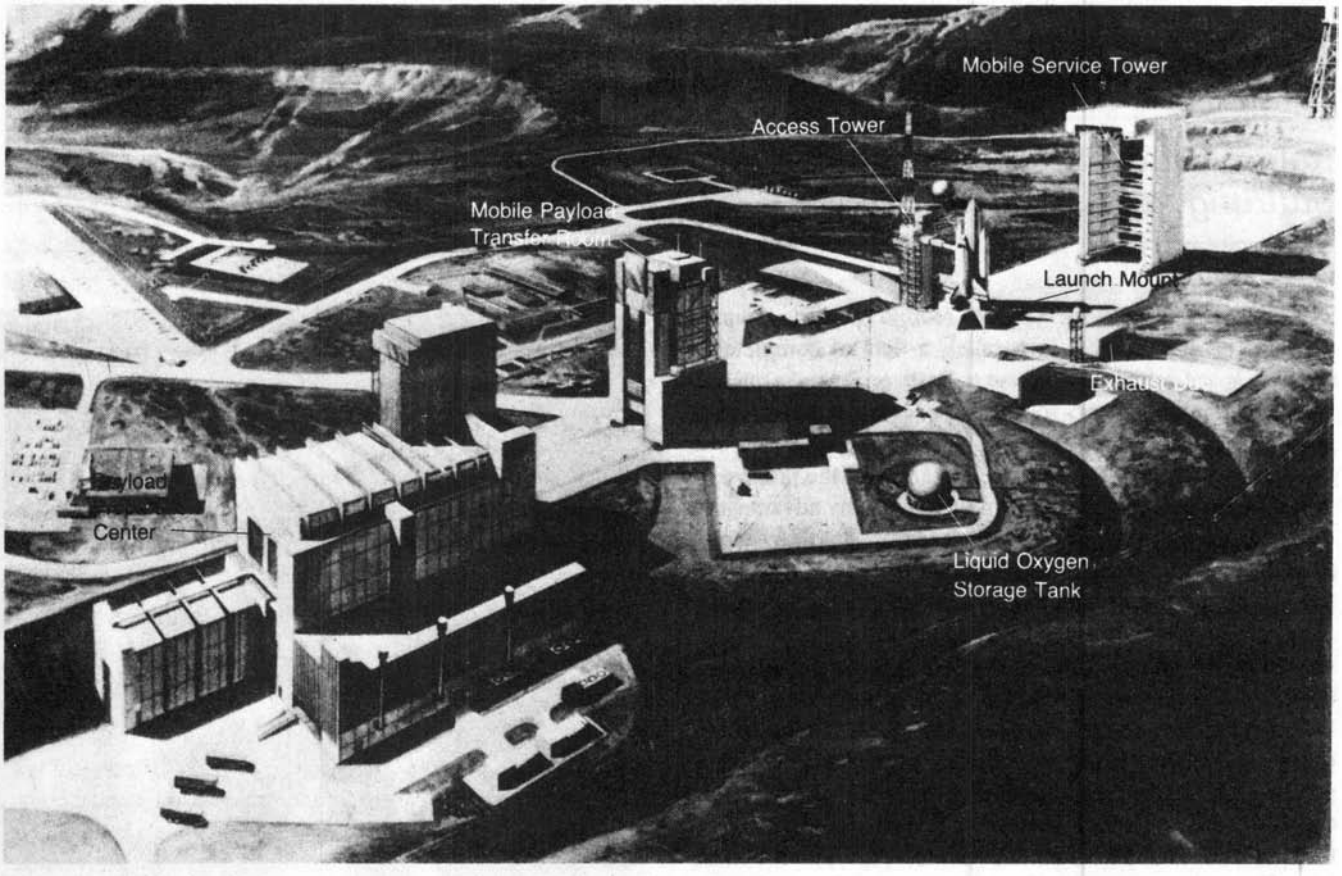
The use of existing facilities, and the departure of Shuttle launch designs used at the Kennedy Space Center, did not initially take account of the difference in weather and climate at Vandenberg. Whereas at Kennedy the orbiter, solid rocket boosters, and external tank are stacked indoors at the Vehicle Assembly Building, at Vandenberg, they are stacked at the pad.

Wind gusts, and fog and frost in particular, were found to be hazardous and unacceptable for the Shuttle stacking procedures. A windshield structure was built to protect the orbiter, which was the largest single modification of the original design. All of the changes that were required, forced a slip in the schedule for operation of the facility.

In 1976, the Air Force expected the facility to be ready at the end of 1982. Some slippage was due to the delays in the Shuttle program itself, where operations and flight experience necessary for readying Vandenberg were put off. In 1978, the operational date for the West Coast launch site was slipped to 1983. By 1981, the date had been moved to October 1985, and now it is the case that no Shuttles can be launched from Vandenberg until the hydrogen entrapment problem is solved.

The subcommittee staff is using these delays and cost overruns to try to buttress their case, that the Vandenberg facility is not really needed. Some critical military payloads that are getting backed-up because of the Shuttle stand-down will be either priority payloads when the Shuttle is flying again, or can be offloaded to the currently-available smaller expendable rockets.

FIGURE 2
The launch site



In a certain sense, the staff report is correct: If you want to kill the SDI program, it will be necessary to get rid of the Vandenberg Shuttle launch facilities.

How the facility will work

The operation of the West Coast Shuttle launch facility starts with the orbiter landing at the north end of Vandenberg Air Force Base. It then takes a 16 mile trip to another part of the facility, to be refurbished and loaded with the payloads for the next mission.

Three out of the eight major structures at Vandenberg are mobile, on tracks which take them right up to the launch pad (see **Figure 2**). The six segments of each solid rocket booster are delivered to the Mobile Service Tower structure on a transporter, and are stacked using a 200-ton capacity crane. This 27-story high tower moves, at 40 feet per minute, the 450 feet to the pad, and is locked into place.

The Shuttle Assembly Building, which is also mobile, is 250 feet high, with a roof-mounted crane. The empty external tank is raised, by a pair of cranes—one on the Assembly Building and one on the Service Tower—rotated, and lifted into place between the stacked boosters. Then the orbiter, which is also delivered in a horizontal position, is lifted and put into place in the same way. This design creates an enclosed weather-shield structure around the Shuttle, which shelters the assembly until the payload is loaded in the orbiter, and it is ready to fly.

These two buildings could be thought of as one building during launch preparation, which splits apart, one on either side, for launch. The Payload Preparation Building, on the opposite side of the Shuttle Assembly Building, contains sealed chambers where the payloads are delivered and checked out. They are sealed to prevent unauthorized monitoring of electronic transmissions from the military payloads. Inside, there is a Movable Payload Changeout Room, which moves the payload to the Assembly Building, where it is placed in the orbiter.

When the entire Vandenberg launch complex is complete it will give the nation a second Shuttle launch site, which is important in itself for national security, and it will provide the military with a secure facility under tighter restriction than is possible at the Cape Canaveral site.

It would be considerably more honest if Senator Sasser and others would state directly that their opposition to finishing and using the Vandenberg Shuttle Launch Site is based on their opposition to a secure United States.