

SUMMARY

This Environmental Assessment (EA) has been prepared as part of the United States Air Force (USAF) Environmental Impact Analysis Process (EIAP) for evaluation of proposed major projects, in compliance with the National Environmental Policy Act (NEPA) and the regulations of the President's Council on Environmental Quality (CEQ). The EA presents and environmental impact analysis of the proposed action and its alternatives. Section 1 of this EA contains the proposed action, its purpose and need, and alternatives. Section 2 is a description of the natural and man-made environment which may potentially be affected by the proposed action. Section 3 is an analysis of the potential environmental impacts which may result from implementation of the proposed action. Section 4 presents mitigation measures to prevent or minimize potentially significant impacts. Section 5 is a regulatory review of the proposed action, including identification of environmental permits and approvals which may be required. Section 6 summarizes the environmental impacts for each alternative.

Proposed Action and Alternatives

The proposed action is the construction and operation of an Air Force Small Launch Vehicle (AFSLV) and associated structures in support of the Department of Defense (DOD) space program. The AFSLV program will provide inexpensive launch services for small research and development (R&D) satellite payloads. The Air Force plans to acquire launch services for small payloads through a contractor. An initial launch capability of early fiscal year 1993 is planned. A maximum of 5 launches per year, or a total of 40 launches over a period of eight years, is planned through the year 2000. The proposed action would provide DOD, and possibly other users, with access to space via polar launch from the West Coast.

The specific site and launch system configuration for the AFSLV program have not been selected at this time. This document evaluates the potential sites and launch systems that may be selected for AFSLV, and therefore, is "programmatically" in nature, covering the broad action with an evaluation that is generic in nature and based on environmental analysis of past launch projects. This EA has been prepared in support of the Air Force source selection process for the AFSLV program, and allows the evaluation of environmental effects from each concept to be considered as part of the decisionmaking process. Once a

specific site and launch system are selected by the Air Force, a site specific environmental analysis will be prepared.

Nine potential sites in California for the proposed AFSLV program are evaluated in this EA: seven sites on Vandenberg Air Force Base (VAFB), one site on Edwards Air Force Base (EAFB), and one site on San Nicolas Island. Sites being considered include both active launch sites currently used for other programs and undeveloped sites. The active launch sites are Launch Facility 6 (LF 06), Test Pad 1, Advanced Ballistic Re-Entry System (ABRES) A-3 on North VAFB; Space Launch Complex (SLC)-4W (west) and SLC-5 on South VAFB; an air platform facility for an air-launched space program at EAFB; and U.S. Navy facilities, including Pad 192, on San Nicolas Island. Undeveloped sites are Cypress Ridge and Boathouse Flats, both on South VAFB.

Three launch systems are evaluated in this EA: conventional launch pad, launch from an air platform, and launch from a transportable truck-trailer system. The conventional launch system is considered from each active launch site where similar launch activities have occurred: LF 06, Test Pad 1, ABRES A-3, SLC-4W, SLC-5 and Pad 192. The air-launched system is considered at existing facilities on EAFB. The truck-trailer system is considered at LF 06, Test Pad 1, SLC-5, Cypress Ridge and Boathouse Flats.

The selected AFSLV facility would include a fenced area of a size to be determined. At active launch sites, this size would be influenced by the extent of available facilities which could be reconstructed or modified for the AFSLV program. Depending on requirements unique to each particular launch system, facilities would be expected to include a launch area, a launch control structure, one or more operations support structure, and vehicle and payload processing areas. It is possible that some processing activities would take place at an off-site location, although processing facilities are available at each of the three bases. Existing access roads, utilities and parking areas would be used, where available, at active sites. Since these facilities are not available at undeveloped sites, use of these sites would require more construction activities. Utility corridors or tie-ins and access roads would be required at the undeveloped sites. The construction period will depend on the extent of available facilities that can be modified at active sites. At undeveloped sites, construction would require more time.

Alternatives to the proposed action are evaluated. These alternatives include: placement of AFSLV payloads as secondary payloads with other launch programs, participation with Navy/NASA launch vehicle acquisition, or initiating a new military developed program.

It was determined that only few opportunities as secondary payloads are available, and this would result in risk to mission schedules. The uncertainty of Navy and NASA programs would not allow the Air Force to meet mission objectives. An Air Force development program for a small launch vehicle would require funds in excess of the budgeted amount and not meet mission schedule requirements. Also, it would not foster the promotion of a commercial space launch industry. The No Action alternative was also evaluated and determined not to be a viable solution for meeting DOD mission requirements for assured access to space. Therefore, each of these alternatives were eliminated from further consideration. It has been determined that acquisition of launch services and use of available launch sites and facilities at VAFB, EAFB or San Nicolas Island would present the most reasonable course of action for meeting mission requirements, technical needs, costs, and engineering design considerations.

Environmental Setting

The three potential locations for the AFSLV program are VAFB in Santa Barbara County, EAFB in Kern County, and San Nicolas Island off the coast of Southern California in Ventura County. Characteristics of existing environments at these locations vary according to topography and the amount of previous development at each individual site.

Each available active facility varies in terms of existing structures that could be adapted to launch an AFSLV. LF 05 is an active Minuteman III launch silo facility, located at the northernmost area of North VAFB. Test Pad 1, also on North VAFB, is an active AFSC facility that consists of a concrete platform. The ABRES A-3 site is an active aboveground launch mount facility on North VAFB, used to launch a commercial Single Module Launch Vehicle (SMLV). On South VAFB, SLC-4W and SLC-5 are active Titan II and NASA Scout launch pads with associated facilities and structures. Cypress Ridge and Boathouse Flats are two undeveloped sites that were evaluated for the proposed construction of the Titan IV/Centaur facility known as SLC-7. Both sites are vacant, with the exception of an access road (Shuttle External Tank Tow Route) and electrical service at the Boathouse Flats site. Existing ground support facilities for the Air Launched Vehicle (ALV) at EAFB are available as a potential site for an air-launched AFSLV. Facilities consist of a vehicle assembly building, office trailers and primary runways on Rogers Dry Lake. Pad 192 on San Nicolas Island is an aboveground launch mount currently used for the U.S. Navy Vandal launch program. San Nicolas Island is part of the U.S. Navy Pacific Missile Test Center (PMTTC) Naval Air Station (NAS).

- **Air Quality**

Air quality at each of the three general locations is generally good, with the exception of periods when ambient air quality standards are exceeded for ozone and particulates at VAFB and EAFB. Areas around EAFB may also exceed the ambient standards for nitrogen oxides. Air quality at San Nicolas Island is expected to meet all ambient air quality standards.

- **Water Quality**

Surface water is found in the immediate vicinities of SLC-4W and SLC-5. Unnamed drainages are located near some of the North VAFB facilities. Most sites on VAFB are underlain by non-water bearing formations, or are isolated from groundwater resources. On EAFB, three groundwater basins provide a source of domestic water. Pad 192 on San Nicolas Island overlies an area of groundwater recharge, which occurs by percolation.

Surface and ground water quality on VAFB has exhibited high mineral, metal and total dissolved solids concentrations. On EAFB, water quality has shown elevated levels of organic contaminants. Data collected on San Nicolas Island indicate that water is of marginal quality for consumption.

- **Geology**

Sites on North VAFB are located at the base of the Santa Ynez Mountains within one mile of the Pacific Ocean. On VAFB, sites are underlain by bedrock of the Monterey Formation. Topography is varied, ranging from sea level to elevated marine terraces, and includes sand dunes at some sites. At EAFB, soils are not unique, whereas San Nicolas Island soils are derived from stabilized sand dunes. Potentially significant paleontological resources are found at VAFB, EAFB and San Nicolas Island. All sites are located within the range of several active and potentially active earthquake faults.

- **Biota**

VAFB is located within a boundary region between coastal southern and central California provinces. A number of plant and animal species reach their northern, southern, or western limits in this region, making the base an area of ecological value. Although much of California has been modified or disturbed in the past, VAFB is relatively undisturbed and offers habitats that include central scrub, Burton Mesa (maritime)

chaparral, stabilized sand dunes, riparian scrub, and small wetlands. While many special status plants occur on VAFB, the Federal Category 2 candidate plant, San Luis Obispo monardella, occurs at several of the sites. Several species of protected marine mammals use the beaches and rocky coastal areas of VAFB for haul out areas. The base also provides habitat for number of wide-ranging reptile, amphibian, mammal, and bird species, including regionally rare, candidate and protected species.

EAFB is characterized by Joshua tree woodland, creosote bush scrub, Mojave saltbush scrub, shadscale scrub, and alkali sink scrub plant communities in which three Federal candidate plants may occur. Small reptiles, mammals and birds are common on EAFB. In addition to other regionally rare or protected species, the federal-and State-listed threatened desert tortoise and Mojave ground squirrel occur on EAFB.

San Nicolas Island, one of the eight Channel Islands, is the location of marine mammal and sea bird rookeries. Except during a two-month period in the fall, the entire southern shore is restricted to human access. The federally-threatened sea otter also uses the extensive kelp beds along the island's south shore. Other species on the island include the State-listed rare island fox and the federally-listed threatened island night lizard. Four species of federally-listed sea turtles and seven endangered cetaceans either occur, or are expected to occur, offshore.

- **Visual Resources**

The visual environment of VAFB is characterized by rolling hills, valleys, ocean cliffs, and wide-open terrain. Some sites on VAFB are visible from marine vessels, from the public railroad which runs the length of the base, and from public beaches. EAFB offers less visual resources, and is generally not visible from any public vantage points. San Nicolas Island is visible to marine traffic. All three locations include active and industrial type uses.

- **Socioeconomics and Public Services**

The socioeconomic area of influence in Santa Barbara, Kern and Los Angeles Counties is growing, and communities are affected by VAFB, EAFB, and the oil and gas industry. With the exception of San Nicolas Island, temporary and permanent housing are available in the surrounding communities. With the exception of limited water supplies on San Nicolas Island, public services and utilities are available.

- **Transportation**

Transportation routes are available to each base. Primary access to VAFB is via Highway 101. The Southern Pacific, Santa Maria Valley, and Ventura County Railroads also provide service in the vicinity of VAFB. Access to EAFB is via Highways 14, 395, 18, and State Routes 58 and 138. The Atchison, Topeka and Santa Fe rail line provides freight service to the EAFB area. All materials must be barged to San Nicolas Island. A commercial commuter air service transports personnel to and from the island.

- **Cultural Resources**

Prehistoric and historic cultural material is abundant on VAFB, EAFB and San Nicolas Island. Over 712 known archaeological sites have been documented on VAFB. Approximately 1,130 cultural resource sites are known on EAFB, and more than 500 sites have been found on San Nicolas Island.

Impacts and Mitigation Measures

Although potential impacts to the natural and man-made environments could result from implementation of the proposed action at each location, most potential direct and indirect impacts may be avoided through careful project design or operational procedures, adherence to regulatory and permit requirements, and specific mitigation efforts.

In the event that an active site is selected for the AFSLV and new construction is not required, impacts are expected to be minimal. With the application of mitigation measures, such impacts could be reduced to a level of insignificance. In the event that an active site is selected and modifications include any earthmoving activities, it is possible that impacts could occur. With the exception of impacts associated with launch operations from San Nicolas Island, it is also possible that such impacts could be mitigated to level of insignificance. The use of the undeveloped sites at Cypress Ridge or Boat house Flats would involve new construction, and therefore, would result in greater impacts than use of active facilities.

- **Air Quality**

Impacts to air quality could result from construction activities involving earthmoving. The generation of fugitive dust during construction can be effectively reduced by applying

water to exposed surfaces. Construction activities will also result in the emission of exhaust products from construction machinery, vehicles or equipment use. Launch preparation, including payload processing activities, will result in the emission of volatile organic solvents and other chemicals. Propellant loading operations will also result in potential emissions of propellant and combustion products. The launch ground cloud is expected to contain hydrochloric acid and aluminum oxide, which may be initially harmful to populations in the immediate vicinity of the launch site. Pre-launch meteorological monitoring is an effective means of avoiding launch during times that would result in a persistent ground cloud to remain in the area. Launching during favorable meteorological conditions should result in short-term minimal impacts to air quality and the civilian population surrounding VAFB. The air-launched system will result in aircraft emissions of carbon monoxide, nitrogen oxides, and hydrocarbons. Potential accidents on the launch pad and during takeoff would also result in the generation of air pollutants and toxic constituents. Emissions of greenhouse gases from the proposed AFSLV program are not expected to contribute significantly to global warming.

- **Water Quality**

Impacts to hydrologic resources could occur at VAFB from the inadvertent discharge of wastewater. The proposed action would also place an increased demand on groundwater basins that are currently experiencing overdraft conditions. In the event that construction is required, soil compaction and loss of pervious areas will contribute to this overdraft. The potential for contamination of surface water by hydrochloric acid and aluminum oxide is also possible at all sites except EAFB. This effect is potentially minimized by pre-launch meteorological monitoring. At EAFB the lack of surface water resources, and air platform launch would preclude such contamination. The potential for generation of contaminated stormwater runoff is possible for all sites with the exception of EAFB. The potential for contamination from accidental spills is possible at each site.

- **Geology**

Impacts to geologic resources include changes in topography and physiography from site modification for all VAFB sites, and erosion of stratigraphic units from construction at Pad 192 on San Nicholas Island. Erosion of sand dunes could occur at Test Pad 1, ABRES A-3 and at Pad 192. Landslide hazards are possible at LF 06 and Cypress Ridge. Slope failure from wavecutting of sea cliffs is a potential impact at Boathouse Flats. Strong to intense ground motion, and possible surface rupture along unmapped faults, could occur as

a result of potential future large earthquakes at many of the AFSLV sites. Construction at VAFB and on San Nicolas Island could result in the loss of potentially significant paleontological resources. Mitigation of these potential impacts could be accomplished using careful design considerations, including preventive construction practices, to avoid or minimize these effects. The use of a paleontologic monitor at sensitive sites is also an effective mitigation.

- **Biota**

In the event that construction occurs, vegetation would be lost, with the greatest losses expected at undeveloped sites. During siting of facilities, consideration should be given to avoiding ecologically sensitive areas, and any areas containing unique or special status plants. This is particularly important at LF 06, sand dunes at Test Pad 1, ABRES A-3, Pad 192, and at the two undeveloped sites. Because of the proximity of ABRES A-3, SLC-4W and SLC-5 to surface water, the potential for inadvertent contamination of freshwater resources at these sites as a result of wastewater discharge or spills, should be given consideration.

The launch of the AFSLV may have potential effects on marine mammals and birds along the coast at both VAFB and San Nicholas Island. Such effects would be related to the sudden impulse noise from the launch. Noise levels expected from the AFSLV are not expected to result in long term effects, such as permanent hearing loss. The projected launch direction from San Nicolas Island would fly over breeding areas for marine mammals and seabirds. Effects on breeding activities may occur if launches take place during critical courtship and mating periods.

- **Visual Resources**

The AFSLV program may result in loss of visual resources from public views if placement of new structures result in alteration of terrain and obstruction of views. This is a potential impact at LF 06, ABRES A-3, Cypress Ridge, Boathouse Flats, and Pad 192.

- **Socioeconomics and Public Services**

Although difficult to quantify, construction activities at either of the undeveloped sites may result in potential impacts on community services, depending on the number of construction personnel required. Additional temporary and permanent housing would be required on San Nicolas Island. Impacts to the available water supply on San Nicolas

Island would also occur. Economic impacts to commercial fishermen, using the waters around San Nicolas Island, may also occur during periods of evacuation.

- **Transportation**

The proposed action may result in temporary disruption of local traffic patterns during transport of launch vehicle components to the sites. This impact would be short-term and localized, and therefore, not significant. Transport of components to San Nicolas Island by barge is not expected to result in any significant impacts to marine traffic.

- **Waste Management**

Waste management is not expected to result in any significant impacts, although transport of waste would vary according to the site. Two sites on VAFB (Test Pad 1 and ABRES A-3) have evidence of past hazardous waste contamination and are currently being investigated under the VAFB Installation Restoration Program.

- **Noise**

Impacts to the noise environment is not expected as a result of the AFSLV program. With the exception of EAFB, a focused sonic boom over the Channel Islands and/or the mainland is possible, as a result of launch from any site.

- **Cultural Resources**

Impacts to cultural resources, as a result of construction, could occur at Test Pad 1, ABRES A-3, SLC-4W, SLC-5 and Cypress Ridge. Such impacts are not expected to be significant if pre-construction surveys, construction monitoring and mitigation are implemented. Impact to archaeological sites on San Nicolas Island could result from launch operations that would lead to the acceleration of natural erosion processes.

Conclusions

Potential environmental consequences of the proposed AFSLV program have been evaluated in this EA. Specific environmental impacts associated with the AFSLV program cannot be evaluated until detailed project and site information is known. The Air Force will prepare a site-specific EA or Environmental Impact Statement (EIS) when detailed information on the selected launch system and site becomes available.

The environmental sensitivities of sites considered for the AFSLV have been evaluated to provide information on the potential for significant environmental impacts. The potential for significant impacts has been projected for each AFSLV site:

- Sites with the highest environmental sensitivity, and the highest potential for causing significant environmental impacts, are Sam Nicolas Island and Cypress Ridge. This is because of the potential effects on protected marine mammal species that breed on San Nicolas Island, and the presence of important biological and cultural resources at Cypress Ridge.
- Because of modifications required at Boathouse Flats, Test Pad 1 and ABRES A-3 these sites have moderate environmental sensitivity and moderate potential for causing significant environmental impacts. While Boathouse Flats is an undeveloped site in close proximity to marine mammal haul-out areas, the use of a transportable launch system at this site would not require construction of any new access roads. All tree sites have important biological and cultural resources present.
- Because active launch facilities would be used with minimal modification required, LF 06, SLC-4W, SLC-5, and EAFB have the lowest environmental sensitivity and a low potential for causing significant environmental impacts. Site-specific studies will be required to determine potential impacts to any biological and cultural resources at any of these sites, especially if any disturbances outside of the perimeter fence occur. In the event of new construction, and depending on the scale of construction, at these four sites, the sensitivity and potential for causing significant environmental impacts might increase to moderate level.