

## DEPARTMENT OF TRANSPORTATION

### Federal Aviation Administration

Office of Commercial Space Transportation; Finding of No Significant Impact

**AGENCY:** Federal Aviation Administration (FAA), Department of Transportation (DOT)

**ACTION:** Finding of No Significant Impact

**SUMMARY:** Orbital Sciences Corporation has applied to the FAA for renewal of a Launch Operator License (license number LLO 04-069) for operation of the Pegasus expendable launch vehicle at the U.S. Army Space and Missile Defense Command Kwajalein Atoll Ronald Reagan Ballistic Missile Defense Test Site (USAKA/RTS) in the Republic of the Marshall Islands. The proposed license would expire 5 years from issuance unless surrendered, suspended, or revoked. Following the license period, a license renewal would require additional environmental review. Renewing a license is considered a major Federal action subject to environmental review under the National Environmental Policy Act of 1969, as amended (NEPA; 42 U.S.C. 4231, *et seq.*). The FAA prepared the *Environmental Assessment for Pegasus Launches at the U.S. Army Kwajalein Atoll Ronald Reagan Ballistic Missile Defense Test Site* (the EA), in accordance with NEPA, Council on Environmental Quality (CEQ) NEPA implementing regulations (40 Code of Federal Regulations [CFR Parts 1500 to 1508]), and FAA Order 1050.1E, *Environmental Impacts: Policies and Procedures, Change 1*, to evaluate the potential environmental impacts of activities associated with renewing LLO 04-069. The U.S. Army was a cooperating agency in the development of the EA.

After reviewing and analyzing available data and information on existing conditions and potential impacts, the FAA has determined that renewing Orbital Sciences Corporation's Launch Operator License for launch operations of the Pegasus expendable launch vehicle family would not significantly impact the quality of the human environment within the meaning of NEPA. Therefore, the preparation of an Environmental Impact Statement is not required, and the FAA is issuing this Finding of No Significant Impact. The FAA made this determination in accordance with all applicable environmental laws.

**FOR A COPY OF THE EA OR FONSI:** Visit the following internet address:

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**PURPOSE AND NEED:** The purpose of the FAA's Proposed Action of renewing Orbital Sciences' Launch Operator License for launch operations of the Pegasus launch vehicle family is to ensure compliance with the international obligations of the U.S. and protect the public health and safety, safety of property, and national security and foreign policy interest of the U.S. during commercial launch or reentry activities. This action would also encourage, facilitate, and promote commercial space launches and re-entries by the private sector; and to facilitate the strengthening and expansion of the U.S. space transportation infrastructure, in accordance with the requirements of the Commercial Space Launch Amendments Act of 2004 (Public Law 108492); the Commercial Space Transportation Competitiveness Act of 2000 (Public Law 106-405); Executive Order 12465, *Commercial Expendable Launch Vehicle Activities* (February 24, 1984); Code of Federal Regulations (CFR) Title 14, *Aeronautics and Space*, Parts 400-450, *Commercial Space Transportation, Federal Aviation Administration, Department of Transportation*; the Commercial Space Act of 1998 (Public Law 105-303); the U.S. Space Transportation Policy of 2004; and the National Space Policy of 1996 and 2006.

The need for the action is to allow the continued operation of the Pegasus launch vehicles to meet the demand for lower-cost access to space. Less expensive space launch capability is necessary to support rising industries through more cost effective commercial, government, and scientific satellite launches.

**PROPOSED ACTION:** Orbital Sciences Corporation has applied to the FAA for renewal of LLO 04-069. Under the Proposed Action (the preferred alternative), the FAA would renew Orbital Sciences Corporation's Launch Operator License for launch operations of the Pegasus expendable launch vehicle family from USAKA/RTS in the Republic of the Marshall Islands.

The Pegasus expendable launch vehicle consists of three graphite epoxy case solid rocket propellant motor stages with an optional liquid propellant-based Hydrazine Auxiliary Propulsion System (HAPS) fourth stage and is designed to be carried to its launch point by an L-1011 Launch Carrier Aircraft (LCA). The L-1011 LCA, which consists of FAA-approved standard engines, uses Commercial Jet-A or Military JP4 or JP10 fuel. Pre-launch and mating activities would occur at Vandenberg Air Force Base (VAFB) under LLO 00-053. A separate environmental review was conducted in conjunction with the approval of LLO 00-053. Therefore, pre-launch Pegasus processing operations are not included under this Proposed Action.

The L-1011 LCA and mated Pegasus launch vehicle would travel to USAKA/RTS and land on an existing runway. Once on the ground at USAKA/RTS, the L-1011 LCA would be refueled and systems would be checked. Concurrently, an advisory to nearby ships and aircraft would be issued. The L-1011 LCA and mated Pegasus launch vehicle would takeoff and travel under jet power to the launch area over the Pacific Ocean. At an altitude of 35,000 feet, the L-1011 LCA would release the Pegasus launch vehicle and return to a designated runway at USAKA/RTS. The Pegasus vehicle would free fall for 5 seconds before the first stage motor ignites. As described in the Environmental Assessment of Pegasus Air-launched Space Booster from Edwards AFB/Western Test Range, CA (the 1989 EA), the first stage of the Pegasus vehicle would burn for approximately 77 seconds following ignition while propelling the vehicle to an altitude of approximately 223,000 feet. The spent first stage would detach and fall to the ocean. The second stage motor would ignite and burn for approximately 83 seconds carrying the vehicle and its payload to an altitude of 689,000 feet. During the ignition of the second stage, the payload fairing would jettison and fall into the ocean. The spent second stage would detach and fall to the ocean. Ignition of the third stage would occur approximately 578 seconds after launch. The third stage would continue to burn for 65 seconds carrying the payload into orbital insertion; detach from the payload and optional HAPS (if appropriate), and fall into the ocean. The optional HAPS fourth stage could be used in or near orbit to obtain higher altitudes, achieve finer altitude accuracy, or conduct more complex maneuvers. None of the jettisoned stages would be recovered.

**ALTERNATIVES CONSIDERED:** The only alternative analyzed in the EA is the No Action Alternative. Under this alternative, the FAA would not renew Orbital Sciences Corporation's Launch Operator License and there would be no commercial launches of the Pegasus launch vehicle from USAKA/RTS. Existing operating procedures, military operations, and other launch activities would continue at USAKA/RTS.

**ENVIRONMENTAL IMPACTS:** In accordance with NEPA-related FAA requirements and the Compact of Free Association between the Republic of the Marshall Islands and the United States, the FAA analyzed the potential environmental impacts of Pegasus launch operations at USAKA/RTS. The EA describes in detail potential impacts to air quality; biological resources (fish, wildlife, plants); hazardous materials, pollution prevention, and solid waste; noise; and water resources from the Proposed Action. A summary of the impacts of the Proposed Action provided below incorporates by reference environmental documentation from the 2001 *Final Programmatic Environmental Impact Statement for Licensing Launches* (the 2001 PEIS) and the 1993 *Final Supplemental Environmental Impact Statement – Proposed Action at U.S. Army Kwajalein* (the 1993 SEIS). The 2001 PEIS assessed the environmental impacts of approximately 7 annual launches of small-capacity vehicles, of which the Pegasus vehicle family is included. The 1993 SEIS analyzed launch impacts of up to 172 annual launches of meteorological rockets, sounding rockets, and strategic-launch vehicles. The Pegasus vehicle falls within the strategic-launch vehicle category. As appropriate, the EA incorporates by reference and summarizes relevant information from those analyses. The Proposed Action would not be expected to exceed the analyzed number of launches under the 1993 SEIS or the 2001 PEIS.

### **Air Quality**

The Proposed Action would not be expected to significantly impact air quality around USAKA/RTS. The activities associated with the Proposed Action would fall within the parameters analyzed in the 1993 SEIS, which found that impacts from jet-fuel emissions would be negligible. Therefore, the potential impacts to air quality from jet-fuel emissions under the Proposed Action addressed in the EA would not be significant.

Pegasus launches would result in minor contributions of greenhouse gases and stratospheric ozone depletion due to releases of carbon dioxide, hydrochloric acid, nitrogen oxides, and aluminum oxide, as described in the 1989 EA. The 2001 PEIS found that launch-related emissions of carbon dioxide would have a negligible impact on global climate change. The emissions expected under the Proposed Action would fall within the parameters analyzed in the 2001 PEIS. Therefore, launches under the Proposed Action would not be expected to significantly affect global climate change. The 2001 PEIS analysis also found that effects on the ozone layer would be localized and temporary and no permanent damage would be expected from the analyzed launch activity. Because the Proposed Action would be expected to fall within the parameters of the activity analyzed in the 2001 PEIS, contributions of greenhouse gasses and ozone depletion under the Proposed Action would be negligible.

## **Biological Resources**

Due to the high level of existing disturbance and extensive clearing, the 1993 SEIS found that activities similar to those associated with the Proposed Action would not result in impacts or would result in negligible impacts to terrestrial plants and wildlife at USAKA/RTS. No construction would be required as part of the Proposed Action. Therefore, the impacts to vegetation would be negligible. The 2001 PEIS analysis of activities similar to those associated with the Proposed Action found that that noise associated with launches could startle birds and mammals. Startle responses are usually temporary and birds and mammals would be expected to return to their normal behavior patterns within minutes. In addition, impacts to terrestrial animals under the Proposed Action would be expected to be minimal because the Pegasus vehicle would be launched over the open ocean. While jet engine noise from takeoff and landing could startle birds and mammals, USAKA/RTS is an active military base with existing launch activities and aircraft operations. The Proposed Action would not significantly increase the overall existing noise level. Furthermore, because there would be no construction activities or modification to the surrounding area and a limited number of proposed launches, the Proposed Action would result in negligible impacts to terrestrial wildlife.

The 1993 SEIS found that there would be no impacts or negligible impacts to reef habitat, fishery resources, and other marine biological resources from rocket launch emissions and debris at USAKA/RTS and surrounding ocean water. According to the 2001 PEIS, the probability of a jettisoned portion of the launch vehicle striking a marine animal would be extremely small. Jettisoned stages of the Pegasus launch vehicle that fall into the ocean would not likely contribute toxic concentrations of metals to the water column because of the slow rate of corrosion in the deep ocean environment and the large volume of water available for dilution. Residual amounts of propellant could be released in the water column. However, because the vehicle stages are designed for full burn, any residual amount of propellant would be expected to be extremely small. In the event of an accidental release of unburned solid rocket propellant, due to the natural buffering ability of the ocean, any unburned propellant would be diluted and dispersed and would not be expected to harm marine life. A launch failure of a Pegasus vehicle with the additional HAPS stage could cause a release of hydrazine into the water column. However, the released hydrazine would quickly oxidize forming amines and amino acids. The oxidized hydrazine would be dispersed and have negligible long-term impacts on marine species. Sonic booms from Pegasus launches might represent a physical, habitat, or migratory threat to marine species, especially those on the surface of the ocean. However, because Pegasus launches would be infrequent, the Proposed Action would be expected to result in negligible impacts to marine wildlife.

The Proposed Action would not result in a significant impact on threatened and endangered species. The turtle, pigeon, dolphin, and whale species identified in Exhibit 3-1 of the EA could be startled by launches and sonic booms. Startle responses would be temporary and animals would be expected to return to their normal behavior patterns within minutes. There is also the remote possibility that the Pegasus launch vehicle or other debris could strike one of these threatened and endangered species, but the probability of such a strike would be extremely low.

## **Hazardous Material, Pollution Prevention, and Solid Waste**

The Proposed Action would not be expected to cause significant impacts related to hazardous material, pollution prevention, and solid waste. Orbital Sciences Corporation would continue to complete all hazardous pre-launch processing operations at Vandenberg Air Force Base in accordance with a separate FAA-license agreement. Furthermore, the Pegasus vehicle, which would be mated to the L-1011 LCA at Vandenberg, would have its solid rocket propellant loaded before leaving Vandenberg; therefore, there would be no need for fueling at USAKA/RTS. However, the L-1011 LCA might need to be refueled upon landing at USAKA/RTS. Because launch activities would be infrequent and there are standard operating procedures for fueling jet aircraft that substantially minimize the risk of fuel spillage, the potential impacts of using hazardous materials would be expected to be negligible.

There would be no significant impacts from solid waste associated with the Proposed Action because there would be no construction or population-base increase. Existing operations and facilities would be able to handle the limited potential increase in solid waste. In addition, the Proposed Action would not affect pollution prevention measures if Orbital Sciences Corporation continues to comply with all applicable waste disposal regulations, including Resource Conservation and Recovery Act requirements and standard operating procedures.

## **Noise**

The Proposed Action would not be expected to significantly impact noise-sensitive receptors around USAKA/RTS. Noise associated with L-1011 LCA takeoff and landing is common to other similar activities conducted at USAKA/RTS. The potential impacts of noise from the L1011 LCA would be temporary and infrequent. Therefore, potential noise impacts from L-1011 LCA takeoffs and landings under the Proposed Action would be negligible. The noise that would be audible at the altitude over the ocean where the Pegasus vehicle is launched would be of no consequence to humans. In addition, potential sonic booms would occur over the Pacific Ocean and would not be expected to impact populated areas. Noise from launches could startle birds, but this effect would be of short duration. Sonic booms from Pegasus launches might represent a physical, habitat, or migratory threat to marine species, especially those on the surface of the ocean. However, because Pegasus launches would be infrequent, the Proposed Action would be expected to result in negligible impacts to marine wildlife.

## **Water Resources (Surface Water, Groundwater, Floodplains, and Wetlands)**

The Proposed Action would not be expected to significantly impact water resources around USAKA/RTS. Launches of the Pegasus launch vehicle at USAKA/RTS would not place an increased demand on the groundwater supply and the impacts on wastewater would be negligible since additional staff would not be needed due to the occurrence of pre-launch activities at Vandenberg Air Force Base. In the event of an accidental release of solid rocket propellant that has not burned completely, ammonium perchlorate can occasionally form a binder matrix and be released into water bodies as unburned segments. Ammonium perchlorate can be highly toxic, depending on its reactivity; however, the binder matrix configuration would dissolve slowly in the water column, with only very local impacts to marine life. The 1993 SEIS concluded that negligible impacts from these spill events would be expected because of the buffering capacity of the ocean. A launch failure of a Pegasus vehicle with the additional HAPS stage could release hydrazine into the water column. However, the released hydrazine would be quickly oxidized and dispersed. There are no designated wetlands at USAKA/RTS, thus no impacts to wetland resources would occur. In addition, no flood hazards have been designated at Kwajalein Atoll.



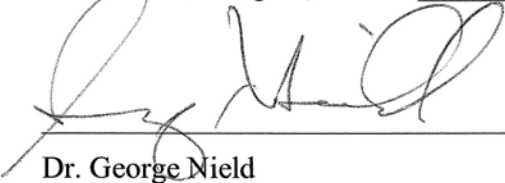
## Cumulative Impacts

No significant cumulative impacts would be expected under the Proposed Action. USAKA/RTS is an active military base which supports missile defense and U.S. security operations. Multiple facilities are spread across several islands of the Atoll and consist of several launch pads and airfields. Bucholz Army Airfield on Kwajalein Island has reported a maximum air traffic volume of 1,674 operations per month, averaging over 55 operations per day. Flight operations consist of inter-atoll commercial aircraft traffic and helicopter activities as well as military operations. Space Exploration Technologies Corporation (SpaceX), a privately owned enterprise aimed at developing launch vehicles for commercial space transport, has also established a launch location for its Falcon Launch Vehicle Program on Omelek Island, part of USAKA/RTS. In December 2004, the U.S. Army Space and Missile Defense Command released the Final EA for the SpaceX Falcon Program and Finding of No Significant Impact (the SpaceX EA) for the construction/refurbishment and operation of the Falcon Launch Vehicle launch site and supporting facilities. Other ongoing launch activities at USAKA/RTS include the Missile Defense Agency's Theater High Altitude Area Defense (THAAD) system. The THAAD system involves multiple test launches of target and interceptor missiles from USAKA/RTS, specifically Meck Island. The environmental impacts of the THAAD test flights at USAKA/RTS were analyzed in the *THAAD Pacific Test Flights Environmental Assessment* (THAAD EA). Recent operational changes at USAKA/RTS have resulted in planned facility closures. Facilities proposed for closure include a hospital annex, water-treatment facility, a photography laboratory, warehouses, Xerox repair shop, weather-balloon storage, and a theater. The potential impacts of facility closures and associated demolition and decommissioning activities have been addressed in the U.S. Army Space and Missile Defense Command's 2009 *Final Environmental Assessment* – *U.S. Army Kwajalein Atoll Ronald Reagan Ballistic Missile Defense Test Site Facility Closures and Demolitions* (the 2009 EA). Based on the SpaceX EA, THAAD EA, and 2009 EA analyses, along with the analysis of potentially impacted resources under the Proposed Action, the Pegasus launches added to the proposed demolition and closure activities, Falcon and other launches, and existing operations would not be expected to result in significant cumulative impacts.

**DETERMINATION:** An analysis of the Proposed Action has concluded that there would be no significant short-term, long-term, or cumulative effects to the environment or surrounding populations. After careful and thorough consideration of the facts herein, the undersigned finds that the proposed Federal action is consistent with existing national environmental policies and objectives set forth in Section 101(a) of NEPA and other applicable environmental requirements

and that it will not significantly affect the quality of the human environment or otherwise include any condition requiring additional consultation pursuant to Section 102(2)(c) of NEPA. Therefore, an Environmental Impact Statement for the Proposed Action is not required.

Issued in Washington, DC on: June 29, 2009



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