

## **NATIONAL AERONAUTICS AND SPACE ADMINISTRATION**

**National Environmental Policy Act:** Operation and Launch of Vulcan Centaur Space Launch Program at Cape Canaveral Space Force Station, Florida

**AGENCY:** National Aeronautics and Space Administration

**ACTION:** Finding of No Significant Impact

**SUMMARY:** Pursuant to the National Environmental Policy Act of 1969 (NEPA), as amended (42 U. S. C. 4321, *et seq.*), the Council on Environmental Quality Regulations for Implementing the Procedural Provisions of NEPA (40 CFR parts 1500-1508), and the National Aeronautics and Space Administration (NASA) procedures for implementing NEPA(14 CFR part 1216, subpart 1216.3), NASA has made a Finding of No Significant Impact (FONSI) with respect to the operation and launch of the Vulcan Centaur Launch Vehicle at Space Launch Complex (SLC) 41 on Kennedy Space Center (KSC) property (leased to the USAF at Cape Canaveral Space Force Station (CCSFS), Florida. NASA is proposing to use the Vulcan as a launch vehicle for future NASA payloads.

**ADDRESSES:** The Environmental Assessment that serves as the basis for this FONSI can be viewed online at <https://www.nasa.gov/content/public-reviews>.

### FOR FURTHER INFORMATION CONTACT:

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**SUPPLEMENTARY INFORMATION:** In 2019, the U.S. Air Force (USAF) and the United Launch Alliance, LLC (ULA) prepared an Environmental Assessment (EA) to address the potential environmental consequences associated with the implementation of the ULA Vulcan Centaur Space Launch Program at CCSFS SLC-41, Florida (*Environmental Assessment Vulcan Centaur Program Operations and Launch on Cape Canaveral Air Force Station, 2019*) and issued a FONSI for the operation and launch of the Vulcan. NASA served as a cooperating agency in the preparation of the USAF EA. NASA has reviewed the EA prepared for the operation and launch of the Vulcan and has determined it represents an accurate and adequate analysis of the scope and level of associated environmental impacts. NASA, as the adopting agency, has concluded that the EA prepared by the USAF adequately describes NASA's proposed action, the potential environmental impacts and in all other respects meets NASA's requirements for an EA. NASA, therefore, has adopted the USAF EA and hereby incorporates it by reference in the FONSI.

### Purpose and Need

The Vulcan Centaur Program was established by ULA to reduce cost, increase launch capability and provide the opportunity to partner with companies in the United States (US) to develop rocket engines that eliminate reliance on the current Atlas V Russian-supplied RD-180 engines. The Vulcan Centaur Vehicle is designed primarily to meet all current USAF Evolved Expendable Launch Vehicle (EELV) requirements and will support NASA, Department of Defense (DoD), and commercial payloads.

As stated in the USAF EA, the Vulcan Program allows continued fulfillment of the National Space Policy to actively promote the purchase and use of US commercial space goods and services, to reduce space transportation costs and eliminating use of Russian-supplied engines. The Vulcan Program also supports the Commercial Space Launch Act and its Amendments and both manned and unmanned NASA, DoD, and commercial payloads.

The purpose of NASA's Proposed Action is to provide NASA with greater flexibility and transport capability for launching of payloads. The action would provide access to a launch vehicle that can provide medium (2,500 to 17,000 pounds) and heavy (13,500 to 41,000 pounds) payload lift capability for Government space launches at lower recurring costs than current ULA expendable systems. Once Vulcan Centaur is fully operational, ULA eventually intends to phase out its Atlas V and Delta IV Programs. The Proposed Action is needed to ensure US space launch capability is not reduced or limited for NASA.

#### Proposed Action and No Action Alternative

The NASA Proposed Action is the operation and launch of the Vulcan Centaur launch vehicle from the CCAFS SLC-41 in support of NASA missions.

The Vulcan launch vehicle will contain a larger diameter booster tank than the Atlas V. The first stage will use new BE-4 booster engines that consume liquid oxygen (LO2) and liquefied natural gas. (LNG). Multiple Solid Rocket Motor (SRM) configuration options (zero, two, four or six Orbital ATK GEM-63XL motors) can be specified depending on payload and performance requirements. The Vulcan first stage will integrate with the Centaur V upper stage, which is similar to but larger than the current Centaur III stage flying on Atlas V rockets.

No vehicle components will be reused; the Vulcan launch vehicles are completely expendable. Vulcan payloads will be similar to current and planned payloads launched on Atlas V. Vulcan Centaur ground support operations and vehicle processing flow will be nearly identical to current Atlas V operations.

Under the No Action Alternative, NASA would not use the Vulcan launch vehicle at CCAFS to support NASA missions. The No Action Alternative would not meet the purpose and need of the Proposed Action.

#### Summary of Environmental Impacts

The 2019 USAF EA evaluated the potential environmental impacts associated with the Vulcan Centaur Program and operations at CCAFS. The scope included evaluating the environmental impacts of the program from receipt of vehicle components at the CCAFS wharf, vehicle component transportation and vehicle preparation, launch preparation, payload considerations and final launch from SLC-41. All of these operations are similar to current Atlas V operations covered under existing NEPA documentation (*Final Environmental Impact Statement Evolved Expendable Launch Vehicle Program, 1998* and *Final Supplemental Environmental Impact Statement (SEIS) for the EELV Program, 2000*) and thus the 2019 AF EA focused on the modifications or changes required by the Vulcan Program.

Sixteen (16) environmental aspects were analyzed in the USAF EA : Land Use / Visual Resources, Noise, Biological Resources, Historical and Cultural Resources, Air Quality, Climate, Orbital and De-Orbiting

Debris, Hazardous Materials and Solid and Hazardous Waste, Water Resources, Geology and Soils, Transportation, Utilities, Health and Safety, Socioeconomics, Environmental Justice and Department of Transportation Act Section 4(f) Properties.

No significant impacts from operations and launch of the Vulcan were identified in the USAF EA. There would be no effect on historic properties and no significant impacts on biological resources are anticipated. Cumulative impacts were determined to be negligible with less than significant effects to resources.

A summary of potential impacts identified in the USAF EA that are associated with operations and launch of the Vulcan is presented below.

Aspect Area	Proposed Action Environmental Impacts
1. Land Use Zoning/ Visual Resources	<p>Launches would not result in significant impacts to land use compatibility at CCSFS. SLC-41 is designated for space launch activities consistent with the CCSFS General Plan. The Proposed Action would not impact or require changes to land use.</p> <p>Facilities built for Vulcan will be within the existing Atlas V footprint and are all shorter than existing facilities. The Proposed Action has no change to coastal zone impacts and will be consistent in meeting Florida CZMA plan objectives. The Proposed Action would generate no significant impacts on visual resources.</p>
2. Noise	<p>Operations and Launch: Based on modeled launch noise levels, noise impacts would not be significant based on the DNL 65 dB noise contour for the Proposed Action. Operations and launch noise would not exceed the 85 dBA noise threshold limit value recommended for workers in an 8-hour day.</p> <p>The sonic booms modeled for Vulcan Centaur would intercept the surface more than 40 miles off the coast over the Atlantic Ocean with a maximum sonic boom overpressure of 5.25 psf and would not be heard on land.</p> <p>No significant impacts from launch effect noise including sonic booms is anticipated.</p>
3. Biological Resources	<p>To comply with the requirements of the Endangered Species Act and the Marine Mammal Protection Act and avoid significant adverse impacts to species, ULA would be required to continue to adhere to all requirements of the past, current and ongoing consultations with the U.S. Fish and Wildlife Service (USFWS) and the National Marine Fisheries Service (NMFS). With these measures, the Proposed Action would not be expected to have a significant impact on biological resources. No significant impacts to vegetation are anticipated as a result of the Proposed Action based on similarity to current Atlas V launches.</p> <p>An anomaly (explosion) on the launch pad could injure or kill wildlife found adjacent to the launch pad or within debris impact areas. Potential fires started from the anomaly could result in a temporary loss of habitat and mortality of less mobile species. Debris from launch failures has a very small potential to adversely affect managed fish species and their habitats in the vicinity of the project area. Sonic booms from launches are not expected to negatively affect the survival of any marine species.</p> <p>Post launch monitoring conducted on previous launches and previous environmental analyses concluded that launch impacts to threatened and endangered (T&amp;E) species are minimal and insignificant.</p> <p>Overall impacts on Biological Resources are anticipated to be insignificant and comparable to the current Atlas V Program.</p>
4. Historical and Cultural Resources	<p>The 45 SW Cultural Resources Manager evaluated the Proposed Action areas of potential effect and no historical or cultural resource issues were found within the boundaries of SLC-41, SMARF, VIF and the surrounding area. The Proposed Action would have no effect on Historical or Cultural Resources.</p>
5. Air Quality	<p>Operations and Launch: ULA operations at SLC-41 are not a major source of air pollutants and do not currently require a Title V or non- Title V air operating permit. Based on current knowledge of expected Vulcan Centaur Program Vehicle operations, the additional emissions would not require obtaining a Title</p>

	<p>V or non- Title V air operating permit. As documented in previous EAs and EISs performed for the launch vehicles at CCSFS, emissions from nominal launches, catastrophic launch failures, or spills of liquid propellants would not substantially impact ambient air quality.</p> <p>Proposed Action air emissions include PM, VOC, NOx, SOx, HAPs and CO<sub>2</sub>/CO. Air emissions from Vulcan launches with SRMs are expected to be similar to Atlas V or Delta IV launches with SRMs. LNG is a cleaner burning fuel than RP-1, with anticipated reductions in PM, but overall Vulcan launch emissions are expected to be similar to the current Atlas V launch emissions.</p> <p>Vulcan Centaur operations at CCSFS would not be expected to have a significant impact on air quality.</p>
6. Climate	<p>Emissions of GHGs from the operations and launch of the Proposed Action alone would not cause any appreciable global warming that may lead to climate change. At present, no methodology exists that would enable estimating the specific impacts that this increment of warming would produce locally or globally. The impact to the climate would still not be significant. The Proposed Action would not be significantly impacted by sea level rise due to climate change in the next 30 years because of its elevation. The Proposed Action GHG emissions would be essentially unmeasurable and not have a climate change impact.</p>
7. Orbital and De-Orbiting Debris	<p>The environmental consequences of orbiting and deorbiting debris from additional payloads potentially launched on Vulcan Program vehicles would be addressed under separate NEPA documentation for each of the satellite programs, as required. Although the Vulcan Centaur upper stage is larger than the current Atlas V Centaur upper stage, the environmental impact of orbiting and deorbiting debris is similar. Implementation of the Proposed Action would not likely change the total number of worldwide space launches. Thus, no significant global effect on orbital/deorbiting debris would be incurred from the implementation of the Proposed Action.</p>
8. Hazardous Materials/Solid and Hazardous Waste	<p>Operations and Launch: Launch operations, routine maintenance and flight support activities would require the use and storage of hazardous materials and generation of solid and hazardous waste similar in nature and quantities used and generated by the Atlas V Program. No significant impact on hazardous material use or solid or hazardous waste generated is anticipated.</p>
9. Water Resources	<p>The Proposed Action would have no significant impact on surface water, groundwater, or floodplains and wetlands.</p> <p>The Proposed Action slightly increases deluge and sound suppression water quantities, but since the flame trench has sufficient capacity and ULA has never inadvertently discharged wastewater, no impacts on surface water are expected.</p> <p>In the event of a launch abort or failure, debris could land in the ocean or other surface waters. Impacts to surface waters from a launch anomaly are similar to current Atlas V launches. Increased SRM use could decrease exhaust cloud pH slightly, but it is not expected to significantly impact surface water.</p> <p>ULA's safety and operating procedures minimize the risk of groundwater contamination by fuels or other hazardous liquids. No impacts to floodplains or wetlands are anticipated.</p> <p>Impacts to water resources would be similar to the current Atlas V and no significant water resource impacts are expected to result from the Proposed Action.</p>
10. Geology and Soils	<p>No unique geologic features of exceptional interest or mineral resources occur in the project area; therefore, no impacts would occur to these resources.</p> <p>The Proposed action would have no direct impacts on geology or soils.</p>
11. Transportation	<p>Transportation of Vulcan components to assembly areas is on a route identical to Atlas V and is not expected to have a significant impact to CCSFS transportation routes. During launches, the increase in traffic should be similar to existing launches and would not be significant. No significant transportation impacts are expected to result from the Proposed Action.</p>
12. Utilities	<p>Proposed Action impacts on potable water, wastewater and electrical power needs have no significant impacts compared to existing availability and capacity.</p>
13. Health and Safety	<p>The Vulcan Program will adhere to all ULA, USAF/USSF, CCSFS, state and federal safety and health regulations and requirements, as does Atlas V currently. The Vulcan Program construction and launch operations will have no significant impacts on on-site personnel health and safety.</p>
14. Socioeconomics	<p>The Vulcan launch preparation timeframe and personnel requirements are anticipated to be similar to Atlas V requirements and will not impact population or growth rate of the region. The Proposed Action would generate no negative socioeconomic impacts on the region.</p>
15. Environmental Justice	<p>Environmental impacts generated by operations or launch activities for the Proposed Action would have no significant impacts and would not affect minority or low-income populations or children and would not cause any environmental justice impacts. Use of the SLC-41 site would also not have an impact on any Environmental Justice subject groups.</p>
16. Section 4(f) Properties	<p>Operations and Launch: Section 4(f) properties are impacted by noise levels from existing Atlas V and other launches from both CCSFS and KSC. The Proposed Action would generate no negative Section 4(f) publicly-owned land impacts on the region.</p>

Ref: USAF Environmental Assessment Vulcan Centaur Operations and Launch CCAFS, FL June 2019

On the basis of the USAF EA, NASA has determined the environmental impacts associated with the proposed action would not individually or cumulatively have a significant impact on the quality of the human environment. Therefore, an environmental impact statement is not required.

*Robert Gibbs*

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SIGNED: DECEMBER 8, 2021