

**DEPARTMENT OF TRANSPORTATION**

**Federal Aviation Administration**  
**Office of Commercial Space Transportation**

**Adoption of the Environmental Assessment**  
**and**  
**Finding of No Significant Impact**  
**for**  
**Terran 1 Space Launch Program Operations at Cape Canaveral Air**  
**Force Station**

**Summary**

The U.S. Air Force acted as the lead agency, and the Federal Aviation Administration (FAA) was a cooperating agency, in the preparation of the June 2020 *Environmental Assessment for Terran 1 Launch Program Cape Canaveral Air Force Station* (EA), which analyzed the potential environmental impacts of Relativity Space, Inc.'s (Relativity) Terran 1 Space Launch Program at Cape Canaveral Air Force Station (CCAFS).<sup>1</sup> Relativity plans to launch the Terran 1 launch vehicle from Launch Complex 16 (LC-16) at CCAFS up to 12 times per year beginning in the third quarter of 2021. The EA was prepared in accordance with the National Environmental Policy Act (NEPA) of 1969, as amended (42 United States Code [U.S.C.] § 4321 et seq.); Council on Environmental Quality NEPA implementing regulations (40 Code of Federal Regulations [CFR] parts 1500 to 1508); USAF's Environmental Impact Analysis Process (32 CFR § 989); and FAA Order 1050.1F, *Environmental Impacts: Policies and Procedures*.

Relativity is required to obtain a license from the FAA for Terran 1 launch operations at LC-16. Based on its independent review and consideration of the EA, the FAA issues this Finding of No Significant Impact (FONSI) concurring with, and formally adopting, the analysis of impacts and findings in the EA supporting the FAA's issuance of licenses to Relativity for Terran 1 launches at LC-16. If, in its license application to the FAA, Relativity makes changes to its operations which fall outside the scope of the EA, additional environmental review will be required prior to the FAA issuing a license associated with such an application.

---

<sup>1</sup> On December 9, 2020, Cape Canaveral Air Force Station was officially named Cape Canaveral Space Force Station.

After reviewing and analyzing available data and information on existing conditions and potential impacts, including the EA, the FAA has determined the issuance of licenses to Relativity for Terran 1 launches at LC-16 would not significantly affect 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 independently issuing this FONSI. The FAA has made this determination in accordance with applicable environmental laws and FAA regulations. The EA is incorporated by reference into this FONSI.

For any questions or to request a copy of the EA, contact:

Leslie Grey  
Environmental Specialist  
Federal Aviation Administration  
800 Independence Ave., SW, Suite 325  
Washington DC 20591  
Leslie.Grey@faa.gov  
(907) 227-2113

## **Purpose and Need**

The FAA is responding to Relativity's proposal to apply for launch licenses to conduct Terran 1 launches at LC-16. The FAA must review each application and determine whether to issue the license. The purpose of Relativity's proposal is to provide versatile, cost-effective launch services (deploying satellite constellations) to government and commercial entities in accordance with the U.S. Commercial Space Launch Competitiveness Act and its Amendments. The project aligns with National Space Policy to actively promote the purchase and use of U.S. commercial space goods and services and reduce space transportation costs. The project is needed to find cost-effective ways to make continued space exploration, development, and use of space sustainable. Relativity will bring extensive use of 3D printing and other cost-effective space exploration technologies to the commercial space launch market to provide a more cost-competitive commercial space launch vehicle, to ensure that U.S. space launch capability is not reduced or limited, and to ensure the United States remains the leader in space launch technology.

## **Proposed Action**

The FAA's Proposed Action is to issue licenses to Relativity for Terran 1 launches at LC-16. Relativity plans to conduct up to 12 launches per year from LC-16 starting in the third quarter of 2021. The launch

vehicle would deploy and resupply satellite constellations for both government and commercial sector payload delivery to Low Earth Orbit (LEO) and Sun-synchronous orbit. In addition to launches, the EA analyzed modifications to existing facilities and construction of new systems and facilities at LC-16 to enable these launches. The FAA has no federal action associated with the construction activities discussed in the EA. Therefore, this FONSI addresses only those aspects of the activities considered in the EA for which the FAA has regulatory authority, namely the issuance of launch licenses to Relativity for Terran 1 launch operations.

## **Alternatives**

Alternatives analyzed in detail in the EA include (1) the Proposed Action and (2) the No Action Alternative. Under the No Action Alternative, Relativity would not construct a launch site for Terran 1 launches at LC-16 and thus not apply to the FAA for a launch license for Terran 1 launches at LC-16. The No Action alternative would not meet the purpose and need because it would not allow Relativity to meet its goal of using 3D printing and other cost-effective space exploration technologies to provide a more cost-competitive commercial space launch vehicle. Other action alternatives were considered but eliminated from further study (refer to EA Section 2.9).

## **Environmental Impacts**

The following presents a brief summary of the potential environmental impacts considered in the EA for the FAA's Proposed Action. This FONSI incorporates the EA by reference and is based on the potential impacts discussed therein. The FAA has determined the analysis of impacts presented in the EA represents the best available information regarding the potential impacts associated with the FAA's regulatory responsibilities as described in this FONSI. This FONSI analyzes all the FAA's environmental impact categories except farmlands, children's environmental health and safety risks, and natural resources, as these were dismissed from detailed analysis in the EA (see the beginning of EA Section 3). The Proposed Action would not convert prime agricultural land to other uses or result in a decrease in the land's productivity. Given the location of LC-16 and the activities proposed, the Proposed Action would not disproportionately affect children. As defined by the FAA, the Proposed Action would not have a measurable effect on natural resources, such as water, asphalt, aggregate, or wood (see EA 3 at 14).

## **Air Quality**

The Terran 1 launch vehicle uses liquid natural gas (methane (CH<sub>4</sub>)) and liquid oxygen as propellant. Combustion byproducts are carbon dioxide (CO<sub>2</sub>) and water vapor with trace amounts of particulate matter. Carbon monoxide is also produced; however, the majority is oxidized to CO<sub>2</sub> during after burning in the exhaust plume. Most of the launch emissions occur above the mixing height and do not affect ambient air quality. No substantial changes to existing air quality conditions at CCAFS are expected from Terran 1 launches. The Proposed Action would not result in an exceedance of a National Ambient Air Quality Standard. Therefore, the Proposed Action would not result in significant air quality impacts (see EA 4.5 at 58-59).

## **Biological Resources (including Fish, Wildlife, and Plants)**

Terran 1 launches would have minor impacts on vegetation near the launch pad associated with fire and scorching of vegetation. Past vegetation scorching at CCAFS has not permanently affected vegetation near other launch sites and this same impact is expected at LC-16. The FAA anticipates the effects from Terran 1 launches would be similar.

Night lighting has been a concern at CCAFS because of the potential for sea turtle hatchlings at the beach to be drawn toward the lights instead of toward the surf. The USAF developed the 45th Space Wing<sup>2</sup> Instruction 32-7001, Exterior Lighting Management, for various areas and facilities on CCAFS to protect sea turtles. A U.S. Fish and Wildlife Service (USFWS) Biological Opinion issued to the USAF requires development of Light Management Plans (LMPs) for all new facilities that are in close proximity to the beach, are not compliant with 45th Space Wing lighting policies, have lighting directly visible from the beach, and/or might cause significant sky glow. Relativity would develop an LMP once site design is completed and send the LMP to the USFWS for approval prior to conducting nighttime launch operations.

Noise generated during launches would startle wildlife in the vicinity of LC-16. No animal mortality is expected. The USAF conducted Endangered Species Act (ESA) Section 7 consultation with the USFWS for the project. The USFWS concluded the project would not jeopardize the continued existence of an ESA-listed species or result in destruction or adverse modification of designated critical habitat (see EA Appendix D for the USFW's Biological Opinion).

---

<sup>2</sup> On May 11, 2021, the 45<sup>th</sup> Space Wing was renamed Space Launch Delta 45 and became part of the U.S. Space Force.

During a nominal launch, the launch vehicle would fly over the coastal waters of the Atlantic Ocean and through the Earth's atmosphere. When expended, the booster would disengage and fall into the Atlantic Ocean and would not be recovered. In August 2016, the FAA conducted Endangered Species Act (ESA) consultation with the National Marine Fisheries Service (NMFS) to address potential effects of waterborne landings of spacecraft and rocket components on ESA-listed species and critical habitat in the Atlantic Ocean, including sea turtles, marine mammals, and fish. NMFS concluded that potential effects to ESA-listed species and critical habitat are discountable and/or insignificant and thus would not adversely affect ESA-listed species and critical habitat. The FAA anticipates the effects of Terran 1 launches would be similar.

Sonic booms generated during launches would occur over the open Atlantic Ocean and would not affect marine species.

In summary, the Proposed Action, in combination with any anticipated mitigation, is not expected to result in significant impacts on biological resources (see EA 4.3 at 55–57).

### **Climate**

Terran 1 launches would emit CO<sub>2</sub> and water vapor. These emissions would not cause any appreciable global warming that may lead to climate change. However, these emissions would slightly increase the atmospheric concentration of greenhouse gases. Emissions of CO<sub>2</sub> to the stratosphere would be negligible in comparison with U.S. annual CO<sub>2</sub> emissions of CO<sub>2</sub> would not have a significant impact on global climate change.

In summary, despite the continued impacts to climate resulting from various worldwide events, the Proposed Action alone is not expected to result in significant climate-related impacts (see EA 4.6 at 59-60).

### **Coastal Resources**

Terran 1 launches are similar to previous and current launch activities that occur at CCAFS. The FAA will not issue a license to an applicant unless an applicant's project meets the consistency requirements of the state's coastal management program. The Florida State Clearinghouse review determined that the project is consistent with the Florida Coastal Management Program. Given that the FAA's Proposed Action meets the consistency requirements, the Proposed Action would not result in significant impacts to coastal resources (see EA 4.1 at 47).

### **Department of Transportation Act, Section 4(f)**

The Proposed Action would not result in a physical use or temporary occupancy of any potential Section 4(f) property. Potential Section 4(f) properties would experience temporary increases in noise from Terran 1 launches. Due to the long history of these properties experiencing noise from launches at CCAFS and Kennedy Space Center (KSC), the FAA has determined the Proposed Action would not substantially diminish the protected activities, features, or attributes of any of the properties identified, and thus would not result in substantial impairment of the properties. Therefore, the Proposed Action would not be considered a constructive use of these properties and would not invoke Section 4(f) of the Department of Transportation Act. Consequently, the Proposed Action would not result in significant impacts on Section 4(f) properties (see EA 4.16 at 72).

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

Launch operations would require the use and storage of hazardous materials. Small quantities of hazardous waste would be generated during routine operations and maintenance. Most of the hazardous materials would be consumed, so no substantial volumes of hazardous waste would require disposal.

To minimize the potential for surface water or groundwater contamination, Relativity plans to implement an emergency response and spill plan to ensure that adequate and appropriate guidance, policies, and protocols regarding hazardous material incidents and associated emergency response are available to and followed by all personnel. Emergency response and cleanup procedures contained in the plan would reduce the magnitude and duration of any impacts both on and off site. No groundwater contact or disturbance is expected from launch operations.

Best Management Practices (BMPs) for pollution prevention would be implemented in accordance with the Pollution Prevention Act of 1990. Relativity would prevent pollution via source reduction whenever feasible. Solid waste generated from Terran 1 operations would be in small quantities and disposed off-site by construction contractors or independent waste disposal services.

The Proposed Action, including the BMPs and other measures outlined above, is not expected to result in significant impacts related to hazardous materials, solid waste, and pollution prevention (see EA 4.8 at 61–64).

## **Historical, Architectural, Archeological, and Cultural Resources**

The USAF conducted National Historic Preservation Act Section 106 consultation with the Florida State Historic Preservation Officer (SHPO) for the project. The SHPO concurred with the USAF's determination that the project will have no adverse effect on historic properties (see EA Appendix E). Also, the project would not affect traditional cultural properties. Therefore, the Proposed Action would not result in significant impacts on historical, architectural, archeological, or cultural resources (see EA 4.4 at 57).

## **Land Use**

The Proposed Action would not change the existing use of the land, which is designated for space launch activities. Operations would be consistent with the Base General Plan and the USAF mission at CCAFS. Therefore, the Proposed Action would not result in significant impacts to land use (see EA 4.1 at 47).

## **Natural Resources and Energy Supply**

As stated above, the Proposed Action would not affect natural resources (see EA 3 at 14). The project requires the installation of new electrical infrastructure to connect LC-16 to the CCAFS power grid. Terran 1 launches would not require energy beyond CCAFS's available electrical supply. Therefore, the Proposed Action would not result in significant impacts related to natural resources and energy supply (see EA 4.12 at 68-69).

## **Noise and Noise-Compatible Land Use**

Blue Ridge Research and Consulting, LLC (BRRC) conducted noise modeling for the project (see EA Appendix B). The FAA's Office of Environment and Energy approved BRRC's modeling methods. Increased noise levels in the area surrounding LC-16 from Relativity launches would be of short duration and diminish quickly as the vehicle rises. Sonic booms generated from Terran 1 launches would be directed easterly out over the Atlantic Ocean in the direction of the launch azimuth, making them inaudible over the mainland. Therefore, with respect to human annoyance, health and safety, or structural damage, noise impacts from sonic booms would not occur. According to the modeling, the day-night average sound level (DNL) 65 and 60 A-weighted decibel (dBA) contours extend approximately 0.7 and 1.1 miles from the launch pad, respectively. This area does not encompass land outside the boundaries of CCAFS, and thus no residences would be impacted. Accordingly, the Proposed Action would not result in significant noise impacts (see EA 4.2 at 48-50).

## **Socioeconomics, Environmental Justice, and Children’s Environmental Health and Safety Risks**

The Terran 1 launch program would not impact population or growth rate of the region. The launch program would not affect the local housing market or the need for new social services or support facilities. Therefore, the Proposed Action would not result in significant socioeconomic impacts (see EA 4.14 at 71).

The project area is not located adjacent to or near minority or low-income populations. The Proposed Action would not substantially affect human health or the environment and would not disproportionately affect any population group, including minority or low-income populations. Therefore, the Proposed Action would not result in significant impacts to environmental justice communities (see EA 4.15 at 71–72).

As stated above, the Proposed Action would not affect children’s environmental health and safety (see EA 3 at 14).

### **Visual Effects (including Light Emissions)**

Relativity’s facilities would not be visible by the public except potentially from the ocean or from the KSC Visitor Complex viewing structure. Launch operations would occur within the launch complex footprint and at heights similar to or lower than other active launch sites at CCAFS. Therefore, the Proposed Action would not result in significant visual effects (see EA 4.1 at 47).

### **Water Resources (including Wetlands, Floodplains, Surface Waters, Groundwater, and Wild and Scenic Rivers)**

Under the Proposed Action, launch deluge water would be contained in the impermeable concrete flame trench, sampled, and pumped to a percolation pond, separate from all permitted stormwater management areas, in accordance with a State Industrial Wastewater Discharge Permit. In the event of an early launch abort or failure, spacecraft and launch vehicle debris could fall into the ocean, which could potentially cause very temporary and very localized changes in pH. The Proposed Action would not use or affect groundwater. LC-16 is not located within the 100-year floodplain. Launches would not affect wetlands. No wild and scenic rivers are located near CCAFS; therefore, the Proposed Action would not affect a wild and scenic river. In summary, the Proposed Action is not expected to result in significant impacts on water resources (see EA 4.9 at 64–66).



## **Cumulative Impacts**

This FONSI incorporates by reference the EA, which addresses the potential impacts of past, present, and reasonably foreseeable future activities at and within the vicinity of CCAFS that would affect the resources impacted by the Proposed Action. Due to the nature of the Proposed Action and its location on the coast within CCAFS, only launch-related actions occurring at CCAFS would meaningfully interact in time and space with the Proposed Action such that potential cumulative impacts could result. There is a reasonably foreseeable increase in future launch actions (government and commercial) at CCAFS and KSC. Launches occur days or weeks apart from each other and are often delayed due to technical issues. The cumulative effect of planned launches at CCAFS and KSC are not expected to result in significant cumulative environmental impacts (see EA 5 at 78–84).

## **Agency Finding and Statement**

The FAA has determined that no significant impacts would occur as a result of the Proposed Action and, therefore, that preparation of an Environmental Impact Statement is not warranted and a FONSI in accordance with 40 CFR § 1501.4(e) is appropriate.

After careful and thorough consideration of the facts contained herein, the undersigned finds that the proposed Federal action is consistent with existing national environmental policies and objectives as set forth in Section 101 of NEPA and other applicable environmental requirements and will not significantly affect the quality of the human environment or otherwise include any condition requiring consultation pursuant to Section 102(2)(C) of NEPA.

APPROVED: \_\_\_\_\_

DATE: \_\_\_\_\_

Daniel Murray  
Executive Director, Office of Operational Safety