June 24, 2024

VIA ONLINE SUBMISSION

Office of Commercial Space Transportation
Federal Aviation Administration
800 Independence Avenue, SW
Washington, D.C. 20591

Re: Docket No. FAA-2024-1395, Notice of Intent to Prepare an Environmental Impact Statement, Open a Public Scoping Period, and Hold Public Scoping Meetings

Comments of United Launch Alliance, LLC

Dear FAA Staff:

Please accept these comments on the Office of Commercial Space Transportation's Notice of Intent ("NOI") to Prepare an Environmental Impact Statement ("EIS"), Open a Public Scoping Period, and Hold Public Scoping Meetings. United Launch Alliance ("ULA") is the nation's most experienced space launch company and a frequent partner of the Federal Aviation Administration ("FAA"), NASA, and the Space Force. ULA conducts its launch operations at the Cape Canaveral Space Force Station ("CCSFS"), a mere three miles from SpaceX's proposed new launch site at Kennedy Space Center ("KSC") Launch Complex 39A ("LC-39A") for its Starship rocket. ULA takes its safety and environmental obligations seriously and engages in significant efforts to minimize its impact on the surrounding environment, communities, and businesses. ULA submits these comments to encourage the FAA to address a number of important considerations in establishing the scope of the EIS and in ultimately assessing SpaceX's application for a launch license ("License").

In the EIS, the FAA must consider the purpose and need of the proposed action—namely, allowing SpaceX to use LC-39A and expend considerable shared launch complex resources to launch the largest rocket system ever. The FAA must also consider a multitude of environmental impacts, including air quality, biological resources, hazardous materials, coastal resources, historical, architectural, and cultural resources, land use, natural resources and energy supply, noise, socioeconomics and environmental justice, and water resources.[1] The EIS is just one part of the FAA's review of SpaceX's application, however. The FAA must also consider public safety issues, national security concerns, and insurance implications. These issues must be considered for all stages of the operations, including entry and reentry. The comments below identify several issues that warrant particular attention in the FAA's review process.

SCOPE OF ASSESSMENT

NASA previously prepared an Environmental Assessment ("EA") and issued a Finding of No Significant Impact ("FONSI") for LC-39A.[2] But, as the FAA recognized in its Notice of Intent to prepare an EIS, the "concept of operations has evolved from the original . . . scope," with a new design and infrastructure.[3] In light of these significant developments, the EIS should consider "[t]he potential environmental impacts of *all* proposed construction and operational activities, including those from launch and landing"—not just the proposed modifications from the EA.[4] This complete assessment is required to properly understand the potential impacts of the proposed operations. NASA prepared its EA in 2019, before SpaceX had conducted even a single test flight of Starship.[5] Circumstances have since changed, and the EIS must account for that.

1. SpaceX should not be permitted to prepare its own EIS.

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[1] FAA, Environmental Impacts: Policies and Procedures, Order 1050.1F § 4-1 (2015); *see* GAO, *Commercial Space Transportation: How FAA Considers Environmental and Airspace Effects* at 11 (April 2024) ("*Airspace Effects*").

[2] NASA, Finding of No Significant Impact, KSC-04-19 (Sept. 19, 2019), https://go.nasa.gov/3R9KnGA.

[3] Notice of Intent, 89 Fed. Reg. 40,527 (May 10, 2024).

[4] *Id.* at 40,528 (emphasis added).

[5] NASA, *Final Environmental Assessment for the SpaceX Starship and Super Heavy Launch Vehicle at KSC* at v–x (Sept. 19, 2019), https://go.nasa.gov/4592h1T.

According to the NOI, "SpaceX will prepare this EIS under the supervision of the FAA."[6] To the extent that the FAA still intends to have SpaceX draft the EIS, the FAA should reconsider that decision. Both as a matter of statutory and regulatory authority and good policy, the FAA should be the one preparing the EIS, not the regulated entity.

To start, the FAA's own regulations do not permit an applicant to prepare its own EIS. Instead, those regulations state that an applicant may "[p]repare an Environment Assessment with FAA oversight," or may "[a]ssume financial responsibility for preparation of an Environmental Impact Statement *by an FAA-selected and -managed consultant contractor*."[7] The FAA's Order 1050.1F confirms this, explaining that "[a]pplicants may prepare EAs, but may not prepare EISs," and that "[w]hen an EIS is required, the FAA must prepare the EIS or select the contractor that will assist the FAA in preparing the EIS."[8] If a third-party contractor is selected, "the role of the applicant is limited to providing planning information, environmental studies . . ., other FAA-requested information, and financing for the EIS consultant's costs."[9] The FAA must be sure to follow that regulation here.

The FAA's regulations track NEPA's mandate, which does not contemplate that an agency may delegate the preparation of an EIS to the applicant. NEPA requires that the "detailed statement"—in other words, the EIS—be made "*by* the responsible official."[10] It is the agency's responsibility to ensure that environmental impacts are considered, and so it is the agency that must evaluate and assess those impacts. Nothing in NEPA suggests that this responsibility can be delegated to the applicant. In fact, NEPA explicitly carves out an exception for an EIS that has "been prepared by a State agency or official."[11] That NEPA provides a carve-out for state agencies but not applicants indicates that Congress did not contemplate delegation to applicants.

And for good reason. "[A]n agency may not delegate its public duties to private entities, particularly private entities whose objectivity may be questioned on grounds of

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[6] 89 Fed. Reg. 40,527; *but see* FAA, *Fact Sheet: Environmental Impact Statement (EIS) for SpaceX Starship-Super Heavy Launch Vehicle at Launch Complex 39A at the Kennedy Space Center, Florida* at 5, https://tinyurl.com/bdxyzpm2 ("Fact Sheet") (stating that "*[t]he Federal Aviation Administration (FAA)* is preparing an Environmental Impact Statement") (emphasis added).

[7] 14 C.F.R. § 450.47(b) (emphasis added).

[8] Order 1050.1F at 2-5, 2-6.

[9] *Id.* at 2-6.

[10] 42 U.S.C. § 4332(C) (emphasis added).

[11] 42 U.S.C. § 4332(G).

conflict of interest."[12] And a conflict of interest is "inherent in the situation of those outside the government coming to the government for money, leases or permits while attempting impartially to analyze the environmental consequences of their getting it."[13] "The danger" of such delegation "is the potential, if not likelihood, that the applicant's statement will be based upon self-serving assumptions," as applicants have strong incentives to minimize the projected environmental impacts of their planned operations.[14] For example, the Programmatic Environmental Assessment for SpaceX's operations in Boca Chica—also prepared by SpaceX—estimated a debris field of 700 acres, or just over a square mile.[15] But when Starship exploded mid-launch in April 2023, debris reached as far as six miles away, showing that SpaceX has seriously underestimated the consequences of a failure.[16]

To be sure, regulations promulgated by the Council on Environmental Quality provide that a federal agency may "direct an applicant or authorize a contractor to prepare an environmental document," including an EIS.[17] But that regulation is not a proper or reasonable reading of the plain text of the statute. And the FAA's own regulation governs its actions over the Council's more general regulation.[18]

Further, here, amidst all of the identified environmental issues and concerns that have been raised by the public, where the FAA is the responsible agency for determining the issuance of a license to launch Starship from SLC-39A, the FAA must prepare the EIS itself, or hire an independent third-party to prepare the study. If the FAA does hire an independent third party, the FAA must be sure to fulfill its duty of supervision and review. The FAA must "independently evaluate the" EIS and must remain "responsible for its accuracy, scope, and contents."[19] Further, "the agency must independently

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[12] *Sierra Club v. Sigler*, 695 F.2d 957, 962 n.3 (5th Cir. 1983)

[13] *Id.* (internal quotation marks omitted).

[14] *Greene Cnty. Planning Bd. v. Fed. Power Comm'n*, 455 F.2d 412, 420 (2d Cir. 1972).

[15] FAA, *Final Programmatic Environmental Assessment for the SpaceX Starship/Super Heavy Launch Vehicle Program at the SpaceX Boca Chica Launch Site in Cameron County, Texas* at 98 (June 2022), https://tinyurl.com/5cwcpysr.

[16] Lora Kolodny, *SpaceX Starship Explosion Spread Particulate Matter for Miles*, CNBC (Apr. 24, 2023), https://cnb.cx/3XkWMLY.

[17] 40 C.F.R. § 1506.5(b).

[18] *See Gozlon-Peretz v. United States*, 498 U.S. 395, 407 (1991) ("A specific provision controls over one of more general application.").

[19] 40 C.F.R. § 1506.5(b)(2).

perform its reviewing, analytical and judgmental functions and participate actively and significantly in the preparation and drafting process."[20]

2. The EIS must address the current and evolving Starship design and scope of operations.

As a threshold matter, the EIS must acknowledge that Starship is still in its experimental stages and that SpaceX's planned operations at the LC-39A have evolved and continue to evolve. Starship is the largest rocket ever built, and it is currently tested at SpaceX's private base in Boca Chica, Texas. In prior test flights, SpaceX has experienced several technical accidents. In addition, SpaceX has acknowledged that the vehicle is not meeting anticipated performance levels. As a result, SpaceX has indicated that it plans to increase the size and thrust level of the vehicle stages to address this performance shortfall. This would result in environmental and safety issues greater than those witnessed at Boca Chica.

SpaceX intends to launch a larger model at LC-39A than it is currently testing in Boca Chica. In April 2024, SpaceX revealed plans to, at minimum, quadruple payload capability to make up for shortfalls in predicted performance. Starship will eventually be 492 feet tall, "roughly 20% higher than the massive system aboard the Super Heavy rocket right now."[21] The Super Heavy booster is expected to hold up to 4100 metric tons of propellant, and Starship up to 2,600 metric tons.[22] The maximum lift-off thrust is anticipated at 103 meganewtons.[23] The resulting launch impacts would far exceed current impacts seen during current Boca Chica launches. Additional growth of the Starship launch vehicle may be planned if performance continues to fall below expectations. Given these changes, the EIS must perform a comparative analysis between current usage impacts and the proposed operations, with a rocket proposed to be more than double the size of any currently licensed launch vehicle and with increased frequency of launches.

Just as Starship's design is evolving, so are SpaceX's planned operations at KSC. SpaceX originally proposed up to 24 launches per year at the KSC,[24] but now aims for 44 launches.[25] SpaceX previously planned to land the Super Heavy Booster on a droneship

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[20] *Sierra Club v. Lynn*, 502 F.2d 59 (5th Cir. 1974).

[21] Elizabeth Howell, *SpaceX's Giant Starship Will Be 500 Feet Tall for Mars Missions, Elon Musk Says*, NPR (Apr. 13, 2024), https://bit.ly/3Xl19GS.

[22] *Fact Sheet* at 5.

[23] *Id.*

[24] *Environmental Assessment* at iii.

[25] 89 Fed. Reg. 40,527.

in nearby water, but now it proposes landing the Booster at LC-39A.[26] Landing a booster at LC-39A, rather than in the ocean, shifts the risks of a system failure onto the communities, businesses, and environment that surround KSC. And SpaceX has also indicated that it needs additional infrastructure, including a tower to catch the Super Heavy Booster, a natural gas liquefaction system and air separation unit, and stormwater/deluge ponds.[27] The NOI does not specify the intended payloads or purposes of the launches.

The EIS must detail the full scope of expected operations, including intended payloads and launch purposes. It must also address the changed circumstances, both from the current operations at Boca Chica and from the projected operations analyzed in the 2019 EA. Finally, the EIS must address any planned modifications to the vehicle and surrounding infrastructure that would further exacerbate the environmental and safety concerns already demonstrated through prior test flights. Specifically, the EIS must consider design and operation changes between the model intended to be launched at KSC with the current model launched at Boca Chica and how these changes in design and operations affect the findings and conclusions in prior NEPA documents. Plus, the EIS should assess multiple scenarios involving future modifications to the launch vehicle or infrastructure which will have additional impact. These scenarios should include an assessment of, for example, increased propellant storage, increased wastewater generation during launch, higher acoustic levels during launch, higher explosive yield in the event of a test or launch incident, and greater strain on overall launch base infrastructure.

3. The EIS should consider the cumulative effects of SpaceX's proposed operations at KSC and Cape Canaveral Space Force Station.

SpaceX does not intend to limit its operations to LC39-A. It also proposes to build infrastructure and launch multiple Starships from the nearby Space Launch Complex 37 (SLC-37) at CCSFS. The Department of the Air Force is currently preparing an EIS to assess the environmental impacts at SLC-37.[28] The EIS notice for SLC-37 provides little detail about the proposed scope of operations, simply stating that

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[26] *Id.*

[27] *Id.*

[28] Dep't of Air Force, Notice of Intent to Prepare an Environmental Impact Statement for SpaceX Starship-Super Heavy Operations at Cape Canaveral Space Force Station, 89 Fed. Reg. 13,050 (Feb. 21, 2024).

"SpaceX would modify, reuse, or demolish the existing . . . infrastructure at CCSFS to support Starship-Super Heavy launch and landing operations."[29]

The FAA's EIS should evaluate SpaceX's proposed operations at LC-39A in conjunction with SpaceX's proposed operations at SLC-37. This should further include an assessment of national security space capabilities and the associated vulnerabilities presented by the consolidation of these operations at adjacent launch complexes within a six-mile area. This also potentially increases the threat to other national security space launch providers located in the same six-mile area. SpaceX seeks to frequently launch the largest rocket ever from *two* launch sites within a six-mile area. Just one Starship launch site is likely to disrupt other launch operations in the area and cause significant environmental impacts, as discussed in detail below. The impacts are certain to be amplified if coming from two launch sites in such close proximity. For example, SpaceX intends to conduct up to 44 launches per year from LC-39A. If SpaceX aims for a comparable number at SLC-37, that would lead to nearly 100 launches per year—or one every three days or so. The FAA should also consider the cumulative impacts of SpaceX operations from LC-39A and SLC-37 on air quality, noise, water quality, public safety, other launch operators, and the ability to maintain assured access to space.

To that end, the FAA and the Department of the Air Force should consider conducting a joint EIS to assess the individual and cumulative impacts at LC-39A and SLC-37. At the very least, in drafting its own EIS for LC-39A, the FAA should coordinate with the Department of the Air Force on its ongoing assessment of proposed Starship operations from SLC-37.

4. The EIS must evaluate SpaceX's prior compliance record and assess the potential impacts at LC-39A in light of that record.

SpaceX has been testing and launching Starship at Boca Chica for several years. There are documented instances of regulatory violations, accidents, and environmental impacts at Boca Chica that must inform the scope and content of the current EIS and the FAA's assessment of the proposed launch license at the KSC.

Rocket launches involve a complex statutory and regulatory scheme that ensures public safety and minimizes environmental damage. Potentially relevant statutes include the National Environmental Policy Act, the Commercial Space Launch Act, the U.S. Commercial Space Launch Competitiveness Act of 2015, the Clean Water Act, the Clean Air Act, the Endangered Species Act, the Resources Conservation and Recovery Act, the National Historic Preservation Act, the Native American Graves Protection and Repatriation Act, and the Archaeological Resources Protection Act.

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[29] *Id.* at 13,051.

For example, the Commercial Space Launch Act ("CSLA") requires that every launch be licensed. In December 2020, "SpaceX . . . requested a waiver to conduct [a] flight even though it had not shown that a pressure wave that could be generated by an explosion during the test would not pose a danger to the public."[30] The FAA denied the waiver, yet SpaceX still launched its rocket.[31]

As another example, regulations under the CSLA require the closure of the "flight hazard area,"[32] or the area around a launch that poses a danger to the public.[33] SpaceX receives permission to close down Highway 4, the sole road in and out of Boca Chica, for a set number of hours per year. But, as the U.S. Fish and Wildlife Service documented SpaceX exceeded those limits in 2019, 2020, and 2021.[34]

Or, for instance, the Clean Water Act ("CWA") prohibits discharges into or building on protected wetlands without the required permits.[35] Boca Chica sits on protected wetlands. In 2021, a Fish and Wildlife complex refuge manager sent a letter to SpaceX expressing concerns about "SpaceX's employees using refuge lands as a parking lot" or building "a drainage ditch on protected land."[36] And in July 2023, SpaceX ran a full-pressure test of a new flame detector for Starship without applying for the required permit.[37]

The EIS must take into account those events for the proposed operations at LC-39A. In fact, the EIS should contain a full evaluation of SpaceX's regulatory compliance record, including of Starship operations. This evaluation is essential to ensure that Starship operations will meet all applicable statutory and regulatory safety and environmental requirements for the proposed action on a sustained basis.

5. The EIS must consider the likelihood and scope of potential accidents.

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[30] Kenneth Chang, *SpaceX Mars Rocket Prototype Explodes, But This Time It Lands First*, N.Y. Times (Mar. 3, 2021), https://nyti.ms/3XeJssp.

[31] *Id.*

[32] 14 C.F.R. § 401.7.

[33] *Id.* § 450.101.

[34] 60 Minutes, *SpaceX Launch Site Brings Controversy to Texas Town*, CBS (Aug. 17, 2021), https://cbsn.ws/4b18dLY.

[35] 33 U.S.C. §§ 1342, 1344.

[36] 60 Minutes, supra n.34.

[37] Lora Kolodny, *SpaceX Hasn't Obtained Environmental Permits for 'Flame Deflector' System It's Testing in Texas*, CNBC (July 28, 2023), https://cnb.cx/3ySODE6.

In addition to evaluating the impacts of normal launch operations, the EIS must also address the environmental and public safety impacts from potential accidents and vehicle failures that would occur before, during, and after launch. In issuing launch licenses, the FAA must "determine[] that an applicant can conduct launch or reentry without jeopardizing public health and safety and safety of property."[38] Part of this analysis includes "account[ing] for vehicle failure probability."[39]

SpaceX has had significant accidents and associated impacts during testing of its Starship system. In 2019, the launch of an experimental rocket at Boca Chica "almost immediately started brush fires near the launch pad," and although emergency workers attempted to stop the fire, it spread and burned over 100 acres in the Las Palomas Wildlife Management Area.[40] A similar incident occurred during a static fire test of Starship in 2022, destroying 68 acres of protected bush.[41] In the first Starship test launch, before the rocket itself exploded, the launch caused serious damage at ground level, as the launch pad "exploded, with concrete chunks from it flying in multiple directions leaving behind a giant crater underneath," "risk[ing] hitting the fuel storage tanks."[42] A federal lawsuit, on behalf of the Boca Chica community and protected wildlife areas is currently pending against SpaceX based on the environmental damage caused by that accident.[43]

The EIS must assess the likelihood of accidents, ranging from minor to catastrophic. For example, it should clearly and accurately determine TNT (explosive) equivalence of Starship's propellant systems, to understand the implications of an explosion at or near pad level.

The EIS must also assess "the hazardous debris generated from normal and malfunctioning vehicle flight."[44] In the EA for Starship operations at Boca Chica, SpaceX represented that the debris field would be only 700 acres, or just over a square mile. However, after Starship exploded in April 2023, "particulate matter . . . rain[ed]

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[38] 14 C.F.R. § 450.45(a).

[39] *Id.* § 450.131(a).

[40] Dave Mosher, *SpaceX's Launch of an Experimental Rocket Ship Set Fire to About 100 Acres of Wildlife Refuge in South Texas*, Business Insider (July 26, 2019), https://bit.ly/3VDhvcr.

[41] Bevan Hurley, *Fire at SpaceX Launch Site Burns 68 Acres at Protected Refuge Killing Wildlife*, Independent (Sept. 11, 2022), https://bit.ly/3VAgnpY.

[42] *Id.*

[43] *Center for Biological Diversity v. FAA*, No. 23-1204 (D.D.C. May 1, 2023).

[44] 14 C.F.R. § 450.121(a); *see also id.* § 450.135.

down on resident and habitat as far away as Port Isabel, a town about six miles from the launchpad, and South Padre Island, a few miles up the coast from the site."[45] The EIS must accurately calculate the debris field for launch accidents, big or small.

More broadly, the EIS must conduct a full review of SpaceX's safety record, including OSHA citations, recordable and reportable injuries, and ascertain whether the Starship operations present legitimate and significant concerns.[46] The EIS should also assess the existing FAA licensing process to ensure that adequate controls and protections are included in any launch licenses to ensure that the above-described and similar incidents are not repeated and that all impacts are mitigated or prevented.

ENVIRONMENTAL IMPACTS

The EIS must evaluate the potential environmental harms from all phases of SpaceX's operations at LC-39A, from pre-launch activities through reentry and landing. This includes impacts to water quality, soils, air quality, and biological resources. In assessing these impacts, the EIS should not only consider each phase of a normal launch but also accidents that could occur during each mission phase.

6. The EIS must address potential water contamination.

The CWA prohibits the discharge of industrial wastewater from a "point source" without a National Pollutant Discharge Elimination System ("NPDES") permit. SpaceX's operations at LC-39A will generate large volumes of industrial wastewater and stormwater that will need to be treated and disposed consistent with the CWA.

For Starship launches at Boca Chica, SpaceX uses a deluge system to prevent damage to the launch pad.[47] That system is anticipated to use "up to approximately 1 million gallons of deluge water" during a launch.[48] Much of that deluge water volume is "expected to be vaporized by the heat of the rocket engines."[49] But the significant deluge

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[45] Kolodny, *supra* n.16.

[46] *See* 14 C.F.R. § 450.131(a)(2) ("[V]ehicle failure probability estimates must account for the outcomes *of all previous flights of the vehicle* or vehicle stage in a statistically valid manner.") (emphasis added).

[47] George Dvorsky, *SpaceX Tests Starship Water Deluge System That It Should've Built in the First Place*, Gizmodo (July 18, 2023), https://tinyurl.com/y9nf8msp.

[48] Fact Sheet at 6.

[49] Dvorsky, *supra* n.47.

water that remains is discharged as industrial wastewater into the area surrounding the launchpad.[50] SpaceX apparently anticipates using a similar system at the KSC.

The EIS must address the proposed deluge system infrastructure and related contaminants. The NOI indicates that SpaceX intends to construct "ponds" to handle deluge water and stormwater that is generated during operations.[51] It is not clear from the NOI whether these ponds will provide any treatment for the wastewater or whether treatment will occur elsewhere, if at all. The EIS must consider whether the ponds and other wastewater structures at KSC are capable of handling the maximum deluge water volume for anticipated events at LC-39A. The EIS must also evaluate the environmental impacts from constructing ponds that would be large enough to handle the immense volume of wastewater generated by operations at LC-39A. Additionally, the EIS should also address whether the ponds will be sufficiently lined to prevent leaching of contaminants into the groundwater. The ponds should also be capable of withstanding major rainfall and wind events so as to avoid overtopping and breaches.

If the non-vaporized deluge water is intended to be discharged to grade following treatment, the EIS must address the content, disposal location, frequency, infiltration rate, any impacts to groundwater and biological resources, and groundwater monitoring requirements. Alternatively, if the deluge water is intended to be treated at the KSC wastewater treatment plant, the EIS should evaluate the ability of the plant to handle SpaceX's additional pollutant concentration and volume and whether they will result in restrictions on other companies' use of the plant.

The EIS must ensure permits are in place for all expected wastewater and stormwater releases from planned construction activities and launch operations at LC-39A and that such permits ensure protection of the environment. This includes identifying contaminants of concern and potential impacts on water quality. In particular, the EIS must address construction dewatering relative to the existing long-term monitoring and land use controls associated with Solid Waste Management Unit C056, which includes multiple groundwater contamination plumes.

Finally, the EIS should consider whether SpaceX's operations can and will comply with state and federal water-quality regulations. In testing its deluge system at Boca Chica, SpaceX failed to apply for the necessary discharge permit from the Texas Commission on Environmental Quality, as required by the CWA.[52] More recently, environmental groups have notified SpaceX of their intent to sue the company for

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[50] Kolodny, supra n.37.

[51] 89 Fed. Reg. 40,527.

[52] *Id.*

violations of the CWA through the discharge of industrial wastewater as far as half a mile from the launch pad without necessary permits.[53]

7. The EIS must address the impacts from increased air emissions.

The Clean Air Act sets limits for pollutants harmful to human health and the environment, including nitrogen dioxide and particulate matter. SpaceX's operations at LC-39A would result in the release of toxic, harmful pollutants into the air before, during, and after launch. The EIS must assess the expected emissions from all phases of Starship's normal operations and probable accident scenarios. In particular, the EIS must quantify the magnitude of expected emissions and identify the affected areas, to include schools, hospitals and the elderly, along with environmental justice issues. This consideration must include pre-launch emissions (*e.g.*, from spills, transportation, or loading of propellant), launch and landing exhaust emissions, emissions from system failures or accidents, and emissions from any other process at the LC-39A.

8. The EIS must address noise, vibration, and sonic boom impacts.

One 2020 study prepared for SpaceX found that "Starship orbital launch events are *the single loudest* events of" all tested flight operations.[54] A recent static fire test in Boca Chica—at only 50% of total thrust—"produced far more noise than SpaceX projected," with "[i]ntensity readings three miles from the test site reach[ing] 110 decibels, the equivalent of standing next to a jackhammer."[55] The EIS must address the impacts of noise (plus vibrations and the potential sonic booms) at LC-39A and local communities, protected wildlife areas and tourism areas.

Specifically, the EIS must address the impacts of launches on any historical sites and structures. KSC and CCSFS are historic sites with nearly 50 properties and structures protected under the National Historic Preservation Act.[56] LC-39A is itself a historic district, having serviced 95 space missions.[57] The EIS must quantify and explain the impact of launch/return noise, vibration, and sonic boom on these historic facilities.

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[53] Andrea Guzmán, *South Texans Alert SpaceX of Plan to Sue Over Clean Water Act Violations*, Houston Chron. (June 6, 2024), https://tinyurl.com/3d26p4aj.

[54] KBR, *Starship Rocket Noise Assessment for Flight and Test Operations at the Boca Chica Launch Facility* at 3 (Dec. 2020), https://tinyurl.com/mryeevkc.

[55] Jack Daleo, *SpaceX Starship Grounded Indefinitely by FAA*, Flying (Apr. 26, 2023), https://bit.ly/3KDbGWc.

[56] NASA, *NASA-Owned Historic Properties and Districts, Kennedy Space Center* (2017), https://tinyurl.com/mrymfdrh.

[57] *Id.*

These are, of course, working historic sites, as rockets are regularly launched from these sites. But Starship poses unprecedented problems in light of the magnitude of the noise, vibration, and sonic boom, the frequency of launches, and the potential impact area. The EIS thus must consider this expanded area and increased potential impact.

The EIS must also quantify the impact of repeated, intense vibrations on non-historic facilities at KSC and CCSFS. This includes, for example, electrical substations, the regional wastewater treatment plant, Pump Station 7, and other launch sites, office areas, and storage/processing facilities. Likewise, the EIS must assess any impacts on individuals and businesses in the greater socioeconomic region, including, but not limited to, Port Canaveral, Merritt Island National Wildlife Refuge, Jetty Park, Kelly Park, City of Cape Canaveral, and City of Titusville. Here too, the EIS must consider how Starship's increased magnitude and frequency would pose increased risks to facilities on and off the KSC and CCSFS, including launch infrastructure of other launch service providers. To the extent that existing facilities and utilities were not constructed to withstand the anticipated impacts, the EIS should consider necessary limitations and remedial measures, including any modifications needed to existing facilities and utilities.

A cost-benefit analysis should be conducted to assess economic impacts on people and businesses in the greater socioeconomic area affected by the proposed action. This analysis should include consideration of the real estate, tourism, and agricultural sectors.

9. The EIS must conduct biological surveys for air, land and marine threatened and endangered species.

The Endangered Species Act protects the habitats of threatened and endangered species. KSC is located on Merritt Island and contains the Merritt Island National Wildlife Refuge and most of the Canaveral National Seashore.[58] KSC contains numerous habitats, "including coastal dunes, saltwater estuaries and marshes, freshwater impoundments, scrub, pine flatwoods, and hardwood hammocks."[59] This area is home to more than 1,500 plant and animal species, of which 33 animals and 39 plants are listened as threatened, endangered, or of special concern.[60]

Starbase, SpaceX's private launch facilities in Boca Chica, is also home to a wildlife reserve and a rich ecosystem. Both terrestrial and marine animals can be severely adversely affected by noise and sonic booms, especially from a rocket as large as

[58] *Natural Resources*, NASA, https://tinyurl.com/yt8689em.

[59] *Id.*

[60] *Id.*

Starship. For example, according to the U.S. Fish and Wildlife Service, "at least two species of plover have stopped or reduced nesting" near SpaceX's operations.[61]

The EIS must assess and ensure that SpaceX's operations will not threaten the rich biodiversity in the area. To that end, the EIS must conduct biological surveys for threatened and endangered species, including species prevalent around LC-39A, like the southeastern beach mouse, scrub jay, gopher tortoise, indigo snake, and manatee. In addition, impacts on the broader ecosystem, to include any related impacts to the agricultural industry, should also be assessed.

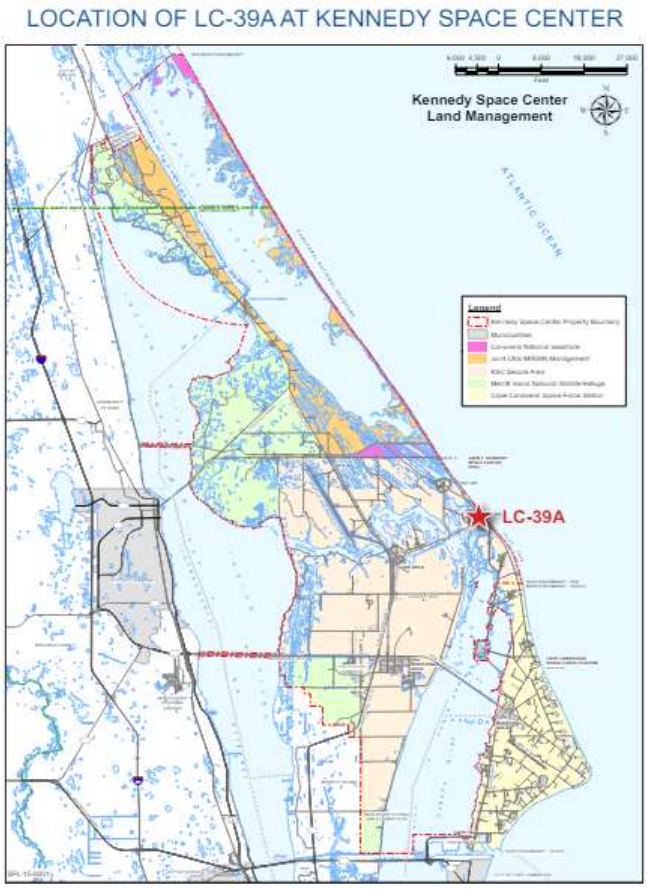
10. The EIS must consider harms from hazardous materials.

The Resource Conservation and Recovery Act regulates hazardous waste. Starship operations at KSC would involve numerous hazardous materials, ranging from paints to propellants, that would pose serious harms to humans and the environment. The EIS must consider the storage, use, and disposal of these materials and the potential impacts of any leaks or spills or disturbances of these existing materials. The EIS must also quantify the risk of potential health impacts and propose mitigation measures.

DISRUPTION TO LOCAL COMMUNITIES AND BUSINESSES

LC-39A sits in a bustling center for space operations. That center is surrounded by communities, including Cape Canaveral and Titusville, and important ecosystems, including the Merritt Island National Wildlife Refuge and the Canaveral National Seashore.

[61] *Fragile Boca Chica Ecosystem Endures the Impact of SpaceX Starship Launches*, Texas Public Radio (Apr. 18, 2023), https://bit.ly/3Rn56XE.



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The EIS must consider any disruptions to the health and safety of local communities and ecosystems, from both normal operations and any potential accidents. This includes impacts on traffic, economic and property harms to local businesses and individuals, and concerns about environmental justice. Impacts to public safety must also be addressed, including but not limited to, nearby schools, hospitals and other key public support infrastructure and services.

11. The EIS must assess any adverse impacts on vehicle traffic.

The EIS must consider any traffic impacts.[63] Merritt Island is home to numerous individuals and businesses, including the multitude of government employees and contract and private employees that work at KSC and CCSFS. The existing roadway

[62] *Fact Sheet* at 12.

[63] *See Environmental Assessment* at vii.

infrastructure is, in its current form, only marginally adequate for current businesses and residents.

The EIS must assess how SpaceX's proposed operations will affect traffic volume and patterns and how they will increase the frequency of heavy transport and other construction vehicles. This assessment must look at each phase of Starship operations, including the construction phase and launch and non-launch operations. As part of this assessment, the EIS should include a transportation study of existing and planned roadway corridors to ensure that public and other roadways have sufficient capacity and to identify any needed improvements, plus potential funding sources.

12. The EIS must assess any adverse impacts on maritime and air traffic.

The Port Canaveral, CCSFS, and KSC waterways accommodate significant commercial, recreational, and military maritime traffic. In fact, Port Canaveral is the second busiest cruise port in the world. SpaceX proposes to launch Starship over and land in busy waterways. The EIS must assess any adverse impacts to traffic on these waterways and the maritime industry from Starship's proposed launch and recovery operations. The EIS should also address the potential need to deliver Starship vehicle sections to KSC and CCSFS via maritime transportation.

The airspace above CCSFS and KSC likewise sees significant air traffic, much of it travelling to and from the nearby Orlando International Airport. The EIS must calculate the flight hazard area and address the expected duration of closures. The EIS must also estimate the anticipated disruption commercial, private, and government air traffic, including any possible closures of airports.[64]

13. The EIS must address impacts to local businesses and property owners.

The EIS must consider the risk and magnitude of potential personal injury, property damage, and economic harm from SpaceX's operations to nearby communities. This includes Port Canaveral, Merritt Island National Wildlife Refuge, Jetty Park, Kelly Park, City of Cape Canaveral, and City of Titusville, plus popular nearby tourist destinations, like Cocoa Beach.

SpaceX's operations at Boca Chica illustrate this need. Following the launch in April 2023 at Boca Chica, "people in Port Isabel reported broken windows in their businesses, shaking windows at their homes, and dust and particulate matter that

[64] *See Airspace Effects* at 16–20, *supra* n.1 (discussing these considerations in detail).

coated their homes, schools and land unexpectedly."[65] This launch occurred with a version of Starship that was significantly smaller than the version proposed for LC-39A. Launches are planned to occur much more regularly at LC-39A, exacerbating these reported impacts.

In assessing the potential for damages, the EIS should also include an assessment of the insurance that residents and businesses will need to sufficiently protect themselves. It should also evaluate potential effects on the insurance market, including any potential increases in premiums or decreases in coverage.

The FAA requires all license holders to provide evidence of sufficient funds—either in financial reserves, escrow, or insurance—equivalent to the "maximum probable loss" for licensed launch activities.[66] The EIS should consider whether these existing financial responsibility requirements are sufficient to protect third parties in case of damage from a Starship launch at LC-39A. In particular, the EIS needs to address if these requirements cover harms from normal launch operations or only accidents, and if the latter, should consider regulatory revisions to address the former. The EIS should also evaluate the various mechanisms of financial responsibility to determine the best form of financial protection or protections available to promptly process and pay third-party claims for bodily injury and property damage from Starship operations. In particular, the EIS should also assess whether certain forms of financial protection are necessary to address claims for business interruption or lost profits. The EIS should also evaluate SpaceX's claims and lien history to determine if it has a reliable and proven track record of promptly paying claims.

14. The EIS must address any environmental justice concerns.

The EIS must also consider any disparate impacts on disadvantaged and overburdened communities. Environmental justice has long been an important part of the EIS process, and Executive Order 14096 charges each federal agency with making environmental justice part of its mission.[67] In Boca Chica, the impacts of SpaceX's operations have been felt most keenly by the underprivileged. For example, construction and testing led to frequent closures of a free public beach frequented by lower-income individuals in the area.[68] And as SpaceX's ambitions for Starbase grew, a

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[65] Kolodny, *supra* n.16.

[66] 14 C.F.R. § 440.7.

[67] E.O. 14096, Revitalizing Our Nation's Commitment to Environmental Justice for All (Apr. 21, 2023).

[68] Olivia Solon, *Disgruntled Neighbors and Dwindling Shorebirds Jeopardize SpaceX Expansion*, NBC (Dec. 8, 2021), https://tinyurl.com/2m7brhmv.

real estate intermediary pressured residents of Boca Chica to sell their homes under threat of eminent domain, leaving some residents unable to purchase an equivalent home elsewhere.[69] The EIS must consider similar possibilities as a result of SpaceX's expanded operations at LC-39A.

The EIS must also assess the proposed operation's compliance with the Native American Graves Protection and Repatriation Act and the Archaeological Resources Protection Act, as Merritt Island served as the home of the Ais tribe.

DISRUPTION TO OTHER LAUNCH OPERATORS

Beyond the local community, the EIS must also consider potential impacts to other launch operators. KSC/CCSFS is a hub for space operations, and other entities have significant infrastructure and conduct launch operations near LC-39A. Specifically, NASA operates at Launch Complex 39B. ULA operates at Launch Complex 41 (LC-41), and Blue Origin operates at Launch Complex 36 (LC-36). In its prior EA, NASA noted the importance of "ascertain[ing] flight safety risks to KSC and CCSFS programs, facilities, personnel and operations."[70] In fact, ULA currently launches the majority of its National Security Space missions for the United States Space Force from LC-41, and Blue Origin is anticipated to launch such missions from LC-36. Numerous additional launch operators support government and commercial programs at other launch complexes between LC-41 and LC-36, all of whom would be affected by Starship operations at LC-39A.

The federal government must ensure, "to the maximum extent possible, that the United States has the capabilities necessary to launch and insert United States national security payloads into space whenever such payloads are needed in space."[71] The EIS must evaluate whether impacts from SpaceX's planned operations and the proposed launch cadence at LC-39A would obstruct assured access to space by harming other launch operators. This evaluation must include, among other things, potential damage to infrastructure used by other launch providers from Starship normal launch operations and launch accidents, demands on KSC and CCSFS infrastructure such as roadways and other support facilities, demands on commodities supporting the launch service industry, and current Launch Range practices governing launch support, launch safety, and management of launch manifesting, among other things.

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[69] *Id.*

[70] *Environmental Assessment* at iii.

[71] 10 U.S.C. § 2273(a).

Competition is essential in this "second-generation space race."[72] Government space operations have long "been limited by budgetary conflicts, differing priorities and changing administrations."[73] Commercial space companies like ULA have taken up the mantle, making important technological advancements that make space access easier and more cost-effective. But as in any race, competition is key to pushing that progress farther and faster. The EIS must keep this competition in mind in ensuring that any Starship operations at KSC will not cause property damage or economic harm to other launch operators.

15. The EIS must assess the additional demands on the existing infrastructure used by other launch operators and potential adverse impacts on other launch range users, including physical damage to infrastructure and vehicles and disruptions to business operations.

The infrastructure at KSC and CCSFS already serves numerous other operators, and the EIS must consider the additional strain that SpaceX's Starship operations will put on that infrastructure. For example, if SpaceX intends to use gaseous helium and nitrogen from the existing infrastructure, the EIS must evaluate SpaceX's expected demand, assess the current system capacity, and identify any restrictions on SpaceX or other launch operators. Likewise, the EIS must consider the existing wastewater treatment infrastructure and address any restrictions on use. And the EIS must consider access to other commodities necessary for launch operations.

The EIS must consider potential physical and economic harms to other launch operators from Starship's normal operations and any potential accidents. SpaceX proposes up to 44 launches a year at LC-39A, which will result in significant airspace and ground closures, result in acoustic impacts felt at nearby operations, and potentially produce debris, particulates, and property damage. Combined with operations at SLC-37, SpaceX would have up to 88 Starship launches and landings within a six-mile radius annually.

KSC and CCSFS already experience significant traffic congestion due to road closures, slow-moving oversized load convoys, and other restrictions associated with current operations. This congestion negatively impacts nearby operations, preventing equipment, supplies, and employees from efficiently travelling to and from launch sites. The EIS must assess how SpaceX's additional proposed operations will affect traffic and road closures relevant to other launch operations. And, to the extent that critical roads

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[72] Michael Peregrine, *How Entrepreneurs Are Leading the New Space Race*, Forbes (Sept. 13, 2023), https://tinyurl.com/29xhn9c7.

[73] *Id.*

must be closed during Starship launch operations, the EIS must identify potential bypass routes.

Heavy construction is expected if SpaceX builds its infrastructure and prepares for Starship operations. The EIS must assess the impact of this construction on nearby launch operations. As part of that, the EIS must address construction site security, including offsite/adjacent lay-down, staging, fabrication, and parking facilities.

The EIS must also provide estimated clear zones and durations associated with static tests, launches, and landings. And, because emergency services must be on site for all launches, the EIS must address the provision and scheduling of emergency services at various launch sites in the area.

The EIS must also consider potential physical damage to other operators' infrastructure and vehicles. Starship causes the largest acoustic impacts of any launch vehicle in flight today, and impacts will be greater for the larger version proposed for LC-39A. That noise can harm personnel of other operators, and vibrations and sonic booms would damage launch vehicles, ground support equipment and structures. As the largest rocket in existence, an accident would inflict serious or even catastrophic damage, while normal launch operations would have a cumulative impact on structures, launch vehicle hardware, and other critical launch support equipment. For example, the event in April 2023 scattered debris up to six miles away. ULA conducts its launch operations a mere three miles from LC-39A, and numerous other companies operate within six miles. If a similar accident occurs again, that debris would reach ULA's operations and could hurt people or damage property. And with the increased liftoff thrust planned for Starship, the debris from a similar launch failure could reach larger, populated areas surrounding KSC.[74]

These concerns are not ULA's alone. In 2022, NASA officials "told SpaceX that a Starship explosion at Launch Complex 39A could effectively cut off the space agency's sole means of launching U.S. astronauts to the International Space Station."[75] In light of these serious concerns, the EIS must establish stringent health and safety measures to ensure that any Starship launches from LC-39A minimize the risk of launch accidents and other adverse impacts to neighboring commercial and government operators, including impacts from "normal" launch operations.

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[74] Indeed, debris from a 2021 SpaceX launch from KSC landed in central Washington State. *See* Hanneke Weitering, *Debris from SpaceX Rocket Launch Falls on Farm in Central Washington*, Space.com (April 3, 2021), https://tinyurl.com/2p9c4mvd.

[75] Joey Roulette, *SpaceX Faces NASA Hurdle for Starship Backup Launch Pad*, Reuters (June 13, 2022), https://tinyurl.com/5duj4ckv.

16. The EIS must consider adverse impacts to the United States's policy for assured access to space.

Federal policy mandates that "the United States ha[ve] the capabilities necessary to launch . . . national security payloads into space whenever such payloads are needed in space."[76] This is called "assured access to space." Assured access requires, "at a minimum," ensuring "the availability of at least two space launch vehicles . . . capable of delivering into space any . . . national security payload."[77] It also requires "a robust space launch infrastructure and industrial base," plus "rapid, responsive, and reliable space launches" that "maintain risks of mission success at acceptable levels."[78]

Between LC-39A and SLC-37, the frequency of SpaceX's launch schedule would not only interrupt the other operators' launch commitments and contractual obligations, but its launch cadence could jeopardize assured access to space by conflicting with the launch windows for other operators that carry national security payloads or worse, result in significant or catastrophic damage to launch infrastructure that is used to support national security space missions.

To that end, the EIS must address launch cadence, scheduling, and overall range management practices, the potential for damage to other launch infrastructures, and potential impacts on current launch provider missions. To accommodate this launch volume, the FAA and other agencies will have to ensure a fair and adequate scheduling process. In particular, the EIS should consider whether existing processes are adequate to account for projected increases in launches by all current and any future providers. If not, the EIS should consider modifications, such as allowing increased insight into and participation in manifest review.

The EIS must also consider the assured-access requirements, including "maintain[ing] risks of mission success at acceptable levels" and "lower[ing] the costs of launching a national security space system."[79] Specifically, the EIS must consider how SpaceX's operations would adversely impact the government's ability to demonstrate assured access at all times through continued utilization of other critical launch service providers by maintaining all capabilities necessary for the performance of these critical missions.

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[76] 10 U.S.C. § 2273(a).

[77] *Id.* § 2273(b)(1).

[78] *Id.* § 2273(b)(3)(C).

[79] 10 U.S.C. § 2273(b)(3)(B)–(C).

REASONABLE ALTERNATIVES

17. A reasonable alternative already exists.

The Notice of Intent indicated that the EIS will consider only two options: the full proposed scope of operations at LC-39A or no operations at all. However, SpaceX has developed Starbase in Boca Chica for the purpose of launching Starship, and it currently conducts all tests and launches from that location. Notably, SpaceX is the sole launch operator in that area, which avoids interference and risk to other launch operators and minimizes airspace interference with commercial air traffic. The FAA must consider Boca Chica as another reasonable alternative to the proposed action.

ULA offers these important issues for the FAA and its partner agencies to consider in drafting the EIS and evaluating SpaceX's launch application for Starship at LC-39A. ULA welcomes competition in the space race, but this competition must be in line with important safety, health, and environmental standards. ULA looks forward to reviewing and commenting on the draft EIS.

Respectfully submitted,

United Launch Alliance, LLC
United Launch Services, LLC