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 Federal Aviation Administration
 Southwest Regional Office
 Obstruction Evaluation Group
 10101 Hillwood Parkway
 Fort Worth, TX 76177

Aeronautical Study No.
 2024-AWP-241-OE

Issued Date: 11/18/2024

Austin Shafer
 Relativity Space
 3500 E Burnett St.
 Long Beach, CA 90815

**** DETERMINATION OF NO HAZARD TO AIR NAVIGATION ****

The Federal Aviation Administration has conducted an aeronautical study under the provisions of 49 U.S.C., Section 44718 and if applicable Title 14 of the Code of Federal Regulations, part 77, concerning:

Structure:	Relativity Space Test Stand
Location:	Long Beach, CA
Latitude:	33-49-01.81N NAD 83
Longitude:	118-09-38.53W
Heights:	49 feet site elevation (SE)
	161 feet above ground level (AGL)
	210 feet above mean sea level (AMSL)

This aeronautical study revealed that the structure would have no substantial adverse effect on the safe and efficient utilization of the navigable airspace by aircraft or on the operation of air navigation facilities. Therefore, pursuant to the authority delegated to me, it is hereby determined that the structure would not be a hazard to air navigation provided the following condition(s) is(are) met:

As a condition to this Determination, the structure is to be marked/lighted in accordance with FAA Advisory circular 70/7460-1 M Change 1, Obstruction Marking and Lighting, paint/red lights-Chapters 3(Marked),4,5(Red),&15.

Any failure or malfunction that lasts more than thirty (30) minutes and affects a top light or flashing obstruction light, regardless of its position, should be reported immediately to (877) 487-6867 so a Notice to Air Missions (NOTAM) can be issued. As soon as the normal operation is restored, notify the same number.

It is required that FAA Form 7460-2, Notice of Actual Construction or Alteration, be e-filed any time the project is abandoned or:

- At least 10 days prior to start of construction (7460-2, Part 1)
- Within 5 days after the construction reaches its greatest height (7460-2, Part 2)

See attachment for additional condition(s) or information.

Any height exceeding 161 feet above ground level (210 feet above mean sea level), will result in a substantial adverse effect and would warrant a Determination of Hazard to Air Navigation.

This determination expires on 05/18/2026 unless:

- (a) the construction is started (not necessarily completed) and FAA Form 7460-2, Notice of Actual Construction or Alteration, is received by this office.
- (b) extended, revised, or terminated by the issuing office.
- (c) the construction is subject to the licensing authority of the Federal Communications Commission (FCC) and an application for a construction permit has been filed, as required by the FCC, within 6 months of the date of this determination. In such case, the determination expires on the date prescribed by the FCC for completion of construction, or the date the FCC denies the application.

NOTE: REQUEST FOR EXTENSION OF THE EFFECTIVE PERIOD OF THIS DETERMINATION MUST BE E-FILED AT LEAST 15 DAYS PRIOR TO THE EXPIRATION DATE. AFTER RE-EVALUATION OF CURRENT OPERATIONS IN THE AREA OF THE STRUCTURE TO DETERMINE THAT NO SIGNIFICANT AERONAUTICAL CHANGES HAVE OCCURRED, YOUR DETERMINATION MAY BE ELIGIBLE FOR ONE EXTENSION OF THE EFFECTIVE PERIOD.

This determination is subject to review if an interested party files a petition that is received by the FAA on or before December 18, 2024. In the event an interested party files a petition for review, it must contain a full statement of the basis upon which the petition is made. Petitions can be submitted to the Manager, Rules and Regulations Group via email at OEPetitions@faa.gov, or via mail to Federal Aviation Administration, Air Traffic Organization, Rules and Regulations Group, 5th floor, 600 Independence Ave, SW., Washington, DC 20597. FAA encourages the use of email to ensure timely processing.

This determination becomes final on December 28, 2024 unless a petition is timely filed. In which case, this determination will not become final pending disposition of the petition. Interested parties will be notified of the grant of any review. Any questions regarding your petition, contact Rules and Regulations Group via telephone (202) 267-8783.

This determination is based, in part, on the foregoing description which includes specific coordinates, heights, frequency(ies) and power. Any changes in coordinates, heights and frequencies or use of greater power, except those frequencies specified in the Colo Void Clause Coalition; Antenna System Co-Location; Voluntary Best Practices, will void this determination. Any future construction or alteration, including increase to heights, power or the addition of other transmitters, requires separate notice to the FAA. This determination includes all previously filed frequencies and power for this structure.

If construction or alteration is dismantled or destroyed, you must submit notice to the FAA within 5 days after the construction or alteration is dismantled or destroyed.

This determination does include temporary construction equipment such as cranes, derricks, etc., which may be used during actual construction of the structure. However, this equipment shall not exceed the overall heights as indicated above. Equipment which has a height greater than the studied structure requires separate notice to the FAA.

This determination concerns the effect of this structure on the safe and efficient use of navigable airspace by aircraft and does not relieve the sponsor of compliance responsibilities relating to any law, ordinance, or regulation of any Federal, State, or local government body.

This aeronautical study considered and analyzed the impact on existing and proposed arrival, departure, and en route procedures for aircraft operating under both visual flight rules and instrument flight rules; the impact on all existing and planned public-use airports, military airports and aeronautical facilities; and the cumulative impact resulting from the studied structure when combined with the impact of other existing or proposed structures. The study disclosed that the described structure would have no substantial adverse effect on air navigation.

An account of the study findings, aeronautical objections received by the FAA during the study (if any), and the basis for the FAA's decision in this matter can be found on the following page(s).

If we can be of further assistance, please contact Kelly Nelson, at (404) 305-6430, or kelly.r.nelson@faa.gov. On any future correspondence concerning this matter, please refer to Aeronautical Study Number 2024-AWP-241-OE.

Signature Control No: 608859144-639383515

(DNH)

Julie A. Morgan

Manager, Obstruction Evaluation Group

Attachment(s)

Additional Information

Map(s)

Additional information for ASN 2024-AWP-241-OE

A full list of acronyms and abbreviations is available at the FAA's public website at https://oeaaa.faa.gov/oeaaa/downloads/external/content/FAA_Acronyms.pdf.

1. LOCATION OF PROPOSED CONSTRUCTION

The proposed rocket test stand, consisting of four (4) aeronautical study numbers (2024-AWP-238-OE through 2024-AWP-241-OE), would be located between .19 and .20 Nautical Miles (NM) north of the Long Beach / Daugherty Field (LGB), Long Beach, CA, Runway (RWY) 08R landing threshold. The proposals were initially filed at 200 ft. AGL / 249 ft. AMSL, but due to the traffic pattern and Part 77 horizontal surface impacts, the sponsor has agreed to lower the height of the structure to 161 ft. AGL / 210 ft. AMSL to mitigate those impacts.

Each of the four proposed structure points has been studied separately under the following aeronautical study numbers:

2024-AWP-238-OE: 33-49-01.40N / 118-09-37.59W / 161 ft. above ground level (AGL) / 210 ft. above mean sea level (AMSL)

2024-AWP-239-OE: 33-49-01.40N / 118-09-38.53W / 161 ft. AGL / 210 ft. AMSL

2024-AWP-240-OE: 33-49-01.81N / 118-09-37.59W / 161 ft. AGL / 210 ft. AMSL

2024-AWP-241-OE: 33-49-01.81N / 118-09-38.53W / 161 ft. AGL / 210 ft. AMSL

A separate determination will be issued for each individual case.

2. OBSTRUCTION STANDARDS EXCEEDED

The proposed rocket test stand project has been identified as an obstruction under the standards of Title 14, Code of Federal Regulations (CFR), Part 77, as applied to LGB as follows:

Section 77.19 (e): Transitional Surface. These surfaces extend outward and upward at right angles to the runway centerline and the runway centerline extended at a slope of 7 to 1 from the sides of the primary surface and from the sides of the approach surfaces. The proposal would exceed the runway (RWY) 08R/26L Transitional Surface by the following:

2024-AWP-238-OE: 30 ft.

2024-AWP-239-OE: 30 ft.

2024-AWP-240-OE: 24 ft.

2024-AWP-241-OE: 24 ft.

3. EFFECT ON AERONAUTICAL OPERATIONS

Aeronautical study disclosed that the proposal would have no effects on existing or proposed arrival, departure, or en route instrument flight rule (IFR) operations, minimum flight altitudes, minimum vectoring altitudes (MVA), aeronautical procedures, or aeronautical facilities at LGB or at any other known public use or military airport. Information on the proposals shall be forwarded for appropriate aeronautical charting.

4. CIRCULARIZATION AND COMMENTS RECEIVED

In order to facilitate the public comment process, the studies were circularized under 2024-AWP-238-OE on February 29th, 2024, to all known aviation interests and to non-aeronautical interests that may be affected by the proposals. Nine responses were received as a result of the circularization. The comments are summarized below.

Comment 1: There were several comments with regards to noise impacts that the proposed structure may contribute to. The city of Lakewood indicated a concern that the Sky Knight law enforcement helicopter would be forced to turn crosswind west of Cherry Road and over noise-sensitive residential areas at night, contributing to more noise impacts. National Air Transportation Association (NATA), Aircraft Owners and Pilots Association (AOPA), National Business Aviation Association (NBAA), Vertical Aviation International (VAI), and the Southern California Airspace Users Working Group (SCAUWG) commented that the placement of the proposal will likely result in increased off-airport noise.

Response: Environmental concerns, such as noise, are beyond the scope of Title 14 CFR Part 77.

Comment 2: A comment suggested the proposed structure would impact the VOR approach procedure for runway 30 and the RNAV (RNP) procedure for runway 26R could be impacted.

Response: Aeronautical study identified no IFR impacts for any existing or proposed procedures.

Comment 3: This comment indicates that at a height of 200 ft AGL, there would be negative impacts to the airborne law enforcements helicopter pad, located 700 ft south of the proposed tower. Their departure route is typically direct west to gain altitude and then turn back east bound to intercept the North Downey departure route. The proposed structure would force them to fly further west over neighborhoods to gain the necessary altitude to fly back over the obstacle to intercept the departure route.

Response: The special maneuvering characteristics of helicopters are recognized in 14 CFR Part 91, Sections 91.119 and 91.155, provided operations are conducted without hazard to persons or property on the ground. Helicopter pilots must also operate at a speed that will allow them to see and avoid obstructions. Consequently, proposed structures are not considered factors in determining adverse effect upon helicopter VFR operations with the exception of structures that penetrate an established/published helicopter route or would exceed heliport imaginary surfaces. Review of the helicopter procedures outlined in the letter of agreement between LGB Airport Traffic Control Tower (ATCT) and local helicopter operators, as well as historic helicopter flight path data, gave no indication that helicopters would need to extend their traffic patterns any further to the west than they currently operate.

Comment 4: The proposed structure will impact Air Traffic Controls line of sight (LOS) of all aircraft. A local flight school owner and flight instructor indicated that the proposal would obscure the vision of air traffic control from the control tower and other operating aircraft.

Response: At the reduced height of 161 ft AGL / 210 ft AMSL, there may be a momentary, approximately two (2) second blockage of aircraft on half-mile final approach to RWY 8L, which does not constitute a substantial adverse effect as per FAAO 7400.2P, Procedures for Handling Airspace Matters, para 6-3-5.

Comment 5: Several comments from NATA, AOPA, NBAA, SCAUWG and VAI were received expressing concern over whether marking and lighting of the structure would be required.

Response: The proposed structure will be required to be properly marked and lighted in accordance with FAA Advisory Circular (AC) 70/7460-1M, Obstruction Marking and Lighting.

Comment 6: The Long Beach airport requested that the FAA ATO conduct a safety risk assessment.

Response: A safety risk assessment doesn't fall under the scope of Title 14 CFR Part 77 and is coordinated independently by the local air traffic facility, if required.

Comment 7: Several organizations expressed concerns with the proposed structure's location due to the potential change in helicopter routes and future electric vertical takeoff and landing (eVTOL) aircraft. An organization expressed concerns that the proposed structure would be in the flight path, and it needs careful assessment. NATA, AOPA, NBAA, SCAUWG and VAI indicated that the proposal may impact future eVTOL flight operations.

Response: The aeronautical study evaluated the proposed rocket test stand with regard to all helicopter procedures published in the letter of agreement between LGB ATCT and helicopter operators based at LGB. It indicated no impact to any current or proposed VFR arrival or departure procedures.

Comment 8: A comment indicated concern that the obstacle databases, including GPWS, EGPWS, and TAWS will not be updated to include the proposed structure until a later date, which could create a hazardous situation for aircraft.

Response: The airport has the ability to use the ATIS, temporary NOTAMS, or traffic advisories to let all pilots know of the location and height of the structure. Additionally, the structure will be required to be marked and lighted for increased pilot awareness during the time where these systems are not updated with the proposed structure.

Comment 9: Several comments indicated that the dimensions of the proposed tower posed a collision hazard.

Response: Aeronautical study of the proposed structure at the submitted coordinates and height determined that there would be no substantial impact to air traffic at the negotiated height of 161 ft AGL.

Comment 10: A local pilot and president of the Redlands Airport Association expressed concerns over the structure's close proximity to RWY 26L and 26R. With so many helicopters and student pilots operating at LGB and visibility degradation due to weather, the location is a concern.

Response: The structure will be marked and lighted in accordance with AC 70/7460-1M to increase pilot awareness and conspicuity. The aeronautical study did not identify any impacts to VFR or IFR procedures for runway 26R or 26L.

Comment 11: A helicopter company expressed concern with the location of the proposed tower. They indicate that the location would be hazardous to helicopter routes, helicopter traffic patterns, helicopters holding over the hangar west of the proposed structure and possible transient traffic landing at LGB.

Response: The special maneuvering characteristics of helicopters are recognized in 14 CFR Part 91, Sections 91.119 and 91.155, provided operations are conducted without hazard to persons or property on the ground. Helicopter pilots must also operate at a speed that will allow them to see and avoid obstructions. Consequently, proposed structures are not considered factors in determining adverse effect upon helicopter VFR operations with the exception of structures that penetrate an established/published helicopter route or would exceed heliport imaginary surfaces. In addition, the tower will be marked and lighted as per the current circular to ensure transient pilot conspicuity. Review of the helicopter procedures outlined in the letter of agreement between LGB Airport Traffic Control Tower (ATCT) and local helicopter operators, as well as historic helicopter flight path data, gave no indication that the rocket test stand would pose a hazard to aircraft operating on standard arrival and departure routes and in the traffic pattern, holding over the Relativity Space hangar, or conducting takeoff and landing operations.

Comment 12: A local flight school owner and flight instructor indicated that the proposal would displace the helicopter pattern and encroach upon the fixed-wing aircraft traffic pattern and surrounding neighborhoods.

Response: The proposal is inside of the traffic pattern. After a thorough review of the aircraft flight tracks at LGB, very few aircraft overflew the area of the proposal and there does not indicate to be a significant number of aircraft or helicopters that would need to adjust their flight paths if the proposal was to be built.

Comment 13: The proposal would use a large amount of water, would be loud and pose a potential hazard by pressuring a metal tube.

Response: Environmental concerns, such as noise, are beyond the scope of Title 14 CFR Part 77.

Comment 14: The VAI indicated that the construction of this proposal could lead to further construction of tall structures within the Airport Influence Area.

Response: Each future proposed structure will be evaluated individually as per Part 77 guidelines.

Comment 15: The NATA, AOPA, NBAA, SCAUWG and VAI share concerns about the impacts on the emergency procedures at LGB and the collision hazard that the proposal may create based on the airport geometry.

Response: Emergency procedures at LGB are created by the airport to evaluate, promote, assure and enhance safety. Aeronautical study of the proposed structure at the submitted coordinates and height determined that there would be no substantial impact to air traffic at the negotiated height of 161 ft AGL.

5. DETERMINATION - NO HAZARD TO AIR NAVIGATION. It is determined that the proposal would not have a substantial adverse effect on the safe and efficient utilization of the navigable airspace by aircraft or on any air navigation facility and would not be a hazard to air navigation as long as all conditions written within this determination are met.

6. BASIS FOR DECISION

Study for possible visual flight rules (VFR) effect disclosed the proposal would exceed section 77.19 (e) transitional surface, as noted above; but would have no greater effect on any existing or proposed arrival or departure VFR operations or procedures when compared to either existing terrain or other existing obstructions in proximity to the proposal. The proposal would not conflict with any airspace required to conduct normal VFR traffic pattern and/or visual approach operations at LGB or at any other public-use, joint-use, or military airport. Therefore, at the heights listed above, the proposed structure would have no substantial adverse effects on any existing or proposed VFR arrival, VFR departure, en route, minimum flight altitudes, or VFR helicopter routes in the vicinity of this location.

The cumulative impact of the proposal, when combined with other proposed and existing structures, is not considered to be significant. Study did not disclose any adverse effects on existing or proposed public-use or military airports or navigational facilities, nor do the proposals affect the capacity of any known existing or planned public-use or military airport.

7. CONDITIONS

The proposed structure should be appropriately marked/lighted with red lights and paint, in accordance with FAA AC 70/7460-1, to make it more conspicuous to airmen.

