

**DEPARTMENT OF TRANSPORTATION****Federal Aviation Administration****Commercial Space Transportation;  
Waiver of Liquid Propellant Storage  
and Handling Requirements for  
Operation of a Launch Site at the  
Mojave Airport in CA**

**AGENCY:** Federal Aviation Administration (FAA), DOT.

**ACTION:** Notice of waiver.

**SUMMARY:** The FAA has determined to waive the liquid propellant storage and handling requirements of 14 CFR part 420 for East Kern Airport District's operation of a launch site at Mojave, California, under a license issued by the FAA on June 17, 2004. The FAA finds that waiving the liquid propellant storage and handling requirements is in the public interest and will not jeopardize public health and safety, safety of property, and national security and foreign policy interests of the United States.

**FOR FURTHER INFORMATION CONTACT:** Carole Flores, Manager, Licensing and Safety Division, Office of the Associate Administrator for Commercial Space Transportation, Federal Aviation Administration, U.S. Department of Transportation, 800 Independence Avenue, SW., Washington, DC 20591, (202) 385-4701.

**SUPPLEMENTARY INFORMATION:****Background**

The Federal Aviation Administration (FAA) licenses the launch of a launch vehicle, reentry of a reentry vehicle, and operation of a launch or reentry site under authority granted to the Secretary of Transportation in the Commercial Space Launch Act of 1984, as amended (CSLA), codified in 49 U.S.C. Subtitle IX, chapter 701, and delegated to the FAA Administrator. Licensing authority under the CSLA is carried out by the Associate Administrator for Commercial Space Transportation.

The CSLA allows the FAA to waive a requirement for an individual license applicant if the Administrator decides that the waiver is in the public interest and will not jeopardize public health and safety, safety of property, and national security and foreign policy interests of the United States (see 49 U.S.C. 70105(b)(3)).

On June 17, 2004, the FAA issued a launch site operator license authorizing East Kern Airport District (EKAD) to operate a launch site at Mojave Airport in Mojave, California. The license, issued in accordance with licensing requirements under 14 CFR part 420, is

valid for five years. The license authorizes EKAD to operate a launch site at Mojave Airport in support of suborbital Reusable Launch Vehicle (RLV) missions authorized by an FAA license to take-off at Mojave Airport. EKAD is responsible for ensuring the safe operation of the Mojave Airport launch site and for ensuring that public safety and safety of property are protected at all times during licensed site activities.

EKAD's application for a launch site operator license had several unique attributes relevant to public safety and explosive siting. For example, EKAD's application was the first to propose support of RLV launches, exclusively. Also, EKAD's proposed explosive site plan did not comply with the liquid propellant storage and handling requirements of 14 CFR part 420. Specifically, EKAD's proposed explosive site plan included separation distances between an explosive hazard facility and the public that violated the requirements of 14 CFR 420.67 for storage and handling of liquid oxygen and hydrocarbon fuels.

The explosive siting requirements for liquid propellant in 14 CFR 420.67 address how the explosive equivalent, as defined in 14 CFR 420.5, should be determined based on various conditions principally related to the quantities of energetic liquids present. The explosive equivalent for energetic liquids depends on the quantity of fuel and oxidizer that are mixed. Therefore, a principal objective of an explosive site plan is to provide safeguards that prevent the mixing of incompatible energetic liquids. Physical separation is the preferred method to safeguard against mixing of stored energetic liquids. For operations that present an unavoidable potential for mixing of incompatible energetic liquids, such as static test firings of engines, the requirements in 14 CFR 420.67 prescribe minimum separation distances between the explosive hazard facility and the public. EKAD's proposed explosive site plan did not comply with the minimum separation distances prescribed in 14 CFR 420.67.

The explosive site plan requirements of 14 CFR part 420, issued in October of 2000, captured the state of knowledge of explosives safety at launch sites and were intended to provide for public safety and the safety of property. The requirements for storage and handling of liquid propellants in 14 CFR 420.67 are prescriptive in nature, and based on previous Department of Defense (DoD) standards that were developed by the Department of Defense Explosives Safety Board (DDESB) from experience

gained with sites supporting launches of expendable launch vehicles. While launch sites supporting RLV missions are covered by part 420, as evidenced by the explicit location review requirements for RLVs in § 420.23(d), the explosive site plan requirements of part 420 did not take into account differences in explosive hazards associated with RLVs that take off from a runway from those associated with vehicles that lift-off vertically, with explosive thrust, from a launch pad. No performance standards were available for explosive site plans when part 420 was published, nor did the FAA establish one in promulgating the part 420 regulations. The state of knowledge of explosive safety and DoD standards continued to evolve since the issuance by the FAA of part 420, especially in the area of energetic liquids used for launch. Specifically, the DoD has revised its requirements regarding: (1) the minimum separation distances between the public and storage sites for energetic liquids involved with launch operations and (2) the minimum separation distances between the public and sites where the explosive equivalent is less than 450 pounds.

The supplementary information accompanying issuance of part 420 discusses "Future Change in Liquid Propellant Requirements" and acknowledges the following:

1. "A number of possible irregularities and inconsistencies have been identified in the current approach to siting liquid propellants."

2. "Because the DDESB is possibly the best equipped group in the country to address these issues, the FAA will carefully consider its recommendations."

3. "DoD Standard 6055.9 is perhaps the best example of a standard governing many more explosive safety issues than those addressed to date in this part."

(See 65 FR 62819, issued October 19, 2000.)

In the part 420 rulemaking, the FAA acknowledged that (1) the rule's approach to siting liquid propellants was not perfect, (2) the DDESB is a highly credible group, and (3) its Ammunition and Explosives Safety Standards, DoD 6055.9-STD, August 11, 1997, the source of part 420 explosive siting requirements, is a more comprehensive standard than part 420.

The FAA has monitored the continuing evolution of liquid propellant siting requirements in DoD 6055.9-STD. The FAA maintains that public safety is provided by using an explosive site plan that complies with the current requirements of DoD

6055.9-STD. The DDESB's most current requirements are in the "Rewrite DoD 6055.9-STD, Revisions 4 and 5, Jan 2004," which is referred to herein as DoD 6055.9-STD, Rev 4.5. According to the DDESB website, this latest version of DoD 6055.9-STD "is the version of the Standard that is being maintained by the Secretariat of the DDESB, and that is kept current as the DDESB approves criteria changes." (See <http://www.ddesb.pentagon.mil/documents.html>.) Although the DoD has not formally adopted this latest version of 6055.9-STD, the Chairman of the DDESB instructed the DDESB Secretariat to "begin using the 're-write' version of the DoD 6055.9-STD (latest revision), when conducting surveys, reviews of site plans, and the work of the Board" in a memorandum dated 26 August 2003, Subject: Department of Defense Explosives Safety Board (DDESB) Secretariat's Working Copy of DoD 6055.9-STD. This memorandum is also available at the DDESB Web site.

Paragraph C9.5.6 of 6055.9-STD, Rev 4.5 provides insight into the applicability of the DoD 6055.9-STD "Quantity-Distance" (QD) standards to a launch site from which RLVs takeoff and land using runways, as opposed to lifting off from a launch pad. It provides:

Paragraph C9.5.6. QD standards. Since many energetic liquids are not classified as UN Class 1 explosives, conventional QD storage criteria do not generally apply to these materials. At the same time, the (non-Class 1) UN transportation hazard classifications for many energetic liquids appear to be inappropriate and/or inadequate for application to storage safety (based on available accident and test data). For example, hydrazine has a UN hazard classification of 8 (corrosive), while it also is subject to dangerous fire and explosive behavior. Thus, the implementation of QD criteria for energetic liquids is based on an independent determination of the predominant hazard presented by the material in the storage environment. The following standards are applicable to energetic liquids used for propulsion or operation of missiles, rockets, and other related devices.

Accordingly, the energetic liquids standards presented in 6055.9-STD, Rev 4.5, apply to energetic liquids used for propulsion or operation of missiles, rockets, and other related devices, including those RLVs that are authorized to use Mojave Airport as a launch site. The FAA has determined that 6055.9-STD, Rev 4.5 provides an acceptable level of public safety for energetic liquids to be stored and handled at the EKAD launch site.

Subparagraphs C9.5.5.6 through C9.5.5.6.12, of DoD 6055.9-STD, Rev

4.5, acknowledge that "the predominant hazard of the individual energetic liquids can vary depending upon the location of the energetic liquid storage and the operations involved." A list of various energetic liquid storage and handling operations in decreasing order of hazard: launch pads,<sup>1</sup> static test stands,<sup>2</sup> ready storage, cold flow test operations, bulk storage, rest storage, run tankage, and pipelines is also provided. Horizontal takeoff RLV operations are not on this list. Although RLVs were considered during the promulgation of part 420, as evidenced by the location review requirements for RLVs in § 420.23(d), the explosive site plan requirements of part 420 were taken from standards that were developed from experience gained with sites supporting vertical lift-off from a launch pad.

The FAA has assessed the nature and hazards of the proposed operations to be conducted at the Mojave Airport launch site in support of horizontal takeoff RLVs. The FAA considers that operations involving energetic liquids in support of certain RLVs, conducted under the conditions specified below, will produce explosive hazards more akin to static test stands than launch pads. Specifically, the FAA considers that, under certain conditions, the explosive equivalent estimated for ground operations involving horizontal takeoff RLVs may safely exclude the energetic liquid contained in the run tanks.<sup>3</sup> The FAA also considers that the standards of DoD 6055.9-STD, Rev 4.5, will achieve the public safety goal of part 420 while allowing less separation distance between explosive substances. For example, whereas part 420 would require 130 feet between the proposed liquid oxygen storage location and the public at the Mojave Airport launch site, use of DoD 6055.9-STD, Rev 4.5, allows for a separation distance of 1,000 feet.

Therefore, the FAA finds that public safety and the safety of property will not be jeopardized by allowing use of revised standards issued in DoD 6055.9-STD, Rev 4.5, for storage and handling of liquid propellants at EKAD.

<sup>1</sup> Paragraph C.9.5.5.6.1 states that launch pad operations "are very hazardous because of the proximity of fuel and oxidizer to each other, the frequency of launchings, lack of restraint of the vehicle after liftoff, and the possibility of fallback with resultant dynamic mixing on impact."

<sup>2</sup> Paragraph C.9.5.5.6.2 states that static test stand operations "are less hazardous because test items are restrained and subject to better control than launch vehicles. As with launch pads, the proximity of fuel and oxidizer presents a significant hazard."

<sup>3</sup> The run tanks consist of the tank and other containers and associated piping used to hold the energetic liquids for direct feeding into the engine or device during operation.

Accordingly, the FAA has determined that it is in the public interest to waive compliance with EKAD with 14 CFR 420.67, subject to compliance by EKAD with the following conditions:

A. In place of compliance with 14 CFR 420.67, EKAD is required to submit a revised explosive site plan (referred to herein as "the plan") that complies with all applicable requirements of "Rewrite DoD 6055.9-STD Rev 4.5, Jan 2004" (referred to herein as DoD 6055.9-STD, Rev 4.5), pertaining to storage, handling, and static test firings involving energetic liquids. EKAD must comply with all other requirements of 14 CFR 420.63(a).

B. EKAD will maintain the configuration of the launch site in accordance with the plan as approved by the FAA.

C. "Minimal allowable distances" under 14 CFR 420.63(a)(1) must be calculated in accordance with DoD 6055.9-STD, Rev 4.5, requirements.

D. Any liquid oxygen stored in support of a launch vehicle ground operation, such as propellant loading or static test firing, must be separated from public areas by a minimum of 100 feet. (See Table C9.T21 of DoD 6055.9-STD, Rev 4.5.)

E. Any Occupational Safety and Health Administration (OSHA), National Fire Protection Association (NFPA), or both, Class I-III flammable and combustible fuel stored in support of a launch vehicle ground operation, such as propellant loading or static test firing, must be separated from public areas by a minimum of 50 feet. (See Table C9.T19 of DoD 6055.9-STD, Rev 4.5.)

F. Positive measures for spill containment and control are required for isolated storage of energetic liquids in accordance with applicable OSHA and NFPA guidance (referenced in Tables C9.T19 through C9.T21 of DoD 6055.9-STD, Rev 4.5). For flammable energetic liquids and liquid oxidizers where only minimum blast or fragment distances are specified, applicable OSHA and/or NFPA guidance referenced in Tables C9.T19 and C9.T20 of DoD 6055.9-STD, Rev 4.5, must also be used.

G. For any launch vehicle ground operation where incompatible energetic liquids are capable of mixing, the plan must require the launch site operator to document in advance the estimated net explosive weight (NEW) and the corresponding minimum separation distances to public areas, including public roads, based on DoD 6055.9-STD, Rev 4.5 requirements.

H. For any launch vehicle ground operation where incompatible energetic liquids are capable of mixing, the plan

must require that minimum separation distances are used to protect all public areas, including public roads, based on the estimated net explosive weight (NEW) and DoD 6055.9–STD, Rev 4,5, requirements.

I. For any ground operation where any energetic liquid is present in support of a launch vehicle, including storage and handling, the plan must require the launch site operator to document in advance the minimum separation distances to public areas, including public roads, based on DoD 6055.9–STD, Rev 4,5, requirements.

J. For any ground operation where any energetic liquid is present in support of a launch vehicle, including storage and handling, the plan must require that minimum separation distances are used to protect all public areas, including public roads, based on DoD 6055.9–STD, Rev 4,5, requirements.

K. For operations involving energetic liquid transfer to or from a RLV, and static test firings of an RLV with energetic liquid present, the plan must require the following: (The source that gave rise to each standard is in parentheses.)

1. All tanks must be hydrostatically proof tested to 1.5 times the maximum expected operating pressure. (See paragraph C9.5.5.6.2.1 of DoD 6055.9–STD, Rev 4,5.)

2. For cryogenic propellants, the tank wall will be surrounded by insulation, and the insulation will be covered by a secondary shell (which may be the vehicle skin), to reduce the risk of damage to the tank wall. (See paragraph C9.5.5.6.2.2 of DoD 6055.9–STD, Rev 4,5.)

3. All tanks will be fitted with pressure relief devices; the set point and tolerance of these devices shall be such that they are closed at maximum expected operating pressure, and that they open before reaching the hydrostatic proof test pressure. (Compressed Gas Association, Oxygen, publication G–4, edition 9, Dec. 1, 1996, republished Sept 4, 2002, paragraph 3.2.3 (CGA G4))

4. Transfer operations for oxidizer must take place over a non-combustible surface such as concrete or earth. In particular, asphalt pavement is a porous combustible material that must not be exposed to liquid oxygen. (CGA G–4, 1996, paragraph 6.1.1)

5. Both the fuel and oxidizer lines must contain two independent, redundant valves to shut off the flow in the event of a malfunction. (See paragraph C9.5.5.6.2.4 of DoD 6055.9–STD, Rev 4,5.)

6. The design is such that the system is closed except for approved venting

while propellant is not being fed to the engine. (See paragraph C9.5.5.8 of DoD 6055.9–STD, Rev 4,5.)

7. Once fuel is transferred into the system, the fuel system is closed off and made airtight, preventing ingress of oxygen vapor into the fuel system or escape of fuel vapor. (See paragraph C9.5.5.8 of DoD 6055.9–STD, Rev 4,5.)

8. Fuel and oxidizer are never transferred to or from the system concurrently. (See paragraph C9.5.5.8 of DoD 6055.9–STD, Rev 4,5.)

9. The fuel and oxidizer systems must be separated from each other; it must not be possible for any commanded or accidental valve action to cross-connect the fuel and oxidizer system, and the design of the ullage pressurization system must prevent cross-flow of fuel and oxidizer. (See paragraph C9.5.5.8 of DoD 6055.9–STD, Rev 4,5.)

10. The fuel and oxidizer transfer fittings must have separate and physically incompatible fitting types or other means to prevent connecting the wrong fill hose to the fill port. (See paragraph C9.5.5.8 of DoD 6055.9–STD, Rev 4,5.)

11. Propellants used must not be contaminated (*i.e.*, no fuel in the oxidizer, no oxidizer in the fuel). (See paragraph C9.5.5.8 of DoD 6055.9–STD, Rev 4,5.)

12. The vehicle tankage must be protected from fragments produced by an engine hard start. (See C9.5.5.6.2.3 of DoD 6055.9–STD, Rev 4,5.)

13. No common bulkhead exists between the fuel and oxidizer; the space between them must be drained and vented, such that it takes two independent punctures of fuel and oxidizer tanks to make mixing possible and that such a leak would be drained from the intertank volume.

14. Whenever the system is in a ready-to-fire state, such that a single malfunction or erroneous action would allow fuel and oxidizer to enter the engine combustion chamber, areas around the vehicle, including public roads, must be kept free of the public. Minimum distances shall be based upon the explosive equivalence and other requirements of DoD 6055.9–STD, Rev 4,5.

Based on the foregoing reasons and conditions, the FAA has waived the liquid propellant storage and handling requirements of 14 CFR part 420 for East Kern Airport District to operate a launch site at Mojave Airport, California, and requires in their place, compliance by EKAD with requirements of DoD 6055.9–STD, Rev 4,5, and certain conditions as described in this Notice. The FAA is considering whether to initiate rulemaking to revise

requirements for explosive siting under 14 CFR part 420 based upon DoD 6055.9–STD, Rev 4,5.

Issued in Washington, DC, on June 30, 2004.

**Patricia Grace Smith,**

*Associate Administrator for Commercial Space Transportation.*

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## DEPARTMENT OF TRANSPORTATION

### Federal Aviation Administration

[Summary Notice No. PE–2004–39]

#### Petitions for Exemption; Dispositions of Petitions Issued

**AGENCY:** Federal Aviation Administration (FAA), DOT.

**ACTION:** Notice of dispositions of prior petitions.

**SUMMARY:** Pursuant to FAA's rulemaking provisions governing the application, processing, and disposition of petitions for exemption part 11 of title 14, Code of Federal Regulations (14 CFR), this notice contains a summary of certain dispositions of certain petitions previously received. The purpose of this notice is to improve the public's awareness of, and participation in, this aspect of FAA's regulatory activities.

**FOR FURTHER INFORMATION CONTACT:** Tim Adams (202) 267–8033, or Sandy Buchanan-Sumter (202) 267–7271, Office of Rulemaking (ARM–1), Federal Aviation Administration, 800 Independence Avenue, SW., Washington, DC 20591.

This notice is published pursuant to 14 CFR 11.85 and 11.91.

Issued in Washington, DC, on July 2, 2004.

**Donald P. Byrne,**

*Assistant Chief Counsel for Regulations.*

#### Dispositions of Petitions

*Docket No.:* FAA–2001–10876.

*Petitioner:* Experimental Aircraft Association, Inc.

*Section of 14 CFR Affected:* 14 CFR 91.319(a)(2), 119.5(g), and 119.21(a).

*Description of Relief Sought/Disposition:* To permit Experimental Aircraft Association, Inc., to operate the Boeing B–17G, N9563Z in addition to the Boeing B–17.

*Grant, 6/18/2004, Exemption No. 6541H.*

*Docket No.:* FAA–2000–8533.

*Petitioner:* Israel Aircraft Industries, Ltd.

*Section of 14 CFR Affected:* 14 CFR 61.77(a).

*Description of Relief Sought/Disposition:* To permit pilots employed