

NATIONAL TRANSPORTATION SAFETY BOARD

Office of Aviation Safety
Washington, D.C. 20594

April 21, 2015

Attachment 26

AST Response to NTSB Information Request 15.132 – Five Question Set

SYSTEM SAFETY

DCA15MA019



Federal Aviation Administration

Memorandum

Date: April 15, 2015

To: [REDACTED] Manager, AVP-100, Accident Investigation Division

From: [REDACTED] Mishap Program Manager, AST-400, Safety Inspection Division [REDACTED]

Subject: Closure of National Transportation Safety Board Information Request 15.132

On February 12, 2015, the Office of Commercial Space Transportation (AST) received National Transportation Safety Board (NTSB) information request 15.132, seeking a response to five question sets related to AST's evaluation of Scaled Composites experimental permit application. These questions concern the October 31, 2014, Scaled Composites SpaceShipTwo launch accident.

In response to the above request, AST submits the attached information request responses. Please note the PF01 Airspace Request is included as a reference to question set 5, question 4.

Should you have any questions, please contact [REDACTED] or [REDACTED]

Attachments:

1. AST Response to NTSB Information Request 15.132 – Five Question Sets [REDACTED]

AST Response to NTSB Information Request 15.132 – Five Question Set

Questions Set #1:

In section C “Operations of the SpaceShipTwo Vehicle” of a letter from the FAA (AST) to Mr. Kevin W. Mickey dated May 21, 2014, AST indicated the following: “*The FAA waives the hazard analysis requirements of sections 437.29 and 437.55(a) for the second renewal of experimental Permit 12-007 because the SS2 operation will not jeopardize public health and safety or safety of property, national security or foreign policy interests of the United States, and is in the public interest.*”

1. Can AST confirm that the above referenced letter was the actual waiver provided to Scaled for their second renewal of the experimental permit? And if it is not, could you please supply the NTSB with the actual waiver”?

The above referenced letter was the actual waiver provided to Scaled Composites for the second renewal of its experimental permit.

2. Can AST please provide their interpretation of the language “*The FAA waives the hazard analysis requirements of sections 437.29 and 437.55(a)*” and elaborate on the differences between the requirements waived in this waiver and the July 2013 waiver. (i.e. why does this waiver waive all of the requirements for Scaled to provide a hazard analysis instead of only waiving the requirements to provide the FAA with a hazard analysis that identifies hazards created by software and human error?)

The language “*The FAA waives the hazard analysis requirements of sections 437.29 and 437.55(a)*” does not mean that the FAA waived the entire sections of 437.29 and 437.55(a). The July 2013 waiver, which was published in the July 18, 2013 Federal Register notice, has the same scope as the May 2014 waiver. The rationale for granting the July 2013 waiver is also applicable to the May 2014 waiver.

Questions Set #2:

In a letter from Mr. Ken Wong of the FAA (AST) to Mr. Kevin W. Mickey dated October 14, 2014, AST indicated the following: “*On May 21, 2014, the FAA waived specific hazard analysis requirements of 14 CFR 437.29 and 437.55(a) for the second renewal of Experimental Permit No. 12-007. The FAA waived the requirements that Scaled provide a hazard analysis that identifies, mitigates, and verifies and validates mitigation measures for all hazards. For the same reasons stated in the May 21, 2014 waiver, the FAA waives 14 CFR 437.29 and 437.55(a) for the permit modifications listed in this letter*”

1. Can AST please clarify the intent of the language “*...the FAA waives 14 CFR 437.29 and 437.55(a) for the permit modifications listed in this letter*”. Specifically, is AST waiving all subparts of the part 437.55(a) regulations for Scaled to perform a hazard analysis on the modifications made to its permit? Please specifically list the regulations and associated subparts of regulations that AST waived according to this October 14, 2014 letter.

The response under question 2 of Questions Set #1 is also applicable here.

2. Is this letter considered another waiver? If so, does it supersede the May 21, 2014 waiver? And if it is not, could you please supply the NTSB with the actual waiver”?

Yes, it is another waiver that supersedes the May 21, 2014 waiver because it covers the permit modifications it lists. However, the rationale for granting the previous waivers still applies to the October 2014 waiver.

Questions Set #3:

On March 6, 2013, Scaled submitted an application to renew its experimental permit. In its application for renewal, Scaled included modifications to its permit to reflect changes made to SpaceShipTwo (SS2). Contained within a May 22, 2013 internal FAA Memo, (AST 300 to AST-200), AST-300 indicated that they supported the renewal of the experimental permit by clarifying and accepting certain observed deficiencies such as the lack of identifying and characterizing human error. Therefore,

1. Please provide the rationale developed to support AST-200’s decision to choose to issue a waiver. Please identify what divisions and offices provided input to the waiver.

AST’s rationale to support its decision to issue a waiver is documented in the July 18, 2013 Federal Register notice of waiver. This waiver was developed under an internal coordination process that included input and review from all of AST’s operational divisions (Space Transportation Development, Licensing and Evaluation, Regulations and Analysis, Safety Inspection, and Operations Integration), AST’s Chief Engineer, AST’s Deputy Associate Administrator, and the FAA Office of the Chief Counsel’s Regulations Division.

2. Did AST ask Scaled to modify the hazard analysis to include human and software errors? If yes, what was Scaled’s response? If no, why not?

Prior to issuing the July 2013 waiver, AST did not ask Scaled to modify its hazard analysis. In its original evaluation, AST determined Scaled’s approach to demonstrating compliance to the 14 CFR § 437.55 Hazard Analysis requirements was sufficiently rigorous to ensure public safety, and, in effect, the approach provided an equivalent level of safety. Upon reassessment, however, AST recognized that procedurally a waiver was necessary since this specific approach did not meet all of the explicit regulatory requirements of 14 CFR § 437.55(a), and 14 CFR part 437 does not contain an equivalent level of safety finding provision (unlike 14 CFR parts 415 and 417 for launch licensing).

3. Please provide the rationale developed to support AST-200’s decision to choose to issue a waiver in lieu of requiring Scaled to identify and characterize human errors in their hazard analysis and then re-submit their application?

As noted above, the waiver was required because Scaled did not demonstrate that it met all of the explicit regulatory requirements of 14 CFR § 437.55(a). During the application and evaluation process, AST may disagree with an applicant's view that it meets a regulatory requirement. AST addresses an applicant's submittal of an application that does not, in AST's view, meet a regulatory requirement as tantamount to applying for a waiver, if AST is otherwise satisfied that the non-compliance raises no public safety issues. In the July 18, 2013 Federal Register notice of waiver, the FAA found that a waiver was in the public interest and would not jeopardize public health and safety, safety of property, and national security and foreign policy interests of the United States.

4. Please provide the rationale to support AST's decision not to issue a waiver for Scaled's original permit issued in May of 2012.

As discussed previously, at the time the FAA issued the original permit, AST had not determined that a waiver was needed. The evaluation of the original permit application noted that due to its aviation heritage, the Scaled Composites hazard analysis process followed the majority of the processes detailed in AC 25.1309-1A, which outlines an acceptable means of compliance for transport airplane aircraft system safety requirements, and that this hazard analysis process is also widely used for experimentally certificated aircraft. During its review, AST determined Scaled's approach was sufficiently rigorous for ensuring public safety with Scaled's experimentally permitted launch vehicle and the proposed operations of SpaceShipTwo. However, as noted above, AST realized that, procedurally, a waiver was necessary rather than an equivalent level of safety determination.

Questions Set #4:

Upon reviewing Scaled's application to renew its permit, the FAA determined that Scaled did not fully meet the requirements of 14 CFR sections 437.29 and 437.55(a). On July 9, 2013, the FAA issued a waiver to sections 437.29 and 437.55(a) for the first renewal of experimental permit No. 12-007.

1. Please explain why the FAA AST does not *require* an applicant to apply for a waiver before issuing a waiver? (i.e. Why did AST feel the need to draft the waiver?)

During the application and evaluation process, AST may disagree with an applicant's view that it meets a regulatory requirement. AST addresses an applicant's submittal of an application that does not, in AST's view, meet a regulatory requirement as tantamount to applying for a waiver, if AST is otherwise satisfied that the non-compliance raises no public safety issues.

2. Has the FAA ever denied an applicant a renewal of an experimental permit under 437? If so why?

No.

3. Was Scaled required to comply with the mitigations that were stated in the waiver? If yes, how did AST ensure compliance? And, please supply the NTSB with the documents instructing Scaled to comply with the mitigations.”

Yes, because the FAA granted the waiver based on the mitigation measures that supported the grant; if Scaled did not comply, the waiver would not have applied to Scaled’s operations. Because the mitigations were extracted from the application, Scaled was required to comply because 14 CFR 437.83 requires a permittee to conduct its operations in accordance with representations made in its permit application. Accordingly, Scaled was required to comply with the mitigation measures stated in the waiver. AST develops a safety inspection plan that is prepared after a review of the contents of a permit application, any Terms and Conditions in a permit order, and any waivers that may be in place. AST inspects certain permitted activities based upon the elements of that plan.

No additional documentation was provided to Scaled instructing them to comply. In accordance with 14 CFR 437.83, Compliance with experimental permit, Scaled was required to conduct any launch under an experimental permit in accordance with representations made in its permit application, with Subparts C and D of this part, and with terms and conditions contained in the permit.

Questions Set #5 “Questions on the July 2013 Waiver”:

1. Please explain why the waiver was issued two months after revision 1 to the permit was issued instead of with the revision to the permit?

At the time of the first permit renewal, it had not been determined that a waiver was needed.

2. What was the valid time period for the waiver to the 1st permit renewal?

The waiver was valid for the time period of the permit renewal.

3. If the original waiver to the 1st permit renewal is only valid for the time period of the permit renewal (1 year), without a subsequent waiver to the 2nd renewal would Scaled have been required to conduct human and software error analysis per 437.55?

Yes.

4. Please cite the specific source(s) of the mitigations described in the supplementary information section of the July 18, 2013 Federal Register notice describing the waiver.

The mitigations cited in the waiver were based on Scaled’s permit application and our evaluation of that application, supplemented by direct observation and other relevant documents that supported the operation.

For example, Section 5 of the permit application describes Scaled’s training program, which includes the SpaceShipTwo (SS2) simulator (typically run at 1.4 times real time), the

WhiteKnightTwo aircraft, and an aerobatic aircraft. Section 2 describes Scaled's incremental approach to flight testing. The SS2 Mission Procedures document refers to high and low chase planes. This is also reflected in the PF01 airspace request (attached). Section 5.4.2 documents the use of a two-pilot model (a pilot and co-pilot) to fly SS2. Section 2.2 describes Scaled's operating area, specifically the use of the R-2508 complex.

5. (a) Is there a requirement to send the applicant the updated waiver with the renewal?

There were several mitigations identified in the waiver. The Waiver states: *“A hazard analysis serves to reduce risk to the public by limiting the possibility of a vehicle mishap. Although Scaled did not complete its hazard analysis as required by the regulations, the combination of its training program, incremental approach to flight testing, use of chase planes, and two-pilot model, as well as the limited duration of the permit and thus the waiver, the remoteness of its operating area and its use of a winged vehicle combine to allow the FAA to find that Scaled's activities will not jeopardize public health and safety or safety of property”* (b) Did AST intend for these mitigations to be requirements that Scaled must meet from that point forward?

(a) Yes, which AST did by issuing the May 2014 waiver to Scaled the same day that AST issued the second permit renewal to Scaled. Also, in accordance with 14 CFR 437.83, Compliance with experimental permit, Scaled was required to conduct any launch under an experimental permit in accordance with representations made in its permit application.

(b) See the response under question 3 of Questions Set #4.