



# National Transportation Safety Board

Washington, DC 20594

## Safety Recommendation

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**Date:** August 4, 2015

**In reply refer to:** A-15-19 through -26

The Honorable Michael P. Huerta  
Administrator  
Federal Aviation Administration  
Washington, DC 20591

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On July 28, 2015, the National Transportation Safety Board (NTSB) adopted its report concerning the October 31, 2014, accident in which the SpaceShipTwo reusable suborbital rocket, N339SS, operated by Scaled Composites LLC, broke up into multiple pieces during a rocket-powered test flight and impacted terrain over a 5-mile area near Koehn Dry Lake, California.<sup>1</sup> Additional information about this accident and the resulting recommendations may be found in the report of the investigation, which can be accessed at our website, <http://www.nts.gov>, under report number NTSB/AAR-15/02.

As a result of this investigation, we issued 10 new recommendations, including 2 to the Commercial Spaceflight Federation and the following 8 recommendations to the Federal Aviation Administration:

### A-15-19

In collaboration with the Commercial Spaceflight Federation, develop and issue human factors guidance for operators to use throughout the design and operation of a crewed vehicle. The guidance should address, but not be limited to, the human factors issues identified during the SpaceShipTwo accident investigation.

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<sup>1</sup> National Transportation Safety Board, *In-Flight Breakup During Test Flight, Scaled Composites SpaceShipTwo, N339SS, Near Koehn Dry Lake, California, October 31, 2014*, NTSB/AAR-15/02 (Washington, DC: National Transportation Safety Board, 2015).

A-15-20

Implement steps in your evaluation of experimental permit applications to ensure that applicants have (1) identified single flight crew tasks that, if performed incorrectly or at the wrong time, could result in a catastrophic hazard, (2) assessed the reasonableness, including human factor considerations, of the proposed mitigations to prevent errors that could result from performing those tasks, and (3) fully documented the rationale used to justify related assumptions in the hazard analysis required by 14 *Code of Federal Regulations* 437.55.

A-15-21

Develop a process to determine whether an experimental permit applicant has demonstrated the adequacy of existing mitigations to ensure public health and safety as well as safety of property before granting a waiver from the human error hazard analysis requirements of 14 *Code of Federal Regulations* 437.55.

A-15-22

Develop and implement procedures and guidance for confirming that commercial space operators are implementing the mitigations identified in a safety-related waiver of federal regulations and work with the operators to determine the effectiveness of those mitigations that correspond to hazards contributing to catastrophic outcomes.

A-15-23

Develop and issue guidance for experimental permit applicants that (1) includes the information in Advisory Circular 413-1, "License Application Procedures," and (2) encourages commercial space vehicle manufacturers to begin the consultation process with the Office of Commercial Space Transportation during a vehicle's design phase.

A-15-24

Develop and implement a program for Office of Commercial Space Transportation inspectors that aligns them with individual operators applying for an experimental permit or a launch license to ensure that the inspectors have adequate time to become familiar with the technical, operational, training, and management controls that they will inspect.

A-15-25

Direct Office of Commercial Space Transportation (AST) management to work with AST technical staff to (1) develop clearer policies, practices, and procedures that allow direct communications between staff and applicants, (2) provide clearer guidance on evaluating commercial space transportation permits, waivers, and licenses, and (3) better define the line between the information needed to ensure public safety and the information pertaining more broadly to ensuring mission success.

A-15-26

In collaboration with the commercial space flight industry, continue work to implement a database of lessons learned from commercial space mishap investigations and encourage commercial space industry members to voluntarily submit lessons learned.

Chairman HART, Vice Chairman DINH-ZARR, and Members SUMWALT and WEENER concurred in these recommendations.

The NTSB is vitally interested in these recommendations because they are designed to prevent accidents and save lives. We would appreciate receiving a response from you within 90 days, as required by 49 *United States Code* section 1135, detailing the actions you have taken or intend to take to implement them. When replying, please refer to the safety recommendations by number and submit your response electronically to [correspondence@ntsb.gov](mailto:correspondence@ntsb.gov).

[Original Signed]

By: Christopher A. Hart,  
Chairman