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**Federal Aviation
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SAFO

Safety Alert for Operators

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http://www.faa.gov/other_visit/aviation_industry/airline_operators/airline_safety/safo

A SAFO contains important safety information and may include recommended action. SAFO content should be especially valuable to air carriers in meeting their statutory duty to provide service with the highest possible degree of safety in the public interest. Besides the specific action recommended in a SAFO, an alternative action may be as effective in addressing the safety issue named in the SAFO.

Subject: Training for Bombardier Learjet 60 (Learjet 60) Pilots on Inadvertent Thrust Reverser Stowage on Takeoff and Landing

Purpose: To ensure that Learjet 60 Training curriculums properly address the best practices on recognizing thrust reverser(s) stowage while commanding deployment during takeoff and landing phases of flight.

Background: On September 19, 2008, a Learjet 60 overran runway 11 while departing Columbia Metropolitan Airport, South Carolina. Sparks were observed on the takeoff roll, and the pilot initiated a rejected takeoff. The airplane continued beyond the runway, struck an embankment, and was destroyed by post-crash fire. The flight crew and two passengers were killed and two other passengers seriously injured. Post-accident examination of markings and tire debris indicated that during the takeoff, the right outboard tire failed from apparent under inflation. Subsequently the other tires failed, which damaged a squat switch. This resulted in thrust reversers stowage while deployment was commanded, resulting in high forward thrust from both engines.

Discussion: Title 14 of the Code of Federal Regulations (14 CFR) part 142 training centers and other training organizations of the Learjet 60 need to ensure their training curriculums properly address the best practices on recognizing inadvertent stowage of thrust reverser(s) while deployment is commanded during the takeoff and landing phases of flight.

a. Recognizing Inadvertent Thrust Reverser Stowage. Pilots should be aware of the possibility that thrust reverser stowage can occur while deployed if the air/ground squat switch circuits are damaged. Under these conditions, it is possible that a damaged squat switch may incorrectly sense that the aircraft is in air mode and stow or prohibit the reverser(s) from activating. Accordingly, the engines would provide forward thrust even though the reverse levers are in reverse position. The degree of forward thrust would be commensurate with the angle of the reverse thrust lever position commanded by the pilots. The only way to reduce forward thrust under these abnormal circumstances is to move the reverse levers to the stowed position, which is counterintuitive to a pilot during a rejected takeoff.

If the thrust reversers inadvertently stow during a rejected takeoff or landing, the pilots would note the following indications:

Learjet 60:

- The white TR DEPLOY lights would extinguish,
- The amber TR UNLOCK lights would illuminate momentarily, and,
- The green TR ARM lights would blink momentarily during the transition to stow

Learjet 60XR (thrust reverser indications are displayed on the Engine Page in the Learjet 60XR):

- The white DEP annunciations would extinguish,
- The red UNL annunciations would illuminate momentarily, and,
- The amber REV annunciations may flash momentarily

Thus, the only indication available to the pilots that the cockpit reverse levers and engine thrust reverser(s) do not agree, would be the pilots' comprehension that neither of the TR DEPLOY or DEP annunciations are illuminated, with the reverser levers in the position normally associated with reverse thrust. Unless exposed to the need for evaluating reverse thrust indicator lights when reverse thrust deployment is commanded, pilots may not properly diagnose a thrust reverser failure during critical phases of flight. Additionally, it will be difficult for a pilot to recognize the absence of reverse thrust solely by indicator lights while attention is focused outside the aircraft. This issue and its implications must be stressed during training.

b. Best Practice and or Procedure for Inadvertent Stowage of Thrust Reverser: In the event of inadvertent and or un-commanded thrust reverser stowage; maintain directional control, immediately stow both thrust reverses, reduce thrust to idle and initiate maximum braking effort.

Recommended Action: Directors of safety, directors of operations, training center program managers and individuals responsible for training programs are encouraged to review their training curriculums to ensure emphasis on recognizing inadvertent stowage of thrust reversers during takeoff and landing phases of flight.

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