

UNITED STATES OF AMERICA
DEPARTMENT OF TRANSPORTATION
FEDERAL AVIATION ADMINISTRATION
KANSAS CITY, MISSOURI 64106

In the matter of the petition of
AIR TRACTOR INCORPORATED
for an exemption from § 23.49(b)(1)
of the Federal Aviation Regulations

*
*
*
*
*
*
*

Regulatory Docket No. 054CE

GRANT OF EXEMPTION

By letter dated January 25, 1988, Mr. Leland Snow, President of Air Tractor Incorporated, Post Office Box 485, Olney, Texas 76374, petitioned for an exemption from § 23.49(b)(1) of the Federal Aviation Regulations to permit certification of the Air Tractor Model AT-503 and AT-802 airplane with stall speeds (V_{SO}) greater than the 61 knots requirement. Mr. Snow provided additional supportive information by letter dated April 11, 1988.

Section of the FAR affected:

Section 23.49(b)(1) of the Federal Aviation Regulations (FAR) requires, in pertinent part, that the stalling speed (V_{SO}) of a single-engine airplane at maximum weight may not exceed 61 knots.

The Petitioner's supportive information is as follows:

The Petitioner states under this exemption the special purpose operation of the Air Tractor Model AT-503 airplane would be for drug eradication and the Air Tractor Model AT-802 would be for fire fighting. Since the certification issues of these airplanes are different, the Air Tractor Model AT-503 airplane is addressed in a separate exemption.

The Air Tractor Model AT-802 is a prototype aircraft in the development stage. This aircraft has a gross weight of 12,500 lbs. with a Pratt & Whitney (P & W) PT6A-65AG engine, and a hopper with a capacity of 800 U.S. gallons. The stalling speed (V_{SO}) of the aircraft is 72 knots (83 mph) at a gross weight of 12,500 pounds. The aircraft is designed primarily for fire bombing and each hopper will have installed two separate (16" X 38") fire dump doors each having an opening of over 600 square inches.

Petitioner states that fire bombing aircraft seldom, if ever, land at the same approximate weight as the takeoff weight, and that the aircraft meets the stall speed requirement with the hopper empty. Also, in case of emergency, the hopper can be dumped in one to two seconds.

Petitioner noted that P & W PT6A engines have an in-flight shutdown rate of one per 333,333 hours, which offers a reliability level at least equal to twin-engine aircraft which are exempt under certain conditions from meeting the 61 knot stall speed limit.

The Petitioner stated that in order to meet the 61 knot stall speed requirement, a larger, heavier, and more expensive aircraft will be required. The larger airframe will have the following negative effects:

1. Locating the two crew aft of the hopper will require excessive ballast forward of the firewall in a larger airframe.
2. Lower climb performance due to increased weight and drag will result which has a negative effect on safety when fighting a fire in mountainous terrain.
3. Lower cruise speeds will lower effectiveness in early fire suppression techniques, as it is imperative to reach the fire as soon as possible to contain it in the early stages.
4. Increased cost will result from the larger airframe, with a substantial possibility that the planned P & W PT6A engine, which is relatively inexpensive will have to be abandoned in favor of a much more expensive P & W series engine.

The Petitioner states additional compensating crashworthiness design features that this airplane employs are as follows:

1. The airplane does not have significant items of mass located behind the cockpit, as the hopper is forward of the cockpit. The top longeron in the cockpit area is of 1 3/8 X .058 4130 N tubing having a compression allowable of 14,400 pounds per side, 28,800 pounds total. When considering pilot weights of 340 pounds, and aft structure and tail weight of 200 pounds along the top longeron, the top longerons will withstand over 53 g's of compressive load.
2. Massive overturn structure prevents occupant injury in case of overturns. The structure will have a combined allowable load (both cockpits) exceeding 75,000 pounds down (6 g's at 12,500 lbs.), and forward/side load exceeding 37,500 pounds.
3. The airplane employs the American Safety part number 443220 seat belt and part number 500702 shoulder harness. This is a 5,000 pound restraint system consisting of a 3-inch military style over-center steel latch seat belt and a 2-inch shoulder harness which meets TSO-C-22e. The airplane also has an Air Tractor part number 10529-1 seat structure, which the Petitioner states is a copy of the Spinks Industries part number AL-1021-1 bucket seat, except the wall thickness of the primary structural tubes has been increased for greater strength. The Spinks Industries seat is designed for high vertical crash loads, such as in military helicopter application. A proof of crashworthiness of the seat design was demonstrated in an accident with high vertical impact.
4. In accordance with § 23.967(e)(1) of the FAR, the fuel tanks must be designed, located, and installed so as to retain the fuel under the forward inertia forces of 9 g. The integral fuel tanks have been tested without failure to 60 psi pressure, which is the equivalent to 80 g forward and 195 g vertical inertia forces with jet fuel.

5. All fuel lines are constructed of high pressure flexible hose with fixed-end fittings (Stratoflex part number 11417-12D) to allow fuselage distortion after impact without fuel line rupture. There is a physical separation of fuel lines and electrical cables of approximately 54 inches. All the electrical cables are routed down the right side of the airplane and the fuel lines are routed on the left side. Electrical cables which might stretch or fall short during fuselage distortion are separated by the maximum distance from the source of fuel. Past accidents of Air Tractor airplanes showed they seldom burn unless a collision with powerlines is involved.
6. Spring steel type landing gear are used to absorb crash energy. There is no bottoming out of the spring at the end of the stroke as in oleo type or other fixed-stroke shock absorbers in landing gears. The spring steel type landing gear will continue to flex and absorb energy until the fuselage attach bolts fail.

The Petitioner provided the additional supportive information as follows:

1. The AT-802 is planned as a more suitable replacement for military surplus aircraft such as the Grumman Tracker aircraft in service with the California Department of Forestry (CDF) which has 700 to 800 gallon hoppers installed.
2. The Petitioner has been dealing with forestry officials for many years and has noted excessive attention to cost, as evidenced by the fact that CDF presently operates military surplus equipment instead of the Canadair CL-215, which is designed specifically for fire bombing.
3. The AT-802 represents an alternative to the Canadair CL-215 amphibious water bomber, which has a 1,425 gallon hopper. Two AT-802's will represent the same hopper capacity, the same crew, but only 20% of the cost of a single CL-215.
4. The Grumman TBF single-engine military surplus aircraft has long been used in the fire bombing role and that this aircraft when at gross weight does not meet the stall speed limit.

Petitioner takes the position that it is in the public interest to protect forests and rangeland with modern reliable turbine-powered equipment as opposed to thirty-year-old radial engine powered military surplus aircraft such as those types presently in operation.

Petitioner also notes that any economic studies conducted by the CDF or any other state or U.S. government forestry service will compare operating costs and acquisition costs of the AT-802 with those costs of operating present surplus equipment.

Petitioner notes that the AT-802 is to be certificated under FAR 21.25, not FAR 23, and that in the Introductory Note of CAM 8 it states, "We have been advised that the existing requirements, which were designed primarily to establish an appropriate level of safety for passenger-carrying aircraft, have

imposed an unnecessary economic burden and are unduly restrictive for the manufacture and operation of aircraft intended for use in rural, sparsely settled areas outside the usual lanes of air transportation and in which no passengers are to be carried for hire. For such restricted operations where public safety is not endangered, it appears unreasonable to require the same level of safety as that required for passenger-carrying aircraft."

Petitioner estimates that the AT-802 aircraft in the present airframe size and engine concept will have a selling price of \$650,000.00 but with a larger airframe and the P & W 100 series engine installed the price would be \$1,000,000 or more, which is not in the public's best interest.

The Petitioner concluded that the AT-802 is designed to be purchased by the public, to be used on public forests and rangelands, and that presently used military surplus aircraft lack safety, reliability and economy and should be replaced by modern reliable turbine-powered aircraft, and that small efficient and economical turbine-powered aircraft may be used for this replacement providing that exemption is granted for stall speed requirements, all such factors being in the public interest.

Comments to published petition summary:

A summary of this petition was published in the FEDERAL REGISTER for public comment on March 21, 1988 (53 FR 9169). The comment period closed April 11, 1988. No comments were received.

The Federal Aviation Administration's (FAA) analysis is as follows:

To obtain the exemption, the Petitioner must show, as required by § 11.25(b)(5) of the Federal Aviation Regulations, that: (1) granting the request is in the public interest; and (2) the grant of the exemption would not adversely affect safety, or that a level of safety will be provided which is equal to that provided by the rule from which the exemption is sought.

The FAA has carefully reviewed all of the information contained in the Petitioner's request for exemption, current FAA policy related to restricted category certification for agricultural and forest service conservation purposes, and the intended operation of this airplane.

The Air Tractor Model AT-802 is planned to be type certificated at 12,500 pounds gross weight under the restricted category aircraft of § 21.25 of Part 21 of the FAR. Section 21.25 requires, in pertinent part, that an airplane may be type certificated in the restricted category for special purposes, such as forest conservation operations, if there is no feature or characteristic of the airplane which makes it unsafe when it is operated under the limitations prescribed for its intended use, and that the airplane meets the airworthiness requirements for an aircraft category except those requirements that the Administrator finds inappropriate for the special purpose for which the airplane is to be used. FAA has determined that the stalling speed airworthiness requirements are appropriate for agricultural and forest conservation airplanes and similar special purpose aircraft in the restricted category.

The FAA agrees that the proposed exemption would be in the public interest provided operations are limited to those operations in the petition. As noted by the Petitioner, these airplanes will be operated for the purpose of agricultural and forest conservation programs. The FAA considers forest conservation programs on behalf of the United States, state, county, and city governments to include operations by contractors for these governments and that such operations should include crew training in the specific configuration.

Section 137.53 of Part 137, Agricultural Aircraft Operations, requires in pertinent part that for operation over congested areas the airplane must be equipped with a device capable of jettisoning at least one-half of the aircraft's maximum authorized load of agricultural material within 45 seconds. The FAA recognizes that the demonstrated ability to jettison 100 percent of the fire retardant in the hopper within 2 seconds far exceeds the requirement for operation over congested areas. In addition, the FAA recognizes that the airplane complies with the 61 knot maximum stall speed limit with an empty hopper. The FAA agrees that the ability to dump the hopper in the short time discussed, the massive overturn structure, the pilot restraint system, and the additional crashworthiness design features provide some compensation for the reduction in the level of safety caused by the increased stall speed.

In consideration of the foregoing, I find that a grant of exemption is in the public interest. Pursuant to the authority contained in §§ 313(a) and 601(c) of the Federal Aviation Act of 1958, as amended, delegated to me by the Administrator (14 CFR 11.53), Air Tractor Incorporated is hereby granted an exemption from § 23.49(b)(1) of the Federal Aviation Regulations (FAR) to the extent required to permit certification of the Model AT-802 airplane having a stall speed (V_{SO}) greater than the 61 knots requirement. This exemption is subject to the following conditions and limitations:

1. The maximum certificated weight must not exceed 12,500 pounds.
2. The type certificate must contain a limitation specifying that the affected airplane is to be operated at gross weights in excess of the certificated weight when the airplane does not meet the stall speed requirement of § 23.49(b)(1) only by, or on behalf of, the United States, states, county, and city governments for the purpose of forest conservation. In this regard, operations on behalf of these governments are considered to include forest conservation by contractors and to include incidental operations, such as crewmember training, as well as the actual forest conservation operation.
3. The airplane must comply with the stall speed requirements of § 23.49(b)(1) of the Federal Aviation Regulations at the certificated gross weight with the hopper installed and empty.
4. Each crewmember must be provided with a pilot restraint system consisting of an Air Tractor design pilot seat, part number 10529-1 and an American Safety (Flight Systems, Inc.) seat belt, part number 443220, and shoulder harness system, part number 500702.

5. It must be demonstrated that the pilot can jettison the entire contents of the fire retardant in the hopper within two seconds.
6. In case of an emergency condition, a usable designated drop zone must be established near the takeoff area.

Issued in Kansas City, Missouri on November 28, 1988.


Barry D. Clements
Manager, Small Airplane Directorate
Aircraft Certification Service