

Factual Report – Attachment 23
Flying for Skydive Operations – P- 8740-62

OPERATIONAL FACTORS

WPR19MA177

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Introduction

"Flying skydivers is demanding, and requires training and constant preparation."

In the United States today, there are over 300 active skydiving centers and clubs. Throughout the US, these "drop zones" operate over 500 skydiving aircraft, referred to as jump planes. The Cessna 182 is the most common jump plane in use, so we will focus on this particular aircraft throughout the pamphlet.

Obviously, trained jump pilots are in high demand to help keep these aircraft flying. Although it is a rewarding and challenging opportunity, flying skydivers is unusually demanding on the pilot. Having actual skydiving experience can be helpful, but is not necessary. Training and preparation, however, are vital.

To help maintain high safety standard, the FAA and the US Parachute Association have collaborated to create this pamphlet and a video entitled *Flying for Skydive Operations*. The intent of this pamphlet is to describe specific flight operations and safety considerations that are needed when flying skydivers.

Regulations and Other Information that Affect Skydive Operations

Whenever there is compensation for a flight (regardless of whether the pilot is compensated), that flight is considered a "commercial" operation. Nearly all jump flights involve compensation, and by FAA standards, skydiving flights are commercial operations.

When an aircraft is used in a commercial operation, the aircraft is subject to a 100-hour inspection, as well as an annual inspection.

The FAA requires pilots to hold at least a commercial pilot certificate, along with a current second class medical certificate.

Federal regulations (14 CFR Part 119) describe the certification requirements for air carriers and commercial operators, but exempts skydiving flights operating within 25 miles of the departure airport. As a result, skydiving flights are conducted in accordance with 14 CFR Part 91 and 14 CFR Part 105.

14 CFR Part 91

- Allows skydivers to use the floor of an aircraft as a seat, provided that there is a seat belt for each skydiver to use.
- Requires every reserve parachute on board to have been packed within the preceding 120 days.
- Requires a transponder for flight at or above 10,000 MSL, an altitude commonly exceeded by most jump planes.

14 CFR Part 105

- Requires skydivers to observe visual flight rules (VFR) conditions. Below 10,000 feet, the pilot must have three miles of visibility and at least 500 feet below, 1,000 feet above, and 2,000 feet horizontally from a cloud. At and

above 10,000 feet, the rules require five miles of visibility and 1,000 feet below, 1,000 feet above, and one mile horizontally.

- Holds the pilot responsible for jumps that create a hazard to air traffic or persons, or property on the ground.
- Requires prior permission from an airport manager before jumping over or onto an airport.
- Requires ATC authorization when jumping into Class A, B, C, or D airspace. Prior to jumping into Class E and G airspace, the appropriate ATC facility must simply be notified beforehand.
- Requires radio communications with the appropriate ATC facility at least 5 minutes prior to the jump. This requirement is primarily intended to allow the jump pilot to receive information from ATC about known traffic in the area. It is best to make the call soon after takeoff for radar coverage.

Radio Calls to ATC

A jump pilot must make radio contact with the ATC facility that has jurisdiction of the airspace at the intended jump-run altitude. After initial contact, ATC will issue a transponder code and most will request a two-minute jump run call, although it can vary. ATC also wants a "jumpers away" call. Some will require a "jumpers on the ground" call.

If the pilot can continue to monitor the ATC frequency, it is advisable to also make the same advisory announcements on the CTAF frequency, if skydiving onto an airport.

Aircraft Modifications

Common examples of aircraft modifications include:

- Removal of a cabin door and a jump door installed or air deflector installed.
- Seat belts added (every skydiver is required to use a seat belt).
- Steps installed or handholds for jumper climbout.
- Door removal or modification approvals often have provisions that require all occupants, including the pilots, to wear a parachute if the door is opened.
- Airspeed limitations related to door use, which must be placarded. Speed limitations for Cessnas are usually between 80-110 mph for door opening or flight with the door open.

Jump Pilot Training

Training from experienced jump pilots and Drop Zone (DZ) operators is the best way to learn how to fly skydivers. First, gain a thorough knowledge of the airplane and its systems, especially the fuel system. Then practice typical jump plane maneuvers: gross-weight takeoffs, best-rate climbs, slow flight, door operation, and maintaining airspeed and heading on jump run and with skydivers on the step. Simulate engine-out scenarios at every opportunity, including after takeoff, so that pitching forward to maintain airspeed is a natural reaction. Mentally note the fields and available areas around the airport that can be used for an emergency landing. Finally, always begin

each takeoff roll with the expectation that the engine will fail on that flight. Be prepared!

Pilot Preparation

- Have a current weather briefing, including winds aloft.
- File a Notification with Air Traffic Control.
- Determine jump run direction and altitude (be sure to convert AGL to MSL).
- Determine who is the jumpmaster or loadmaster for the flight.

Aircraft Inspection

- Jump planes are flown hard and endure more takeoffs and landings than most other aircraft. A thorough preflight inspection is essential to each day.
- Look for cracked and loosened components around the spinner, engine cowling, inflight doors, and landing gear.
- Check propeller for nicks and scratches.
- Check tires and brakes.
- Check the oil quantity.
- Check fuel tanks often with a calibrated fuel stick; do not rely on fuel gauges. Use only approved aviation fuels. **Research has shown that the vast majority of jump plane accidents were the result of fuel exhaustion, fuel starvation, or fuel contamination.**
- Conduct an engine run up and aircraft systems check.

Loading the Aircraft

An aircraft both overweight and out-of-balance is on the verge of being uncontrollable.

- Determine the aircraft's weight and center of gravity (CG). The maximum takeoff weight is found in the aircraft manual. The center of gravity can be calculated from charts also found in the aircraft manual.
- Ensure that the aircraft stays within its weight and balance limitations. This includes the weight of each occupant and his or her associated gear - parachute, jumpsuit, helmet, etc.
- Occupants must be secured with a seat belt or other approved restraint prior to taxi. All equipment should be secured or restrained.

The Takeoff

- If multiple jump planes are operating, constant vigilance for landing parachutes is necessary when taxiing and taking off.
- In Cessnas, the fuel selector is in a location where it can be inadvertently switched off. Check it prior to and during each takeoff for proper position.
- Have a pre-planned action for every possible event, including engine failure (e.g., have alternative emergency landing areas in mind).

The Climb

- Climb angles often impede the front view from the flight deck. Use shallow turns (usually to the left), which also serve as clearing turns.
- Avoid busy victor airways or established arrival or departure routes.
- Monitor power settings and engine temperatures to maximize the climb performance while minimizing engine overheating.
- At any point during the flight, the aircraft should be in a position to safely glide back to the airport if the engine fails.

The Jump Run

- Every jump plane has a target speed for the jump run. For Cessna, it is generally between 80 and 90 mph. Find the power setting that maintains the jump run altitude and target airspeed.
- Determine the desired spot for dropping jumpers. The spot is the skydivers' predetermined exit point over the ground, and it is nearly always upwind of the intended landing area.
- The jump pilot must assess whether releasing the jumpers will compromise safety. If so, the jumpers must be held until all conditions are clear for the jump.
- Winds at altitude can have a large influence on the spot, even though the skydivers are free-falling through it. (A 30 mph wind at 12,500 AGL can move a group of free-falling jumpers a half-mile from their exit point.)
- A jumpmaster will fine-tune the aircraft's alignment over the spot.
- It is vital that the pilot maintain a healthy margin above stall speed to prevent a stall on the jump run.
- With student skydivers, the jumpmaster will often call for reduced power to assist jumper climb-out. Use pitch to maintain airspeed.
- On jumper climb-out, the pilot may need additional control inputs to counter the effect of skydivers on the step. Many jump planes with a rear door can have their aft CG exceeded if many jumpers mass in or near the door on a jump run.
- When jumpers have exited, notice ATC of "jumpers away" and advise the controller of your next maneuver.

Descent

- A Cessna's inflight door can be closed with a yaw maneuver that will need to be practiced. Make sure that the door is securely latched.
- Set up a descent consistent with safety, and guarding against shock cooling. Each operator will have a preferred airspeed for descent. For Cessnas, descent speeds are in the 140 mph range. This speed should result in a 1,000-1,200 fpm descent rate.
- Use carburetor heat during descent; Cessnas are susceptible to carburetor ice.
- At any point, the aircraft should be in a position to glide to the airport if necessary.

- Remember that descending turns serve well as clearing turns, and make sure that all of your exterior lights are on.
- Keep a tight traffic pattern. The aircraft should be able to glide to the airport in the event of a power loss.
- Ensure that the aircraft remains clear of the skydiver airspace.

Reloading

- To reduce the potential for propeller strikes, shut down the aircraft prior to boarding and deboarding.

Emergencies

- When everything else is falling apart around you, remember: **fly the aircraft first!**
- No matter what the emergency, the jump pilot's first and primary responsibility is to fly the aircraft. Too many pilots have been distracted by events that can result in disastrous consequences.

Common Jump Plane Accidents

- **Fuel exhaustion/starvation:** Jump planes often fly with reduced fuel to accommodate heavier payloads while maintaining weight and balance limits. Pilots must check fuel levels.
- **Carburetor icing:** The C182's Continental O-470 is a sturdy, reliable engine, but it is highly susceptible to ice formation. Pilots should use carburetor heat, especially during descent.
- **Inadvertent deployment:** Premature parachute deployments can cause catastrophic damage and injury. This problem happens most often when skydivers are positioning themselves in or near the door prior to exit. Make gear checks prior to boarding and jump run. Also, expedited descents can cause a parachute's automatic activation device to fire, opening the parachute container in the aircraft.

Flying skydivers can be a rewarding way to build time, but it demands thorough training and constant attention. This pamphlet covers only a portion of the safety issues and regulations required for skydiving operations.

Note: The information contained in this pamphlet does not supersede the material contained in the Pilot's Operating Handbook or your Aircraft Flight Manual.

About This Series

The purpose of this series of Federal Aviation Administration (FAA) Aviation Safety Program publications is to provide the aviation community with safety information that is informative, handy, and easy to review. Many of the publications in this series summarize material published in various FAA advisory circulars, handbooks, other publications, and various audiovisual products developed by the FAA and used in its Aviation Safety Program.

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Comments regarding these publications should be directed to the National Aviation Safety Program Manager, Federal Aviation Administration, Flight Standards Service.

For more information on skydiving and parachute operations or details on the US Parachute Association, please call 1-800-371-USPA or visit online at <http://www.uspa.org>.