



Safety Information Bulletin

Airworthiness – Operations

SIB No.: 2018-18

Issued: 28 September 2018

Subject: Use of Restraint Systems and Pilot Back Protection during Parachute Operations

Ref. Publications:

- [1] Commission Regulation (EU) No [748/2012](#) dated 03 August 2012.
- [2] Commission Regulation (EU) No [965/2012](#) dated 05 October 2012.
- [3] Federal Aviation Administration Advisory Circular [AC 105-2E](#) – Sport Parachuting dated 04 December 2013.

Applicability:

Operators of Part 23 (FAR, JAR, CS) certificated aeroplanes, if conducting parachute operations, and holders of a Design Organization Approval (DOA), designing aeroplane modifications to allow parachute operations.

Description:

In reaction to several air accident investigation reports, EASA has investigated the use of restraint systems for parachutists and pilot back protection in general aviation aeroplanes used for parachute operations. As conclusion of this investigation, through this SIB, further guidance is provided to operators involved in parachute operations, and to affected Design Approval Holders (DAH).

(1) Legal framework:

To perform parachute operations, an aeroplane needs to be modified for the scope of such operations and to be operated in accordance with the flight limitations and instructions related to that modification. The applicable requirements for initial airworthiness and operations are provided respectively in Ref. [1] and Ref. [2]. Restraint systems for parachutists and/or pilot back protection are not required by either of these regulations. The decision to install them should be taken by the operator, based on the risk assessment required under Ref. [2], “Part-SPO” and “Part-NCO”, as applicable.

Requirements for Initial Airworthiness:

The technical requirements for parachute operations are set in the Certification Specifications (e.g. CS-23), as complemented by special condition (SC), such as the SC “SC-O23-div-01 – Use of aeroplanes for parachuting activities”. This SC addresses the following topics:

- Control of the aeroplane Center of Gravity (CG) during parachute operations;
- Modification of the structure;
- Flight tests to be performed including operational items;
- Information to be provided in the Aeroplane Flight Manual (AFM);

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- Installation of restraint systems (if required by the operator of the aeroplane);
- Installation of pilot's back protection (if required by the operator of the aeroplane).

Requirements for Aeroplane Operation:

The applicable annexes of Ref. [2] are Annex VIII "Part-SPO" for commercial operations, and Annex VII "Part-NCO" for non-commercial operations. Since the requirements for parachute operations in Part-SPO and Part-NCO are similar, below only a summary of part SPO is reported:

- SPO.OP.230 "Standard operating procedures" (SOP), requires that the operator shall conduct a risk assessment and based on its results shall establish the SOP for specific operations;
- SPO.GEN.106 "Task specialists responsibilities", paragraph (b), requires that task specialists (parachutists are task specialists) shall be, during critical phases of flight or whenever deemed necessary by the pilot-in-command in the interest of safety, restrained at their assigned station, unless otherwise specified in the SOP;
- SPO.SPEC.PAR.105 "Carriage of crew members and task specialists" states that the requirement for task specialist's responsibilities to be restrained (SPO.GEN.106(c)) shall not be applicable for task specialists performing parachute jumping;
- SPO.SPEC.PAR.110 "Seats" states that "...the floor of the aeroplane may be used as a seat, provided means are available for the task specialist to hold or strap on";
- SPO.IDE.A.160 "Seat, safety belts and restraint systems" requires that restraint devices are available for each station (SPO.SPEC.PAR.110 provides that means to "hold on" are also acceptable).

As described, there is no mandatory requirement to install restraint systems for parachutists, nor a requirement to install any pilot back protection. The decision whether to install these or not should be taken by the operator, based on the risk assessment required, e.g., by Ref. [2], SPO.OP.230.

(2) Role of the operator and of the DAH:

Restraint systems

The role of the operator is to establish the SOP for the specific operations for which the aeroplane will be used. For parachute operations, and in particular in the specific case of restraint systems for parachutists, the operator should establish if restraint systems are to be installed and also the type of restraint systems that should be used, since this will affect the corresponding procedures. Cooperation between the operator and DAH is important in the above assessments.

The role of the DAH to design the modification of the aeroplane for parachute operations. If restraint systems are required by the operator to be part of the modification, the DAH has to show that the corresponding modification and installation meet the applicable requirements.

Pilot back protection

As for restraint systems, it is the responsibility of the operator to establish if any pilot back protection needs to be installed. Cooperation between the operator and DOA holder will be important in this case as well. The role of the DOA holder is to design the pilot back protection and make sure that it meets the applicable requirements.

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(3) Advantages and disadvantages in the use of restraint systems for parachutists

Advantages

Restraint systems are aimed to keep the parachutists in place during the flight, before jumping, in order to keep the aeroplane CG within the envelope and prevent uncontrolled movement of the parachutists through the cabin. Alternative means are also possible, e.g. Ref. [2], SPO.SPEC.PAR.110 specifies that means to “hold on” are also acceptable.

Restraint systems can also provide some protection in case of landings with parachutists on board (e.g. aborted take-off, parachutist(s) decided not to jump, etc.) and emergency landing, but given the specific type of operations, they are not expected to provide the same crashworthiness protection like standard restraint systems.

Disadvantages

Restraint systems for parachutists can increase the risk of snagging, interfering or catching harness in the jumping phase and corresponding preparation. Furthermore, restraint systems may delay the evacuation after an emergency landing when parachutists are still on board.

The operator should, through the risk assessment required e.g. by Ref. [2], SPO.OP.230, balance the advantages with the disadvantages (depending on the aeroplane model, configuration, existing operating procedures) and determine if restraint systems are required, considering also the following aspects:

- The size of the cabin;
- The number of parachutists;
- The risk of uncontrolled CG shift;
- The risk of interference provided by the restraints.

In some cases, the result of such assessment may conclude that “means to hold” may provide an acceptable alternative, as allowed by Ref. [2], SPO.SPEC.PAR.110.

(4) Type of restraint systems for rear facing parachutists

There are several available solutions of restraint systems for parachutists. Typically, the preferred solution is made of a short belt directly attached to the parachute harness of the parachutist (through single or dual point attachment systems) and the aeroplane structure.

The dual attachment point solution is the most effective to provide crashworthiness protection. The attachment point of the belt to the airframe structure should be moved aft with respect to the position of the parachutists (under forward inertia emergency loads). The most effective point to attach the restraint to the parachute harness is at the junction of the leg straps, main lift web, and the horizontal back strap (see Ref. [3]).

On the other hand, the dual attachment point solution has the disadvantage that it requires more time and double action to be disengaged, compared with the single point attachment. Furthermore, it may provide more impediment on the floor during the jumping phase and in case of emergency evacuation on ground after landing. For these reasons, in some cases (e.g. smaller aeroplanes), a single belt can provide a better solution. Provisions for stowage of the belt, where possible, should be considered in all configurations. Additional information and guidance can be found in Ref. [3].

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(5) Advantages and disadvantages in the use of pilot back protection

Pilot back protection may, in some scenarios, prevent inadvertent interference by parachutists with the pilot's task of flying the aeroplane. This might be the case when parachutists are positioned close to the pilot and are subject to unexpected acceleration during flight, or when parachutists move during the jumping phase. It should be highlighted that, except for the jumping phase, parachutists should be appropriately secured in their position, either by restraint systems or by alternative means, depending on what the operator has established as appropriate for that aeroplane. Typically, the jumping phase is short and performed during level flight, and the pilot is advised to avoid sudden/abrupt manoeuvres during this phase.

The main disadvantage of the pilot back protection is the reduction of the pilot capability to oversee, and/or communicate with the other occupants of, the cabin.

Pilot back protection should not be used as a mitigation for not installing restraint systems, and it is normally not expected that the pilot back protection provides for crashworthiness protection for the pilot or the parachutists.

At this time, the safety concern described in this SIB is not considered to be an unsafe condition that would warrant Airworthiness Directive (AD) action under Regulation (EU) [748/2012](#), Part 21.A.3B, nor warrant the issuance of an operational directive under Regulation (EU) [965/2012](#), Annex II, ARO.GEN.135(c).

Recommendation(s):

EASA recommends that affected operators take note of this SIB during the development of their SOP, and assess the need for restraint systems for parachutists and/or installation of any pilot back protection.

EASA recommends that affected DAH take note of this SIB, particularly paragraphs 1 and 2.

Contact(s):

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