

Standard Change CS-SC035b

INSTALLATION OF SOLAR CELLS ON SAILPLANES

1. Purpose

This SC is for the installation of solar cells on sailplanes for the purpose of allowing longer operation of the on-board battery system.

This SC does not cover solar cells that are used to recharge any batteries or energy storage systems for an electric propulsion system on a powered sailplane.

This SC does not cover the installation of batteries.

2. Applicability/Eligibility

This SC is applicable to ELA1 sailplanes, including powered sailplanes.

3. Acceptable methods, techniques, and practices

The following standards contain acceptable data for installation purposes:

- FAA Advisory Circular AC 43.13-2B, Chapters 1 and 2; and
- FAA Advisory Circular AC 43.13-1B, Chapter 11 or ASTM F2639-18 or subsequent revisions.

Additionally, the following conditions apply:

- The solar cells shall be located either in the area of the upper side of the fuselage between the tangential bolts that connect the wings to the fuselage, and/or on the doors of a retractable engine, or as specified by the aircraft manufacturer. Typically, the solar cells are bonded to the surface with self-adhesive tape as described/specified by the solar cell manufacturer.
- Any holes that are required to route cables from the solar cells into the inner parts of the fuselage should not be larger than 6 mm in diameter, and special attention is required to prevent any chafing or short circuit in these feedthroughs. If several holes are required for these feedthroughs, then these shall not be closer than 30 mm from each other and the number of holes should be minimised.
- Special care is required to avoid damaging any bulkheads or stringers on the inside of the fuselage structure when drilling these holes.
- Seal any hole in the skin and in the solar panel to prevent any moisture penetration beneath the solar panels.
- The distance between the new holes and the cut-outs or other edges should comply with the aircraft manufacturer guidance. In the absence of such guidance, a minimum of 100 mm should be considered.
- The electrical connections to the storage battery(ies) shall be installed according to the instructions of the manufacturer of the solar cell charging system, and shall:
 - include a battery charge controller to prevent overcharging of the storage battery(ies). If a lithium battery(ies) is (are) installed, a battery management system is required;

- provide circuit protection (e.g. circuit breakers) against system overloads, and against smoke and fire hazards that result from intentional or unintentional system shorts, faults, etc.; and
- provide a clearly labelled 'ON/OFF switch' for deactivating all the solar cells, which is easily accessible by the pilot-in-command when in flight. As an alternative, a clearly labelled switch-rated circuit breaker may be used to also provide the circuit protection.

Note: The use of circuit breakers as switches is not acceptable as it can degrade their protection function, except for switch-rated circuit breakers, provided that they are shown to be appropriately rated for the number of switch cycles that are expected during the service life of the system or of the circuit breakers.

- After installation, perform a test to ensure that the flight control systems can move freely.
- Before the first operation in flight, a functional test of the system needs to be conducted on the ground with special attention paid to any possible overcharging or overheating of the system.
- Any impact on the weight and balance of the aircraft needs to be considered.
- The instructions and tests defined by the equipment manufacturer shall be followed.

4. Limitations

- If more than one battery will be charged at the same time, then all these batteries must have the same voltage and be of the same type and voltage (e.g. only lead-acid batteries running on 12 V).
- Any limitations defined by the solar cell and charging system manufacturer apply.
- Any limitations defined by the aircraft manufacturer apply (e.g. a limitation to install such solar cells onto a certain area on the surface of the sailplane).
- The installation of solar cells on structural parts such as the fuselage (i.e. not on the doors) is subject to the aircraft manufacturer not technically objecting (i.e. NTO) to this installation.
- Direct power supply to flight instruments and ATC equipment solely by solar cells is not allowed.
- The maximum power of the solar cells installed by means of this SC cannot exceed 40 W.

5. Manuals

Amend the AFM with an AFMS that contains or references the equipment instructions for operation, as required (e.g. normal, abnormal and emergency procedures for solar cell system power off).

Amend the ICAs to establish the required actions regarding the maintenance/cleaning/caring actions for the solar cells and charging system.

6. Release to service

This SC is not suitable for the release to service of the aircraft by the pilot-owner.

[Issue: STAN/3]

[Issue: STAN/4]