

**Piper PA-46-350P  
(Modified),  
G-HYZA**

**1 mile north Cranfield  
Airport**

**29 April 2021**

**Accident**

### **Investigation Synopsis**

The electrically powered aircraft was undertaking experimental flight tests, under E Conditions, when power to the electrical motors was lost. A forced landing was carried out close to Cranfield airfield during which the aircraft was severely damaged.

The loss of power occurred during an interruption of the power supply when, as part of the test procedure, the battery was selected off with the intention of leaving the electrical motors solely powered by the hydrogen fuel cell. During this interruption the windmilling propeller generated a voltage high enough to operate the inverter protection system, which locked out the power to the motors. The pilot and observer were unable to reset the system and restore electrical power.

Five Safety Recommendations were made regarding Civil Aviation Publication (CAP) 1220, 'Operation of experimental aircraft under E Conditions'. The operator has also taken Safety Action to address a number of findings from this accident.

### **Safety Recommendation 2022-008**

#### **Justification**

While CAP1220 does not require aircraft to conform with the airworthiness requirements of a Permit to Fly or Certificate of Airworthiness, there are safety benefits in following existing design guidelines, where possible, to ensure that the operational risk is kept as low as reasonably practicable and tolerable.

Therefore, the following safety recommendation was made:

#### **Safety Recommendation 2022-008**

It is recommended that the Civil Aviation Authority develops guidance in CAP1220, Operation of Aircraft Under E Conditions, regarding the use of existing guidance on the design and positioning of controls and displays used in the operation of the aircraft.

**Date Safety Recommendation made:** 20 July 2022

#### **LATEST RESPONSE**

**Response received:** 21 December 2023

The CAA is considering these safety recommendations within the context of the Operation of Experimental Aircraft under E Conditions (CAP1220) review project. This project is a collaborative joint endeavour between the CAA and the Royal Aeronautical Society General Aviation Group. A Bi-Annual review of E Conditions was in planning at the time CAA received the five Safety Recommendations, so these were included within our scope of review as per our original responses to AAIB.

The project working group met for the first time in April this year and subsequently several further meetings took place during 2023, including one kindly hosted by AAIB at which the investigation team were able to discuss the accident report with the working group which proved extremely helpful in our work going forward.

At this time work is still ongoing to develop the next revision to CAP1220 guidance and we now anticipate this work will conclude in the latter part of 2024. Our intentions to address the five Safety Recommendations have not changed since our original response, only the timeline has been extended.

The CAA will provide a further update by the end of September 2024.

**Safety Recommendation Status**                      **Open**

**AAIB Assessment**                                      **Adequate**

**Action Status**                                      **Planned Action Ongoing Update Due 27 September 2024**

**Feedback rationale**

The AAIB acknowledges the response which meets the intent of the Safety Recommendation. An update on the progress of the actions being taken is requested by 27 September 2024. (EU Regulation 996/2010 article 18 refers).

**RESPONSE HISTORY**

Response received: 20 September 2022

The CAA accepts this Safety Recommendation.

We will enhance the existing guidance in Part B of the CAP1220 dossier as per the Safety Recommendation.

We will aim to issue revised guidance within CAP1220 by the end of December 2023.

AAIB Assessment – Adequate Open

## Safety Recommendation 2022-009

### Justification

The reduction in the burden of regulation makes E Conditions attractive to a wide range of parties who wish to test a proof of concept ranging from relatively simple designs to high-profile, leading-edge technology. The scope of CAP1220 allows for a wide range of experimental projects some of which may be beyond the original intent of the authors in 2015 and beyond the experience and resources of some parties. Complex and commercially dynamic projects, or those involving multi-crew aircraft operation, may require additional provisions to ensure that they can be safely managed.

Therefore, the following safety recommendation was made:

### Safety Recommendation 2022-009

It is recommended that the Civil Aviation Authority clarify the scope of projects considered suitable to be carried out under CAP1220, Operation of Aircraft Under E Conditions, and any additional provisions that might be required for more complex projects.

**Date Safety Recommendation made:** 20 July 2022

### LATEST RESPONSE

**Response received:** 21 December 2023

The CAA is considering these safety recommendations within the context of the Operation of Experimental Aircraft under E Conditions (CAP1220) review project. This project is a collaborative joint endeavour between the CAA and the Royal Aeronautical Society General Aviation Group. A Bi-Annual review of E Conditions was in planning at the time CAA received the five Safety Recommendations, so these were included within our scope of review as per our original responses to AAIB.

The project working group met for the first time in April this year and subsequently several further meetings took place during 2023, including one kindly hosted by AAIB at which the investigation team were able to discuss the accident report with the working group which proved extremely helpful in our work going forward.

At this time work is still ongoing to develop the next revision to CAP1220 guidance and we now anticipate this work will conclude in the latter part of 2024. Our intentions to address the five Safety Recommendations have not changed since our original response, only the timeline has been extended.

**Safety Recommendation Status** Open

**AAIB Assessment** Adequate

**Action Status** Planned Action Ongoing Update Due 27 September 2024

### Feedback rationale

The AAIB acknowledges the response which meets the intent of the Safety Recommendation. An update on the progress of the actions being taken is requested by 27 September 2024.

## **RESPONSE HISTORY**

Response received: 20 September 2022

The CAA accepts this Safety Recommendation.

We will clarify the scope of projects within CAP1220 and also any additional provisions that might be required for more complex projects. This may mean limiting the complexity of projects within the boundaries of E Conditions and directing more complex projects to the usual certification routes in Part 21 and BCAR Section A. An element of this work will be to define what we mean by complex and non-complex projects.

We will aim to issue revised guidance within CAP1220 by the end of December 2023.

AAIB Assessment – Adequate Open

## Safety Recommendation 2022-010

### Justification

Apart from the basic details submitted on the declaration, there is no independent review of the suitability of a project for E Conditions or if all the required conditions have been fully addressed in the Dossier. That judgement is delegated to the competent person who may be supported in this decision by the operator and the experimenting team where one exists. There is an option for the CAA to review the Dossier, but it is unclear what would trigger this additional scrutiny. It was not triggered for G-HYZA, which at the time of the accident was one of the more complex projects conducted under E Conditions.

Therefore, the following safety recommendation was made:

### Safety Recommendation 2022-010

It is recommended that the Civil Aviation Authority require an independent review of the Dossier for aircraft operating under the provisions of CAP1220, Operation of Aircraft Under E Conditions, to ensure the project meets the intent of the guidance and can be safely managed by a competent person.

**Date Safety Recommendation made:** 20 July 2022

### LATEST RESPONSE

**Response received:** 21 December 2023

The CAA is considering these safety recommendations within the context of the Operation of Experimental Aircraft under E Conditions (CAP1220) review project. This project is a collaborative joint endeavour between the CAA and the Royal Aeronautical Society General Aviation Group. A Bi-Annual review of E Conditions was in planning at the time CAA received the five Safety Recommendations, so these were included within our scope of review as per our original responses to AAIB.

The project working group met for the first time in April this year and subsequently several further meetings took place during 2023, including one kindly hosted by AAIB at which the investigation team were able to discuss the accident report with the working group which proved extremely helpful in our work going forward.

At this time work is still ongoing to develop the next revision to CAP1220 guidance and we now anticipate this work will conclude in the latter part of 2024. Our intentions to address the five Safety Recommendations have not changed since our original response, only the timeline has been extended.

**Safety Recommendation Status** Open

**AAIB Assessment** Adequate

**Action Status** Planned Action Ongoing Update Due 27 September 2024

### Feedback rationale

The AAIB acknowledges the response which meets the intent of the Safety Recommendation. An update on the progress of the actions being taken is requested by 27 September 2024.

## **RESPONSE HISTORY**

Response received: 20 September 2022

The CAA accepts this Safety Recommendation.

We will work to establish a process of independent review of the dossier required under CAP1220 to ensure the project meets the intent of the guidance and can be safely managed by the competent person. It is our intent to ensure the CAA is not the person that performs this review so as to maintain the overall current objective of delegation and proportionality of E Conditions in a deregulated environment.

We will aim to issue revised guidance within CAP1220 by the end of December 2023.

AAIB Assessment – Adequate Open

## Safety Recommendation 2022-011

### Justification

Currently, there is no assessment required to ensure the competent person is able to fulfil their responsibilities, considering factors such as organisational relationships, conflicting interests, availability, skills and knowledge. A closer assessment could identify if the individual is suitable, or if additional measures are required, to assist the competent person manage the project.

Therefore, the following safety recommendation was made:

### Safety Recommendation 2022-011

It is recommended that the Civil Aviation Authority requires that the individual nominated as a competent person under CAP1220, Operation of Aircraft Under E Conditions, has the knowledge, skills, experience, and capacity to manage and oversee the experimental test programme registered on the Declaration.

**Date Safety Recommendation made:** 20 July 2022

### LATEST RESPONSE

**Response received:** 21 December 2023

The CAA is considering these safety recommendations within the context of the Operation of Experimental Aircraft under E Conditions (CAP1220) review project. This project is a collaborative joint endeavour between the CAA and the Royal Aeronautical Society General Aviation Group. A Bi-Annual review of E Conditions was in planning at the time CAA received the five Safety Recommendations, so these were included within our scope of review as per our original responses to AAIB.

The project working group met for the first time in April this year and subsequently several further meetings took place during 2023, including one kindly hosted by AAIB at which the investigation team were able to discuss the accident report with the working group which proved extremely helpful in our work going forward.

At this time work is still ongoing to develop the next revision to CAP1220 guidance and we now anticipate this work will conclude in the latter part of 2024. Our intentions to address the five Safety Recommendations have not changed since our original response, only the timeline has been extended.

**Safety Recommendation Status** Open

**AAIB Assessment** Adequate

**Action Status** Planned Action Ongoing Update Due 25 July 2024

### Feedback rationale

The AAIB acknowledges the response which meets the intent of the Safety Recommendation. An update on the progress of the actions being taken is requested by 27 September 2024.

**RESPONSE HISTORY**

Response received: 20 September 2022

The CAA accepts this Safety Recommendation.

We shall review the current guidance in Chapter 6 of CAP1220 to determine any additional contents that may be necessary to fully assess all expected areas of competence as mentioned in the Safety Recommendation.

We will aim to issue revised guidance within CAP1220 by the end of December 2023.

AAIB Assessment – Adequate Open



## Safety Recommendation 2022-012

### Justification

CAP1220 provides limited guidance on how to organise a complex experimental flight test programme, nor does it address the management of human, organisational and cultural factors that were seen in the accident involving G-HYZA. The safety of operating under E Conditions could be strengthened through additional guidance and training to help the competent person anticipate and manage factors that may be prevalent. The principal test pilot also has a key role in the safety of the programme, as well as the management and organisation of the flight, and would also benefit from this training and guidance.

Therefore, the following safety recommendation was made:

### Safety Recommendation 2022-012

It is recommended that the Civil Aviation Authority enhance the guidance for the competent person and principal test pilot in the organisation, management, and conduct of the flight of an experimental aircraft project operating under CAP1220, Operation of Aircraft Under E Conditions.

**Date Safety Recommendation made:** 20 July 2022

### LATEST RESPONSE

**Response received:** 21 December 2023

The CAA is considering these safety recommendations within the context of the Operation of Experimental Aircraft under E Conditions (CAP1220) review project. This project is a collaborative joint endeavour between the CAA and the Royal Aeronautical Society General Aviation Group. A Bi-Annual review of E Conditions was in planning at the time CAA received the five Safety Recommendations, so these were included within our scope of review as per our original responses to AAIB.

The project working group met for the first time in April this year and subsequently several further meetings took place during 2023, including one kindly hosted by AAIB at which the investigation team were able to discuss the accident report with the working group which proved extremely helpful in our work going forward.

At this time work is still ongoing to develop the next revision to CAP1220 guidance and we now anticipate this work will conclude in the latter part of 2024. Our intentions to address the five Safety Recommendations have not changed since our original response, only the timeline has been extended.

**Safety Recommendation Status** Open

**AAIB Assessment** Adequate

**Action Status** Planned Action Ongoing Update Due 27 September 2024

### Feedback rationale

The AAIB acknowledges the response which meets the intent of the Safety Recommendation. An update on the progress of the actions being taken is requested by 27 September 2024.

**RESPONSE HISTORY**

Response received: 20 September 2022

The CAA accepts this Safety Recommendation.

We will review and enhance the guidance for the competent person and principal test pilot as per the intent of the Safety Recommendation.

We will aim to issue revised guidance within CAP1220 by the end of December 2023.

AAIB Assessment – Adequate Open