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## **INFORMATION CIRCULAR**

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### **POTENTIAL FIRE HAZARD FROM BULK STORAGE OF ELECTRONIC TABLETS (E-TABLETS) IN AIRCRAFT GALLEY CARTS**

#### Purpose

1 This information circular is to raise awareness on the potential fire hazard associated with the storage of multiple e-tablets in aircraft galley carts.

#### Background

2 The usage of e-tablets as a replacement for the conventional in-flight entertainment has increased in popularity in airlines globally, while the effects of electromagnetic interference/compatibility of e-tablets with aircraft avionics system has been well studied and documented.

3 On the potential of fire hazard caused by the lithium batteries in e-tablets stored in galley carts, a series of tests were carried out by CAAS and the Federal Aviation Administration (FAA) William J. Hughes Technical Center. The objectives of these tests were to determine:

- (a) The required configuration to store the multiple e-tablets to prevent the propagation of fire caused by thermal-runaway from a single lithium-ion battery in an e-tablet to adjacent e-tablets.
- (b) The ability of the galley cart to contain a lithium-ion battery fire and to prevent fire and smoke from spreading outside the galley cart.

4 It should be noted that the e-tablets selected for the tests were based on the watt-hour rating of the batteries installed within the e-tablets and the test results would not be representative for e-tablets that have batteries with different watt-hour rating installed.

#### Tests outcome

5 The results of these tests established the potential fire hazards associated with bulk storage of e-tablets in a galley cart. The findings derived from these tests include the following:

- (a) The risk of lithium battery thermal-runaway propagation from one e-tablet to another was small when the e-tablets were arranged in a vertical orientation with sufficient spacing between them (1 inch was sufficient in this study).

- (b) Thermal runaway may cause the accumulation of flammable gases in the galley cart and increase the risk of an explosion. The force of an explosion can force open a latched galley cart door.
- (c) The fire or explosion created within the galley cart has the potential to ignite adjacent aircraft cabin materials.
- (d) The heavy accumulation of smoke in the cabin may interfere with firefighting efforts and can be hazardous to airplane occupants.

6 Details of the tests conducted are documented in the joint FAA-CAAS technical report, entitled "Fire Behavior of E-Tablets Stored in Aircraft Galley Carts". A copy of the report is available at ( <https://www.fire.tc.faa.gov/reports/reports.asp> ).

### Conclusion

7 The results of the tests confirmed the potential fire hazards associated with bulk storage of e-tablets in a galley cart and concluded that storage of e-tablets in a horizontal-stacked orientation without separation is not recommended. Although the tests confirmed that the risk of lithium battery thermal-runaway propagation from one e-tablet to another was small when the e-tablets were arranged in a vertical orientation with 1 inch spacing between them, this is true only for e-tablets with the associated battery watt-hour rating. Operators intending to store e-tablets in the vertical orientation will need to conduct additional assessments or tests to determine that the appropriate separation distance needed for the respective e-tablets.

8 Additional work is required to determine the desirable features of galley carts to contain a lithium battery fire and to prevent the danger associated with fire, smoke intensity and explosion.

9 For further enquiries, please contact Mr Jonathan Tan, Senior Manager (Airworthiness Engineering, Standards) at [caas\\_afo\\_infocenter@caas.gov.sg](mailto:caas_afo_infocenter@caas.gov.sg) .

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