



# Interagency Aviation Accident Prevention Bulletin



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**Subject: Lithium Batteries**

**Area of Concern: Flight Safety**

**Distribution: All Aviation Activities**

Discussion: In June of 2012, an Interagency Accident Prevention Bulletin on Lithium batteries ([IAAPB 12-02](#)) was published. The bulletin identified hazards associated with lithium batteries and provided tips to mitigate the risk when using, storing, or transporting the batteries. With the increase of small lithium battery operated UAS, now's a good time to revisit the subject, especially since there are a lot of new folks in DOI and the USFS. This Accident Prevention Bulletin will focus on lithium batteries used in UAS that are carried on DOI, USFS, and commercial flights.



**3DR Solo is rated at  
76.96 watt hours**

Lithium batteries are listed in 49 CFR 172.101 Hazardous Materials Table due to their potential to overheat and ignite in certain conditions. The Department of Transportation (DOT) rules for lithium batteries are risk based in that it recognizes that the amount of stored energy is the major component of risk for starting a fire. The amount of stored energy is related to the number of cells in the battery and the total amount of lithium present. In general, the risks posed by lithium batteries are a function of battery size (the amount of lithium content and corresponding energy density) and the likelihood of short-circuiting or rupture.

In comparison to standard alkaline batteries, most lithium-ion (polymer) batteries manufactured today contain a flammable electrolyte with a very high energy density. A lithium battery is susceptible to thermal runaway, a destructive chain reaction resulting from self-heating and the release of its stored energy. Most concerning is the extreme difficulty in extinguishing such a fire and the battery's ability to burn through materials such as metal.

Like other products that contain hazardous materials, lithium batteries can be transported safely provided that the appropriate precautions are incorporated into the design, packaging, handling, and emergency response.

For flights under DOI and USFS operational control, DOT has granted a waiver to carry hazardous material. All aircraft and personnel operating under the terms of this special permit ([DOT-SP 9198](#)) must be in compliance with the requirements of the NWCG Standards for Aviation Transport of Hazardous Materials dated February 2018. The publication states that "Lithium batteries must be transported in a manner that assures that they remain undamaged and dry, and the terminals must be protected against short circuits."

According to the FAA, passengers may carry all consumer-sized lithium ion batteries (up to 100 watt hours per battery). The watt hours (Wh) rating is marked on newer lithium ion batteries. The current battery for

the 3DR Solo is rated at 76.96 Wh. External chargers are also considered to be a battery. With airline approval, devices can contain larger lithium ion batteries (101-160 watt hours per battery), but spares of this size are limited to two batteries in carry-on baggage only. Except for spare (uninstalled) lithium-ion batteries, all batteries allowed in carry-on baggage are also allowed in checked baggage. The batteries must be protected from damage and short circuit or installed in a device. 49 CFR 175.10(a)(18) states that "...Portable electronic devices powered by lithium batteries may be carried in either checked or carry-on baggage... Spare lithium batteries must be carried in carry-on baggage only." The batteries for the new Fire Fly 6 is rated at up to 125.4 Wh, so check with the airline first before showing up at the airport.

While the FAA makes the distinction between a spare battery and an installed battery, the DOI and USFS do not. **For all DOI and USFS UAS, the battery(ies) must be removed from the UAS prior to checking it on an aircraft** in order to prevent an inadvertent activation. **This also includes external battery packs.** Each spare lithium battery must be individually protected so as to prevent short circuits (e.g., by placement in original retail packaging, or otherwise insulating terminals by taping over exposed terminals with electrical tape and placing each battery in a separate non-conductive bag or protective pouch).

For additional information on this or on shipping lithium batteries via FedEx, contact the OAS UAS Division at 208-433-5002 / 5091.

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