

September 28, 2016



U.S. Department
of Transportation

East Building, PHH-30
1200 New Jersey Avenue S.E.
Washington, D.C. 20590

**Pipeline and Hazardous
Materials Safety Administration**

DOT-SP 16598
(FIRST REVISION)

EXPIRATION DATE: 2018-02-28

(FOR RENEWAL, SEE 49 CFR 107.109)

1. GRANTEE: Spaceflight, Inc.
Tukwila, WA
2. PURPOSE AND LIMITATION:
 - a. This special permit authorizes the one-time transportation in commerce of twenty one low production lithium ion batteries contained in equipment (SHERPA satellites) that are not of a type proven to meet the criteria in Part III, sub-section 38.3 of the UN Manual of Tests and Criteria. This special permit provides no relief from the Hazardous Materials Regulations (HMR) other than as specifically stated herein. The most recent revision supersedes all previous revisions.
 - b. The safety analyses performed in the development of this special permit only considered the hazards and risks associated with the transportation in commerce.
 - c. No party status will be granted to this special permit.
3. REGULATORY SYSTEM AFFECTED: 49 CFR Parts 106, 107 and 171-180.
4. REGULATIONS FROM WHICH EXEMPTED: 49 CFR § 173.185(a)(1) in that certain lithium ion batteries contained in equipment are not of a type proven to pass the tests in the UN Manual of Tests and Criteria, except as specified herein.
5. BASIS: This special permit is based on the application of Spaceflight, Inc. dated June 14, 2016 submitted in accordance with § 107.105 and the public proceeding thereon.

September 28, 2016

6. HAZARDOUS MATERIALS (49 CFR 172.101):

Hazardous Materials Description			
Proper Shipping Name	Hazard Class/ Division	Identi- fication Number	Packing Group
Lithium ion batteries, contained in equipment	9	UN3481	N/A

7. SAFETY CONTROL MEASURES:a. OPERATIONAL CONTROLS-

(1) Only low production battery packs contained in equipment and comprised of not more than the following number of cells (identified in Spaceflight, Inc.'s amended application for special permit dated February 5, 2016 and application on June 14, 2016 for modification and on file with the Approvals and Permits Division (APD) may be offered for transportation under the terms of this special permit.

(i) Cortex Battery Unit (CBU): three battery packs each comprised of not more than two Yardney NCP 25-1 cells.

(ii) HISat Battery Pack: fourteen battery packs each comprised of not more than eighteen Tenergy 18350 cells.

(iii) Arkyd-6 Satellite Battery Pack: one battery pack comprised of not more than ten E-One Moli Energy 18650 cells.

(iv) Corvus-BC3 Satellite Battery Pack: one battery pack comprised of not more than four Panasonic 18650 cells.

(v) KAUSAT-5 Satellite Battery Pack: one battery pack comprised of not more than eight VARTA 503562 DL cells.

September 28, 2016

(vi) skCUBE Satellite Battery Pack: one battery pack comprised of not more than two A123 18650 cells.

(2) Battery packs must be installed with internal protection to prevent short-circuiting.

(3) A battery kill switch must be installed in each piece of equipment to be able to cut off the current between the battery packs and the satellite during transportation.

(4) The battery packs must be equipped a Battery Management Controller which limits the maximum charge current and the maximum voltage.

(5) Cells must be equipped with burst discs for control of venting risk.

(6) Other hazardous materials contained in the equipment must comply with all requirements in the HMR.

a. TESTING -

(1) CBU:

(i) Cells must be of a type proven to have passed the external short, overcharge, overdischarge (including the forced discharge at 200% overdischarge), thermal abuse, and mechanical abuse (including the crush test at the applied pressure of 17 MPa) tests as described in Yardney Technical Products Inc.'s test summary titled "Safety Evaluation of Large Lithium-ion Cells."

(ii) Each CBU must be of a type subjected to the vibration and shock test criteria of Spaceflight Industries' document AS-100-RPT-00011 (identified in Spaceflight, Inc.'s application for approval under CA2015100008 which is on file with APD).

(iii) Each CBU must be of a type subjected to the Thermal Vacuum Test criteria of Spaceflight Industries' document AS-100-RPT-00012 (identified in Spaceflight, Inc.'s application for approval under CA2015100008 which is on file with APD).

September 28, 2016

(2) HISat Battery Pack: Cells and battery packs must be of a type proven to have passed T.1 through T.6 as described in the application submitted on June 14, 2016. Cells must have passed the T.7 and T.8 tests as described in the application.

(3) Arkyd-6 Satellite Battery Pack: Battery packs must be of a type proven to have passed T.1 through T.8 except for T.6 and T.8 tests as described in the application submitted on June 14, 2016. Cells must have successfully passed the tests in accordance with the UN Manual of Tests and Criteria, Fifth Revised Edition.

(4) Corvus-BC3 Satellite Battery Pack: Cells and battery packs must be of a type proven to have passed T.1 through T.8 except for T.6 and T.8 tests as described in the application submitted on June 14, 2016. However, cells must have successfully passed the T.6 and T.8 tests in accordance with the UN Manual of Tests and Criteria, Fifth Revised Edition.

(5) KAUSAT-5 Satellite Battery Pack: Battery packs must be of a type proven to have passed T.1 through T.3 as described in the application submitted on June 14, 2016. However, cells must have successfully passed the T.1, T.2, T.5, T.6, T.7, and T.8 tests in accordance with the UN Manual of Tests and Criteria, Fifth Revised Edition.

(6) skCUBE Satellite Battery Pack: Battery packs must be of a type proven to have passed T.1 through T.3 as described in the application submitted on June 14, 2016. However, cells must have successfully passed the T.1, T.2, T.5, T.6, T.7, and T.8 tests in accordance with the UN Manual of Tests and Criteria, Fifth Revised Edition.

b. PACKAGING -

(1) Cells and batteries must be protected against short circuiting;

(2) Battery packs contained in equipment (i.e., the satellites within the SHERPA spacecraft) must be wrapped in an anti-static bag meeting the military specification (MIL-PRF-81705).

September 28, 2016

(3) All satellites containing battery packs must be placed inside strong outer packagings in a protective wooden box as described in Spaceflight, Inc.'s amended application dated February 5, 2016;

(4) Not more than a total of twenty one battery packs are authorized in the equipment comprising six satellites.

8. Marking Requirements: Each package, and overpack if used, prepared under the provisions of this special permit must be plainly marked with the number: DOT-SP 16598.
9. SPECIAL PROVISIONS:
 - a. Under the terms of this special permit, the grantee may only offer hazardous materials (i.e., the grantee is not authorized as a carrier).
 - b. This special permit is valid for the one-time transportation of one piece of equipment containing three low production lithium ion batteries (other hazardous materials contained in the equipment are authorized provided these materials comply with all requirements in the HMR). Once the equipment containing the lithium ion batteries covered under the terms of this special permit is delivered to Vandenberg Air Force Base, California, further transportation under the terms of this special permit is prohibited.
 - c. A person who is not a holder of this special permit who receives a package covered by this special permit may reoffer it for transportation provided no modification or change is made to the package and it is reoffered for transportation in conformance with this special permit and the HMR.
 - d. A current copy of this special permit must be maintained at each facility where the package is offered or reoffered for transportation.
10. MODES OF TRANSPORTATION AUTHORIZED: Motor vehicle.
11. MODAL REQUIREMENTS: A current copy of this special permit must be carried aboard each motor vehicle used to transport packages covered by this special permit.

September 28, 2016

12. COMPLIANCE: Failure by a person to comply with any of the following may result in suspension or revocation of this special permit and penalties prescribed by the Federal hazardous materials transportation law, 49 U.S.C. 5101 et seq:

- o All terms and conditions prescribed in this special permit and the Hazardous Materials Regulations, 49 CFR Parts 171-180.
- o Persons operating under the terms of this special permit must comply with the security plan requirement in Subpart I of Part 172 of the HMR, when applicable.
- o Registration required by § 107.601 et seq., when applicable.

Each "Hazmat employee", as defined in § 171.8, who performs a function subject to this special permit must receive training on the requirements and conditions of this special permit in addition to the training required by §§ 172.700 through 172.704.

No person may use or apply this special permit, including display of its number, when this special permit has expired or is otherwise no longer in effect.

Under Title VII of the Safe, Accountable, Flexible, Efficient Transportation Equity Act: A Legacy for Users (SAFETEA-LU)—"The Hazardous Materials Safety and Security Reauthorization Act of 2005" (Pub. L. 109-59), 119 Stat. 1144 (August 10, 2005), amended the Federal hazardous materials transportation law by changing the term "exemption" to "special permit" and authorizes a special permit to be granted up to two years for new special permits and up to four years for renewals.

13. REPORTING REQUIREMENTS: Shipments or operations conducted under this special permit are subject to the Hazardous Materials Incident Reporting requirements specified in 49 CFR §§ 171.15 Immediate notice of certain hazardous materials incidents, and 171.16 Detailed hazardous materials incident reports. In addition, the grantee(s) of this

September 28, 2016

special permit must notify the Associate Administrator for Hazardous Materials Safety, in writing, of any incident involving a package, shipment or operation conducted under terms of this special permit.

Issued in Washington, D.C.:



for William Schoonover
Acting Associate Administrator for Hazardous Materials Safety

Address all inquiries to: Associate Administrator for Hazardous Materials Safety, Pipeline and Hazardous Material Safety Administration, U.S. Department of Transportation, East Building PHH-30, 1200 New Jersey Avenue, Southeast, Washington, D.C. 20590.

Copies of this special permit may be obtained by accessing the Hazardous Materials Safety Homepage at http://hazmat.dot.gov/sp_app/special_permits/spec_perm_index.htm. Photo reproductions and legible reductions of this special permit are permitted. Any alteration of this special permit is prohibited.

PO: SH/TG