



Designation: F3610 – 23

Standard Classification for Descriptions of Spaceport Capabilities¹

This standard is issued under the fixed designation F3610; the number immediately following the designation indicates the year of original adoption or, in the case of revision, the year of last revision. A number in parentheses indicates the year of last reapproval. A superscript epsilon (ϵ) indicates an editorial change since the last revision or reapproval.

1. Scope

1.1 This classification lists elements recommended for describing a spaceport's facilities and capabilities to potential launch customers, users, third-parties, or other members of the public. Using standardize elements simplifies comparisons and makes it easier to understand the suitability of a spaceport for a given purpose. Spaceports have the discretion to communicate all, some, or none of these elements.

1.2 Measurement data in this standard shall use the ASTM guidance on International System of Units (SI) for all data. In addition to the SI units for data, spaceports addressing U.S. customers should also consider including U.S. customary units for the ease of much of their customer base.

1.3 *This standard does not purport to address the legal requirements associated with licensing or permitting a spaceport. It is the responsibility of the user of this standard to establish appropriate legal and licensing practices and determine the applicability of regulatory limitations prior to use.*

1.4 *This standard does not purport to address all of the safety concerns, if any, associated with its use. It is the responsibility of the user of this standard to establish appropriate safety, health, and environmental practices and determine the applicability of regulatory limitations prior to use.*

1.5 *This international standard was developed in accordance with internationally recognized principles on standardization established in the Decision on Principles for the Development of International Standards, Guides and Recommendations issued by the World Trade Organization Technical Barriers to Trade (TBT) Committee.*

2. Referenced Documents

2.1 *ASTM Standards:*²

[F3377 Terminology Relating to Commercial Spaceflight](#)

¹ This classification is under the jurisdiction of ASTM Committee F47 on Commercial Spaceflight and is the direct responsibility of Subcommittee F47.04 on Spaceports.

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² For referenced ASTM standards, visit the ASTM website, www.astm.org, or contact ASTM Customer Service at service@astm.org. For *Annual Book of ASTM Standards* volume information, refer to the standard's Document Summary page on the ASTM website.

2.2 *Other Standards:*

[Range Commanders Council Document 501-12, Universal Documentation System](#)³

[Code of Federal Regulations, Title 14, Chapter III, Aeronautics and Space—Commercial Space Transportation, Federal Aviation Administration, Department of Transportation](#)⁴

[FAA Commercial Space, Spaceports by State](#)⁵

[The Space Industry Regulations 2021, UK Statutory Instruments, 2021 no. 792](#)⁶

3. Terminology

3.1 See individual sections in this classification and Terminology [F3377](#).

4. Significance and Use

4.1 This classification provides voluntary guidance for spaceports to provide information about their spaceport, capabilities, systems, restrictions, and other information for use by customers and potential customers.

4.2 Information provided by the spaceport is intended to be for public use and only encompass non-proprietary information.

5. Elements of Spaceport Descriptions

5.1 *Spaceport Contact Information:*

5.1.1 *Spaceport Physical Address*—The postal address of the actual spaceport. This should not be a post office box, but it should be the actual location of the spaceport.

5.1.1.1 If there is no physical address assigned by the postal system, use an appropriate geographic descriptor. Example: Milepost 15 on RR1, Anytown, Anystate, USA.

5.1.2 *Mail Address*—The preferred mailing address as specified by the spaceport licensee. This can be for a business office location or a post office box, as appropriate.

³ Available from Secretariat of the Range Commanders Council, White Sands Missile Range, New Mexico 88002-5110, July 2012, <https://www.trmc.osd.mil/wiki/display/publicRCC/Public+RCC+Home>.

⁴ Available from <https://www.ecfr.gov/current/title-14/chapter-III>, accessed 16 March 2021.

⁵ Available from http://www.faa.gov.space/spaceports_by_state, accessed 23 February 2022.

⁶ Available from <https://www.legislation.gov.uk>, accessed 31 March 2022.

5.1.3 *Phone Number*—The preferred general access phone number as specified by the spaceport licensee. The international phone number should be listed, with appropriate prefixes, is the preferred format. Alternately, the country of the phone number should be clearly identified. Additional phone numbers may be added at the spaceport’s discretion. The phone number should be an actively monitored number.

5.1.4 *Email*—The preferred general access email address as specified by the spaceport licensee. Additional emails may be added at the spaceport’s discretion. The email should be an actively monitored address.

5.1.4.1 If available, include a domain-specific email.

5.1.5 *Senior Personnel*—A list of senior spaceport personnel with name and title. Recommended minimum personnel to list are the Chief Executive Officer, President, Chief Operations Officer, and Chief Financial Officer. Additional personnel may be added at the spaceport’s discretion. Contact information for named personnel may be added at the spaceport’s discretion.

5.1.6 *Website*—The primary website/URL-address for the spaceport. Additional websites may be added at the spaceport’s discretion.

5.2 *Capabilities*—The purpose of this section is to provide launch operators a plain-English sense of the missions that each spaceport can support. It is not intended to be a limit on any spaceport’s capabilities, but as a place to start discussions. This section is intended to be a brief and overarching description of each spaceport for the convenience of potential users. Specific details on each element of launch are in other sections of the document.

5.2.1 Include the number and description of launch, landing, and recovery allowed by the licensing agency as part of the spaceport license (see following sections).

5.2.2 *Launch Vehicles Supported*—This section focuses on the sizes and capabilities for launch that are associated with each launch site. These capabilities can be license related, environmentally related, infrastructure related, or simply by preference of the spaceport.

5.2.2.1 *USA FAA-definition Based Launch Vehicle Categories*—The category(ies) of launch vehicle that can be launched from the spaceport as defined by its license per Code of Federal Regulations (CFR) Title 14, Chapter III, Subchapter C, Part 420, Subpart B, 420.19. Note that the FAA defines vehicles based on the U.S. customary units rather than the International System of Units (SI). Types of launch vehicles include orbital expendable launch vehicles, guided sub-orbital expendable launch vehicles, unguided sub-orbital expendable launch vehicles, and reusable launch vehicles. Orbital expendable launch vehicles are further classified by weight class, based on the weight of payload the launch vehicle can place in a 100 nm orbit, as defined in **Table 1** (FAA Part 420.19(a)(2)).

(1) *Other Launch Vehicle Categories*—Other appropriate definitions that may include definitions from other national and local governments, agencies or other vehicle category definitions if other than the U.S. FAA definition.

TABLE 1 Orbital Expendable Launch Vehicle Classes by Payload Weight (lbs)

100 nm orbit	Weight Class			
	Small	Medium	Medium Large	Large
28 degrees inclination ^A	≤4400	>4400 to ≤11 100	>11 100 to ≤18 500	>18 500
90 degrees inclination	≤3300	>3300 to ≤8400	>8400 to ≤15 000	>15 000

^A 28 degrees inclination orbit from a launch point at 28 degrees latitude.

(2) *Light Lift Vehicle Category*—Though not a distinct classification used by the FAA, the emergence of launch vehicles designed for ≤1000 kg (2200 lb) to LEO may be termed as “light lift vehicles” in local documentation. Site licensing requirements will always take precedence in official documentation.

5.2.2.2 *Sizes, Dimensions, Thrust*—This is a spaceport-defined field that provides a description of overall vehicle-specific limits for the site. Capabilities in this category are usually limits to the vehicle(s) capable of being launched from the spaceport. Limits can be low limits, high limits, or both. The source of the capability limits are usually from physical constraints of the spaceport (such as height, thrust, or weight capabilities limited by facilities), legal/licensing requirements (such as licensing authority limits to the type of vehicle), or simply by spaceport self-defined desires.

5.2.2.3 *Types of Launch Systems*—Defined by spaceport operator based on existing capabilities and relevant licenses. Launches of spacecraft have predominantly been classified as vertical or horizontal launch vehicles. Spaceports are often capable of supporting multiple types of launches and recovery, and each should be listed by the spaceport.

(1) *Vertical Launch*—Describe the spaceport’s capabilities for supporting vertical launches.

(2) *Horizontal Launch*—Describe the spaceport’s capabilities for supporting horizontal launches.

(3) *Other Vehicles*—There are many other types of vehicles in development or use. Any capability that a launch site wants to support, and is licensed/permitted to launch, should be added by the spaceport in this section. Some examples are listed below.

(a) *Lighter-Than-Air*—High-performance balloons capable of reaching “near space” altitudes.

(b) *Kinetic Launch*—Non-propulsive staging using kinetic systems to reach orbit, including dynamic launch systems and propulsive “guns.”

(c) *Hybrid Launch Vehicles*—Balloon-lifted rocket launches (Balrocs); modified or unique high-performance “aircraft,” etc.

5.2.2.4 *Landing Types*—Defined by spaceport operator based on existing capabilities and relevant licenses. Reentry and landing is typically vertical or horizontal, based on the type of vehicle, and landings may occur with or without propulsion

or steering. This section covers spaceport capabilities and availability of resources such as runways, landing pads, landing barges, skid-strips, at-sea or on-land recovery resources and capabilities, etc. that are to be included at the spaceport's discretion. See 5.2.3 for additional reentry vehicle information.

5.2.2.5 *Recovery Systems*—Defined by spaceport operator based on existing capabilities and relevant licenses. This section covers spaceport capabilities and availability of resources such as runways, landing pads, landing barges, skid-strips, at-sea or on-land recovery resources and capabilities, etc. See 5.2.2 for additional reentry vehicle information.

5.2.2.6 *Fuel Types*—Defined by the spaceport operator based on existing capabilities, relevant licenses, and environmental regulations/permits. This section can include simple descriptions such as liquid-fueled, LOX-hydrocarbon, Class III solids, or to any level of specificity desired by the spaceport. Include any site limitations for quantities of fuels, oxidizers, or other elements.

5.2.2.7 *Spaceport-required Flight Safety Systems*—Defined by the spaceport operator based on existing capabilities and relevant licenses, especially if there are any spaceport-specific requirements or limitations. Predominantly this will be defined as commanded termination flight/launch safety systems, autonomous flight safety systems, hybrid systems, or none required. The actual licensing/permitting of the launch vehicle is part of the launch license with the FAA (or other government entity).

5.2.2.8 *Launch History*—Include a high-level history of the site and launches. Other notes (may include details such as customers, dates, success rates, launch azimuth, type (vertical/horizontal), payload, success, etc.).

5.2.3 *Reentry Site License*—Note that in the United States, this may be a separate license from the spaceport license. The category(ies) of reentry vehicle that can be landed or recovered at the spaceport as defined by its license per Code of Federal Regulations (CFR) Title 14, Chapter III, Subchapter C, Part 433.

5.2.3.1 Include a nominal description of the types of reentry vehicles supported by the spaceport. These can be high level descriptions such as horizontal lifting/landing bodies, ballistic entry components, parachute recover, controlled/powerful vertical landings, powered horizontal landings, etc. Include appropriate details, descriptions, and limits.

5.2.3.2 If there is no reentry capability at the site, note that in lieu of a description of reentry vehicles.

5.2.3.3 *Recovery History*—Include a history of landings and recoveries with the following information: date; landing/recovery facility; landing/recovery vehicle description; landing/recovery vehicle size class; customer (if allowed by customer); other notes (may include details such as landing/recovery approach to site, type (vertical/horizontal), payload, success, etc.).

5.2.4 *Missions Supported*—This section is a spaceport-originated text description of the types of missions that the spaceport can or desires to support. It is not limited to strict definitions of capabilities, but should be reflective of the current capabilities and licenses for the spaceport.

5.2.4.1 *Human Occupied or Non-Occupied*—The spaceport should designate if they are willing, capable, or designed to support human-occupied vehicles and/or non-occupied vehicles. Plain-language descriptions of capabilities or advantages for supporting the types of missions, such as rescue and medical facilities, should be included (see 5.7.5). Any limitations or exceptions to human-occupied or non-occupied launches should be noted (such as restrictions on launches of living items, either animal/plant).

5.2.4.2 *Orbital*—These are launches that are intended to reach orbit (see Terminology F3377).

(1) *Reachable Orbits*—Initially defined by the launch site operator due to the location and licensing limitations of the site. Provide a plain-language description of the types of orbits reachable from the spaceport. This can be modified by discussions between the launch site, the launch operator, and the licensing authority due to unique vehicle launch capabilities (such as the ability to “turn” during launch, significant altitudes before launch vehicle ignition, etc.).

(2) *Launch Inclinations, Azimuths, and Other Limitations*—This section is the definition of geographic and airspace limitations of the launch site as defined in the license or permit for the site. Items to consider are the license limitations, approved azimuths and elevations, geographic limitation of launch, reachable launch inclinations, and suggested orbits (such as low inclination, polar, sun-synchronous, geostationary, etc.). Include any environmental restrictions.

5.2.4.3 *Sub-Orbital*—Launches that do not reach orbit (see Terminology F3377). Plain-language description of the types of sub-orbital missions that could be supported from the spaceport. This includes the launch/return envelopes of the vehicle. This could also include descriptions of capabilities to support unique vehicles such as carrier/launch vehicles, balloons, etc.

(1) *Launch Inclinations, Azimuths, and Other Limitations*—This is the definition of geographic and airspace limitations of the launch site as defined in the license or permit for the site (including any environmental restrictions).

5.2.4.4 *Recovery/Landing/Return-to-Launch Site*—Plain-language description of the spaceport's capabilities for a recovery, landing, or return mission.

5.2.4.5 *Ground Testing*—Plain-language description of the spaceport's capabilities for ground testing, such as designated test stands or testing areas, labs, payload processing capabilities, etc. Include location, services available, and capability of each test site available to customers.

5.2.5 *Weather Systems*—This section focuses on the types of weather systems available at the launch site, as well as any other weather-related systems and capabilities that the site can bring to support a mission.

5.2.5.1 *Weather Monitoring/Sensing*—A plain-language listing and description of the weather tracking systems available. Include the sensitivities and limitations in addition to the listing of the hardware. Examples should include things such as weather radar; linkages to national and global weather service outputs; linkages to local weather service outputs; lightning sensors/field mills; weather balloon and sonde capabilities; visual assessment by piloted or uncrewed/robotic assets; etc.

(1) Include appropriate technical details of the monitor and sensing equipment, such as type/sensitivity/capability of the weather radars; balloon/sonde capability; field mill deployment and sensitivity, etc.).

5.2.5.2 *Weather Prediction Services*—This is a description of any service, ability, and accuracy of the site to read, interpret, and predict weather based on any/all inputs from on-site systems. This can include remote/off-site interpretation and feeds to the launch team; on-site interpretation and feeds as part of the launch team; automated displays and feeds; on-site capabilities for prediction outside of the launch window (such as for scheduling normal operations or worker/vehicle protection).

(1) Include descriptions of any data feeds or systems normally available and used at the site (that is, NOAA, NWS, and FAA data).

(2) Describe the software tools and mission staffing used to provide appropriate weather prediction for the mission and site.

5.2.5.3 *Weather Protection Systems*—Include a plain-language description of the various weather protection systems available at the various areas of the launch site. This can include lightning protection systems such as lightning rods, towers, and catenaries; facility hardening for lightning and weather protection; facility systems such as HVAC, HVAC controls, insulation, etc. to allow for safe processing under specific weather conditions. Any limitations to processing caused by site weather conditions should also be noted.

5.2.6 *Lightning Protection and Hazard Mitigation*—Include a comprehensive description of the lightning protection systems at the site. These should include but are not limited to: air terminals and lightning grounding; surge protection; sensing or warning systems (that is, weather systems and field mills); and site procedures for use of the above.

5.2.7 *Bird Deterrence*—Include a description of known bird risks to the launch vehicle and any deterrence or avoidance systems or procedures. These could include things such as noisemakers, decoys, or site/date limitations due to specific bird presence.

5.2.8 *Services Offered:*

5.2.8.1 *Telemetry Systems*—Telemetry systems are those active or passive systems used to pass data between the launch/reentry vehicles and the ground, including all redundancy capabilities and recording systems. Description of the capabilities including frequencies; data rates; sensitivity; response rates; slew rates; real-time display and off-site transmission capabilities; cryptographic and cybersecurity systems associated with the data handling/processing; flexibility and turn-around time for the use of the system; vehicle to site interface requirements.

(1) Optical or other tracking systems (laser, sound, etc.) available are also part of the available telemetry description.

(2) While any Telemetry links to flight safety systems can be described in this section, the significance and use of such data should be specifically addressed in the following section, flight safety systems.

5.2.8.2 *Emergency Services:*

(1) *On-site Emergency Services*—Describe the capabilities and systems available on-site to a site user to provide emer-

gency services, especially those related to fires and energetics safety; medical support; and commodity spill response and control.

(a) Describe whether those capabilities and systems are always on-site or established at the request/need of a customer.

(2) *Community or Other Available Emergency Services*—Describe the capabilities and systems available from off-site sources to provide emergency services, especially those related to fires and energetics safety; medical support; and commodity spill response and control.

5.2.8.3 *Other Available Services*—Describe other services that the spaceport could provide to customers other than normal site duties. These could be things such as flight risk analysis tools, airspace control, additional security, RF spectrum management for the flight vehicle, etc.

5.2.9 *Flight Safety Systems*—This section covers Flight Safety Systems (FSS) that are used to control flight, terminate flight, or destroy the flight to protect personnel and property safety. This is a list of the systems available at or by the launch site to the launch vehicle operator. Flight safety systems listed are generally a launch requirement by the licensing agency. The launch site is expected to list those flight safety systems that are usable at the launch site, limited by local requirements, regulatory/license requirements, or site choice.

5.2.9.1 *Commanded*—Plain-language description of the on-site commanded FSS capabilities, including frequencies; data rates; sensitivity; response rates; slew rates; real-time display and off-site transmission capabilities; cryptographic and security systems associated with the data handling/processing; flexibility and turn-around time for the use of the system; vehicle to site interface requirements. While this is part of the launch operators' systems per license, this information should be available to the customer. Include any launch site or spaceport requirements for use of these systems for launch at the site.

5.2.9.2 *Autonomous*—Plain-language description of capabilities and limitations of using licensed/permitted autonomous flight safety systems (AFSS) at the spaceport. The description should include frequencies; telemetry links; AFSS capability limits/consideration; real-time display and off-site transmission capabilities; cryptographic and security systems associated; programming capabilities; programming and flight-data loading capabilities and turn-around time for the use of the system; vehicle to site interface requirements. Include any launch site or spaceport requirements for use of AFSS.

5.2.9.3 *Mobile Industrial Equipment Available*—The site's listing of industrial equipment available to the launch operator, either for their use or the site's personnel to use in support of the launch operator. This can include things such as trucks; ordnance-certified vehicles; forklifts; mobile cranes; manlifts; tow vehicles; mobile platform systems; moveable launch stools; etc.

NOTE 1—Facility-specific systems, such as built-in cranes or platforms are included in 5.3.

5.2.9.4 *Commodities Usable and/or Available On Site:*

(1) *Fuels and Oxidizers*—This is a detailed listing of fuels and oxidizers (with quantity limits) that are usable on site per the launch site license and environmental considerations. Any

cryogenic capabilities, hypergolic fuels, and other capabilities should also be highlighted in this section.

(a) The launch site may highlight which fuels and commodities are readily available on-site, including the detailed specification and quantities available on a normal basis.

(b) Lead times, if any, should be listed by commodity.

(2) *Industrial Commodities*—This is a listing of industrial commodities available on-site for use by a launch operator. This listing can include petroleum, oils, and lubricants (POL) (including road-vehicle fuels); industrial gases (such as nitrogen, welding gases, inert gases, etc.); cleaning supplies; paint and preservative coatings; or other commodities used in an industrial environment.

(a) Gaseous, compressed helium should be listed in this section, with detailed specification of quality and quantities available.

(b) Lead times, if any, should be listed by commodity.

(c) Hazardous waste disposal capabilities/responsibilities/procedures.

(3) *Cryogenic Commodities*—This is a listing of cryogenic or liquified gases that are usable on the site per the launch site license and environmental considerations. Included in this would be liquid oxygen, liquid nitrogen, liquified petroleum gases, liquid hydrogen, etc.

(a) Lead times, if any, should be listed by commodity.

5.3 *Spaceport Physical Elements and Descriptions*—This section describes the physical infrastructure on the sites, such as buildings, areas, and other facilities.

5.3.1 *Launch Locations On Site* (below info required for each launch location on the facility)—A launch site is each specific location/facility on the spaceport used for test, sub-orbital, or orbital launches. This includes horizontal launch sites, kinetic launch sites, balloon launch sites, or any other items. All specifically licensed locations should be included, with others as the spaceport desires.

5.3.1.1 *Text Description of the Site*—A plain-language title and description by the spaceport of the launch site to describe and characterize each specific launch location/site/facility.

(1) Include all facilities and support elements available to the launch, recovery, or test customer.

(a) Graphics, such as maps, aerial photography, and facility photography are very useful to the customer.

(b) Facility dimensions should be included in the facility descriptions. Dimensions, at a minimum, should include:

- Length, width, height,
- Usable interior dimensions (length, width, height),
- Door sizes, and
- Occupancy limits.

(c) Describe any amenities and capabilities of each facility (such as clean rooms, hypergolic capabilities, locker rooms, personnel amenities, etc.).

(d) Facility zoning and permit documents are very helpful in satisfying the intent of this section.

5.3.1.2 *Launch Location Latitude/Longitude*—The latitude and longitude of the exact location of the launch points (in the case of a fixed launch point) or the start of the launch-runway for a horizontal launch. The latitude and longitude should be

based on actual, qualified surveys or data linked to a recognized spatial reference system (SRS) or coordinate reference system (CRS).

NOTE 2—An internet-based map value or value from a portable personal cellular device is not generally an adequate source of location data without some form of calibration or corroboration. If the data is from an unverified or unqualified source, that should be noted along with the measurement.

(1) Latitude, with a positive value north of the equator, negative value south of the equator (north latitude is positive, south latitude is negative). Longitude, with a positive value to the east of the Prime Meridian and negative values west of the Prime Meridian.

(a) Preferred format is fractional (decimal) degrees for digital data exchange purposes, with both accuracy and precision considered, to at least four decimal places.

(1) Example using fractional notation: +28.5324°, -80.6830°

5.3.1.3 *Launch Location Elevation*—For a launch site, the height of the lowest fixed element of the launch structure. Height is defined in meters above (or below) the geodetic datum used at the launch site. In the United States, this datum and measurements should be traceable to the National Geodetic Survey (NGS) data, such as the North American Vertical Datum.

NOTE 3—An internet-based map value or value from a portable personal cellular device is not generally an adequate source of location data without some form of calibration or corroboration. If the data is from an unverified or unqualified source, that should be noted along with the measurement.

5.3.1.4 *Allowable Launch Azimuths, Elevations, Allowable Airspace, and Other Limits*—For each launch location, provide the allowable launch azimuths, elevations, allowed/prohibited airspace, and other limits directly from the license and permit. Highlight if there are other spaceport-applied restrictions in addition to the license. Graphical representations to augment the text descriptions are encouraged.

5.3.1.5 *Type/Size of Launches Supported*—For each launch location, provide the allowable vehicle sizes, focused on upper/lower limits that provide focus to the capability of each specific location. Data that are especially useful in this section are length-limits of the launch vehicle, weight limits, diameter limits, fuel restrictions at that launch site, etc.

(1) *Thrust*—Any maximum or minimum thrust limits at the launch location. The reason for any thrust limits should be annotated, such as a license requirement or a physical requirement by the existing facilities.

(2) *Fuels*—Allowable fuels/oxidizers and/or prohibited fuels/oxidizers at the launch location. The reason for these allowed fuels/oxidizers should be annotated, such as a license requirement, environmental permitting, or a physical requirement by the existing facilities.

(3) *Vehicle Size Limitations*—Vehicle height/length, weight, diameter restrictions at the launch location. The reason for these limitations should be annotated, such as a license requirement of a physical requirement due to existing facilities.

5.3.1.6 *Explosive Site Plans, Requirements, and Limitations*—Include a summary of the site's explosive site