

Guidance on applications to launch a large rocket under the Air Navigation Order

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Nomenclature and abbreviations

The following abbreviations and acronyms are used throughout this piece of guidance material:

Abbreviation	Definition
ACP	Airspace Change Proposal
ANO	Air Navigation Order of 2016
ALARP	As Low As Reasonably Practicable
ATC	Air Traffic Control
CAA	Civil Aviation Authority
CAP	Civil Aviation Publication
DfT	Department for Transport
DOF	Degree of Freedom
ELV	Expendable Launch Vehicle
EU	European Union
FAA	Federal Aviation Authority
FAA AST	Federal Aviation Authority, The Office of Commercial Space Transportation
FMECA	Failure Mode Effect & Criticality Analysis
FTA	Fault Tree Analysis
GSN	Goal Structuring Notation
HAZOP	Hazard and Operability Study
HSE	Health & Safety Executive
NASA	National Aeronautics and Space Administration
NSRP	NASA Sounding Rocket Program
Ofcom	The Office of Communications
PoF	Probability of Failure

SIA	Space Industry Act
SRPH	Sounding Rocket Program Handbook
TDA	Temporary Danger Area
UK	United Kingdom
UKSA	UK Space Agency
UKRA	United Kingdom Rocketry Association
US(A)	United States (of America)

CHAPTER 1

Scope

- 1.0 This document provides guidance for applicants seeking a large rocket permission from the Civil Aviation Authority (CAA) in the UK under Article 96 of the Air Navigation Order of 2016 (ANO). A link to the ANO can be found [here](#).

***Please Note:** This guidance has been published before the amendment to Article 96 in July 2021, and this will come into effect in August 2021.*

- 1.1 A large rocket is defined by Schedule 1 in the ANO as a rocket which has a total impulse from its motor (or motors in the case of combination motors) of at least 10,240 Newton-seconds. This guidance material covers any large rocket operating from the UK up to the stratopause (around 47km). For proposed operations that require a Space Industry Act (SIA) licence, please contact commercialspaceflight@caa.co.uk.
- 1.2 A wide range of operations fall into the category of a large rocket launch under the ANO. The risk posed by different operations will vary widely and therefore the approach to regulating large rocket launches must be scalable, and the regulatory burden proportional to the risk posed.
- 1.3 The risks we are interested in are those posed to third parties (people not involved in the launch, on land, sea or in the air). To maintain this proportionality, we use a safety case approach. This requires the operator to provide a structured argument, backed up with evidence, that the planned operation will be conducted safely.
- 1.4 Although this guidance is intended for applicants seeking a large rocket permission, the information in this guidance may be useful for operators launching smaller rockets that do not require a permission.

Definitions

- 1.5 The following terms are used throughout this guidance:
- **Accident:** An unintended event, or sequence of events that causes harm.
 - **ALARP:** As low as reasonably practicable
 - **Harm:** Adverse impact on people, including fatality, physical or psychological injury or long-term damage to health.
 - **Hazard:** A situation that could occur that has the potential for human injury, damage to property, damage to environment or economic loss. A situation which has no identifiable accident does not qualify as a hazard.

- **Property damage:** The estimated damage to property (including buildings and animals) should a launch or flight failure occur.
- **Incident:** Refers to an event which may initiate an accident sequence. The term is often used in the analysis of accidents or near-misses.
- **Permission:** A permission is the CAA allowing an applicant to undertake a particular activity (in this case a large rocket flight is the activity) that requires the CAA's permission.
- **Safety case:** A structured argument, supported by evidence that justifies a system is acceptably safe for a specific application in a specified operating environment. This should be supported by evidence that hazards to people on land, sea and in the air have been identified; and demonstrates how risk will be managed to be acceptably safe.
- **Hazard log:** A hazard log is a tool used to identify hazards and mitigate them, as well as track all hazard analysis, risk assessment and risk reduction activities for the whole-of-life of a safety-related system.
- **Planned apogee:** The defined maximum altitude that the rocket will be reaching during its planned activity.
- **Launch azimuth & inclination:** The launch azimuth is the angle of the launch rail relative to true north, and the inclination is the angle of the launch rail relative to the ground.

Post SIA commencement

- 1.6 Once commenced, the SIA will enable regulation of rockets which are capable of operating above the stratosphere. The stratopause varies with latitude and atmospheric conditions, but for the purpose of this guidance, the stratopause is considered to be about 47km above sea level for launching from the UK.
- 1.7 The ANO will continue to govern and regulate small and large rockets that are not capable of reaching beyond the stratosphere.

CHAPTER 2

Application Process

- 2.0 To apply for a large rocket permission, you as the operator must complete the specified application form ([SRG2200](#)), published on the CAA website.
- 2.1 For the CAA to grant a permission for a large rocket launch we need to be satisfied that your safety case demonstrates that the risks to public safety and to property are as low as reasonably practicable and acceptable, and that you have adequate insurance in place for your proposed launch.
- 2.2 Through your safety case, we are looking for:
- Evidence that you understand and will comply with applicable regulations and standards
 - Assurance through your safety argument that you have identified hazards and will manage risks appropriately.
 - Confidence that your procedures will be effective in managing risk
- 2.3 We request that you submit an outline of your mission specific safety case with the large rocket application form to give us an overview of how you are going to manage the risks to people not involved in the launch, on land, sea or in the air.
- 2.4 We would expect the hazards posed by your proposed activity to be identified and a structured argument to be outlined as to how the risk from these hazards will be minimised, including your approach to safety management. The evidence that supports your safety argument should be listed, including analysis methods, standards, any software tools, and the input parameters to any analysis tools.
- 2.5 An application for a large rocket permission will be assigned a CAA case officer from the commercial spaceflight regulation team throughout the permission process.
- 2.6 Following the review of your outline safety case, your case officer will request that you provide your full safety case.
- 2.7 A permission to launch a large rocket is for a single launch; repeat launches will need to apply for a permission for each subsequent launch. However, in the case of these repeat launches there will most likely be aspects in the application and safety case which can be repeated across each application.