# Guidelines for vertiport design - draft Advisory Circular 139.V-01 v1.0

# Overview

We would like your feedback on the draft advisory circular (AC) for vertiport design. Vertiports are a new type of aerodrome designed to service next-generation vertical take-off and landing (VTOL) capable aircraft (VCA). Vertiport sites can be in urban and regional locations as well as on existing aerodromes.

Draft Advisory Circular (AC) 139.V-01 v1.0 - Guidelines for vertiport design, is intended to provide guidance and information to people designing and constructing vertiports in support of advanced air mobility (AAM) operations. The guidance may support those who are in the early stages of vertiport development. The draft guidance covers the design specifications for vertiports supporting pilot-on-board VCA flying visual operations only.

With AAM evolving rapidly, these specifications for vertiports have been prepared to support the progress of necessary aerodrome infrastructure. The guidance provided is structured in such a way that it will evolve with the industry.

This draft AC provides guidance on:

* site selection including downwash protection
* physical characteristics
* obstacle limitation surfaces
* visuals aids including markings, markers and lights.

This draft AC will be of interest to:

* vertiport developers and designers
* potential vertiport owners and operators
* VTOL-capable aircraft manufacturers
* potential VTOL-capable aircraft operators and pilots
* AAM consultants and proponents
* local and state planning authorities
* aviation safety regulator staff.

## **Why your views matter**

We recognise the valuable contribution that community and industry consultation makes to the regulatory development process. Your feedback will increase our understanding of your needs and whether the draft AC provides adequate guidance on vertiport design considerations.

As this is the first AC relating to vertiports and AAM, we are seeking feedback as to whether:

* the content and structure of the guidance provided is clear and sufficient for this emerging industry
* it is fit for the purpose of supporting the development of infrastructure necessary for vertiports.

A copy of the draft AC is provided below with specific details appearing on the designated page of the survey.

## **Related documents**

All documents related to this consultation are attached in the ‘Related’ section at the bottom of the overview page. They are:

* Draft AC 139.V-01 v1.0
* MS Word copy of online consultation for ease of distribution and feedback within your organisation.

Please submit your comments on the draft AC through the Consultation Hub using the survey provided. If you are unable to provide feedback this way, please email us at [regulatoryconsultation@casa.gov.au](mailto:regulatoryconsultation@casa.gov.au).

Please read the AC document before providing your feedback.

## **What happens next**

At the end of the response period for public comment, we will review each comment and submission received. We will make all submissions publicly available on our website, unless you request your submission remain confidential. We will also publish a summary of the consultation which summarises the feedback received, outlines any changes, and details our plans for the AC.

# **Give Us Your Views** [Appears on the overview page at the bottom]

Online Survey [This link is on the front page of the survey and takes you to the survey questions]

**Events**

We have scheduled 4 webinars over the consultation period to provide background and explanatory information to anyone who is interested. To register to attend, email [vertiports@casa.gov.au](mailto:vertiports@casa.gov.au) and we will provide you a link to your requested session. Dates and topics are outlined below.

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| **Date** | **Time (AEDT)** | **Topic** | **Length** |
| 8 December 2022 | 2 pm | **Webinar – introduction to vertiports and the draft advisory circular**  (register at the link provided under ‘related links’)  This webinar will:   * provide an overview of the advisory circular document * cover the development process and philosophy behind the advisory circular * discuss the consultation process and where to provide feedback. | 45 minutes |
| 19 January 2023 | 2 pm | Webinar – learn about the physical characteristics of a vertiport  (register at the link provided under ‘related links’)  This webinar will:   * provide a chapter overview of the physical characteristics of a vertiport * discuss the essential verses optional components * cover taxiways, taxi-routes, stands and more. | 60 minutes |
| 2 February 2023 | 2 pm | **Webinar – what are the obstacle limitation surfaces for a vertiport**  (register at the link provided under ‘related links’)  This webinar will:   * provide a chapter overview of the obstacle limitation surfaces of a vertiport * discuss the ‘building block’ approach * cover clearways, approach/climb-out surfaces, and putting it all together. | 60 minutes |
| 16 February 2023 | 2 pm | **Webinar – find out what visual aids are needed for a vertiport**  (register at the link provided under ‘related links’)  This webinar will:   * provide an overview on markers and markings, including perimeter, positioning, guidance, and information markings * discuss taxiways and guidelines * cover lighting including perimeter, positioning, and guidance lighting. | 80 minutes |

**Related**[This section is at the bottom of the front page and contains all the links to other sites and documents related to this consultation]

**Related links**

* Webinar - 8 December 2022 at 2 pm AEDT – Introduction to vertiports and the advisory circular <https://www.eventbrite.com.au/e/webinar-introduction-to-vertiports-and-the-draft-advisory-circular-tickets-468152405447>
* Webinar - 19 January 2023 at 2 pm AEDT – Physical characteristics of a vertiport <https://www.eventbrite.com.au/e/webinar-learn-about-the-physical-characteristics-of-a-vertiport-tickets-468192485327>
* Webinar - 2 February 2023 at 2 pm AEDT – Obstacle limitation surfaces for a vertiport <https://www.eventbrite.com.au/e/webinar-what-are-the-obstacle-limitation-surfaces-for-a-vertiport-tickets-468206206367>
* Webinar - 16 February 2023 at 2 pm AEDT – Visual aids of a vertiport <https://www.eventbrite.com.au/e/webinar-find-out-what-visual-aids-are-needed-for-a-vertiport-tickets-468208814167>
* European Union Aviation Safety Agency - [Prototype Technical Specifications for the Design of VFR Vertiports for Operation with Manned VTOL-Capable Aircraft Certified in the Enhanced Category](https://www.easa.europa.eu/en/downloads/136259/en)
* [Federal Aviation Administration (United States) - Engineering Brief No. 105, Vertiport Design](https://www.faa.gov/sites/faa.gov/files/2022-09/eb-105-vertiports.pdf" \t "_blank)

**Related documents**

List of documents attached to the consultation

* Draft AC 139.V-01 v1.0 - Guidelines for vertiport design
* MS Word copy of online consultation on - Guidelines for vertiport design - draft Advisory Circular 139.V-01 v1.0

# **Audience and interest groups**

**Audience**

* CASA staff
* Air operators
* Manufacturers
* Pilots
* Traveling public/passengers
* Air traffic service providers
* Part 173 of CASR Instrument flight procedure designers
* Aerodrome owner/operators
* CASA aerodrome inspectorate
* Aerodrome industry consultants
* Air transport operations – rotorcraft (Part 133)
* Potential AAM operators
* AAM aircraft manufacturers
* Potential AAM pilots
* AAM consultants
* Vertiport developers
* Potential vertiport owner and operator
* Local and state planners

**Interest**

* Drones/unmanned aircraft systems
* Airspace and infrastructure
* Advanced air mobility
* New and emerging technology
* Vertiports

# Page.Consultation contents

This consultation is seeking feedback on the draft Advisory Circular (AC) 139.V-01 v1.0 - Guidelines on vertiport design.

The survey has been designed to give you the option to provide feedback on the survey in its entirety or to provide feedback on the sections of the draft AC that are of interest to you.

When you have completed the sections on which you wish to provide feedback, select the **‘Finish’** button at the bottom right of this page.

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| --- | --- |
| Page | Table of content |
| 1 | Personal information (required) |
| 2 | Consent to publish submission (required) |
| 3 | Site selection (Section 2.2) |
| 4 | Vertiport physical characteristics (Section 3) |
| 5 | Obstacle limitation surfaces (Section 4) |
| 6 | Visual aids – wind direction indicators, markings, and markers (Section 5.1.1 to 5.5.3) |
| 7 | Visual aids – lighting (Section 5.5) |

# Page 1. Personal information

## First name

(Required)

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## Last name

(Required)

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## Email

If you enter your email address, you will automatically receive an acknowledgement email when you submit your response.

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## Do your views officially represent those of an organisation?

(Required)

Please select only one item

Yes, I am authorised to submit feedback on behalf of an organisation

No, these are my personal views.

## If yes, please specify the name of your organisation.

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## Which of the following best describes the group you represent?

Please select only one item

Vertiport developer

Potential vertiport owner/operator

Vertiport or other aviation consultant

Existing aerodrome operator

Advanced air mobility (AAM) aircraft manufacturer

Potential AAM aircraft operator

Potential AAM aircraft pilot/crew

Local or state planning authority

Other government authority or policy stakeholder

Other

Please specify ‘Other’ if selected.

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# Page 2. Consent to publish submission

To provide transparency and promote debate, we intend to publish all responses to this consultation. This may include both detailed responses/submissions in full and aggregated data drawn from the responses received.

Where you consent to publication, we will include:

* **your last name** if the submission is made by you as an individual or
* **the name of the organisation** on whose behalf the submission has been made
* **your responses** and comments

We **will not** include any other personal or demographic information in a published response

Do you give permission for your response to be published?

*(Required)*

*Please select only one item*

Yes - I give permission for my response/submission to be published.

No - I would like my response/submission to remain confidential but understand that de-identified aggregate data may be published.

I am a CASA officer.

Information about how we consult and how to make a confidential submission is available on our [website](https://www.casa.gov.au/rules/changing-rules/consultation-industry-and-public)<https://www.casa.gov.au/rules/changing-rules/consultation-industry-and-public>.

# Page 3. Site selection (Section 2.2)

The nature of advanced air mobility may see the introduction of new aerodrome facilities in urban, suburban, and regional areas. If this happens, careful consideration will be required to ensure vertiports and their surrounds are compatible from an aviation safety point of view.

The selection of a vertiport site requires effective engagement with a range of stakeholders including aircraft manufacturers, operators, and government agencies. It also requires consideration of a range of variables such as:

* intended aircraft types
* area available
* vertiport configuration
* obstacle environment.

Particular attention should be paid to the vertiport’s proximity to other aerodromes and the impact of aircraft downwash on people, aircraft, buildings, and other equipment.

**Fact bank:** Downwash protection

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| Content  Extract from draft Advisory Circular 139.V-01 v1.0:  Section 2.2.3.1, A vertiport should be located and designed in a way to protect the following from damage or injurious effects of downwash associated with vertical take-off and landing capable aircraft operating to/from the vertiport:   * people * other aircraft * buildings * vehicles * equipment. |

**Question 1.** Do you think the content and structure of the guidance provided on site selection is clear and sufficient for this emerging industry?

Radio buttons

Yes

Yes, but with changes (please specify)

No (please explain why)

Not my area of expertise/not applicable

Comments

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**Question 2.** Do you think the information on site selection is fit for the purpose of supporting the development of infrastructure for vertiports?

Radio buttons

Yes

Yes, but with changes (please specify)

No (please explain why)

Not my area of expertise/not applicable

Comments

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**General comments**

Please provide any further comments you may have on the guidance relating to site selection.

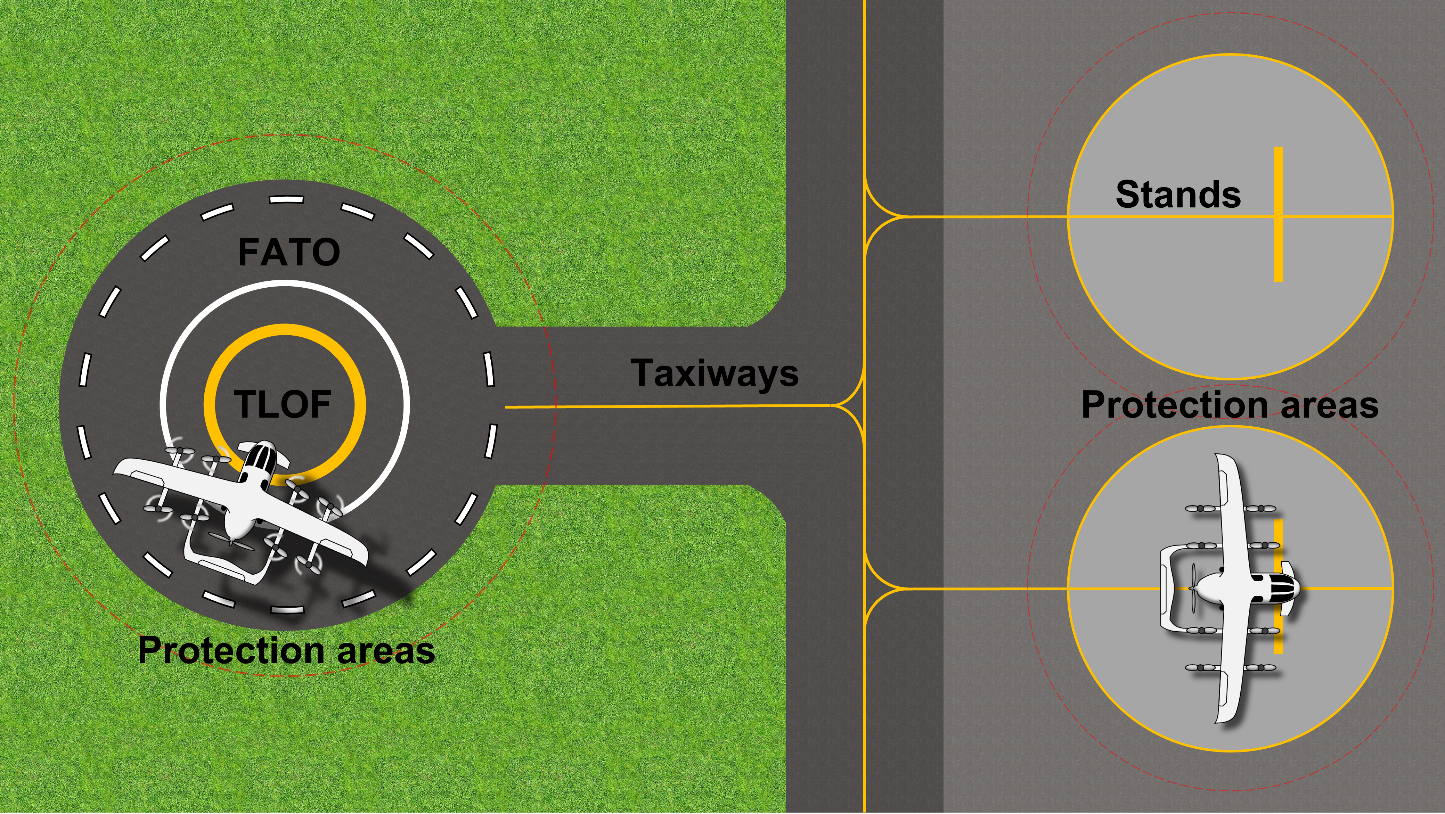
Comments

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# Page 4. Vertiport physical characteristics (Section 3)

A vertiport consists of essential components or defined areas and some optional components. These are the basic building blocks of a vertiport, as shown in the figure below, and include:

* + one or more final approach and take-off (FATO) areas
  + one or more touchdown/lift-off (TLOF) areas
  + protection areas
  + taxiways and/or taxi-routes
  + stands.



This draft advisory circular (AC) provides guidance on the minimum requirement for at least one FATO area and at least one TLOF area in vertiport configuration. This AC does not establish any standard approach to vertiport configuration beyond the minimum requirement for at least one FATO and at least one TLOF. The provision of more facilities including additional FATOs/TLOFs and taxiways or stands, depends on the needs of the vertiport owner and their intended scope of operations.

The dimensions of these components are determined using the dimensions of a design vertical take-off and landing (VTOL) capable aircraft (VCA). This design VCA is a virtual aircraft composed of the most demanding characteristics of the aircraft that the vertiport is intended to support.

A D-value is derived from the design VCA and used in many of the specifications to calculate the size of each vertiport facility. Some facilities may also be determined from overall width, undercarriage width and flight path/performance.

**Fact bank:** Definitions **–** Design VTOL-capable aircraft, D and Design D definitions

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| Content  Extract from draft AC 139.V-01 v1.0, Definitions:  **Design VTOL-capable-aircraft** means a virtual VTOL-capable aircraft type that has:   * + - the largest set of dimensions     - the greatest maximum take-off mass (MTOM), and     - the most critical obstacle avoidance criteria of the aircraft that the vertiport, or for a defined area within, is intended to serve.   **D, for VTOL-capable aircraft**, means the diameter of the smallest circle enclosing the VTOL-capable aircraft projected on a horizontal plane, while the aircraft is in the take-off or landing configuration, with lift/thrust units turning, if applicable.  **Design D** means the D of the design VTOL-capable aircraft. |

**Question 1.** Do you think the content and structure of the guidance provided on vertiport physical characteristics is clear and sufficient for this emerging industry?

Radio buttons

Yes

Yes, but with changes (please specify)

No (please explain why)

Not my area of expertise/not applicable

Comments

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**Question 2.** Do you think the information on vertiport physical characteristics is fit for the purpose of supporting the development of infrastructure for vertiports?

Radio buttons

Yes

Yes, but with changes (please specify)

No (please explain why)

Not my area of expertise/not applicable

Comments

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**General comments**

Please provide any further comments you may have on the guidance relating to physical characteristics.

Comments

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# Page 5. Obstacle limitation surfaces (Section 4)

Early indications are that vertical take-off and landing (VTOL) capable aircraft (VCA) operators intend on operating, and have the capability to manoeuvre, within a wide flight envelope. Early models have demonstrated significant vertical procedures as well as horizontal transitions to more conventional flight. This creates a challenge with establishing an obstacle free environment in which this manoeuvring can be undertaken safely.

A further challenge is the future operation of VCAs in urban and sub-urban areas, as both are considered obstacle-rich environments.

Draft Advisory Circular (AC) 139.V-01 v1.0 describes a set of areas and surfaces that can be used to establish either simple or complex arrangement of surfaces. These arrangements are dependent on the flight path(s) of the aircraft the vertiport is intended to support. As such, the development of a specific vertiport’s obstacle limitation surfaces (OLS) will require coordination with potential aircraft operators.

This AC does not include procedures relating to obstacle restriction or protection with respect to objects outside of the vertiport. Their use as prescriptive or descriptive surfaces will be dependent on the local planning scheme, state policy and scope of operations.

**Question 1.** Do you think the content and structure of the guidance provided on OLS is clear and sufficient for this emerging industry?

Radio buttons

Yes

Yes, but with changes (please specify)

No (please explain why)

Not my area of expertise/not applicable

Comments

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**Question 2.** Do you think the information on OLS is fit for the purpose of supporting the development of infrastructure for vertiports?

Radio buttons

Yes

Yes, but with changes (please specify)

No (please explain why)

Not my area of expertise/not applicable

Comments

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**General comments**

Please provide any further comments you may have on the guidance relating to OLS.

**Comments**

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# Page 6. Visual aids – wind direction indicators, markers, and marking (Section 5.1.1 to 5.5.3)

Draft Advisory Circular 139.V-01 includes specifications for visual aids for wind direction indicators, markers, and marking, as it is directed at pilot-on-board operations.

The specifications are generally based on heliport visual aids. However, there are some differences that should be noted. Namely:

* many provisions have been simplified and some markings made optional
* flexibility has been established with respect to vertiport identification markings.

**Question 1.** Do you think the content and structure of the guidance provided on wind direction indicators, markers and marking, is clear and sufficient for this emerging industry?

Radio buttons

Yes

Yes, but with changes (please specify)

No (please explain why)

Not my area of expertise/not applicable

Comments

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**Question 2.** Do you think the information on wind direction indicators, markers and marking, is fit for the purpose of supporting the development of infrastructure for vertiports?

Radio buttons

Yes

Yes, but with changes (please specify)

No (please explain why)

Not my area of expertise/not applicable

Comments

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**General comments**

Please provide any further comments you may have on the guidance relating to visual aids for wind direction indicators, markers and marking.

**Comments**

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# Page 7. Visual aids – lighting (Section 5.5)

As with marking and markers, specifications for vertiport lighting have been provided to support pilot-on-board advanced air mobility operations.

This section of the draft Advisory Circular (AC) 139.V-01 v1.0 continues the usage of performance-based specifications by setting describing photometric requirements as ‘appropriate’ rather than prescribing complex light output standards.

Again, this section relies on heliport lighting standards as a basis with some provisions held in reserve pending further analysis and industry feedback.

**Fact bank:** Visual aids – lighting – general

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| Content  Extract from draft AC 139.V-01 v1.0:  **5.5.1 General**  5.5.1.1 Lights and lighting systems should be installed, in accordance with the following specifications, at a vertiport used or available for operations at night.  5.5.1.2 The photometrics for vertiport lights and lighting elements should be appropriate to the vertiport environment and intended operations without being visually distracting or confusing to pilots.  5.5.1.3 If the operating environment varies, lighting systems should be adjustable in order to achieve the appropriate intensity, if needed. |

**Question 1.** Do you think the content and structure of the guidance provided on vertiport lighting, is clear and sufficient for this emerging industry?

Radio buttons

Yes

Yes, but with changes (please specify)

No (please explain why)

Not my area of expertise/not applicable

Comments

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**Question 2.** Do you think the information on vertiport lighting is fit for the purpose of supporting the development of infrastructure for vertiports?

Radio buttons

Yes

Yes, but with changes (please specify)

No (please explain why)

Not my area of expertise/not applicable

Comments

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**General comments**

Please provide any further comments you may have on the guidance relating to visual aids for lighting.

**Comments**

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