

**USE-CASES – SPACE FOR SUSTAINABILITY IN SPORT AND MASS
EVENTS**

Prepared by	ESA
Reference	ESA-CICA-SOW-2025-2838
Issue/Revision	1.0
Date of Issue	06/05/2025
Status	Final

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1. INTRODUCTION

This document outlines the use cases to be incorporated into the “Space for Sustainability in Sports and Mass Events” thematic call for proposals.

The use cases presented have been developed through collaboration between the European Space Agency (ESA) and key stakeholders in the sports and mass events sectors.

The initiative aims to foster the development of sustainable services that leverage space assets and technology to address critical challenges and unlock opportunities for operational solutions.

When preparing the initial proposal (APQ/Outline proposal), applicants must clearly specify which use-case(s) their proposed solution intends to address.

2. USE CASES

The European Space Agency (ESA) and key stakeholders have identified several focus areas and use cases where space-enabled solutions can provide significant benefits. Potential bidders responding to this thematic call for proposals are encouraged to submit proposals that address the outlined use cases or propose alternative concepts based on their own research and expertise.

2.1 International Ski and Snowboard Federation (FIS)

The International Ski and Snowboard Federation is the highest international governing body for skiing and snowboarding. Through its 140 member nations, more than 7,000 FIS competitions are staged annually including World Cup competitions and biannual World Championships. Events could take a heavy toll on resources, society and the environment. In the big events organisation, innovative solutions must be continuously explored to increase the impact and long-term benefits, and to assess and control them, while delivering key legacies prior to and after the event itself to provide not a negative impact on such global issues as the climate change, biodiversity loss and human rights, new solutions must be put in place as soon as possible, based on an open approach to change and innovation.

The main objective is to organize a more sustainable event, considering the pollution and carbon reduction, the nature and biodiversity protection, the circular economy.

2.1.1 Use-case #1: Carbon Reduction

- mobility, logistics and transport services in line with the carbon reduction of the event and with the need to host a high number of users for a short period of time;
- mobility and logistic services through all the event venues and locations.

2.1.2 Use-case #2: Nature and Biodiversity protection

- security of the access to the construction sites, e.g. tracing the authorised vehicles, checking the compliance of materials and tools to the regulations, verifying the compliance of environment and places within the sites;
- monitoring the progress of construction sites and in particular land use and landscape transformations;
- promote a new level of intelligence for the sustainable use of resources in snowmaking, to achieve significant savings in water and electricity use. This is achieved by ensuring accurate planning of the amount of snow required per area and slope. Continuous comparison of planned and actual quantities and other important factors can ensure optimal planning of snowmaking, saving resources.

2.1.3 Use-case #3: Circular Economy

- services supporting the transition towards circular and smart cities for the sustainability of the hosting locations;
- tracking the supply chain by providing deep insights into each individual segment of it to assurance that the products are produced in an environmentally sustainable and ethical way. Having access to an accurate, complete view of the supply chain makes it easier to pursue proactive changes such as shifting production methods to become more sustainable or pressuring a supply partner to improve its labor practices.

2.1.4 Use-case #4: Sustainable Infrastructure

- planning of sustainable new building/infrastructures (transport, energy and other utilities, connectivity) based on assessment of their environmental impact, and aiming at

versatility and flexibility of their use after the events to ensure a return of the investment in the long-term;

- support the planning and location in case of temporary and demountable venues where no long-term venue legacy need exists or can be justified (e.g. mapping of the locations and analysis of the logistics, environmental impact analysis, efficiency of the buildings, monitoring of the working sites status);
- renewal, adaptation and enhancement of the use of existing facilities (e.g. smart building, digitalisation and safety of access).

2.2 Sports for Nature initiative (IUCN)

Sports for Nature is a joint initiative led by IUCN created to tap into sports' enormous potential to take on ambitious goals and drive positive change. The Framework aims to deliver transformative, nature positive action across sports by 2030 and beyond, enabling sports to champion nature and contribute to its protection and restoration. The key challenge to address is the following:

Problem statement: Challenge with monitoring, measuring and evaluating the (positive and negative) impact sport organisations have on nature.

Measuring biodiversity and nature is unique to each ecosystem and activity, and currently, there are no standardized quantitative measures. This is in comparison to carbon accounting, that while it includes many assumptions, there is a globally accepted calculation approach.

Sports organisations and events interact with nature and biodiversity in various ways including but not limited to sound or light pollution, introduction or interaction with invasive alien species, disruption or destruction of ecosystems. Currently, sports organisations are limited in their ability to measure negative or positive impacts on nature.

2.2.1 Use-case #1: Sports Event Site Monitoring system

To monitor the “before-during-after” of a sport event which could include:

- Site assessment, venue selection, and planning
- Ecosystems, flora, and fauna
- Air quality, land or water pollution
- Observe and measure restoration efforts over time

2.2.2 Use-case #2: *Biodiversity Impact mapping and monitoring system for sports*

This tool would support transparency, encourage collaboration, and highlight the role of sport in driving tangible environmental benefits. It could include:

- **Action Mapping & Tracking:** Visualization of (positive) nature-related activities—such as reforestation, habitat restoration, or other biodiversity initiatives—undertaken by sport organisations.
- **Temporal Analysis:** A timeline function to monitor the evolution of the actions and track environmental improvements over time in individual locations as well as globally illustrating the cumulative impact of the Sports for Nature initiative.
- **Categorical Layering:** Grouping of sports based on context, such as urban vs. rural settings, or by ecosystem type, allowing users to filter and compare actions across different sports disciplines and environments.

2.3 Love Tomorrow

Tomorrowland, through its sustainability platform *Love Tomorrow*, is partnering with the European Space Agency (ESA) to co-develop innovative, space-enabled solutions for the sustainability challenge. This initiative focuses on following critical areas: **Carbon Reduction**, **Sustainable Mobility** and **Supply Chain Transparency within the Circular Economy and Food**.

2.3.1 Use-case #1: *Sustainable Mobility for Events*

Transportation represents up to 73% of the festival's carbon footprint.

Goal: Reduce environmental impact and improve visitor travel experience by using space-based technologies for smarter, greener mobility planning.

Key Challenges & Objectives:

1. **Multimodal Mobility Optimization**
 - *Impact:* Reduced congestion, improved flow, and enhanced visitor guidance via a Mobility as a Service (MaaS) platform.
2. **(Transport) Emissions Monitoring**
 - *Impact:* Accurate CO₂ tracking across transport types (air, road, sea), enabling better and faster planning, calculation and data-driven emission reduction.
3. **Last-Mile Connectivity**

- *Impact:* Overcome the "last-mile" gap where current, and especially public or sustainable transport fails, while maintaining safety and accessibility.

2.3.2 Use-case #2: Circular Economy & Supply Chain Transparency

From stage materials to food, events depend on global, complex, and often opaque supply chains.

Goal: Leverage data to ensure responsible sourcing, ethical food systems, and improved resource efficiency.

Key Challenges & Objectives:

1. Sustainable Material Verification

- *Impact:* Reduce dependency on unverifiable certificates and establish traceable, eco-conscious procurement and make better choices in the future.

2. Food Supply Chain Transparency

- *Impact:* Minimize emissions, food waste, and unsustainable practices through better visibility and track sourcing of food.