European Union Aviation Safety Agency

Higher Airspace Operations (HAO)

What is the HAO research project?

Answer

The HAO project is an EASA-led, EU-mandated research and regulatory preparatory action aimed at developing a draft regulatory framework for Higher Airspace Operations (HAO) in EU airspace, to support future civil aviation activities above altitudes where conventional air traffic typically takes place (>FL 550)

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Link:
https://www.easa.europa.eu/en/faq/142984

Why is this project being conducted?

Answer

EASA is developing draft regulations for Higher Airspace Operations (HAO) in response to the emergence of new high-altitude and near-space activities such as high-altitude platforms, pseudo-satellites, and novel aerospace vehicles that are not adequately covered by existing regulatory frameworks. These operations raise new safety, security, environmental, and legal challenges and, if left unaddressed, could lead to regulatory gaps or fragmented national approaches across Europe. To ensure legal clarity, harmonised oversight, and a proportionate safety-based framework that supports innovation while protecting the public interest, the European Commission formally mandated EASA in November 2024 to develop draft regulations for Higher Airspace Operations in Europe.

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What are the main objectives of the HAO project?

Answer

A: The project objectives are to:

1. Build awareness and know-how on HAO,
2. Conduct scientific research and collect technical data,
3. Prepare a Notice of Proposed Amendment (NPA) for a future regulatory framework, and

Coordinate and manage project activities

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How long will the project run?

Answer

The project runs from November 2024 to September 2027.

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What is the expected long-term goal?

Answer

To enable HAO within the EU civil aviation system in a progressive, proportionate and harmonised manner. The framework shall ensure a high level of safety while enabling innovation and sustainable growth. Over time, this framework should provide legal certainty for operators and authorities, support cross-border operations, and ensure consistent oversight across Member States.

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What types of higher airspace operations exist today?

Answer

Several higher airspace operations already exist today within the scope of civil aviation, primarily in experimental, research, or early operational contexts. These include:

Existing or experimental operations include:

- High-altitude aircraft operations (typically up to 18–25 km),
- High-Altitude Long-Endurance (HALE) UAS (approximately 18–30 km),
- High-altitude balloon operations (20–40 km),
- Sounding rockets and experimental vehicles reaching altitudes well above 80 km.

These operations differ significantly from conventional air transport in terms of performance, endurance, flight profiles, and interaction with other airspace users, which highlights the need for tailored and proportionate aviation regulatory approaches. Other types of activities, such as spaceflight or military operations, also take place at higher altitudes but fall outside EASA's civil aviation remit and are therefore not directly addressed within this framework.

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Are there HAO already in operation in Europe?

Answer

Yes, certain types of higher airspace operations are already taking place in Europe, mainly in experimental, research, or limited operational contexts. These include high-altitude research aircraft, High-Altitude Long-Endurance unmanned aircraft systems, and high-altitude balloon operations conducted for scientific, environmental monitoring, or communication purposes. However, such activities are currently managed on a case-by-case basis under existing national or ad-hoc regulatory arrangements, as there is no dedicated, harmonised European regulatory framework for Higher Airspace Operations yet. Large-scale commercial HAO operations do not yet exist in Europe.

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Where does airspace end and where does outer space begin?

Answer

There is no internationally agreed legal boundary defining the vertical limit of national airspace or the start of outer space. However, commonly used conventions include:

- Airspace: Generally considered to extend up to the altitude where aerodynamic flight is no longer practicable, typically below 80–100 km above mean sea level.
- Outer space: Commonly referenced as beginning at the Kármán line (100 km). Some States use an alternative operational reference of 80 km.

These references are based on established practice and common understanding, rather than on formal legal definitions, and are used to support operational coordination and safety management.

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What is the difference between suborbital and orbital flight?

Answer

The distinction is based primarily on velocity and trajectory, not altitude alone.

- Suborbital flight: Follows a trajectory that reaches very high altitudes, potentially even exceeding 100 km, but does not achieve orbital velocity and returns to Earth without completing an orbit.
- Orbital flight: Achieves sufficient horizontal velocity to remain in continuous free-fall around the Earth. Sustained Low Earth Orbit (LEO) typically occurs from approximately 160 km and above.

These distinctions support operational classification and regulatory considerations and do not define legal boundaries.

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Which rules currently apply in higher airspace?

Answer

Flights conducted in higher airspace are generally subject to air law, and the EU and its Member States are competent to regulate civil aviation activities within their respective competences. A legal study is conducted to clarify how existing aviation rules apply to higher airspace operations and to identify any regulatory gaps that may need to be addressed.

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Will HAO vehicles require certification?

Answer

HAO vehicles will - in principle - be subject to certification requirements where they qualify as aircraft under existing EU aviation legislation. In such cases, the applicable certification specifications and processes will be applied in a proportionate manner, taking into account the specific characteristics and operational risks of the operation. For novel designs or operating concepts that are not adequately addressed by existing rules, alternative means of compliance or special conditions may be developed. Where appropriate, new or adapted certification frameworks may be considered as part of the ongoing regulatory development to ensure an appropriate level of safety without unduly constraining innovation.

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Will environmental impacts of HAO be considered?

Answer

Yes. Environmental impacts are being considered as part of the Higher Airspace Operations activities, including potential effects related to noise, emissions, non-CO_2 effects, and other

environmental aspects. This work is intended to support evidence-based decision-making and to inform any future regulatory developments, as appropriate

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How are safety and security addressed?

Answer

Safety and security considerations are being addressed through ongoing studies and analyses intended to identify potential safety and cyber-security risks associated with higher airspace operations. The results will inform the definition of safety and security objectives and support the development of proportionate mitigation measures as part of future regulatory work.

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What are the main risks and challenges associated with HAO?

Answer

Higher Airspace Operations present several specific risks and challenges that differ from those of conventional aviation. These include the safe integration of such operations into the existing airspace system, including issues of segregation where necessary; questions related to national sovereignty and cross-border coordination; and safety and risk management aspects such as collision and ground risks, detect-and-avoid capabilities, and human factors. Additional challenges relate to potential environmental impacts, cybersecurity and system reliability, as well as regulatory and legal uncertainty resulting from the absence of a dedicated and harmonised framework. Addressing these challenges in a proportionate and coherent manner is a core objective of the Higher Airspace Operations project.

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What are the main tasks in the HAO project?

Answer

In line with the mandate received from the European Commission to develop draft regulations for Higher Airspace Operations, the project is organised around four main tasks that support a structured and evidence-based regulatory process.

Task 1: Awareness, guidance, and stakeholder engagement *aims to ensure a shared understanding of Higher Airspace Operations across Member States, industry, and other stakeholders, and to support early alignment on concepts, challenges, and regulatory expectations relevant to future rulemaking.*

Task 2: Scientific studies *provide the technical and analytical basis for regulation, covering safety, security, environmental, and operational aspects. The results of these studies support the identification of risks, the assessment of regulatory needs, and the definition of proportionate safety and security objectives.*

Task 3: Regulatory preparation and development of a Notice of Proposed Amendment (NPA) *focuses on translating the evidence and analysis into concrete regulatory proposals. This includes clarifying the applicability of existing aviation rules, identifying regulatory gaps, and preparing draft regulatory material for consultation in accordance with the Commission mandate.*

Task 4: Project and administrative management *ensure effective governance, coordination, and delivery of the project, including alignment with the Commission mandate, internal EASA processes, and reporting obligations.*

Together, these tasks ensure that the mandate to develop draft regulations for Higher Airspace Operations is addressed in a coherent, transparent, and proportionate manner.

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Will the project include scientific research?

Answer

Yes. Multiple scientific studies are being conducted as part of this project to support impact assessments and regulatory decision-making, including studies on safety, sustainability, cyber-security, human factors and operational constraints.

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https://www.easa.europa.eu/en/faq/143002

What is the key regulatory output of the project?

Answer

The key output will be a Notice of Proposed Amendment (NPA) presenting draft regulatory options and associated impact assessments. A NPA is a formal EASA consultation document that presents proposed changes to aviation rules and invites stakeholder comments before the proposals are finalised and submitted to the European Commission.

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What kinds of studies is EASA outsourcing to external organisations?

Answer

EASA is commissioning external studies covering:

- Literature review on HAO,
- Demand and market analysis,
- Civil CNS needs and capabilities,
- Meteorology and space weather services,
- Aero-medical fitness,
- Safety, sustainability and cybersecurity risks,
- Legal analysis of applicable regimes and competences.

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What HAO tasks is EASA conducting internally?

Answer

EASA is carrying out internally:

- Awareness and capacity building (including regulatory sandbox guidance and occurrence reporting,;
- Review of and consolidation of comments on ECHO 1 and ECHO 2 results,
- Regulatory gap analysis and impact assessment,
- Drafting the NPA and organising stakeholder consultations,
- Organisation of workshops and promotion of new guidance or regulatory material,
- Supporting the Commission with international coordination (e.g. ICAO),
- Project coordination, contract oversight and reporting to the European Commission.

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Who is involved in the HAO project?

Answer

The HAO project is led by EASA and is carried out in close cooperation with the EU Commission, EU Member States, the EDA, EUROCONTROL and others. Seven scientific studies on relevant topics of different complexity are being outsourced to external stakeholders. The project also involves targeted consultations with industry, research organisations, academia, and other stakeholders to ensure that a broad range of operational, technical, and regulatory perspectives is considered. Where appropriate, coordination with international partners and standard-setting bodies is pursued to promote consistency and interoperability beyond Europe.

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How will stakeholders be engaged?

Answer

Through advisory boards, targeted workshops, meetings, and consultations on draft impact assessments and regulatory options.

Specific external stakeholders will be directly involved in the research activities through the outsourced tasks. Specific key stakeholders like the EDA and EUROCONTROL will be engaged through direct cooperation and consultation. In addition, EASA will organise dedicated workshops and technical meetings and conduct focused consultations. Stakeholder input will be sought throughout the project, during the development of impact assessments and the elaboration of regulatory concepts and options, as well as through formal public consultation on draft regulatory proposals.

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What is a regulatory sandbox in the context of HAO?

Answer

A regulatory sandbox is a controlled and time-limited, experimental framework allowing innovative HAO technologies or operational concepts to be tested under defined conditions and appropriate regulatory oversight. Its purpose is to enable learning, risk identification, and evidence gathering in support of future regulatory development, while maintaining an appropriate level of safety and compliance.

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Can companies developing HAO projects get support from EASA?

Answer

Yes, however, there are some caveats: Under the contribution agreement signed with the

European Commission, no resources have been allocated to provide direct operational or financial support to industry. However, independently of the HAO project, companies may consult EASA and draw on its expertise through the Agency's Innovation Services, in accordance with the applicable framework.

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How does EASA ensure international coordination for HAO?

Answer

EASA coordinates with:

- ICAO for global alignment,
- EDA for dual use technology and to take due account of military/state interests,
- EUROCONTROL and ANSPs for airspace and ATM integration,
- International research, industry and civil-military stakeholders to promote harmonisation and safety.

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