

COST Action proposal

Stratospheric vehicle design — a roadmap for the challenges ahead

Invitation to join the Network of Proposers

COST Open Call oc-2026-1 · Submission deadline **28 October 2026, 12:00 CET**
18 September 2026

This note invites researchers and organisations to join the Network of Proposers for a COST Action proposal on the design of stratospheric vehicles, to be submitted to the 2026 COST Open Call.

It is not an invitation to an idea at an early stage. The consortium is formed, the Technical Annex is drafted in full, and the work plan and schedule are complete. What remains before submission is to close a small number of specific gaps in the network — which is the purpose of this note.

8 COST Member countries	12 institutions	4 Working Groups	4 yr duration, ≈ €700k
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The challenge

Uncrewed, solar-powered platforms have now sustained flight in the lower stratosphere, between 18 and 22 km, for periods extending from days to months. The civil applications are immediate: persistent connectivity for regions terrestrial infrastructure cannot reach economically, communications that survive the destruction of ground infrastructure by disaster, and continuous atmospheric observation at a combination of resolution and revisit rate satellites cannot achieve.

Demonstrators have flown. A design discipline has not yet formed around them.

The design problem at these altitudes resembles neither conventional aviation nor spaceflight. Air density is roughly seven per cent of its sea-level value, so lift demands very large wing areas carried by very little mass; the resulting structures are so slender that linear aeroelastic theory no longer describes them. Aerodynamic surfaces operate at Reynolds numbers around 100 000, where established correlations lose validity. Temperatures near and below –60 °C, near-vacuum convection and prolonged ultraviolet exposure hold materials and batteries at their limits. And every one of these constraints feeds a single energy balance that must close across a full day and night, so that a modest error in any one discipline moves a design from feasible to impossible.

Research groups across Europe address these questions in isolation, against different reference cases, different test protocols and different descriptions of the atmosphere. Published results therefore diverge for reasons unconnected to the physics, and progress within each discipline does not accumulate across the field. **That deficit — not any single unsolved equation — is what this Action exists to correct.**

What the Action will produce

The Action is a networking instrument: COST funds coordination, mobility, training and meetings, not research itself. Its outputs are consequently the shared basis that individually funded projects cannot create separately:

- an **agreed specification of the stratospheric design environment** for 18–22 km, adopted as the common input across the network;

- an **open, coupled benchmark and validation suite** — at least eight reference cases with stated conditions and reporting format, allowing independently developed methods to be compared directly for the first time;
- **harmonised accelerated-ageing and test protocols**, validated through an inter-laboratory round-robin across at least five laboratories, so that durability results become aggregable into design allowables;
- **interface definitions** permitting structures, aerodynamics, propulsion, energy and atmosphere to be treated as one coupled system;
- the **European Stratospheric Flight Design Roadmap** — what is technically settled, what remains genuinely open, and what regulators require in order to act.

Working Groups

WG1 — Structures, aeroelasticity and materials. Very slender, highly flexible structures under large deflection; durability of thin films and ultra-light composites under prolonged exposure.

WG2 — Propulsion, energy and thermal management. Aerodynamic and propulsive performance at low Reynolds number; closure of the diurnal energy balance; thermal behaviour.

WG3 — Atmospheric environment, payloads and services. The operating environment and the service requirements that set design cases.

WG4 — Regulation, airspace integration and Roadmap. Certification pathways, airspace integration, and assembly of the Roadmap.

What the network is looking for

The network is strong in structures, aeroelasticity, materials and platform design. It is deliberately seeking partners in the following areas, and in countries not yet represented.

Expertise still needed

- **Aviation law and civil aviation regulation** — the highest priority. WG4 has no senior subject specialist.
- **UTM and airspace integration** — needed for the Roadmap.
- **Accelerated ageing of thin films and ultra-light composites** — the inter-laboratory round-robin campaign rests on it.
- **Structural metrology and experimental test facilities.**
- **Industry — composite production and aerospace systems.**

Countries. Eight COST Member countries are currently represented — Türkiye, Spain, Poland, the United Kingdom, Lithuania, Hungary, Serbia and Ukraine — together with a global partner in Malaysia. The network is expanding further, with priority to **Inclusiveness Target Countries** not yet in the network.

A point better stated plainly than left implicit. COST applies two composition rules as conditions of eligibility: at least half the participating countries must be Inclusiveness Target Countries, and **at least 40% of all individuals in the network must be under the age of 40 during 2026**. The second was the binding one; the network now stands at 54% and the margin is worth protecting, which is why every partner is asked to join together with a younger colleague from their own group — a postdoctoral researcher, PhD candidate or junior faculty member, who becomes a full proposer in their own right and takes a real role in a Working Group.

Nominations of women researchers are particularly welcome; the network stands at 31% and intends to do considerably better.

For companies

Industry participation is not decorative in this Action: companies test every design guideline and benchmark case against what can actually be manufactured, qualified and maintained, host mobility visits, and take part in four industrial review sessions held at their own premises.

Two things are worth knowing. First, **the company decides who represents it** — this need not be a director, and the engineer who would actually do the work is usually the better choice; if that person is under 40, it also helps the network meet the age requirement above. Second, engagement is designed around short, defined contributions — one review round on a draft guideline, one hosted visit, one training contribution — in recognition that smaller companies cannot release engineering staff for open-ended commitments.

What joining involves — and what it does not

There is no financial commitment of any kind. COST funds networking from its own budget. There is no co-funding requirement, no institutional contribution, and **no letter of intent** is required from your institution — no signature, no administrative approval process. Participation is a personal decision.

No budget is requested at proposal stage. There is no financial planning to do.

What is required is short:

Step	Detail
1. e-COST profile	Register or update at e-services.cost.eu . Affiliation, country, date of birth and expertise must be complete — COST derives the eligibility percentages automatically from these fields.
2. Provide	Full name exactly as it appears in e-COST, the e-mail address registered there, year of birth, institution, and first and second Working Group preference — to the contact address at the end of this note.
3. Two declarations	That you are not a proposer in any other proposal in this COST collection, and that you are not a COST National Coordinator, Scientific Committee member or CSO Delegate. Both are COST rules; the first, if breached, makes the whole proposal ineligible.
4. Accept the invitation	A formal invitation is then issued through e-COST and accepted with one click. This must be done by 19 September.

What participation gives you

- Reimbursed travel to Management Committee and Working Group meetings across four years
- Training Schools, as trainee or trainer, and Short-Term Scientific Missions to other partners' laboratories
- Conference grants, including grants reserved for early-career researchers and for participants from Inclusiveness Target Countries
- A route to a seat on the Action's Management Committee, nominated by your national COST Coordinator

- A standing European network in a field that does not yet have one — and, in COST's own terms, an entry point towards larger collaborative research consortia

Timeline

Date	What happens
5 September 2026	Replies due — the details listed in step 2 above
8–12 September	Formal e-COST invitations issued
19 September	All invitations accepted in e-COST — a firm internal deadline
30 September	Full Technical Annex circulated to the whole network for comment
21 October	Submission
28 October, 12:00 CET	COST collection date
≈ May 2027	Results announced; approved Actions begin in the following months

The proposal is evaluated double-blind, so the Technical Annex itself names no person, institution or country. That has no bearing on your participation — it simply means the text describes capabilities rather than partners.

To respond, or to ask anything further

A reply of a few lines is enough at this stage: an expression of interest, a Working Group preference, and whether a younger colleague from the group can be brought in as a proposer. Detailed scientific input is welcome and can follow later.

This note may be forwarded freely to colleagues or groups for whom it may be relevant.

For further information — on the Action, the Working Groups, the practical steps above, or to confirm participation — please contact:

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Main Proposer

A short online call can be arranged if that is easier than exchanging e-mails.