



A WHITE PAPER FROM ALTICORD INFRASTRUCTURE & MOBILITY PVT LTD

Why Mobility Belongs at the Centre of India's Infrastructure Agenda

The case for ropeway, aerial and difficult-terrain mobility infrastructure — and the development model that gets it built.

ALTICORD INFRASTRUCTURE & MOBILITY PVT LTD

October 2026

Executive Summary

Across India's hill geographies, dense urban corridors and high-footfall pilgrimage and tourism destinations, conventional road-based mobility is reaching structural limits — not for want of investment, but because gradient, geology, environmental sensitivity and seasonal demand spikes are problems that more road cannot always solve.

This paper sets out why Alticord believes ropeway, aerial and other purpose-built mobility systems deserve a central place in India's infrastructure agenda — not as a tourism novelty, but as serious, safety-engineered public infrastructure — and why the way such projects are financed, built and operated matters as much as the technology itself.

Three arguments run through this paper. First, that road-based mobility has genuine structural limits in difficult terrain, and that aerial mobility has matured, globally, from a tourism curiosity into serious urban and regional transit infrastructure. Second, that India's own policy direction — through the national ropeways programme described in Section 3 — has already reached the same conclusion. Third, and most centrally, that the development model chosen for such projects — who designs, builds, finances and, critically, operates the asset — shapes safety and service outcomes as much as the underlying technology does.

The question is not only whether aerial mobility works. It manifestly does, at scale, worldwide. The question that matters for outcomes is who builds it, and who stays accountable for it once it is built.

Alticord's own position, set out in Section 6, is that a design-build-finance-operate (DBFO) concessionaire model — in which the developer remains responsible for operations and maintenance across a multi-decade concession term rather than exiting at handover — aligns incentives more closely with safety, reliability and long-term public value than a construction-only contracting model.

1 The Limits of the Road

Road transport has been, and remains, the backbone of Indian mobility. But in a specific and growing set of geographies, the road reaches limits that further investment in road-building does not solve.

Gradient and geology

Steep mountain terrain imposes hard engineering constraints on road alignment. Switchback roads climbing to hill destinations are frequently long, slow, and expensive to build and maintain, and are exposed to landslides, subsidence and seasonal closure. Where a destination sits at significant elevation above the nearest motorable point, the road distance can be many times the straight-line distance — and the drive time even more so.

Environmental sensitivity

Many of India's hill destinations sit within, or adjacent to, ecologically sensitive forest, wildlife or watershed areas. Widening or extending roads through such terrain carries a materially different environmental cost than an aerial system with a comparatively small land-use footprint, limited to its towers and terminal stations, that leaves the terrain beneath largely undisturbed.

Seasonal and event-driven demand

Pilgrimage and tourism destinations experience extreme demand seasonality — steady, modest traffic for much of the year, and overwhelming surges during specific festivals, seasons or weather windows. Road networks sized for average demand become severely congested at peak; road networks sized for peak demand are uneconomic and often environmentally indefensible for the rest of the year. Fixed-capacity, scheduled aerial systems handle this asymmetry more gracefully, moving a predictable number of passengers per hour regardless of road congestion below.

The last mile that roads cannot reach

In many cases the constraint is not the main highway but the final stretch: a steep temple approach, a dispersed hill settlement, an old town core where road widening would mean demolishing what makes the place worth visiting in the first place. This is precisely the terrain where a short aerial connection can outperform a much longer and more disruptive road project.

None of this argues that roads are obsolete — they remain essential for freight, for local access, and for the great majority of India's mobility needs. It argues that in a specific, identifiable and growing category of difficult-terrain and high-footfall geographies, purpose-built aerial mobility is a complement to roads that deserves to be evaluated on its own merits, rather than treated as a novelty.

2 Global Precedent: Aerial Mobility as Serious Infrastructure

Aerial cable transport has a history stretching back over a century, but for most of that history it was associated with ski resorts and tourist attractions. That changed decisively in 2004, when the Colombian city of Medellín integrated an aerial cable line into its public transit network — not as a tourist ride, but as a scheduled, fare-integrated transit service connecting dense, mountainous informal settlements on the city's periphery to its metro system below.

Medellín's Metrocable is widely credited as the moment aerial transit was reimagined as urban infrastructure rather than recreation. The approach has since spread across Latin America and beyond: La Paz and El Alto in Bolivia operate the largest urban cable-car transit network in the world, a multi-line system spanning roughly 30 kilometres that functions as the backbone — not merely a feeder — of the metropolitan transit system, moving well over a hundred thousand passengers on a typical day. Systems following a similar logic have since been built or planned in cities including Caracas, Rio de Janeiro, Manizales, Bogotá, London and Mexico City.

What these systems share is not the technology alone but the reasoning behind it: in terrain where conventional rail or road-based mass transit is technically impractical or prohibitively expensive to build, an aerial system can be deployed faster, at a fraction of the capital cost of a metro line, while still moving thousands of passengers per hour in each direction on a fixed, congestion-immune schedule.

From recreation to regulated public transport

This shift in purpose has been accompanied by a shift in regulatory seriousness. Passenger ropeway and cableway installations across Europe and increasingly elsewhere are governed by a mature body of international technical standards, coordinated in large part through the International Organisation for Transportation by Rope (OITAF) and codified in instruments such as the European Union's cableway installations regulation and its associated EN safety standards. These frameworks require a formal, documented safety analysis for every installation — covering design, construction, operating modes, rescue and evacuation planning, and ongoing inspection — reviewed by an independent body before an installation is permitted to carry passengers.

The practical result is a transport mode with a strong comparative safety record relative to road transport, provided it is designed, built and operated to these standards. That last clause matters: the safety case for aerial mobility rests as much on rigorous, independently verified engineering and operating discipline as it does on the inherent properties of the technology.

3 India's Opportunity

India's own policy direction has already reached a version of this conclusion. The Government of India's Parvatmala Pariyojana — the National Ropeways Development Programme — was announced in the 2022-23 Union Budget and placed under the Ministry of Road Transport and Highways. Its stated purpose is to develop safe, economical and efficient ropeway infrastructure for first- and last-mile connectivity in hilly and congested urban areas where conventional transport modes are saturated or impractical.

The scale of ambition is substantial: the programme framework envisions more than 250 ropeway projects spanning over 1,200 kilometres over a multi-year horizon, with an estimated investment pipeline in the range of ₹1.2-1.25 lakh crore, to be developed substantially through public-private partnership.

Why now

- Pilgrimage and religious tourism in India continues to grow in both scale and year-round spread, placing sustained pressure on hill-town road networks originally built for a fraction of today's footfall.
- Domestic leisure tourism to hill and mountain destinations has grown sharply in the past decade, compounding the same seasonal congestion pattern.
- Climate volatility is increasing the frequency of landslides, flash flooding and road closures on hill highways, raising the value of transport modes less exposed to slope failure.
- States are increasingly constrained in how much further road-widening they can pursue through forest, wildlife and watershed-protected terrain without significant environmental cost.

Taken together, these pressures point toward the same structural conclusion reached in Section 1: India's hill states need a mobility solution that complements roads rather than only widening them, engineered and operated to a standard that treats passenger safety as non-negotiable.

4 Safety & Engineering Standards

Credible aerial mobility infrastructure is defined as much by what happens before a single tower is built as by the system itself. A rigorous development process for a passenger ropeway typically includes:

- A formal, independently reviewed safety analysis covering the full range of operating conditions, including wind, extreme weather and emergency scenarios.
- Engineering design conforming to internationally recognised cableway standards, with redundant braking, haulage and power systems.
- A documented evacuation and rescue plan for every section of the line, tested before commercial operation begins.
- Defined, scheduled inspection and maintenance regimes for ropes, towers, drive systems and cabins, carried out by qualified personnel throughout the asset's operating life — not only during construction.
- Environmental and geotechnical assessment of tower foundations and station sites, particularly in seismically active or landslide-prone terrain.

The critical point is the last one: a safety case built at design stage is only as good as the operating discipline that sustains it for the following twenty or thirty years. A ropeway inspected and maintained to standard for its first five years and then neglected in its twentieth is not a safe system, whatever its original engineering. This is precisely where the development and ownership model — the subject of the next two sections — becomes inseparable from the safety case itself.

5 The Development Model Question

It is possible to build an excellent ropeway and operate it poorly. It is also possible, in principle, to build a mediocre one and run it with great operational discipline. In practice, the two are rarely independent — and the reason is incentives.

A construction contractor's commercial interest in a project is largely resolved at handover. Once the asset passes acceptance testing and payment is received, the contractor's financial exposure to how well that asset performs over the following decades is limited, whatever warranty or defect-liability provisions apply. This is not a criticism of contractors — it is simply how single-phase construction contracting is structured, and it works well for a great many infrastructure assets.

Passenger ropeways are a different category of asset. Their safety-critical systems — haulage ropes, grips, braking systems, towers — require continuous, expert maintenance for the entire operating life of the installation, not just diligent construction. A model in which the entity responsible for design and construction has no ongoing financial stake in decades of safe operation creates a structural gap between the interests of the builder and the interests of the passenger.

The safest infrastructure is not necessarily the infrastructure with the best specification on the day it opens. It is the infrastructure whose builder has to live with the consequences of how it performs for the next thirty years.

This is the logic behind the global shift toward concession-based delivery models for exactly this category of infrastructure — toll roads, airports, ports, and increasingly, ropeways — in which a single accountable entity carries responsibility from design through to the return of the asset to the public authority at the end of a defined concession term.

6 A Concessionaire Framework

India's own Parvatmala Pariyojana has already adopted this logic at a policy level: ropeway projects under the programme are structured to be developed substantially through the Design, Build, Finance, Operate and Transfer (DBFOT) model under public-private partnership, rather than as pure construction contracts.

Alticord's own positioning follows the same principle. Alticord's stated model is to act as a design-build-finance-operate concessionaire on the projects it develops — retaining responsibility for the asset not only through design, construction and financing, but through its operation and maintenance across the full concession term, before transferring it back to the relevant government authority at the end of that term.

What this changes in practice

- Design decisions are made by the same entity that will operate the asset for decades — reducing the risk of over-optimising for construction cost at the expense of lifecycle maintainability.
- Ongoing safety and maintenance investment is not a discretionary cost borne by a separate operator with no role in the original design — it is core to the concessionaire's own commercial interest in the asset's continued performance.
- Government counterparties gain a single accountable entity across the life of the concession, rather than a fragmented handoff between a construction contractor, a separate operator, and the public authority.
- Local communities and passengers benefit from an operating standard that does not degrade once the ribbon-cutting is over, because the concessionaire's economics depend on the asset continuing to perform safely and reliably.

This is why Alticord's capability model, described in its corporate materials, is built around six integrated disciplines — origination, government interface, project structuring, global technology and engineering, specialist contracting, and operations — rather than construction alone. The last of these, long-term operations and concession management, is treated as a first-class discipline, not an afterthought.

7 A Framework for Evaluating Where Aerial Mobility Belongs

Not every hill destination needs a ropeway, and not every congested corridor is a candidate for aerial transit. Alticord evaluates potential mobility corridors against a consistent set of questions, summarised here as a starting framework rather than a rigid formula:

- **Terrain and gradient:** does the elevation change and terrain make a direct aerial alignment meaningfully shorter or faster than the existing road route?
- **Demand pattern:** is there a sufficiently large and/or seasonally concentrated passenger base to justify a fixed-capacity scheduled system?
- **Environmental footprint:** does an aerial alignment reduce land disturbance and forest or habitat impact relative to further road development?
- **Road vulnerability:** is the existing road route exposed to recurring closure from landslides, flooding or extreme weather?
- **Safety and engineering feasibility:** can the alignment meet international cableway safety and engineering standards, including wind exposure, tower siting and evacuation planning?
- **Institutional readiness:** is there a government counterparty with a clear mandate and appetite to structure the project as a long-term concession rather than a construction-only contract?

Corridors that score well against this framework are, in Alticord's view, strong candidates for a design-build-finance-operate approach to aerial mobility. Corridors that do not are often better served by continued investment in road infrastructure, or by other transit modes altogether. The framework is deliberately conservative: aerial mobility is a powerful tool for a specific category of problem, not a universal solution.

Conclusion

India's hill geographies, pilgrimage destinations and congested urban corridors are converging on a shared mobility problem that road infrastructure alone cannot solve.

The technology to address it — aerial and ropeway mobility — has matured from tourist novelty to serious, internationally regulated public transport infrastructure, and India's own national policy has already recognised this through the Parvatmala Pariyojana.

What remains is a question of development model: ensuring that the entity that builds these systems remains accountable for how safely and reliably they run for the following thirty years, not just for the day they open. Alticord was built around that premise — as a design-build-finance-operate concessionaire, integrating global technology, engineering and specialist execution capability with long-term operating accountability.

This is the case Alticord makes for mobility's place in India's infrastructure agenda: not as a novelty at the edge of the transport conversation, but as serious, safety-engineered infrastructure that deserves to be developed, financed and operated to the same institutional standard as any other critical national asset.