

Empyreal Galaxy Pvt. Ltd

Peter Lobner, 5 November 2024

1. Introduction

The Indian firm Empyreal Galaxy Pvt. Ltd was founded in January 2020 in Mumbai, India by Shailesh Dhuri (CEO) and Swati Mehta (COO). The firm reports that it is working to develop “modern carbon-



neutral airships as a cost-effective, efficient, and sustainable mode of transportation that can be used in a variety of applications, such as connecting remote areas that are isolated

from the global economy and other regions that have been affected by a disaster and have become isolated from essential aid.”

In India’s domestic market, Empyreal Galaxy has observed, “Some 33 percent of India's villages do not have access to all-weather roads and remain cut off during the monsoon season. The problem is more acute in India's northern and northeastern states, which are poorly linked to the country's major economic centers.” Examples of similar isolated populations exist in many regions of the world, including the Canadian Arctic, South America, Africa and Southeast Asia.

In their website, Empyreal Galaxy states, “So our initial focus is to build small size airships with a payload capacity of 15 to 20 tonnes (metric tons), working in the areas of humanitarian relief and remote supply, gradually progressing towards greater capacities and wider applications including services to military, usage in mining, transport of heavy cargo and connecting geographies across the world for transport of goods.”

Empyreal Galaxy maintains that airship can perform important roles in a connected economy by providing point-to-point logistics connectivity, including last mile transportation, between sources (medical facilities, factories, farms & warehouses) and distant end-users in cities and rural villages, while eliminating the need for inter-modal freight transfers. Airship-launched drones may have a role in

this logistics framework. This concept of operations is shown in the following diagram



*Role of airships in a connected economy.
Source: Empyrean Galaxy via Swati Mehta (COO) LinkedIn*

Since its founding in 2020, Empyrean Galaxy reports that it has achieved the following milestones:

- Operational factory in Nashik, India
- First prototype aerostat ready
- First client, Indian Defense Services, for whom two important projects are in progress (as of 2024)
- Strong team of fifteen people with right mix of skill-sets has been established

The firm's website is here: <http://empyreinalgalaxy.com>
COO Swati Mehta provides additional updates on [LinkedIn](#).

The author is grateful to Empyrean Galaxy for their thoughtful input to this article.

2. The Pushpak Viman hybrid airship

Pushpak Viman is an approximately spherical, non-rigid, unmanned airship sitting on an inflated toroidal ring that provides a stable landing base. The airship is propelled and maneuvered with six electric motor-driven, thrust-vectoring propellers mounted at 60° intervals around the equator of the spherical airship's gas envelope. An inflated appendage on one side of the gas envelope is an ornamental feature.



Pushpak Viman test flight.

Source: Screenshot from Empyreal Galaxy video (2024)

On 22 January 2024, Swati Mehta posted the following on LinkedIn:

“Empyreal Galaxy Team is elated to announce the successful testing of Pushpak Viman, our modern hybrid airship at our Nashik factory. Replicated from descriptions in historical book of Ramayana, this celestial creation coincides with the Ayodhya Ram Mandir Inauguration, symbolizing a divine connection between past and glorious future. Continuing to shower blessings on all devotees of Lord Shri Ram, it marks a harmonious blend of ancient inspiration and cutting-edge technology for an equitable future.”



The Pushpak Viman hybrid airship.

Source: Empyreal Galaxy via Swati Mehta (COO) LinkedIn (2024)

You can view a short video of a test flight of the Pushpak Viman hybrid airship [here](#).

3. General airship design characteristics

On their website, Empyrean Galaxy describes the main features for their future airship designs, which appear to be rigid, variable buoyancy airships, using variable air ballast:

- Rigid airframe, constructed of aluminum and carbon fiber – lightweight, strong, solid and proven.
- Innovative buoyancy control system – inspired by the buoyancy control system of submarines (following the same technology, but with air instead of water as a variable ballast).
- Combination of helium and hydrogen gas for generating aerostatic lift.
- No requirement of ground crews or runways, allowing the airship to operate out of roadless regions in isolated areas (vertical takeoff and landing, VTOL).
- Consumes 80 to 90% less fuel than aircraft with equivalent cargo capacity:
 - The first-generation airships will be powered by standard aero engines and generators.
 - Photovoltaic arrays installed on the rigid airframe offer the potential for all-electric power (solar PV / battery) on later models.
- Costs to purchase and operate are 80 to 90% less than aircraft with equivalent cargo capacity.
- Costs rival costs of trucks and rail.
- Able to operate in extreme weather conditions.
- At least 40 years working life expected – No helium loss during normal operations

4. Empyrean Galaxy Innovation and Design Approach

As of late 2024, Empyrean Galaxy reports that it “is actively developing next-generation airship technologies through a combination of cutting-edge innovations and advanced manufacturing techniques. While specific design details remain confidential pending patent applications, the company's technological approach encompasses several key innovation areas:

Advanced Manufacturing

- Pioneering applications of large-scale 3D printing for critical airship components
- Integration of advanced composite materials and novel structural designs to leverage the same
- Development of automated manufacturing processes for consistent, high-quality production

Digital Innovation

- Sophisticated computational fluid dynamics (CFD) simulations for optimizing aerodynamic performance
- AI/ML (artificial intelligence / machine learning) powered flight control systems for enhanced stability and autonomous operations
- Advanced weather routing algorithms for optimal flight path planning
- Digital twin technology for predictive maintenance and performance optimization

Materials Science

- Deployment of lightweight composite materials
- Advanced gas envelope materials with enhanced durability and reduced permeability
- Smart materials integration for real-time structural health monitoring

Control Systems

- Novel propulsion and vectoring systems for precise maneuverability
- Intelligent buoyancy management systems
- Advanced stabilization technologies for adverse weather conditions

While specific design details of future commercial models remain confidential, these technological innovations are being incorporated into Empyrean Galaxy's development pipeline, with several patent applications in process. The company's first commercial design is expected to leverage these advances in a rigid, variable buoyancy airship with a payload capacity of 15 to 20 metric tons (16.5 to 22 tons).

5. Funding

On 22 July 2024, Empyrean Galaxy announced that it had been awarded an unspecified amount of funding from the Atal Incubation Centre-Rambhau Mhalgi Prabodhini Seed Fund (<https://www.aic-rmp.org>). Empyrean reported:

“This investment marks a critical step for Empyrean Galaxy as we join the 3rd Cohort and Fast-Track Incubatee program, accelerating our mission to address global infrastructure challenges with solutions.”



An unmanned blimp concept.

Source: Empyrean Galaxy via Swati Mehta (COO) LinkedIn (2024)

6. For more information

- “Empyrean Galaxy, a company into manufacturing lighter-than-air,” BRICS Chamber of Commerce & Industry, 30 January 2023: <https://bricsmainstream.com/editorials/f/empyrean-galaxy-a-company-into-manufacturing-of-lighter-than-air>
- “Carbon-neutral airship developer Empyrean Galaxy gets funding,” Venture Intelligence, 2024:

<https://news.ventureintelligence.com/private-equity/carbon-neutral-airship-developer-empyrean-galaxy-gets-funding>

- “Airship developing firm Empyrean Galaxy secures seed funding,” The Hindu, 22 July 2024:
<https://www.thehindu.com/business/Airship-developing-firm-empyrean-galaxy-secures-seed-funding/article68433824.ece>

Video

- “Pushpak Viman,” (0:31 min, flight test), posted by Empyrean Galaxy, 1 March 2024:
<https://www.youtube.com/shorts/hNoS3rao2-A>
- “Airships Developing Firm Empyrean Galaxy Secures Seed Funding!,” (6:10 min), posted by CNBC-TV18 (India), 7 August 2024:
<https://x.com/CNBCTV18News/status/1821192665355980883>

Other Modern Airships articles

- *Modern Airships - Part 1*: <https://lynceans.org/all-posts/modern-airships-part-1/>
 - Aeros – Aeroscraft rigid, variable buoyancy airships
 - Walden Aerospace / LTAS / LTASI - Lenticular, toroidal, variable buoyancy airships
- *Modern Airships - Part 2*: <https://lynceans.org/all-posts/modern-airships-part-2/>
 - Euro Airship - rigid, variable buoyancy airships
- *Modern Airships - Part 3*: <https://lynceans.org/all-posts/modern-airships-part-3/>