February 2024

Transforming last mile – connectivity in India through aviation

pwc

Foreword

Sonal Mishra
Partner and Leader – Aviation
PwC India

The challenge of last-mile connectivity is not new in India. India's diverse geography, which lends it its majestic landscapes and one-of-a-kind heterogenous culture, is unique. However, the same geography, at times, also poses challenges to connectivity in terms of passenger movement, supply of goods and services, and access to basic services like healthcare. The vast population of the country is not concentrated in its metropolitan cities but rather distributed all over its territory. Thus, India encounters challenges in terms of connecting distant areas to the centres of business, trade and tourism.

To bridge the gap in last-mile connectivity, India has been taking several proactive steps. The country has been expanding its road and rail networks ever since independence to reach tier 2 and 3 cities (semi urban/rural areas). Furthermore, the private sector has been roped in by introducing public–private partnership (PPP) models of infrastructure development which would allow the Government to expand the country's infrastructure in a sustainable and profitable manner, without compromising on the social benefits from such network expansion. In the aviation sector, with the launch of the Regional Connectivity Scheme (RCS) Ude Desh ka Aam Naagrik (UDAN), the Indian airport network underwent major expansion and upgrade. This scheme has allowed a greater number of locations to be connected and simultaneously provided the public with relatively inexpensive flying options which have saved them a significant amount of travel time.

Tourism is one of the main sectors impacted by last-mile connectivity. Popular tourist destinations tend to be those which allow residents of urban areas to explore nature and experience the country's history and culture. Many such locations are difficult to access due to poor connectivity in terms of infrastructure and weather-related issues – or a combination of both. While domestic travellers face fewer difficulties than foreign travellers due to their knowledge of the local language and culture, their access to such locations is still troublesome due to lack of last-mile transport options.

The civil aviation industry in India can provide a viable and sustainable solution to the challenge of last-mile connectivity. Use of helicopters and seaplanes can allow passengers to access distant and challenging locations with significantly less infrastructural requirements. The compatibility and flexibility provided by these vehicles are unmatched, as they can enable connectivity to remote tourist locations which are not accessible by traditional aviation, road and rail. The challenge of last-mile connectivity can thus be dealt with by deploying a new era of civil aviation in India.

Table of contents

1. Introduction

Since India's first commercial flight on 15 October 1932,[1] the civil aviation sector in India has made significant progress to become the third largest in the world by domestic traffic metric. Apart from surge in demand for air travel, major reforms on the capacity supply side – including rapid progress in the airport infrastructure and airport privatisation – has supported this growth. The aviation sector in India also got a major boost with the launch of the Regional Connectivity Scheme (RCS) Ude Desh ka Aam Naagrik (UDAN). The primary aim of this scheme was to improve air connectivity to remote and regional areas while also making air travel more affordable for passengers. Thus, it can be said that the aviation sector has seen a major inflexion point in the past few years. However, the country's air connectivity still lacks last-mile connectivity.

Although it has been a pertinent issue in India, in recent times, there have been major efforts to improve last-mile connectivity in certain sectors like e-commerce, through the deployment of technologies like drones. However, certain other sectors, such as the tourism industry still suffer from these issues. Majority of the tourist destinations in India are situated in the proximity of tier 3 cities or rural areas with less connectivity options. Geographical constraints, fragile public transport system and poor road connectivity add to the dilemma and act as the key deterrents for tourism in these regions. It is in this context that the aviation sector becomes relevant. By providing faster and efficient connectivity options like helicopters and seaplanes, it can play a major role in solving the last-mile connectivity predicament.

In this paper, we highlight the key challenges that the tourism sector faces and how the continuous growth and development of the aviation sector can contribute to solve this problem. We have also discussed the current landscape of the helicopter and seaplane services in India, key impediments to their growth and a way forward to build a robust ecosystem for last-mile connectivity in the country.

Indian aviation sector: An overview

The aviation sector in India has seen a growth trajectory in terms of both demand and supply. The number of passengers at airports has more than doubled during the last decade (nearly 340 million in FY20 versus 143 million in FY11),[2] owing to domestic travellers. With 11 greenfield airports operationalised in the past nine years,[3] the number of operational airports in the country currently stands at 158,[4] thereby bolstering a supply side to tap into the growing demand. The civil aviation sector's growth can be attributed to several reasons – namely, an increasing propensity to fly, strong competition between low-cost carriers, better infrastructure, and sturdy policy reforms both at Central and state government levels. The Government's continued push towards public–private partnership (PPP)

1 Business Today 2022, https://www.businesstoday.in/latest/corporate/story/soared-joyfully-from-karachi-how-jrd-tata-described-his-first-air-india-flight-on-this-day-in-1932-349971-2022-10-15

2 Airports Authority of India website- AAI traffic news

3 Press Information Bureau, Government of India, 7 June 2023 – https://pib.gov.in/PressReleasePage.aspx?PRID=1930553

4 Airports Authority of India – https://www.aai.aero/sites/default/files/AAI_AR_2023_ENG_LARGE.pdf

participation evidenced by its policy decision to lease 25 airports by 2025[5] in the expanding aviation sector reflects its strong intent to promote sectoral growth and in line with their air traffic growth outlook for the country, which is estimated to grow by three to four times by 2037.[6]

Besides this, there have been various interventions by the Government in recent years. One such major intervention is RCS UDAN which, since its inception in 2016, has led to the operationalisation of more than 70 airports in the last five years with the aim of improving air connectivity and making air travel more affordable across the country.[7]

RCS UDAN: The inflexion point in India's aviation sector

RCS UDAN aims to make air travel more affordable and boost national economic development by improving air connectivity to tier 2 and 3 cities, remote and regional areas. Further, it is expected to strengthen the development of the unserved and underserved airports in these regions. Apart from subsidising the cost of air travel for citizens, the scheme also focuses on ensuring viability for the airlines through Viability Gap Funding (VGF).[8] Additionally, this scheme will work towards the betterment of the existing airstrips and airports to extend connectivity to unserved and underserved airports.

Figure 1: RCS UDAN – key highlights

RCS UDAN

RCS UDAN 1.0	RCS UDAN 2.0	RCS UDAN 3.0	RCS UDAN 4.0–4.3	RCS UDAN 5.0–5.3
• **56 routes are operationalised**	• **152 routes are operationalised**	• **165 routes are operationalised**	• **116 routes are operationalised**	• **RCS 5.0: 30 routes are operationalised**
Non-exhaustive	**Non-exhaustive**	**Non-exhaustive**	**Non-exhaustive**	**Non-exhaustive**
• Bhatinda-Delhi • Shimla- Delhi • Kadapa-Hyderabad • Nanded- Hyderabad • Gwalior-Delhi • Gwalior-Indore • Kandla-Mumbai • Porbandar-Mumbai • Hyderabad-Pondicherry • Delhi-Ludhiana • Chennai-Mysore • Hyderabad-Vidyanagar • Bikaner-Delhi • Jaipur-Jaisalmer • Chennai-Kadapa	• Bikaner-Jaipur • Bhatinda-Jammu • Kolkata-Tezpur • Chennai-Hubli • Hubli-Hyderabad • Delhi- Ozar • Hubli-Cochin • Ahemdabad-Hubli • Hubli-Goa • Chennai-Hubli • Pakyong-Kolkata • Jorhat-Kolkata • Guwahati-Pakyong • Jaisalmer-Surat • Hyderabad-Kolhapur	• Ahmedabad-Udaipur • Amritsar-Jaipur • Bhopal-Udaipur • Delhi-Jharsuguda • Guwahati-Lilabari • Hyderabad- Kishngarh • Belgaum-Hyderabad • Gwalior-Hyderabad • Belgaum-Ahmedabad • Pune-Belgaum • Statue of Unity (WA)-Sabarmati Riverfront (WA) • Hindan-Kalaburgi • Surat-Belgaum	• Chandigarh-Hisar • Dharamshala-Hisar • Silchar-Shillong • Guwahati- Rupsi • Pasighat-Guwahati • Pantnagar-Pithoragarh (H) • Dehradun-Haldwani (H) • Srinagar-Dehradun (H) • Aizawl-Imphal • Lilabari-Tezpur • Udaipur-Ahemdabad • Udaipur-Bhopal • Bhatinda-Hindon • Kolkata-Tezpur	• Nagpur-Kishangarh • Kullu-Amritsar • Delhi-Bhatinda • Salem-Cochin • Salem-Bangalore • Salem-Hyderabad • Kishangarh-Pune • Diu-Ahemdabad • Surat-Diu • Shimla-Amritsar • Delhi-Hollongi

Source: Airports Authority of India, February 2023 RCS news notification

5 Business World, 20 Dec 2022, https://www.businessworld.in/article/AAI-To-Lease-25-Airports-By-2025-Under-PPP-Model/20-12-2022-458724/

6 IATA, India's air transport sector – https://www.iata.org/en/iata-repository/publications/economic-reports/the-potential-and-challenges-of-indian-aviation/#:~:text=Over%20the%20next%2020%20years%20IATA%20forecasts%20growth%20of%206.1,520%20million%20journeys%20in%202037

7 Airports Authority of India, February 2024 – https://www.aai.aero/sites/default/files/rcs_news_notifications/76-RCS_Airports_operationalized_as_on_06.02.2024.pdf

8 In the scheme, nearly half of the seats are subsidised, and the participating carriers are given incentive as VGF which is shared by central and the state government – https://www.aai.aero/sites/default/files/rcs_news_notifications/UDAN_Manual.pdf

As of today, RCS UDAN has introduced 519[9] routes, operationalising 76[10] airports – including 19 underserved and 57 unserved airports and 9 heliports. More than 2.56 lakh UDAN flights have operated, and over 1.3 crore passengers have availed the benefits in UDAN flights so far.[11]

Facilitating last-mile connectivity

Although air connectivity in India has already come a long way owing to the success of RCS UDAN, this growth can be further reinforced by deploying aviation in last-mile connectivity. Unavailability of optimal road networks and numerous geographical barriers render many locations inaccessible for both locals and tourists alike. Apart from hindering the socio-economic development of these regions, these also act as a major deterrent for the tourism sector of India. Thus, by providing a faster and efficient means of travel, the aviation sector can prove instrumental in providing last-mile connectivity and help in tapping into the country's untapped tourism potential.

9 Airports Authority of India – https://www.aai.aero/sites/default/files/rcs_news_notifications/519_RCS_Routes_Operationalised_as_on_06.02.2024.pdf

10 Airports Authority of India 2023 – https://www.aai.aero/sites/default/files/rcs_news_notifications/76-RCS_Airports_operationalized_as_on_06.02.2024.pdf

11 https://www.financialexpress.com/business/airlines-aviation-udan-scheme-2-56-lakh-flights-operated-so-far-more-than-13-crore-passengers-benefited-check-details-3388528/

2. Aviation – growth enabler for tourism in India

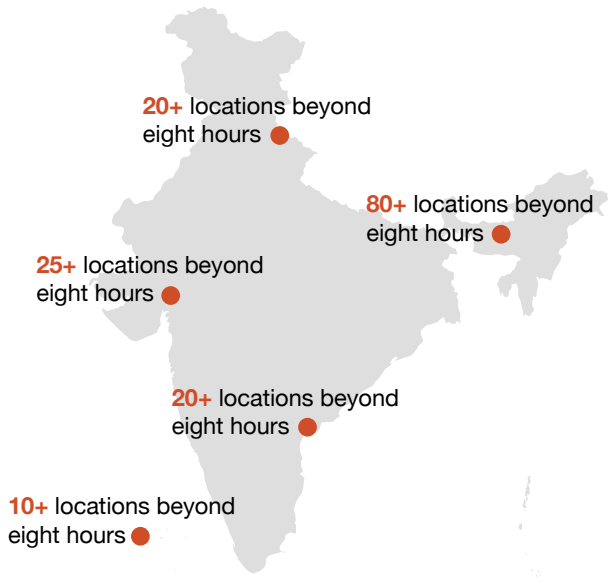
Tourism sector in India: An overview

India's cultural diversity, history and geographical features has positioned it as one of the major tourist attractions in the world. The Indian Tourism Statistics 2020 report reveals that the country received 2,321.98 million domestic tourist visits in 2019 with an annual rate of 25.3%, while foreign tourist arrivals were 10.93 million in 2019 with an annual growth rate of 3.5%.[12] While majority of the tourist destinations in tier 1 and 2 cities have already been commercialised, the potential of destinations in proximity of tier 3 cities (or semi-urban regions) remains largely untapped. More than 150 hotspots in such areas are in remote locations, being eight-plus hours away from the nearest airport by road, while some of them still reman inaccessible due to hilly terrain or other challenging road conditions.

Figure 2: Poorly connected tourist destinations

India has more than **1,500** identified tourist locations.

Nearly 10% of those destinations are located far away from the nearest airport, requiring more than **eight hours of driving**.



Source: PwC Analysis

12 Indian Tourism Sector Report 2023 – https://tourism.gov.in/sites/default/files/2023-07/India%20Tourism%20Statistics%20at%20a%20glance%202023%20-%20English%20version.pdf

Case study: Helicopter trip to Ngengpui Wildlife Sanctuary, Mizoram

The Ngengpui Wildlife Sanctuary, located 200–1,200 metres above sea level, is a dense virgin forest which houses a diverse wildlife. In addition to having a vast landscape, the sanctuary also boasts of flowering plants like orchids. Therefore, it is an ideal destination for adventure lovers and birdwatchers, providing a unique and diverse environment for wildlife enthusiasts.

Figure 3: Connectivity of Ngengpui Wildlife Sanctuary

The Ngengpui Wildlife Sanctuary in Mizoram is situated about 45 km south-west of Lawngtlai and located near the Indo-Myanmar and the Indo-Bangladesh border.

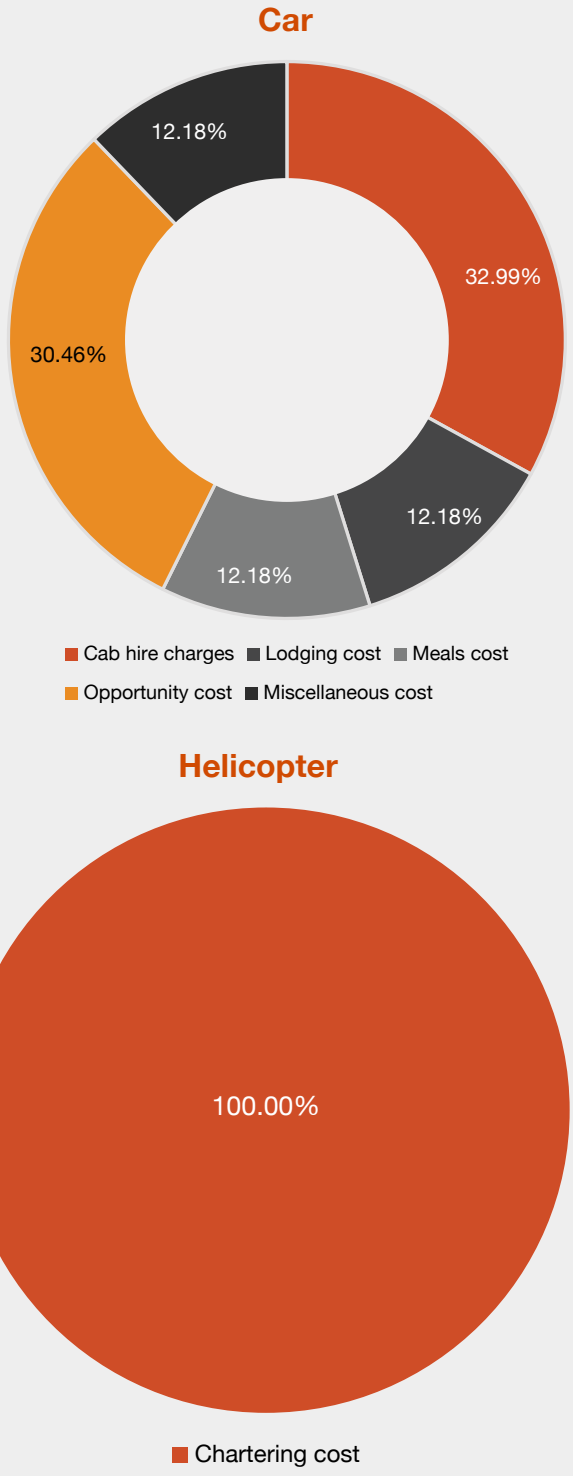
Connectivity via rail and air transport:

- By air – 150 km from Aizawl airport; about 30 mins of flight time (currently not operational)
- By rail – 485 km from nearest railway station via road (Silchar)

The situation is similar for about 155 other tourist destinations in India. Tourists require faster, comfortable and convenient modes of transportation, and this especially holds true for business and working travellers. Considering the current scenario, travellers only have road transport as the most viable option to reach such destinations. The transportation costs associated with car travel can escalate significantly, particularly when traversing hilly terrain. The extended travel duration of approximately 28 hours not only contributes to physical fatigue but imposes additional financial burdens in the form of fuel expenditures, toll taxes and car maintenance. Moreover, costs like lodging and meals further add to the economic implications of the journey. This extended duration also increases the overall opportunity cost, as the trip duration may be long enough for travellers to forego at least one day's worth of income.

Although overall cost of helicopters may be high, if a traveller has the option of using a helicopter or other alternative aircraft service, he/she would save

Figure 4: Comparison of cost components travelling via car vs helicopter



Source: PwC Analysis, https://tourism.mizoram.gov.in/page/car-rentals-taxi

a considerable amount of time (~95%). Moreover, this mode of travel offers spectacular aerial views, making the journey more enjoyable. Therefore, last-mile connectivity can be facilitated via civil aviation and further augment the growth of tourism within the nation.

Future of aviation in last-mile connectivity

Potential tourist hotspots for last-mile aviation services

Like Ngengpui, there are many other tourist destinations with limited or no road connectivity. Let's look at some of the tourist attractions where aviation can be leveraged to ease travel convenience and last-mile connectivity

Lorrain Ville, Mizoram

The Lorrain Ville is a century-old villa built in 1914 by Christian missionaries in Siaha, Mizoram. The work of these missionaries paved way for the whole tribe towards civilisation, literacy and faith. The furnishings are preserved in this house and the family is open to visitors.

Figure 5: Connectivity of Lorrain Ville

Lorrain Ville is a tourist attraction which offers mesmerising and picturesque streets. London-based missionaries have been living here since the 1920s.

Connectivity:

- By air – 188 km from Lengpui Airport in Aizawl
- By rail – 308 km from the nearest railway station (Silchar)

Nathu La, Sikkim

Nathu La, a high-altitude pass on the old silk route at the Indo-China border, is a popular tourist destination in Sikkim. Visitors enjoy a scenic trek, waterfalls and breathtaking views of snow-covered mountains. The pass is one of the highest motorable roads in the world, with picturesque beauty and fresh mountain breeze. Nearby attractions include the Watershed War Memorial, Army Exhibition Centre and canteen. Visitors can also visit Tsomgo Lake, a glacial lake surrounded by high mountain peaks and meadows, and Menmecho Lake, a 4-km idyllic trek from Baba Mandir.

Figure 6: Connectivity of Nathu La

Nathu La is a Himalayan mountainous pass situated at the Indo-China border at 14,140 ft.

Connectivity:

- By air – 176 km from the nearest operational airport, Bagdogra in Siliguri
- By rail – 165 km from the nearest railway station, Siliguri; takes about 5.5 hours by road

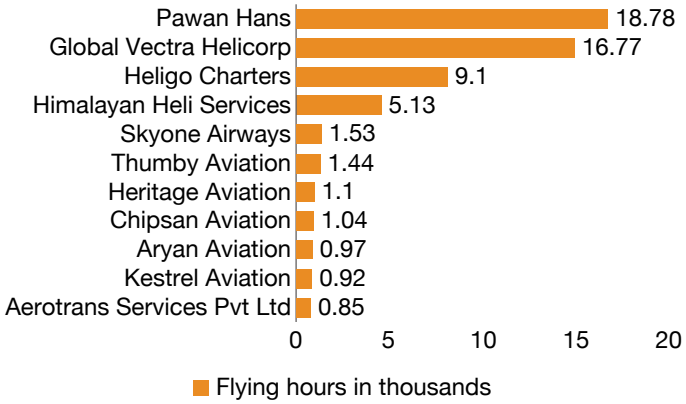
3. Helicopters

Helicopters offer a useful rapid mobility option because of their unique operational capabilities such as vertical take-off and landing (VTOL), hovering, and flying backwards and sideways. Furthermore, they need minimal to no infrastructure which makes them a promising viable alternative to a fixed-wing aircraft. Originally, helicopters were designed and produced for military purposes. However, that has changed now. Today, helicopters can be used to provide transportation services in remote areas –namely, air ambulance services in case of medical emergencies, disaster relief, surveillance, VIP and VVIP movement services, crop spraying, offshore activities, dropping supplies to unreachable areas and for leisure.

The first commercial helicopter flight in the India took off in the 1950s. Currently, there are around 250 helicopters in India, of which 72% belong to non-scheduled operators (NSOPs) while the rest belong to public sector undertakings (PSUs)/governments/private parties. In the NSOP category, the distribution ratio of single and twin-engine helicopters is around 35:65. Most of the helicopters used in India are manufactured outside the country namely Agusta A119, Bell 206 L4, Eurocopter AS350B3 in single engine category and Agusta A109, Bell 412EP, Dauphin AS365 N3, and Sikorsky S76 in twin-engine category.[13]

Hindustan Aeronautics Ltd (HAL) is the only local state-owned public company for manufacturing helicopters, which largely caters to the defence sector. HAL's Dhruv is a utility twin-engine, 14-seater helicopter with day and night flying capabilities equipped majorly with indigenous systems. As of January 2022, 335 HAL Dhruv helicopters have been produced for domestic and export markets, logging more than 340,000 flying hours.[14] HAL also offers its Dhruv helicopters for civilian purposes. Despite there being ample potential for helicopter use in India (e.g. medical emergency services, cargo services, tourism, etc.) its current applications are quite limited due to some prevailing challenges.

Figure 7: Helicopter flight hours in India



Source: Statista website, Pawan Hans Ltd Annual report FY21-22

13 Government of India: https://www.civilaviation.gov.in/sites/default/files/migration/GM-CIVIL-HELICOPTER-E-Book.pdf

14 https://www.businessworld.in/article/HAL-Signs-Contract-For-Export-Of-Dhruv-Helicopter-To-Mauritius/19-01-2022-418261/

The total helicopter flight hours in India during FY2021–22 were about 58,000 hours, whereas in the US, flight hours exceeded 2.7 million during 2022.[15] This suggests that the current helicopter fleet, traffic and operation can be expanded further, and the same has not yet been done due to supply limitations. Due to challenging regulatory bottlenecks, technical difficulties in high-altitude operations, commercial viability, ageing fleet, limited labour and high operational cost, helicopter services in India remain severely underutilised.

Heli tourism: Partnership between heli aviation and the tourism sector in India

As discussed, use of helicopters can help bridge the gap in last-mile connectivity and help improve tourism in the country. The illustration alongside shows some tourist destinations that currently have operational helicopter services. Pawan Hans, Arunachal Directorate of Civil Aviation and Ladakh Heli services are a few Government-owned operators in the locations shown alongside .

Barriers to the growth of heli tourism

Despite offering helicopter services in more than 225 tourist destinations in India, commercial helicopter services have not been as successful as one would hope. This is majorly due to the severe financial, operational and technical constraints faced by heli tourism in India.

Financial constraints

Helicopter operation is a capital-intensive business activity. Aircraft acquisition, its operation, maintenance, repair and operations (MRO) and infrastructure require high initial investment. Currently, there about 250 helicopters registered in India, which is lower than the number of helicopters in western nations. Due to the limited helicopter operations in India, financial institutions perceive it as a low-demand, high-risk and commercially unviable business, and do not accept helicopters as collateral. This makes helicopter financing a challenging aspect for the owners and operators, further impacting its demand.

Technical constraints

Most inaccessible tourist destinations in India are in the high-altitude Himalayan terrain, which is generally above 10,000 ft from mean sea level. As helicopter goes higher in altitude, the air density decreases which results into associated technical challenges for the helicopter to operate at higher altitudes due to lesser lift.

Another issue at high altitude locations (>14,000 ft) is the falling oxygen level which leads to inefficient combustion in the engine, thereby lowering the operational capability of the helicopter to carry a particular payload at higher altitude. Also, flying through the Himalayan terrain makes pilots susceptible to sun glares, windstorms and fog, which can cause spatial disorientation, making them unable to determine their position or relative motion. To address this, the design of the helicopters needs to be further improved to be suitable for high-altitude operations.

Figure 8: Heli services in India

Route	Frequency	Operator
Naharlagun to Zero	Once a week	Arunachal Pradesh civil aviation department
Leh to Kargil	Twice a week	Ladakh Heli services
Dehradun to Srinagar	**Thrice a week**	Pawan Hans

Source: Arunachal Pradesh Civil Aviation Department: http://civilaviation.arunachal.gov.in/time-schedule-2, Ladakh Heli services and Pawan Hans https://booking.pawanhans.co.in

15 https://www.faa.gov/data_research/aviation_data_statistics

Operational constraints

Helicopter pilots in India have frequently raised issues related to following the instrument landing system[16] (ILS) and following the ILS approach (align to the runway for landing) at >15 nautical miles at major airports despite having VTOL capability. The ILS is a tedious and fuel inefficient approach for a helicopter. Also, there have been instances when the helicopter gets its landing clearance far away from its hanger, which again adds to the cost and complexity for parking it at the hanger. The current horizontal and vertical minimum separation distances for operation in the airspace are also challenging for many helicopter pilots.

Helicopter Policy 2021

The Government of India launched a civilian helicopter policy in October 2021 to provide impetus to the helicopter sector. The policy aims to provide some relief to the prevailing challenges and boost regional air connectivity. Furthermore, it focuses on aspects like the establishment of dedicated helicopter corridors and helicopter cells and waiving landing and parking charges. The policy is aimed at nurturing the helicopter ecosystem in India. Some of the key highlights of the same are:[17]

1. **Exempting parking and landing charges:** Helicopter operators are exempted from paying landing and parking charges.

2. **Training:** More engagement has been facilitated between the Airports Authority of India (AAI), Air Traffic Control (ATC) and other helicopter industry stakeholders to provide individual training on helicopter issues.

3. **Heli Disha:** To create awareness on helicopter operation and boost ease of operation, the district collector will be given a booklet 'Heli Disha' containing relevant regulations and issues.

4. **Heli Sewa:** The portal aims to be a single-window platform that integrates various departments and will ensure ease of operations and facilitate all required approvals for helicopter operations.

5. **Heli-hub:** Heli-hubs and training institutes will be established in Delhi, Guwahati and Bangalore (HAL airport).

6. **Helicopter corridors:** Dedicated helicopter corridors will be established in various locations covering 82 routes in 10 cities of the country. The first three envisaged corridors are across Juhu–Pune–Juhu, Mahalakshmi–Racecourse–Pune–Mahalakshmi–Racecourse and Gandhinagar–Ahmedabad–Gandhinagar.

7. **Helicopter emergency medical services:** To address emergency services in India, development of heliports is planned alongside three expressways, namely, Ambala–Kotputli, Delhi–Mumbai, and Ambala–Bhatinda–Jamnagar expressways. These would help in the early evacuation and timely treatment of accident victims.

8. **Helicopter Acceleration Cell:** A dedicated Helicopter Acceleration Cell will be established to provide necessary regulatory and policy directions which will bolster ease of doing business in the helicopter industry.

Although, the helicopter policy has addressed some of the challenges, regulatory, technical and operational impediments still exist for helicopters to achieve their full potential. For example, helicopters are currently treated similar to fixed-wing aircraft in terms of airport operational procedures including taxiing and landing, which prevents the industry from tapping into the ease of operations. Further development of the helicopter sector would thus need adequate interventions that are based on a holistic review of the ecosystem and stakeholder inclusiveness.

16 ILS is a landing aid system which guides the pilot in night or bad weather to approach the runway.

17 Heli Disha - Ministry of Civil Aviation

Propelling the helicopter sector – proposed key interventions and way forward

A few interventions that can be explored to bolster the growth of the helicopter sector in India are as follows:

1. **Development of infrastructure:** Helipads selected for operation need to meet certain safety requirements, such as the helipad dimensions, with an obstacle-free area outside the helipad with a glideslope for safe approach operation while landing.[18] Removal of loosely secured articles from the centre of the helipad and adequate watering down of the touchdown area must be undertaken to avert risks of unclear or dusty helipads. Identification of areas with these specifications can be undertaken by the state governments to facilitate and improve helicopter operation in their states.

2. **Financial incentives:** Helicopter operation is capital-intensive, and a short helicopter ride can cost anywhere from INR 20,000 to 45,000 per person, which is quite expensive for a middle-class passenger. Thus, interventions like providing capital subsidies and increasing the helicopter coverage under RCS can be undertaken by the Government to provide affordable services and increase passenger traffic.

3. **Development of helicopter-specific regulations:** Currently, rotary aircraft or helicopters are treated similar to fixed-wing aircraft in terms of operational regulations. For example, at major airports, helicopters are required to intercept ILS at more than 10–15 nautical miles, which becomes an obstacle to its ease of operation and efficiency. Thus, there is a need to address this issue by curating regulations suitable for helicopter operations.

4. **Inclusion of aviation turbine fuel (ATF) under the Goods and Service Tax (GST) regime:** Expenditure on ATF accounts for nearly 40–50% of the operational cost of helicopters. Currently, the excise duty on ATF stands at 11% while the VAT varies in different states between 1–25%. A total of 31 state and union territory governments have provided relaxation in ATF VAT to 1–5% to boost aviation sector in their states (except for selected airlines from RCS airports). However, including ATF under GST would remove the tax disparity between states and ease commercial viability for helicopter operators.

5. **Relaxation in terms of flying hours:** Currently, helicopter operation is restricted to only day time (20 mins before sunrise to 20 mins after sunset) which limits its operational capability and therefore, its commercial viability. If the operation time is extended, it will result in a reduced yield per passenger but an overall increase in revenue, which in turn would result in commercial viability for operators. To facilitate this, helicopters can be equipped with advanced avionics and fuel-efficient systems and be certified for night flying.

The Government has realised the potential of helicopters and their remarkable characteristics over fixed-wing aircraft. Thus, it has taken the first step towards the development of a successful helicopter ecosystem by announcing Heli Disha and helicopter routes under RCS. However, existing challenges like helicopter financing and operational, technical and infrastructural issues still remain to be addressed. Helicopter operations can be eased and made commercially viable by subsidising the initial acquisition cost and developing separate policies and regulations. The sector holds immense potential in not only bridging gaps in the domestic tourism industry but also augmenting its further growth.

18 Heli Disha - Ministry of Civil Aviation

4. Seaplanes

Seaplanes and amphibious planes are powered fixed-wing aircraft capable of taking off and landing on water or land. With a coastline of more than 7,000 km and several rivers, canals and dams, India offers a lucrative opportunity for seaplane operations. The characteristic short-haul flights undertaken by seaplanes and amphibious planes have the potential to bridge the gap of last-mile connectivity. They can be deployed from tier 2 or 3 cities and connect travellers to scenic destinations close to water bodies, which currently pose logistical obstacles for travellers. Additionally, these planes can mitigate terrain challenges and reduce the travel time for passengers.

Key interventions by the Government

The Government has taken some measures to promote the growth of this sector to boost private sector participation.

1. **Construction of water aerodromes:** Under RCS UDAN, the AAI Implementing Agency has awarded 14 water aerodromes for operationalisation across the country, and INR 287 crore have been sanctioned for the same.[19]

Table 1: Water aerodromes construction projects

Sr. no.	Water aerodrome	State/UT	Sanctioned cost (INR crore)
1.	Sardar Sarovar Dam	Gujarat	25.00
2.	Sabarmati Riverfront	Gujarat	25.00
3.	Shatrunjay Dam	Gujarat	Dropped
4.	Havelock	Andaman and Nicobar Island	20.00
5.	Long Island	Andaman and Nicobar Island	20.00
6.	Neil Port	Andaman and Nicobar Island	37.00
7	Port Blair	Andaman and Nicobar Island	20.00
8.	Guwahati Riverfront	Assam	20.00
9.	Umrangso Reservoir	Assam	20.00
10.	Nagarjuna Sagar Dam	Telangana	20.00

19 https://pib.gov.in/PressReleasePage.aspx?PRID=1844622

Sr. no.	Water aerodrome	State/UT	Sanctioned cost (INR crore)
11.	Prakasham Barrage	Andhra Pradesh	20.00
12.	Kavaratti	Lakshadweep	20.00
13.	Agatti	Lakshadweep	20.00
14.	Minicoy	Lakshadweep	20.00

Source: Press Information Bureau- Government of India July 2022

2. **ATF VAT reduction:** As of February 2024, 31 states/ UTs in India have reduced the VAT on ATF to 1–5% from 20–30%.[20] As oil prices increase across the world due to geopolitical circumstances, reduction in VAT would help in decreasing the cost of operations by a significant margin. Under RCS UDAN, benefits are conferred to operators who seek to operate flights under this scheme. Some of the benefits are conferred by the Union government while others are by the respective state governments.

    a. Excise duty at a concessional rate of 2% is levied on ATF purchased for selected airline operators from RCS airports (Union government).[21]

    b. At RCS airports located within the state, VAT on ATF will be reduced to 1% or less for a period of ten years (by state government).[22]

3. **MRO GST reduction:** In March 2022, the Government reduced the GST rate from 18% to 5% for domestic MRO services.[23] This was done to meet the increasing demand of the commercial aviation sector but had a spillover effect on the seaplane sector as well. This reduction will incentivise airlines to seek MRO services in India, while reducing the dependency on countries like the Maldives.

4. **VGF:** Under RCS UDAN, operators are eligible to get VGF based on their stage lengths. The VGF is granted on a per seat basis and capped at 50% of seating capacity.[24] The VGF rates are determined as per the table below (for UDAN 5.3 scheme)

Table 2: VGF cap for different types of aircraft for operation in priority area(s), including priority and state RCS routes

Stage length (in km)	Cat 1/1A (in INR)	Cat 2/3 (in INR)
1-50	2,265	3,023
51-75	4,044	3,420
76-100	5,229	3,680
101-125	6,440	3,941
126-150	7,625	4,203
151-175	8,811	4,464
176-200	9,855	4,602
201-225	10,902	4,740
226-250	11,931	4,864
251-275	12,974	5,082
276-300	14,022	5,455
301-325	15,051	5,814

20 Financial Express Online news, February 2024 – https://www.financialexpress.com/business/airlines-aviation-boost-to-aviation-sectornbspscindia-applauds-states-for-tax-reduction-on-jet-fuel-heres-how-this-policy-change-is-propelling-the-airline-industry-3390523/

21 https://www.aai.aero/sites/default/files/rcs_news_notifications/Various_Concessions_Under_RCS_UDAN_Scheme.pdf

22 https://www.aai.aero/sites/default/files/rcs_news_notifications/Various_Concessions_Under_RCS_UDAN_Scheme.pdf

23 The Economic Times Mar 2022, https://economictimes.indiatimes.com/news/india/govt-cuts-gst-rate-for-domestic-mro-services/articleshow/90202988.cms

24 https://www.aai.aero/sites/default/files/rcs_news_notifications/UDAN_Manual.pdf

Stage length (in km)	Cat 1/1A (in INR)	Cat 2/3 (in INR)
326-350	16,097	6,186
351-375	17,142	6,559
376-400	18,171	6,917
401-425	18,171	7,290
426-450	18,171	7,664
451-475	18,171	8,022
476-500	18,171	8,395

Source: Airports Authority of India, Government of India – UDAN 5.3 notification January 2024

5. **Other benefits :** As the seaplane sector is covered within RCS UDAN, any benefits granted under the same are conferred to seaplane operations as well. In addition to the VGF and reduction in overall ATF prices, there are other financial incentives granted under RCS UDAN as follows:[25]

    a. allowing selected airline operators to enter into code-sharing arrangements for both international as well as domestic airlines

    b. reimbursement of the GST component on airfares of RCS seats sold in RCS flight at actuals from the Regional Connectivity Fund

    c. no landing or parking charges on RCS flights

    d. no terminal navigation landing charges (TNLC) levied on RCS flights

    e. RNFC levied by AAI on a nominal basis at 42.50% of normal rates for RCS flights.

All the interventions mentioned above would play a critical role in making flying affordable for last-mile passengers. Government's initiatives to minimise cost of operations and granting financial assistance lower the overall operational costs and allow airlines to charge tickets at a lower price without sacrificing commercial viability.

Despite the significant advantages offered, the seaplane industry has not been able to tap into its potential in India. A few of the earlier seaplane operations, like the Andaman and Nicobar Islands (2011), Kerala (2013) could not be successful due to local hurdles and lack of incentives/support among other factors.

The development of an ecosystem conducive for seaplanes would require concerted efforts across multiple areas including regulations, infrastructure development and workforce skilling through the inclusion of important stakeholders.

Key impediments faced by the seaplane industry in India

1. **Financing:** Potential operators in India find it difficult to secure financing for the acquisition of seaplanes. Banks and other financial institutions are unwilling to provide Indian operators liquidity and credit for their intended seaplane acquisition. This is due to the negative perception surrounding creditworthiness of Indian airlines.

2. **Regulatory:** A few regulatory challenges are as follows:

    a. **Water aerodrome regulations:** These regulations stipulate the minimum water runway dimensions and infrastructural requirements for water aerodromes to get licenced. The dimensional requirements are stringent, and in fact, do not take consider the OEM requirements which might be less than what the regulations stipulate. Furthermore, the infrastructural requirements are considered extensive. Under the current regulations, the estimated cost of construction of a single water aerodrome is nearly INR 20 crore. This is due to the stringent requirements, even though seaplane operations require minimal infrastructure like jetties and passenger waiting facilities.[26]

25 Airports Authority of India, Govt of India, https://www.aai.aero/sites/default/files/rcs_news_notifications/Various_Concessions_Under_RCS_UDAN_Scheme.pdf

26 Press Information Bureau (pib.gov.in) – https://pib.gov.in/PressReleasePage.aspx?PRID=1844622

b. **Minimum number of pilot regulations:** The civil aviation requirement (CARs) mandate that any commercial operations in India, conducted in an aircraft with all-up weight (AUW) exceeding 1,500 kg requires two pilots (irrespective of the number of passengers on board).[27] This affects the unit economics of smaller seaplanes considerably, as all seaplane operations would be conducted in airplanes with AUW exceeding the threshold limit.

3. **Infrastructure:** India does not have an MRO facility currently which is capable of servicing seaplanes and amphibious planes. If an operator were to acquire a floatplane in the nation, they would still have to depend upon either Maldives, Singapore, the UAE or another nearby country that has the capability to service and repair such planes. The lack of MRO facilities and certified technicians is a major challenge as:

    1. Payment in foreign currency is subject to change in exchange rates.

    2. Operational halts are for longer durations.

This results in increased expenses for the operator, and ultimately affects the profitability of their operations.

All of these obstacles have the final impact on the commercial viability of seaplane operations. The operator would not bear these costs themselves, but rather pass them on to the passengers. This would result in higher tariffs being charged, thus making the flight tickets unaffordable for certain sections of society. Due to costly flight tickets, many passengers who could afford these may prefer to use alternative means of transport such as road or railways. The sole purpose of floatplanes is to connect inaccessible regions. However, as the ecosystem is not conducive to the growth of floatplanes, it cannot be leveraged to its full potential.

Way forward and growth for the seaplane industry in India

Seaplanes in particular will benefit greatly from the provisions of RCS UDAN, which will increase the competitiveness of operators. Additionally, the interventions introduced by the Government will have significant impact on the profitability and overall commercial viability of seaplane operations.

However, to build a robust ecosystem, the Government, and other regulatory bodies such as the DGCA, AAI and BCAS would be required to intervene. Some key recommendations are:

1. Creation of an MRO facility technically capable of servicing seaplanes and amphibious planes. This can be done by the Government itself or through incentivising private players who already operate MRO facilities.

2. Introduction of seaplane training courses in flight training organisations. Currently, India does not have any courses of this kind, and aspiring pilots must seek certification and training abroad which has the knock-on effect of increasing pilot salaries. Having a pool of capable, domestically trained pilots will provide an impetus to the sector.

3. The CARs may be reviewed and amended to reduce the cost of operations. Moreover, extensive stakeholder consultations shall be undertaken to understand the bottlenecks and mitigation measures.

4. Financial assistance in the form of subsidy, debt financing or financial leases may be made available to operators who wish to acquire seaplanes. This can be done via the GIFT City.

5. Regulations pertaining to NSOPs, and leasing may be liberalised to allow NSOPs to operate foreign-registered planes for a certain duration. This would enable them to operate flights instantly after acquiring the plane and then subsequently get the plane de-registered and re-registered under their Air Operator's Permit (AOP) without any operational halts.

The Government's actions have been appreciated by potential seaplane operators who believe that the Indian aviation industry is viewing seaplanes and amphibious planes favourably. They are hopeful that in the coming years, India will host a number of seaplane operations and view seaplanes and helicopters as viable and readily available options for last-mile connectivity.

27 https://www.dgca.gov.in/digigov-portal/?dynamicPage=dynamicPdf/84xS3h0grBODLLpJ3q26GQ%3D%3D&mainnull

Case study: Seaplane industry in the Maldives[28]

The Maldives is a country located in the Indian Ocean, towards the south of India and southwest of Sri Lanka. The country itself is not a singular landmass but rather an archipelago consisting of nearly 1,200 islands. The islands cover a space greater than 90,000 sq. km, but dry land accounts for only 300 sq. km approximately, making it the smallest country in Asia by landmass. The country is estimated to have a population of nearly 0.5 million.

In spite of being a highly popular tourist destination, its archipelagic geography poses a significant challenge for the country.

Although boats and ships have been traditionally used, seaplanes have played a key role in improving the inter-island transport in the Maldives. As a result, seaplanes claim a significant transport modal share (31%), second to boats and ships (52%). The seaplane industry has flourished in the Maldives mainly due to the following reasons:

1. **High demand:** The geographical profile of the Maldives makes it impossible for the construction of roads or railways. Tourists and locals must thus travel via water or air. Travelling via air is less time consuming and provides the passengers scenic views of the country's geography. The tourist profile for incoming tourists consists of several HNI who can afford seaplanes.

2. **Bundling:** Operators in the Maldives sell majority of their tickets by bundling with hotels, wherein tourists who book a resort or hotel can opt for a seaplane transfer from the airport to the resort. Passengers do not need to pay the operators directly as the seaplane transfer price is paid by the hotel to the operator, who in turn collects the payment from the tourist. Operators enter into exclusive contracts with resorts and hotels and are solely responsible for all seaplane transfers to and from the contracted establishment. This provides the travellers with maximum convenience.

3. **Infrastructure:** Considering the importance of seaplanes, a dedicated terminal named Noovilu Seaplane Terminal has been commissioned near Velana airport. This terminal can accommodate 55 seaplanes and is nearly 28,000 sq. m in area, with a 8,836 sq. m MRO facility.

28 https://www.tourism.gov.mv/en/statistics/annual

5. Conclusion

Civil aviation has undergone many developments in the last few decades. As discussed, it has immense potential to overcome the challenge of last-mile connectivity and can help improve accessibility to distant and remote areas while simultaneously improving tourism within India. Aeronautical tourism is gradually becoming popular in India as it offers a unique experience to travellers in terms of luxury, comfort and picturesque views. However, due to various technological and operational limitations, the growth of both the helicopter and seaplane industry has been very limited in the country.

Proactive and incentivised interventions are required from the Government to kickstart last-mile coverage in India through civil aviation. These interventions can be in the form of introducing regulations specific to helicopters and seaplanes, which will further add to the ease of operations. These regulations must be drafted with the aim of reducing the cost of operations for potential operators so that passengers may also benefit from the same. Amendments in the current regulations should take place in the form of ATF inclusion under the GST regime and liberalising the leasing norms for aircraft in India.

Special focus should be on providing financial support for the acquisition and operation of helicopters and seaplanes. These can be in the form of VGF grants for operations and/or debt financing, subsidy or financial leasing for the aircraft acquisition. In addition, infrastructure and personnel training, which are the cornerstones of any aviation operation, are required. Furthermore, water aerodromes, seaplane MRO facilities and seaplane pilot training organisations should be present to allow for swift and uninterrupted seaplane operations, bridging the gap in the last-mile connectivity within the country.

In order to do so, ideally, it is essential to create a sustainable business ecosystem for operators and reduce tariffs for visitors. In this scenario, the operators would get their desired dues, and the public will be able to travel at reasonable prices. The Government has been actively working towards minimising issues pertaining to these sectors. To this end, Heli Disha – launched by the Ministry of Civil Aviation – and the development of 14 water aerodromes for operationalisation are reflections of the Government's strong commitment towards the development of the sector. However, in addition to these interventions, it is crucial to introduce effective policies as well. Doing so would ensure that the challenges encountered by these sectors are addressed and thus ease last-mile connectivity in the country.

About PwC

At PwC, our purpose is to build trust in society and solve important problems. We're a network of firms in 151 countries with over 360,000 people who are committed to delivering quality in assurance, advisory and tax services. Find out more and tell us what matters to you by visiting us at www.pwc.com.

PwC refers to the PwC network and/or one or more of its member firms, each of which is a separate legal entity. Please see www.pwc.com/structure for further details.

Contact us

Sonal Mishra
Partner and Leader – Aviation
PwC India
sonal.mishra@pwc.com

Contributors:

Razal Faizal
Senior Consultant
PwC India

Vatan Agarwal
Senior Consultant
PwC India

Ayush Raman Sharma
Consultant
PwC India

Tanmay Agarwal
Consultant
PwC India

Editorial support

Dion D'Souza

Rashi Gupta

Design

Kirtika Saxena

Shipra Gupta

pwc.in

SG/February 2023-M&C 34999