CHINESE ADVANCED AIR MOBILITY MARKET

A rich ecosystem with very low visibility from outside the country.

AN OVERVIEW

China, the world's most populous nation and the second largest economy in the world, has all the right conditions to be a hotbed for Advanced Air Mobility (AAM):

- Sprawling cities (Shanghai metropolitan area is similar in size to Los Angeles)
- High population density (63.9% of China's population is urban, climbing to over 77%, or 1.09 billion people, by 2050)
- Traffic congestion (3 Chinese cities are in the top 10 cities with the worst traffic in the world)

While the cities have world-class transportation networks, the sheer number of inhabitants makes urban air mobility solutions attractive.

Logistics is another AAM area of opportunity, as the domestic tech giants are working toward the goal of same day delivery in all urban centers. SF Express, the country's largest package delivery company, ordered 1,000 cargo UAVs Pipistrel Nuuva V300 to satisfy the forecasted demand.

Finally, the extensive High Speed Rail (HSR) network, that, at 37,900 km, accounts for over 70% of the world's total HSR networks and is expected to grow by 12,100 km by 2025, might limit the attractiveness of regional AAM vehicles and services.

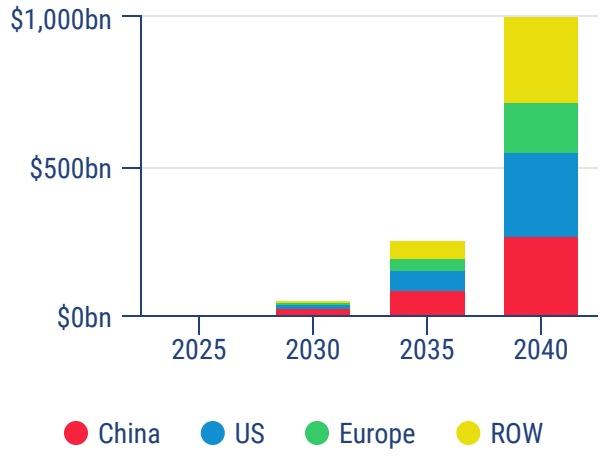
A rich AAM ecosystem is developing to serve such a large domestic market but, from outside China, there is very little visibility due to language barriers and the fact that these vehicles will mainly be sold and operated domestically.

We researched all the major startups and identified the most promising. We applied to them the AAM Reality Index algorithm to see how they would fare when compared to the twenty-one entrants we already rank.

AAM MARKET CHARACTERISTICS

Market Size

Global financial services leader Morgan Stanley sees China's AAM market growing exponentially through the coming decades, and representing the largest AAM market in the world till the 2037-2040 timeframe, when it will be surpassed by the US.



Market ($bn)	2025	2030	2035	2040
China	$6	$26	$89	$268
US	$2	$12	$66	$279
Europe	$1	$8	$41	$168
Global	$10	$55	$255	$1,001

Credit: Morgan Stanley

Three figures stand out for the Chinese AAM market from the table above:

- 2025 - 60% of the global market
- 2030 - ~47% of the global market
- 2035 - ~35% of the global market

Regulatory Environment

The Civil Aviation Administration of China (CAAC) aerospace regulatory body, is working with the domestic OEMs to create AAM certification regulations, a marked difference from the past, when it followed and adopted US and European standards. Furthermore, many OEMs plan to certify their vehicles to Light-Sport Aircraft (LSA) standards in order to achieve certification in significantly shorter times. However, we do not understand how such vehicles will be allowed to carry passengers for revenue or fly in urban airspace.

China currently perceives itself as lagging behind other countries in the AAM sector. At the end of 2020, China's State Council recommended accelerating the development of a comprehensive urban air traffic strategy, inclusive of policy documents and relevant standards. It called for the incorporation of "the development of urban air traffic into the national strategy", promoting "the healthy development of the industry". We believe that China will include AAM/UAM as a focus area in the 15th Five-Year Plan (covering the 2026 - 2030 timeframe).

Supply Chain

Domestic development and certification of AAM vehicles by Chinese OEMs is estimated to be around 20% to 30% less expensive than in the US and Europe due to lower labor rates and city, local and provincial government support.

OEMs

There are many companies developing Advanced Air Mobility vehicles in China. The most prominent, Ehang, is well known worldwide. We take a look at the most promising AAM companies.

HT AERO

An affiliate of Chinese EV pioneer Xpeng Motors, HT Aero is one of the most advanced AAM OEMs in China. With the recent Series A funding round, we estimate that the company has the funding necessary for development, certification and initial production. It has developed five generations of eVTOL prototypes and plans to certify a fully integrated flying vehicle and automobile by 2024, targeting individual consumers.

Year Founded: 2013
Vehicle: X2
Seats: 2
Speed: 80 mph
Range: 35 mins

HT Aero X2

AUTOFLIGHT

Founded by former CEO of drone company Yuneec, Tian Yu, the company recently closed a $100 million Series A funding round. The cash will allow the company to support development and flight testing of their family of vehicles. It has flown several eVTOL prototypes, including the two-seater V600 and it is developing three cargo UAVs of different sizes and the autonomous passenger eVTOL V1500M.

Year Founded: 2016
Vehicle: V1500M
Seats: 4
Speed: 125 mph
Range: 155 mi

Autoflight V1500M

VOLANT AEROTECH

Founded by a group of aerospace veterans coming from several domestic and international firms, the company is developing an eVTOL aimed at the tourism, EMS and Oil & Gas use cases, a departure from all the other domestic AAM OEMs targeting the air taxi market. The company has recently flown their 1/3 sub-scale prototype.

Year Founded: 2021
Seats: 5
Speed: 125 mph
Range: 125 mi

Volant Aerotech eVTOL

TCAB TECH

TCab Tech is a new AAM company that has recently raised $10 million in two funding rounds. It is designing a vectored thrust eVTOL that meets the airworthiness requirements of the CAAC and the European Aviation Safety Agency (EASA). It is working with several pilot provinces to accelerate the opening of the local low-altitude airspace for UAM use.

Year Founded: 2021
Seats: 5
Speed: 162 mph
Range: 125 mi

TCab Tech E20

GREAT WALL MOTORS

An offshoot of the Great Wall Motors car company, China's largest SUV and pickup manufacturer, it is composed of experienced engineers from domestic and international aerospace companies. It has developed and tested a full-scale electric helicopter. Very little data is available on it and images could not be found.

Year Founded: 2020
Seats: N/A
Speed: N/A
Range: N/A

MUYU AERO

A manned and unmanned GA light aircraft manufacturer, Muyu is a subsidiary of Shenzhen Yidian Technology. In the past it has designed an amphibious light aircraft and an amphibious flying-car, the MY-ABC. It is a new entrant in the eVTOL space and it has recently began tethered flights on a lift+cruise configuration. It is rumored not to have enough funds or experience to develop and certify an eVTOL.

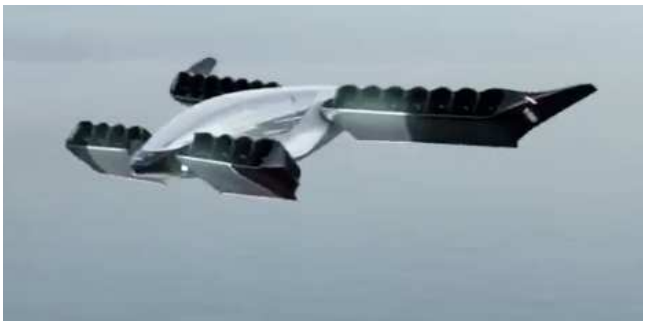
Year Founded: 2018
Seats: 4
Speed: N/A
Range: N/A

MuYu Aero eVTOL

PANTUO AVIATION

The startup recently came out of stealth mode and it is developing a vectored thrust piloted eVTOL prototype. It is ran by a seasoned non-aerospace team with a few aerospace experts and it is rumored to have very limited funding available.

Year Founded: 2019
Seats: N/A
Speed: N/A
Range: N/A



Pantuo Aviation Pantala Concept H

CHINA AAM REALITY INDEX

In order to better understand the Chinese AAM market, we applied the AAM Reality Index algorithm to the seven analyzed OEMs. Due to their relative short existence, limited funding and sparse availability of information, we decided not to include these OEMs in the AAM Reality Index, but to create an ad-hoc China-only AAM Reality Index.

The information reported below was gathered in September and October 2021.

Internationally known and NASDAQ publicly traded Ehang is included in this China-only index for completeness.

Due to the recent Series A funding received and their commitment to vehicle development, certification and industrialization, we are studying the inclusion of HT Aero in the AAM Reality Index, where, with the current data, they would rank 19th out of 22 OEMs.

OEM	ARI	Funding ($M)	Use Case	Vehicle Type	Propulsion	Operation	Vehicles	First Flight	EIS
Ehang	7.4	$132.0	Air Taxi	Multicopter / Lift + Cruise	Electric	Autonomous	EH-216 / VT-30	2018 / 2021	2022 / -
HT Aero	4.6	$512.5	Air Taxi	Multicopter	Electric	Autonomous	X2	2021	2024
Autoflight	3.4	$100.0	Air Taxi	Lift + Cruise	Electric	Autonomous	V1500M	2022	2024
Volant Aerotech	3.2	$10.0	Tourism / EMS / Oil & Gas	Lift + Cruise	Electric	Piloted	-	2022	2026
Great Wall Motors	2.9	Corporate backed	TBD	Helicopter	Electric	TBD	-	-	-
Tcab Tech	2.5	$10.0	Air Taxi	Vectored Thrust	Electric	Piloted	E20	-	2024
MuYu Aero	2.2	TBD	TBD	Lift + Cruise	Electric	TBD	-	-	-
Pantuo Aviation	2.0	TBD	Air Taxi	Vectored Thrust	Electric	Piloted	Pantala Concept H	-	-

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