LILIUM
(LILM US)

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Price ($)	9.5
Shares in issue (m)	260
Mkt Cap ($m)	2,691
Net debt ($m)	-1
EV ($m)	2,690
BVPS ($)	14.0

Share price performance

1m	8.7%
3m	-5.0%
12m	na
12 m high/low	15.5/7.9
Ave daily vol (30D)	1,180,688

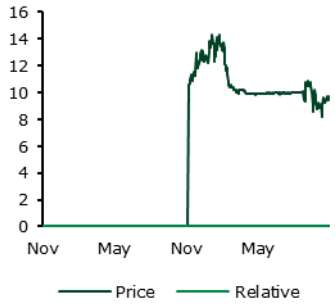
Shareholders

Tencent Holdings	27.0%
Atomico	14.0%
Daniel Wiegand	9.0%
Sebastian Born	6.0%
Matthias Meiner	6.0%
LGT	6.0%
Baillie Gifford	6.0%
Patrick Nathen	4.0%
Total for top 8	78.0%
Free float	33.4%

Next news Ints Q3

Business description

eVTOL developer and regional air mobility operator



REACH FOR THE SKY

Lilium offers a sector leading technology capable of creating genuine disruption in the aviation industry in our view. The recent funding and a successful deal in Brazil put it on track towards launch in 2024 with real traction. We initiate coverage with a central case valuation of $24 per share.

A sector leading eVTOL

Lilium is developing an electric vertical take-of and landing eVTOL aircraft which is optimised for range and passenger numbers. It beats competing designs in these areas and as such can target both the urban air mobility and the regional air mobility markets. It is also designed to be quieter and safer thanks to its proprietary ducted electric vector thrust propulsion system.

A market capable of strong evolution

The eVTOL market has obvious immediate markets in general aviation, taking share from existing air taxi and business aviation with a cleaner, quieter and cheaper alternative. But it can expand to take business as an alternative to ground transportation and if range is available to find wider regional opportunities. Estimates of the total addressable market for urban air mobility alone range up to 1m units.

Lilium is well placed

Lilium is well placed to succeed in these markets in our view. In addition to a sector beating technology, the company has put together a team of engineers and other professionals with strong experience of aerospace propulsion and aircraft design with particular experience in the VTOL space. The company has also established a strong list of partner companies across its sphere of activities all lending credibility to its business model.

Central case valuation at $24 per share

Our DCF based valuations of the company range from $12 per share based on a delayed product launch and limited market penetration to $31.5 per share which assumes major market opportunities are captured and the company can deliver on time. Our central case comes in at $24 per share. The key risks to our valuation are regulatory delays, technology delays, competition and funding. All have mitigation especially if delay can be avoided.

$m, Dec	2020pf	2021e	2022e	2023e	2024e	2025e
Sales	0	0	0	0	0	280
EBITDA	-354	-191	-194	-197	-257	-297
PBT	-414	-204	-217	-229	-298	-362
EPS	-1.5	-0.8	-0.8	-0.8	-0.5	-0.6
CFPS	-1.3	-0.8	-0.9	-0.9	-0.5	-1.1
DPS	0.0	0.0	0.0	0.0	0.0	0.0
Net Debt (Cash)	-552	-331	-87	159	-2,039	-1,452
Debt/EBITDA	1.6	1.7	0.4	-0.8	7.9	4.9
P/E	-6.2	-12.5	-11.8	-11.2	-17.8	-14.6
EV/EBITDA	-6.0	-12.4	-13.4	-14.5	-2.5	-4.2
EV/sales	na	na	na	na	na	7.6
FCF yield	-13.8%	-8.5%	-9.4%	-9.4%	-5.6%	-11.1%
Div yield	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%

INVESTMENT SUMMARY

The Lilium jet uses a proprietary propulsion technology to create a quieter, safer, cleaner and cheaper eVTOL solution for urban and regional air mobility markets. It beats other eVTOLs on the key metrics of range and payload, being able to transport six passengers up to 155 miles. It can expand its design to fifteen passengers without dramatically increasing its footprint creating an unprecedented urban transport solution.

A rising tide raises all boats – and aircraft

eVTOLs are a disruptive technology in our view. Compared to their nearest competing services, eVTOLs are a simpler, cheaper product, which can create its own markets. They can develop away from the most aggressive competition in key niches of the general aviation market allowing them to develop and eventually take on incumbents in the regional air and ground transportation markets.

Range is critical and Lilium's battery is the key

The agreement with CustomCells brings a silicon anode battery which can deliver sector beating range to Lilium. While silicon anodes have been in development for some time we think there is evidence emerging to show that this technology is ready to support the launch of the Lilium jet.

More than just an aircraft

Lilium is developing a regional aviation network with an initial focus on Florida and Germany. It is working with strong partners such as ferrovial and Munich Airport to establish a network of vertiports in regions of high, yet distributed, population density. Last week it added Stuttgart Airport to its German network. The Lilium concept is well placed to adopt as intelligent control is increasingly adopted in aviation and the design is ready for autonomous flying. Indeed, Lilium is already designed around the whole ecosystem of autonomous air mobility and can be a leader as that market develops.

A better company too

Lilium has attracted a strong team of professionals from across the aerospace industry and we see the strength of the team as a stand out point. Notably in engineering the team brings experience working on engines for Airbus and Gulfstream, the Harrier jump jet, the Eurofighter Typhoon and the NextGen Tiltrotor. The company has also built strong partnerships that will help it deliver aircraft and also establish networks. Partners include ferrovial, Honeywell and Lufthansa.

Already gaining traction (or should that be altitude)

The announcement of a deal leading to the sale of 220 aircraft to Azul, the largest airline network in Brazil, represents an important move for Lilium. Brazil, and the Sao Paulo macrometropolis in particular, represent many of the challenges faced in urban and regional mobility and this is an excellent early demonstration of Lilium's attractions.

Funded towards launch

The SPAC transaction and PIPE raised $584m gross. While redemptions reflected a weaker SPAC market in our view, the raise still gives the company funds to move forward towards the launch of a commercial aircraft with regulatory approvals although further funding will be required. Funding the network build out is likely to be achieved through external financing with partners although we have factored in further equity and debt fund raisings.

BULL POINTS

- Best in class eVTOL
- Strong team and partners
- Funded to launch
- Traction following Azul order

BEAR POINTS

- Further funding required although not immediately
- Battery technology relatively unproven

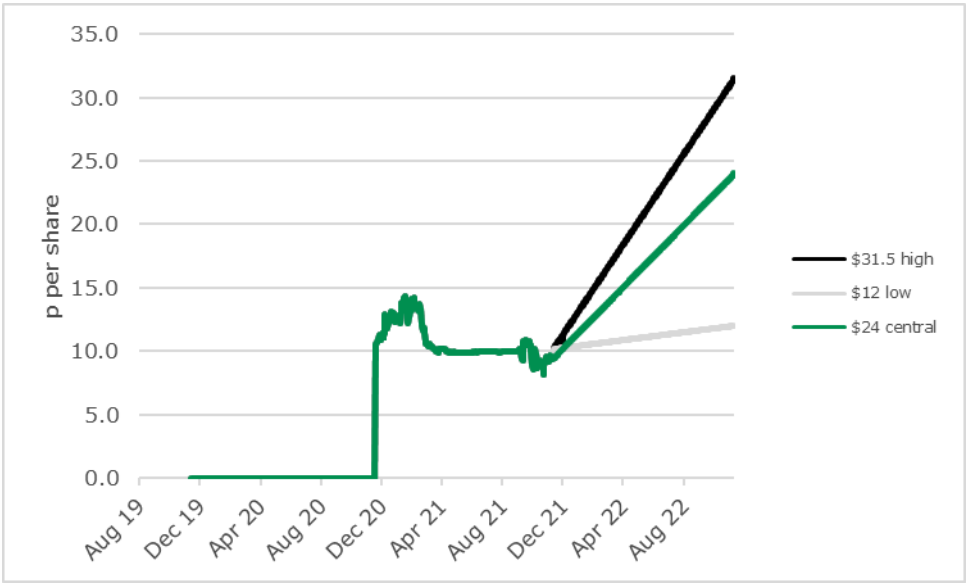
CATALYSTS

- Regulatory and production progress milestones
- Business traction – new deals

VALUATION

Comparative multiples are obscured by the early stage of the eVTOL industry, so a DCF approach is more suitable. Using a WACC of 14.3%, our central valuation case assumes commercial launch in 2025 with an eventual market share of 10% and the launch of a 16 seater aircraft in 2030. Based on these assumptions we value the company at $24. Failure to deliver a 16 seater would value the company at $12. A more prompt launch would give us a valuation of $31.5.

Share price performance and valuation outlook



Source: Longspur Research, Bloomberg

RISKS

We see the key risks to our valuation as principally related to delays, either of regulation or technology. We think there are mitigations given progress to date and the approach of both company and regulators. Delays could affect funding. Finally, competition is present and this is an evolving market where new players could emerge.

LILIUM – COMPANY INTRODUCTION

Lilium BV is the Dutch parent company of Lilium GmbH, a German aerospace company which has developed the Lilium Jet, an electrically powered aircraft capable of vertical take-off and landing, an eVTOL. Lilium was founded in 2015 by four engineers and PhD students at the Technical University of Munich, Daniel Wiegand (CEO), Sebastian Born (Head of Structure and Interior Design), Matthias Meiner (Chief Engineer) and Patrick Nathen (VP Product).

Key developments in Lilium's history

Date	Announcement
2015	Founded in 2015 by four engineers and PhD students at the Technical University of Munich, including Daniel Wiegand (CEO), Sebastian Born (Head of Structure and Interior Design), Matthias Meiner (Chief Engineer) and Patrick Nathen (VP Product)
2017	Lilium announced plans to launch a 5-seat Lilium Jet by 2025.
Apr 2017	The Lilium Eagle, an unmanned two-seat proof of concept model, performed its maiden flight at the airfield Mindelheim-Mattsies near Munich in Germany.
Sept 2017	Lilium raised a new finance round of $90 million in September 2017.
2018	Lilium registered it's Headquarters in Wessling near Gilchingin, Bavaria, Germany
May 2019	The Lilium Jet five-seater prototype Phoenix first flew in May 2019.
Oct 2019	Lilium released footage showing the Jet in full flight, taking off vertically and transitioning to horizontal flight.
Mar 2020	Lilium raised $240 million in funding led by Tencent, with participation of previous backers such as Atomico, Freigeist and LGT.
Nov 2020	Lilium announced a partnership with the developer Tavistock Development Company to build a $25 million "vertiport" in Orlando, Florida.
Jan 2021	Lilium announces a partnership with infrastructure developer Ferrovial to collaborate on 10 vertiports in the USA with $200m of commitments.
Aug 2021	Brazilian airline Azul signed a letter of intend for 220 Lilium Jet seven-seaters.
Sept 2021	SPAC transaction completed raising $584m gross.

Source: Lilium

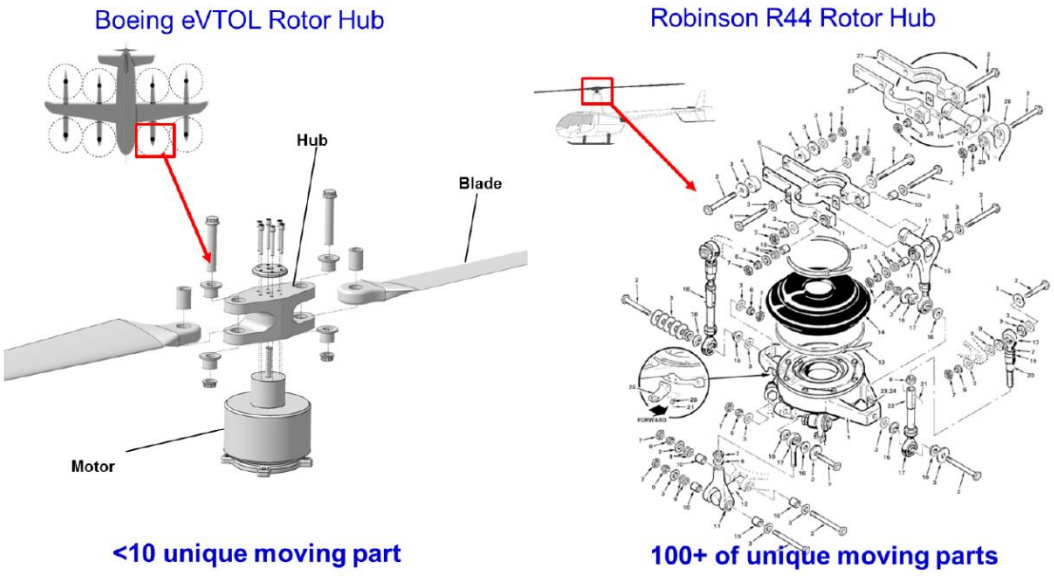
EVTOLS

Electric vertical take-off and landing aircraft combine helicopter versatility with electric car emissions but go beyond the capabilities of both, potentially creating new markets in urban air mobility and regional air mobility. Compared with most other forms of aviation they are expected to be simpler, safer, quieter, cleaner and cheaper.

SIMPLER

An internal combustion engine has hundreds of moving parts whereas an electric motor has just two. Tesla (TSLA US) says their electric vehicle drivetrain has 17 moving parts compared to over a thousand in a normal car. For aircraft, either piston-engined or gas turbine, the complexity increases. Helicopters are especially complex. For example, the rotor hub of a Robinson R44 has over 100 moving parts. A typical eVTOL rotor has less than 10 moving parts.

A typical eVTOL rotor and a helicopter rotor



Source: Boeing

Additionally, the key helicopter componentry is generally held together by a single nut, known as the "Jesus nut" because if it fails the only thing you can do is pray to your deity of choice.

Safety comes with simplicity

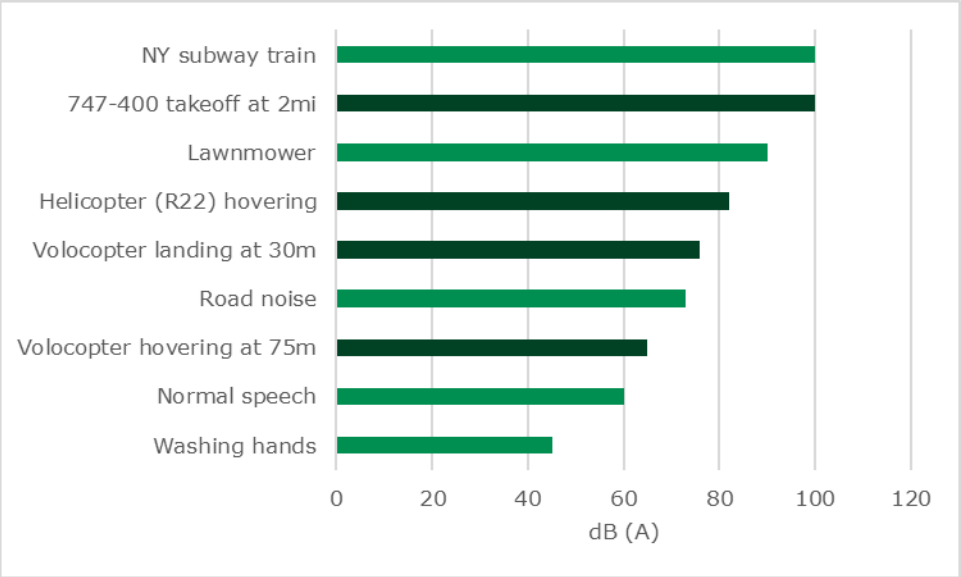
eVTOLs are much simpler than helicopters and even fixed wing aircraft. While the safety case is still being made, we expect that this simplicity will lead to greater safety. Redundancy is high on eVTOLs and on Lilium in particular. Traditional aircraft of all types are reliant on a few big components; the "Jesus nut" above or even the two engines on typical jet airline configurations. By contrast the Lilium jet has many small components none of which are individually critical.

The Lilium jet will comply with the EASA rules for the certification of eVTOLs. These include a safety level objective of $1x10^{-9}$, equivalent to a catastrophic failure once every billion flight hours. This is the safety level required by commercial airliners, putting eVTOLs at the top of the range compared with other forms of transport.

QUIETER

Electrically powered engines mean quieter engine noise for all eVTOLs. Noise is complex as it varies with the aircraft operation and with distance to the measurement and so far there are no standards for measuring it. However, most eVTOL operators are claiming low noise in hover (the loudest operation) compared with helicopters.

Noise compared



Source: Volocopter

Being quieter on its own can expand markets. Lilium makes the point that San Francisco has 40 heliports of which only one can be used at any time because of noise restrictions.

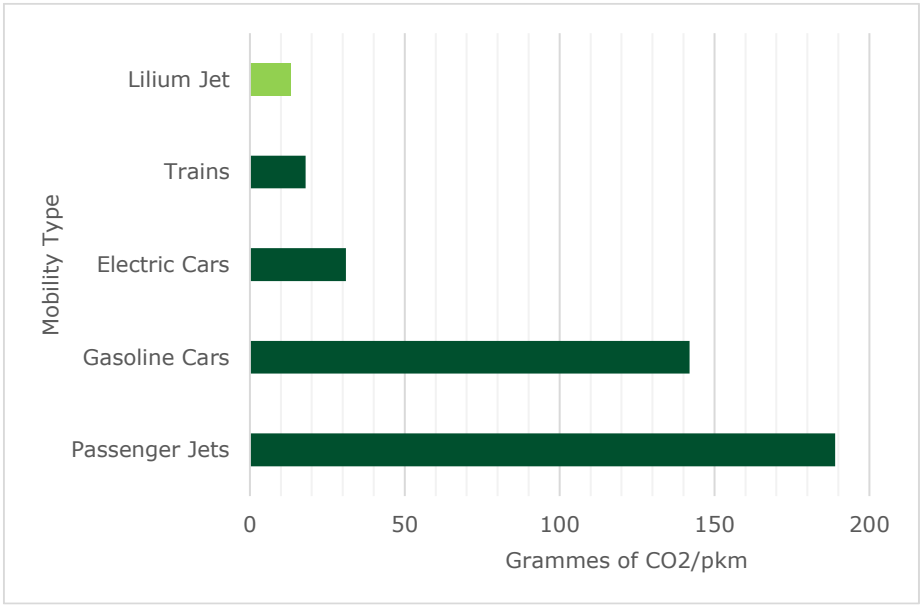
In addition to the noise outside the aircraft, the noise inside is considerably lower than a typical conventional aircraft. Vibration is also reduced. As a result, the ride comfort is greater, giving a more pleasant user experience. This is likely to be important where customer choice is important but also in terms of reducing pilot fatigue.

CLEANER

Environmental benefits in detail

Obviously an all-electric power train has lower emissions than one fuelled by Jet A or Jet A-1. Well to wheel/rotor emissions are affected by the level of decarbonisation of the grid used to charge the aircraft but as society moves to net zero, eVTOLs are capable of being near zero carbon.

Lilium emissions compared to other transportation

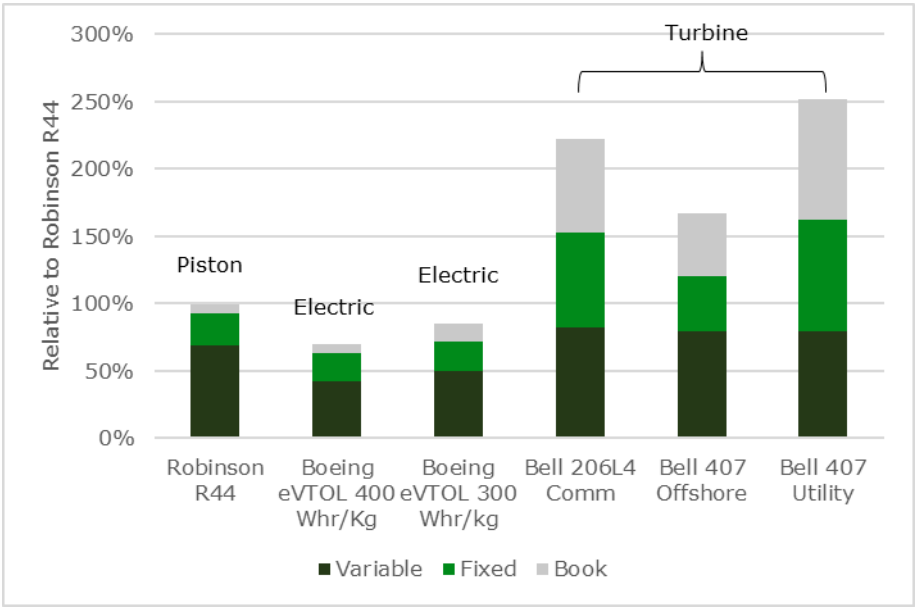


Source: Lilium

CHEAPER

Simplicity is also part of the cost story. With a simpler design, maintenance is reduced. However, electric propulsion is also cheaper relative to either piston engine or turbine powered aircraft. A detailed study of seat-mile costs, normalised to a Robinson R44 helicopter put eVTOLs ahead of both piston and turbine powered helicopters.

eVTOL cost relative to a helicopter

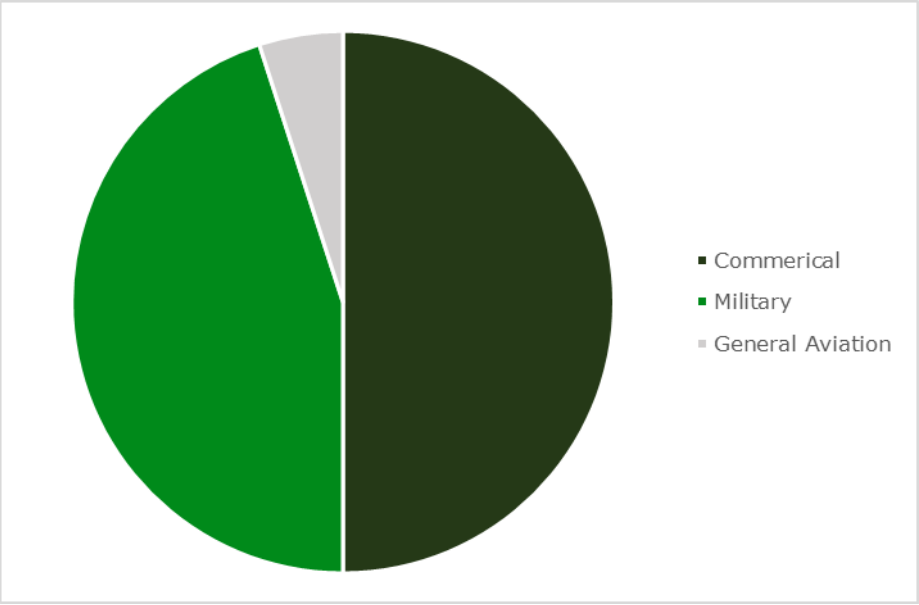


Source: Boeing

KEY MARKETS - FINDING NICHES AWAY FROM THE INCUMBENTS

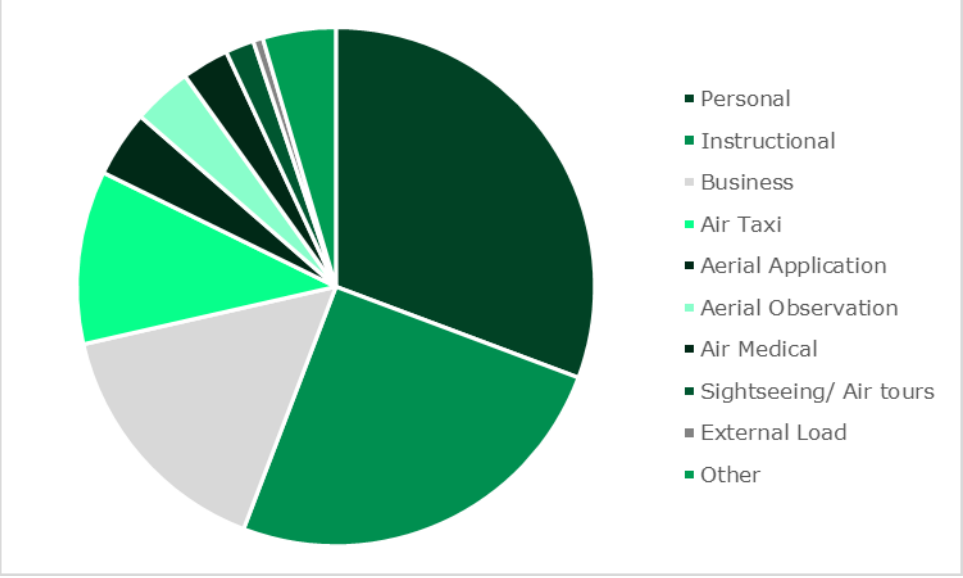
The aviation market is dominated by commercial aviation with long and medium haul the biggest markets. Military comes second and then general aviation. Within general aviation, the business and air taxi markets are the key for eVTOLs initially.

Main aviation markets



Source: DS Smith

US general aviation segments



Source: FAA

The air taxi market on its own is big enough to establish eVTOLs away from the competitive pressure of incumbents, creating a strong platform to build an industry. The routes to building greater market size comes from both related aviation market opportunities but also from the ability to displace incumbents in key areas of ground transportation.

Wider aviation markets

In an early study for NASA, consultants Booz Allen Hamilton listed a comprehensive list of urban air mobility markets.

Wider aviation markets for eVTOLs

Market Category	Potential UAM Market
Air Commute	Airport Shuttle
	Air Taxi
	Train
	Bus
First Response (Public Services)	Air Ambulance
	Police – Local, State, and Federal
	Firefighter – Private, Municipal, and Federal
	Natural Disaster and Armed Conflict Response
Corporations	Company Shuttle
	Office-to-Office Travel
	Inter-office / Client Delivery
Events	Major Events
	Minor Events
Entertainment and Media	Amusement Parks / Extreme Sporting
	Photography
	Film/TV/Radio Stations
	Tourism
Logistics and Goods Delivery	Aerial Delivery
	Aerial Warehousing
Real Estate and Construction	Aerial Showcasing, Inspections, and Survey
Security	Aerial Security
Rentals	Car Rentals – Corporation and Franchise
Asset/Building Maintenance	Building Maintenance
	Utilities Asset Maintenance
Healthcare Providers	Remote Visits
	Medical Equipment Delivery
Scientific Research	Aerospace Travel/Colony Pilot Studies
	Other Applications
Urban Planning	Small Houses/ Emergency Shelters
Security	Storage
Public Services (Non-First Response)	Snowplow & Salt Trucks
	Trash Collection
	School Buses
Agriculture	Flock Tending
	Harvesting
	Landscaping

Source: Booz Allen Hamilton

Ground transport markets

The Booz Allen Hamilton analysis does not really look at the opportunities in freight. Currently the Lilium seven seater design has 6m^3 of storage when configured for freight. With a cruise speed of 175mph and not constrained by traffic to the same extent, Lilium can offer accelerated parcel delivery times and the potential to connect inaccessible regions flexibly.

eVTOLs – A TRULY DISRUPTIVE TECHNOLOGY?

Compared to their nearest competing services, eVTOLs are a simpler, cheaper product, which can create its own markets. We think this makes them truly disruptive. They are also safer, quieter and cleaner which brings further advantages.

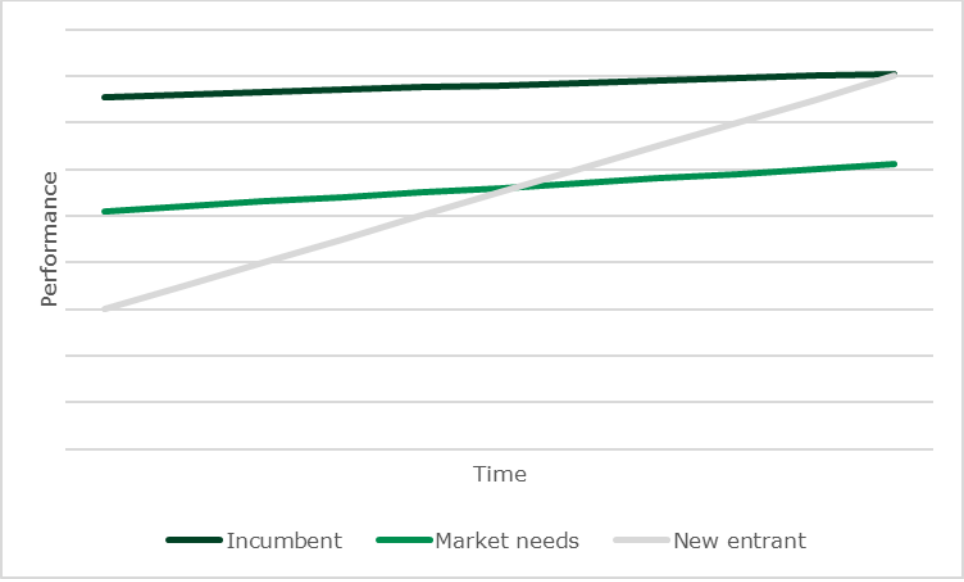
Why this is disruptive

The concept of a disrupting technology was first posited by Harvard Business School Professor, Clayton Christensen in his 1995 paper "Disruptive Technologies: Catching the Wave". He saw industries where incumbents innovated and developed their services to meet the needs of the most profitable customers. In regional aviation that has now become the medium haul low-cost market where volume is key. In such markets, innovative new entrants target lesser markets and gain traction by meeting the needs of that market at a lower cost than offered by incumbents. Eventually the entrant moves into the incumbents' markets creating true disruption.

eVTOLs are targeting the neglected sub-segments of the general aviation market with a technically simpler product that is cheaper.

Classic disruptive technologies usually enter a market with weak performance standards, but are normally simpler and therefore cheaper. Over time performance inflation makes existing technologies more expensive whereas the disruptive technology makes sufficient performance improvements at a lower cost to reach a point where they meet the performance needs of the market but at a much reduced cost.

Incumbent and entrant performance againt market needs

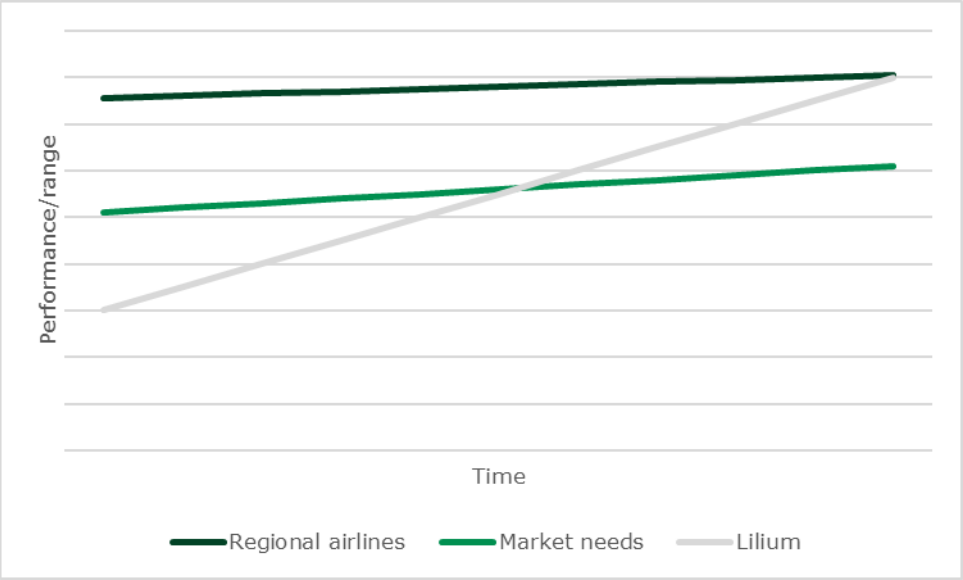


Source: Adapted from "The Innovator's Dilemma" Clayton M. Christensen

Very few situations fit this model perfectly, but we think there is some reason for thinking that eVTOL and Lilium in particular can at least approximate to it. In this case the weaker performance of eVTOLs relative to aviation incumbents is range.

Using range as a proxy for performance then the ability of developing batteries to add range, notable in Lilium's use of a silicon anode battery, can allow eVTOLs to start to disrupt regional aviation incumbents as well as those in ground transportation.

Urban mobility and regional aviation



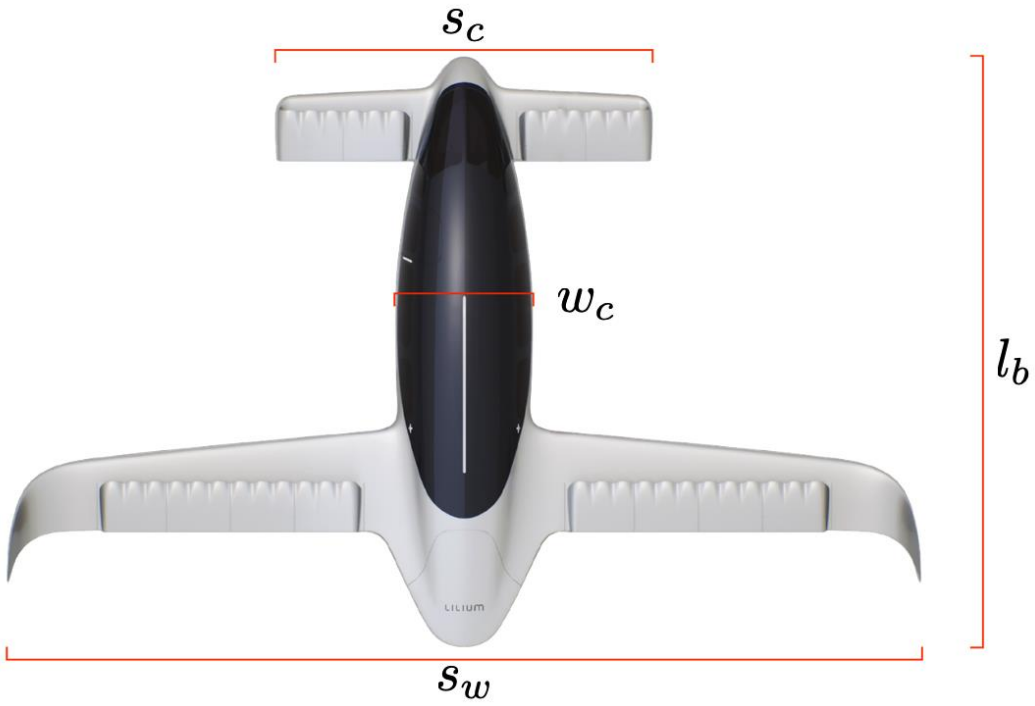
Source: Longspur Research, Adapted from "The Innovator's Dilemma" Clayton M. Christensen

Classically, incumbents find it challenging to innovate along the lines of the entrants despite often having strong ideas. The classic examples here are Kodak who invented the digital camera and Blockbuster who developed movie streaming. In aerospace, incumbents such as Boeing (BA US) are also trying to develop eVTOL solutions but the history of incumbents faced with disruption is weak and it is notable that Boeing has already paused work at its NeXt eVTOL project.

LILIUM – A BETTER EVTOL

Lilium has designed an eVTOL that differs markedly from other offerings in the market. The aircraft is a ducted vectored thrust design where electrically driven rotors are enclosed in a duct. The principal is similar to the turbofan design of jet engine now seen as the most efficient jet at commercial aviation cruise speeds. The Lilium design consists of 36 ducted engines, twelve on each main wing and six on each of the forward canards.

The Lilium Jet



Source: Lilium

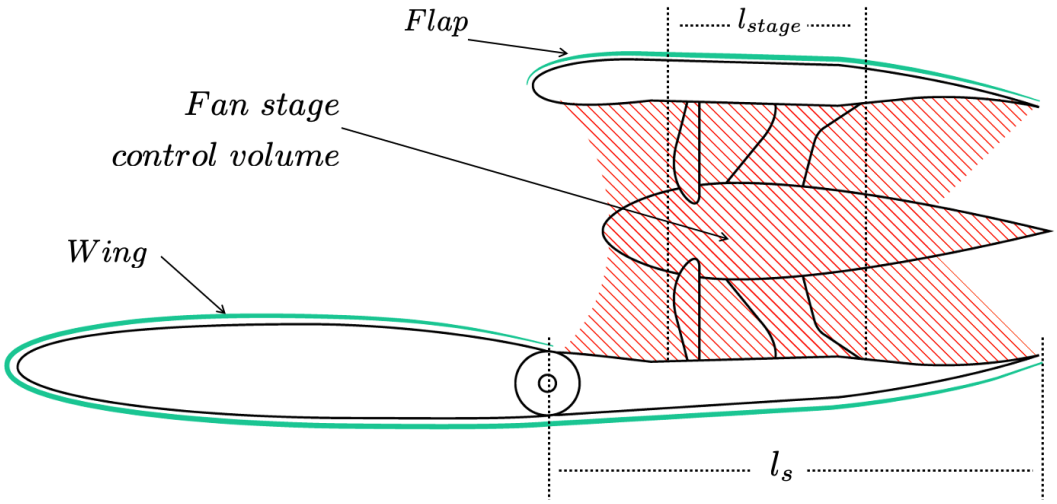
This allows the engines to vector with the wing edge allowing a single pivot for each wing making for a simpler design.

DEVT engine layout

Source: Lilium

Pivoted wings reduce the number of moving parts with all the engines on each wing moving as one.

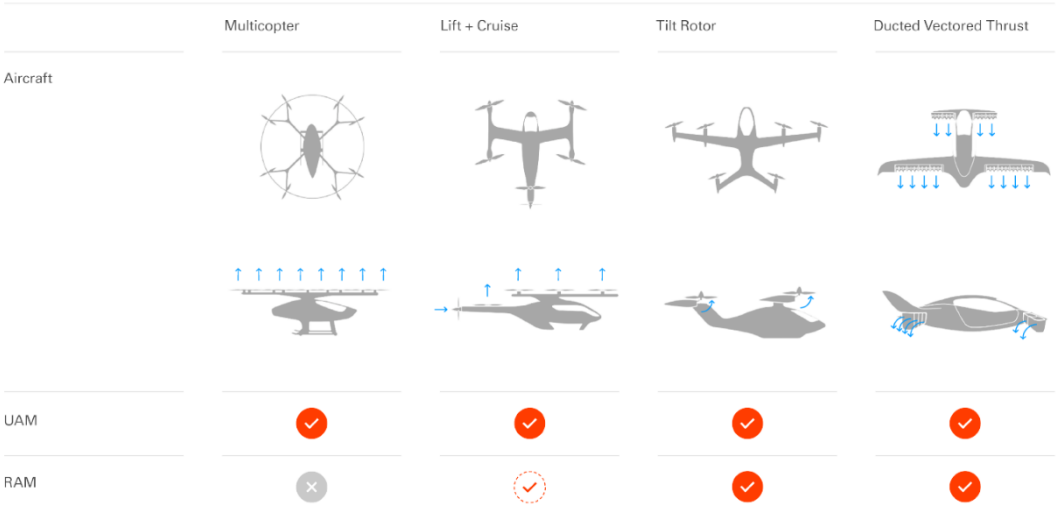
Detail of the DEVT propulsion



Source: Lilium

eVTOLs fall into four main groups; multirotor, lift and cruise, tilt rotor and ducted vectored thrust. Multirotor are simple but they lack cruise efficiency. Lift and cruise designs attempt to improve cruise efficiency with small rotors to reduce drag. However, the small rotor length increases tip speed which means more noise. Tilt rotor designs are efficient for cruise and can be quiet but have high technical complexity, often requiring gearboxes. The ducted vector thrust design used by Lilium overcomes most of these problems.

Key eVTOL designs



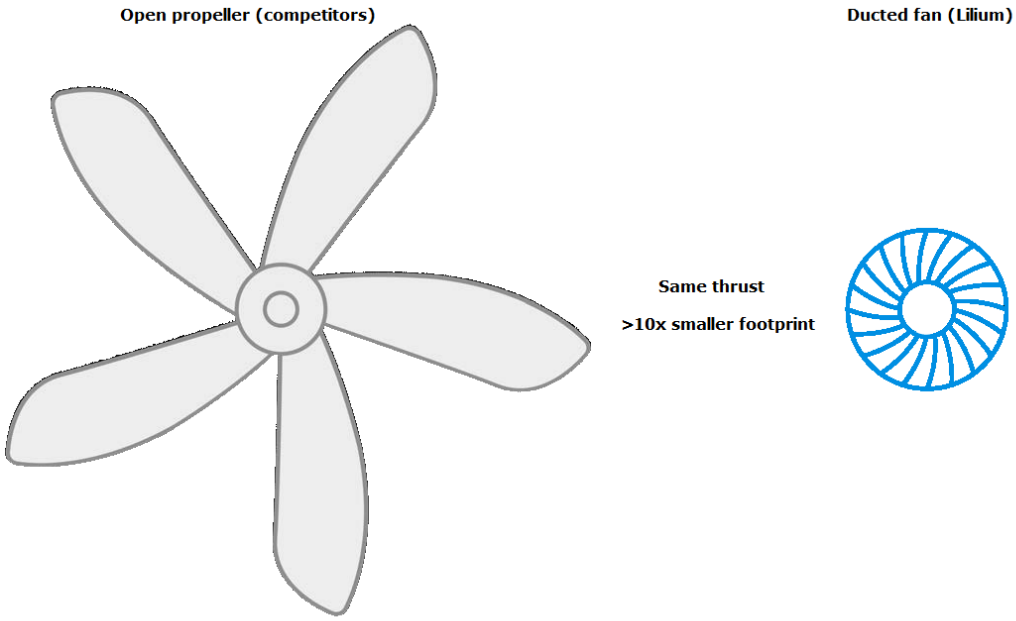
Source: Lilium

The Lilium DEVT design provides a number of key benefits

- Lower noise and vibration
- Safer as a result of blade loss containment and redundancy of power sources
- Allows for larger aircraft with more payload for a given footprint
- Highly scalable leading to more revenue per aircraft

The ducted fan design requires more than ten times less propulsion area than open propellors for the same aircraft.

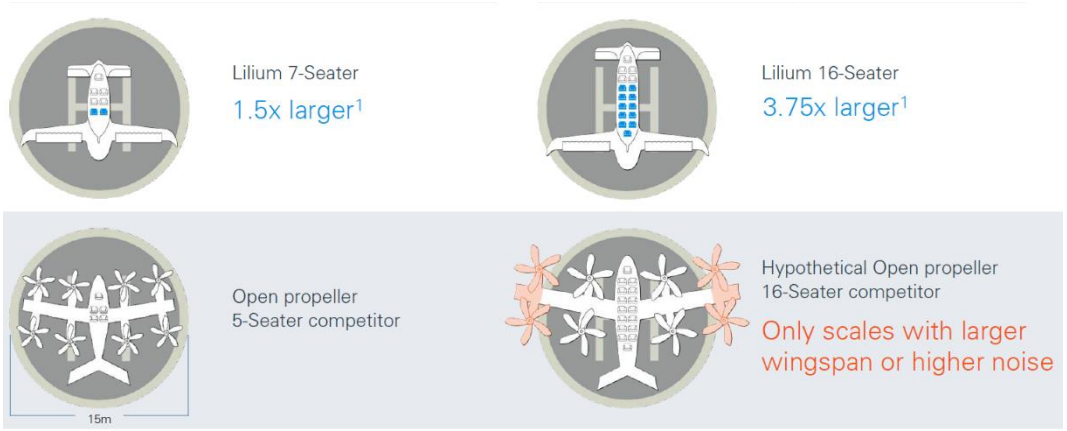
Open rotor compared with ducted fan



Source: Lilium

This will in time allow Lilium to move from 7 seaters to sixteen seaters while still using small vertiports.

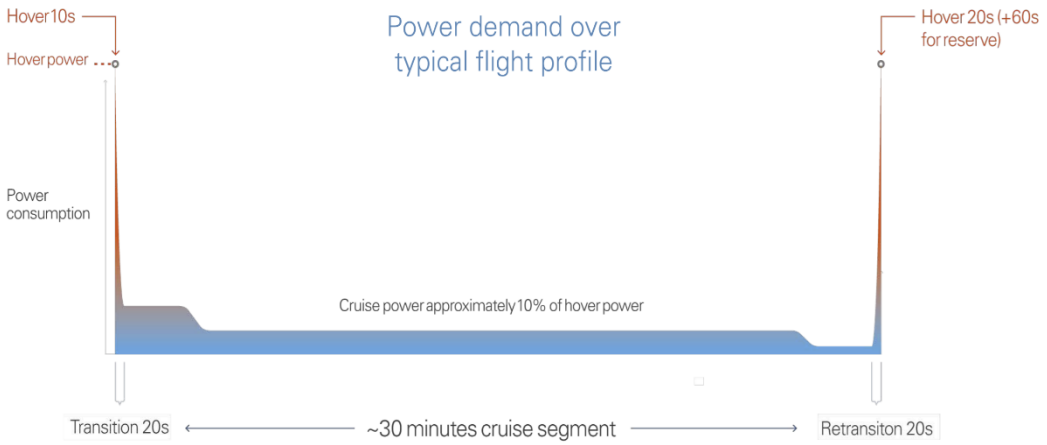
Footprints of 7 seater and 16 seater eVTOL aircraft



Source: Lilium

Lilium has chosen its design to be optimal for cruising. It is less efficient than some designs for hover with roughly twice the power consumption in hover than some open propellor designs. However, this is acceptable as hover is a very small part of the overall duty cycle. A typical flight is shown below.

Power demand over a typical flight



Source: Lilium

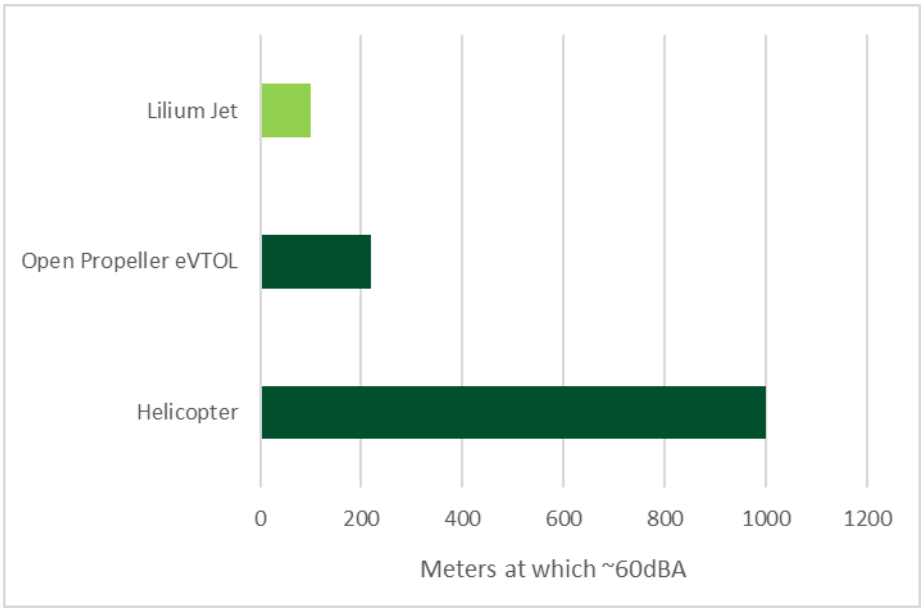
While the power consumption is higher in hover, this is only c.30 seconds compared to the 30 minute cruise. That reduces the two times power consumption to c.5%. With a faster cruising speed this means that on a like for like energy basis, Lilium can achieve a greater range than open propellor competitors and do so in a shorter time.

The design is optimised for flight and not hover. With a smaller total engine area thanks to the ducted design the aircraft has lower drag in cruise and variable nozzle design which improves aerodynamic efficiency. Additionally, the cabin design is aerodynamically optimised to give a reduced frontal area, again reducing drag and contributing to lift. Finally, the lack of a tail or steering rudders further reduces drag. Essentially the Lilium jet is optimised for its role being powerful enough for hover and very efficient in cruise. It fits between helicopters and fixed wing aircraft creating a goldilocks solution for urban and regional air mobility.

Quieter

Despite being quieter as a class, the rotor of eVTOLs remains a major source of noise. The Lilium solution with a ducted rotor makes it class leading. At a distance of 100m it expects to have a noise of 60dB in hover which is comparable to standing near a dishwasher. Open propeller eVTOLs are only hitting this level at 220m and helicopters need to be 1km away.

60db noise range

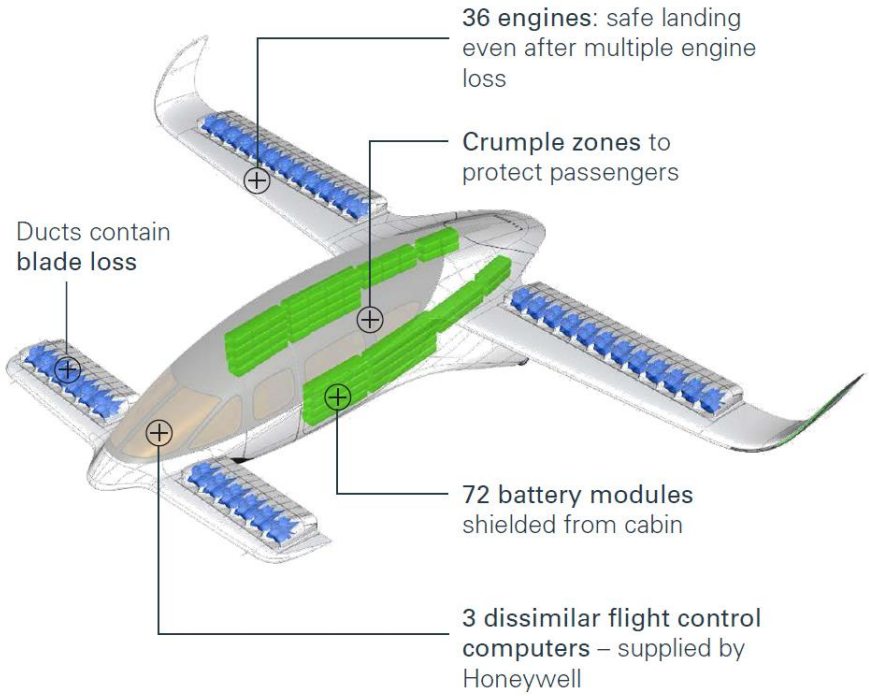


Source: Lilium

Safer

The Lilium jet has been designed to a design assurance level with 1 x 10^{-9} catastrophic failure probability per flight hour in line with the standards set for commercial aircraft like the Airbus A350. It has redundancy, most notably in its 36 separate power units and unlike many helicopter designs, it has no single point of failure. Lilium's redundancy concept with its small distributed engines, allows to safely steer and land the aircraft even in case of failure of multiple units. In addition, it has three flight control computers with different processor types with dissimilar software. This provides an extra degree of protection against software bugs and other threats. Similarly, 72 battery modules provide redundant power supply.

Lilium key safety features



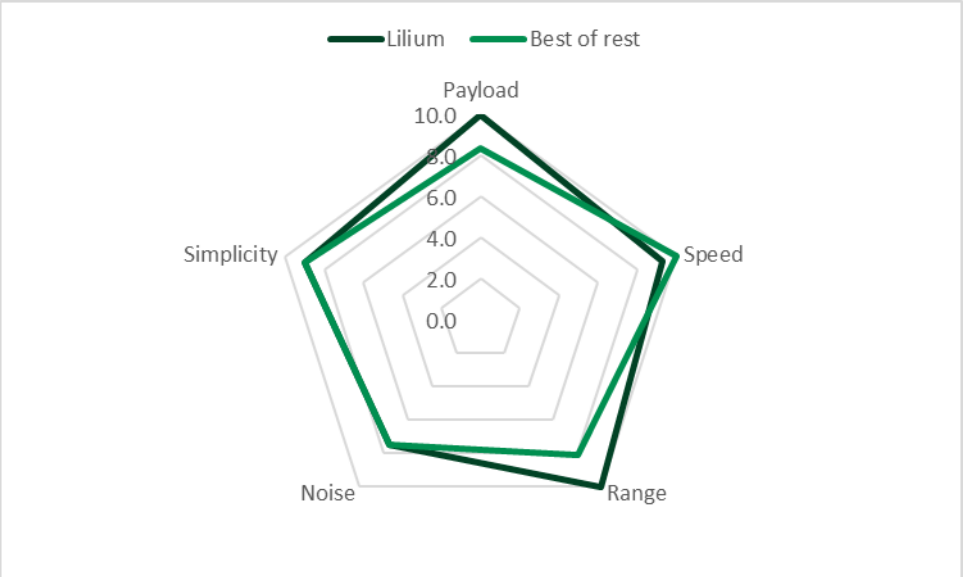
Source: Lilium

IS IT A BIRD? IS IT A PLANE?

When we first saw the Lilium jet we were not sure what to make of it. It is not a helicopter and it is not a plane. In some ways it is closest to an Osprey V22. But being electric it is cleaner, safer and quieter. However, the key is where it beats other eVTOLS.

eVTOL design is driven by five degrees of freedom; payload, speed, range, noise and simplicity. Lilium is sector leading in most. We have compared ten of the leading eVTOL offerings against these degrees of freedom. For simplicity we have rated tilt rotor designs the least simple and ducted vectored thrust designs the most simple.

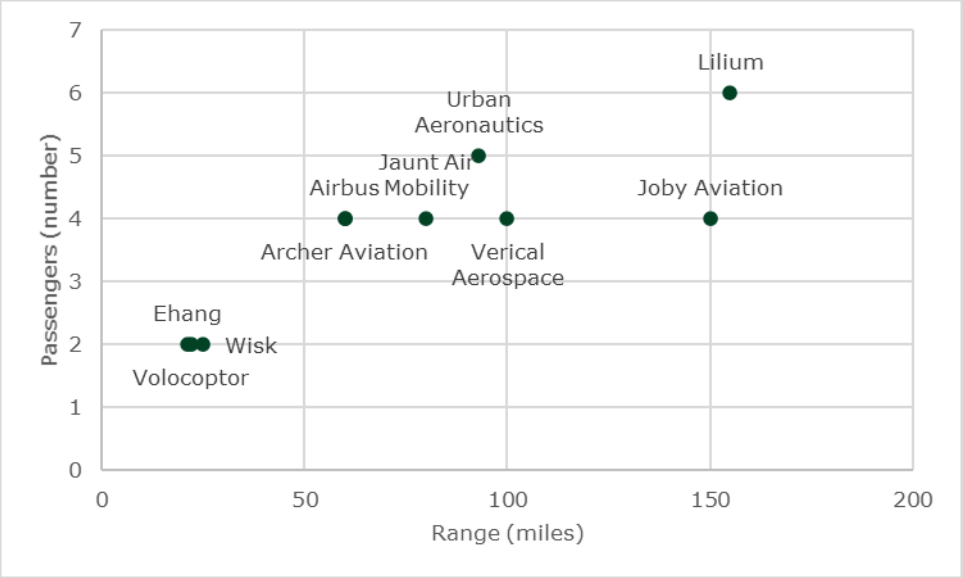
Degrees of freedom compared



Source: Longspur Research

Perhaps the two most critical for the economics of an operator are range and payload. Here Lilium really stands out.

Range and payload of major eVTOLs



Source: Longspur Research

A BETTER BATTERY IS KEY FOR RANGE

Lilium has partnered with Customcells, who have announced a joint venture with Porsche to produce silicon anode batteries. Lilium is targeting the use of these batteries to power the Lilium Jet. Lilium has an exclusive agreement with Customcells to secure these cells which have an energy density of 330Wh/kg enabling a 155 mile range for the Lilium Jet.

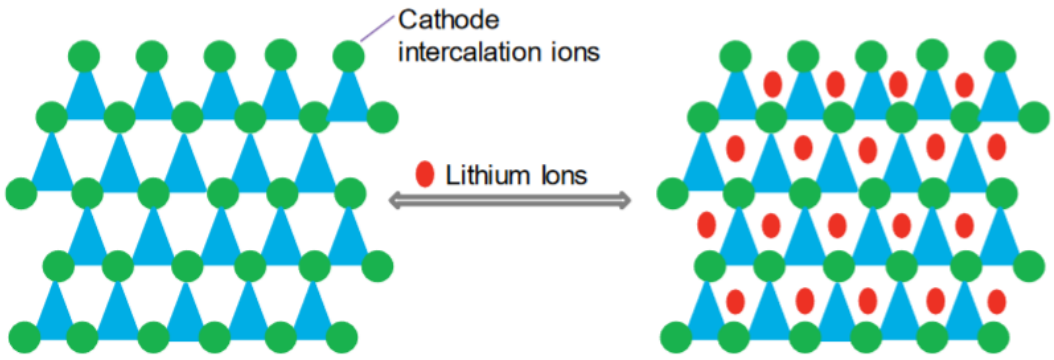
HOW A SI ANODE WORKS

Battery anodes need to receive and store lithium ions in some form, this is how the energy in a battery is stored. In a traditional battery lithium ions are stored (intercalated) between layers in the anode material. This is normally a stable process with a reasonably high cycling efficiency.

A silicon anode can result in much higher energy density. To achieve this the anode has to use alloying where lithium ions react with the silicon anode material to form an alloy. This allows more lithium ions to be stored which results in a higher energy density. However, the materials see large volume changes during charging and discharging, with silicon anodes expanding to four times their initial volume when fully lithiated. This creates significant damage to the anode structure leading to short cycle lives, with the performance improvements from the silicon lasting only a couple of hundred cycles.

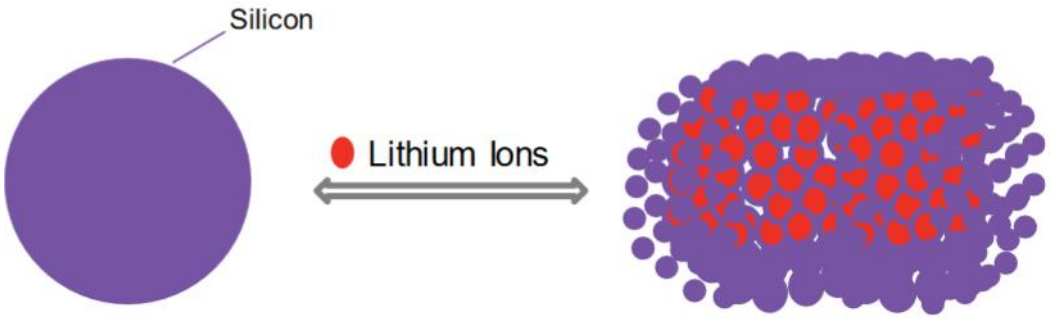
The volume change problem is not trivial and as a result, silicon is being blended with graphite in order to create improvements. The volume expansion problem is so great that blending is currently restricted to c. 3-5% by weight. It is possible to increase this and the ideal is to have a high silicon (i.e. >20%) anode. To do this the volume expansion problem needs to be addressed.

Electrode intercalation reactions



Source: Bloomberg New Energy Finance

Lithium alloying with silicon showing volume expansion



Source: Bloomberg New Energy Finance

SOLVING THE VOLUME EXPANSION PROBLEM

- Contain the silicon with graphene or carbon nano structures
- Reduce the particle size of the silicon
- Physically contain the silicon – but would need a new production process writing off existing processes

We do not know what approach CustomCells are taking. However, while the market has broadly viewed Si anode cells as being some years from commerical development, recent announcements suggest that progress has been faster than expected, giving credibility to the Lilium development timetable.

In particular, Mercedes-backed Chinese battery manufacturer Farasis Energy says that it, and its technology partner Group14 Technologies, have developed and tested a silicon anode cell with the results verified by the US Advanced Battery Consortium. Group14 CEO Rick Luebbe is quoted as saying

"People talk about what might be available in 2026 or 2027. This is a today technology that Farasis has validated works right now."

By getting this right, Lilium can power its fleet with access to an exclusive battery that delivers a class beating range.

Lilium battery characteristics

Characteristic	Value	Units
Energy density	330	Wh/kg
Power density	2.8	kW/kg
Charging time to 80%	15	minutes
Charging time to 100%	30	minutes
Cycle life	800	standard cycles

Source:Lilium

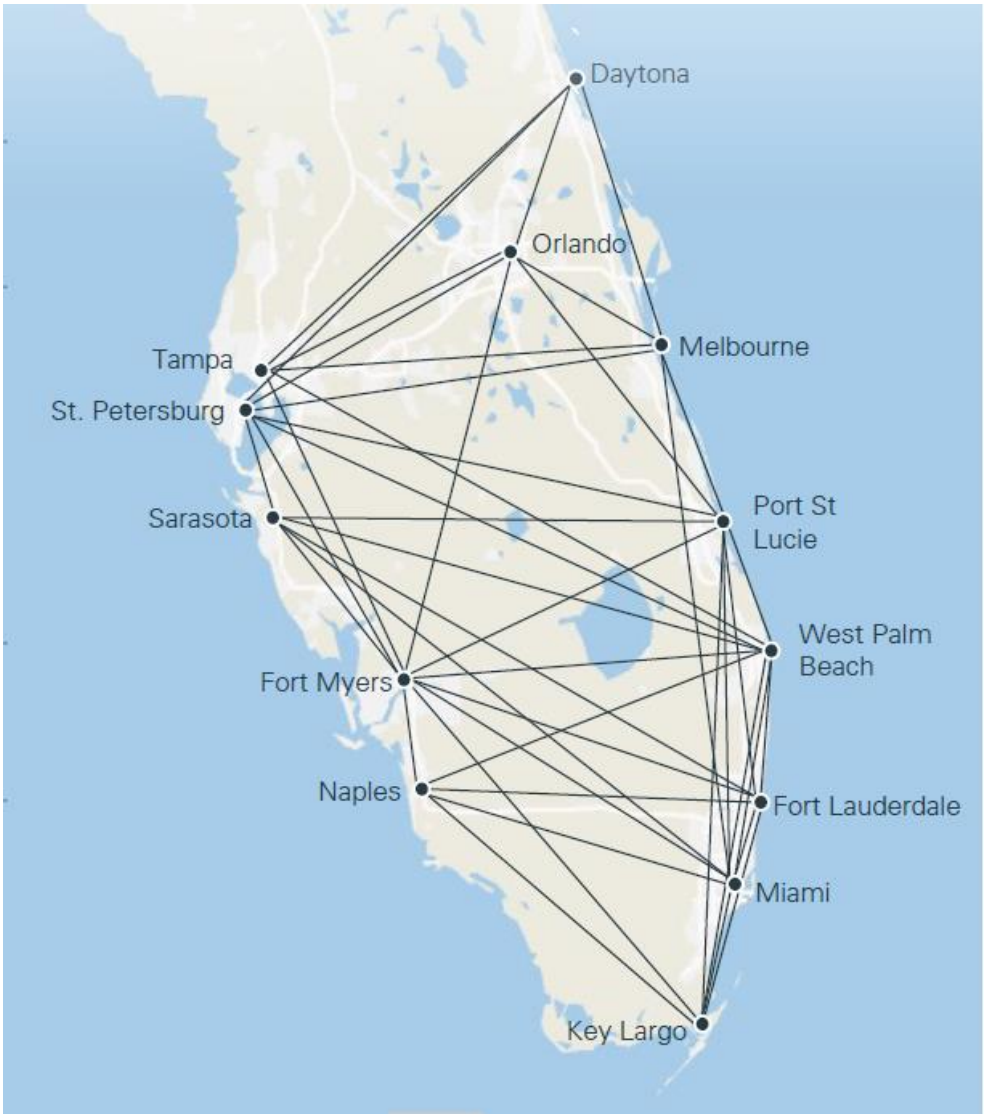
THE MARKET MODEL

Lilium has two approaches to the market. Firstly, it will sell aircraft to other operators. This Turnkey Enterprise Sales offering is B2B and will include arranged service and support where it should build attractive annuity income on top of the one-off aircraft sales. Lilium is also developing a Lilium Network business which will sell tickets on its own passenger network to be operated by existing certified air carriers as a B2C offering. Lilium Network is targeting two initial markets, Florida and Germany both of which have spatial geographies idea for a regional air mobility solution.

FLORIDA

Florida has the fourth highest GDP of US states as well as a large tourism market with 130m tourist every year. Most cities are less than 150 miles from their nearest neighbour allowing an efficient network to be established. Lilium has partnered with Spanish infrastructure developer and airport specialist ferrovial who are planning 10 sites for vertiports in the state. Palm Beach International Airport has already permitted the first vertiport for exclusive use by Lilium. The company has also partnered with development company Tavistock who are planning their first vertiport for Lake Nona by 2025.

Proposed Lilium network in Florida



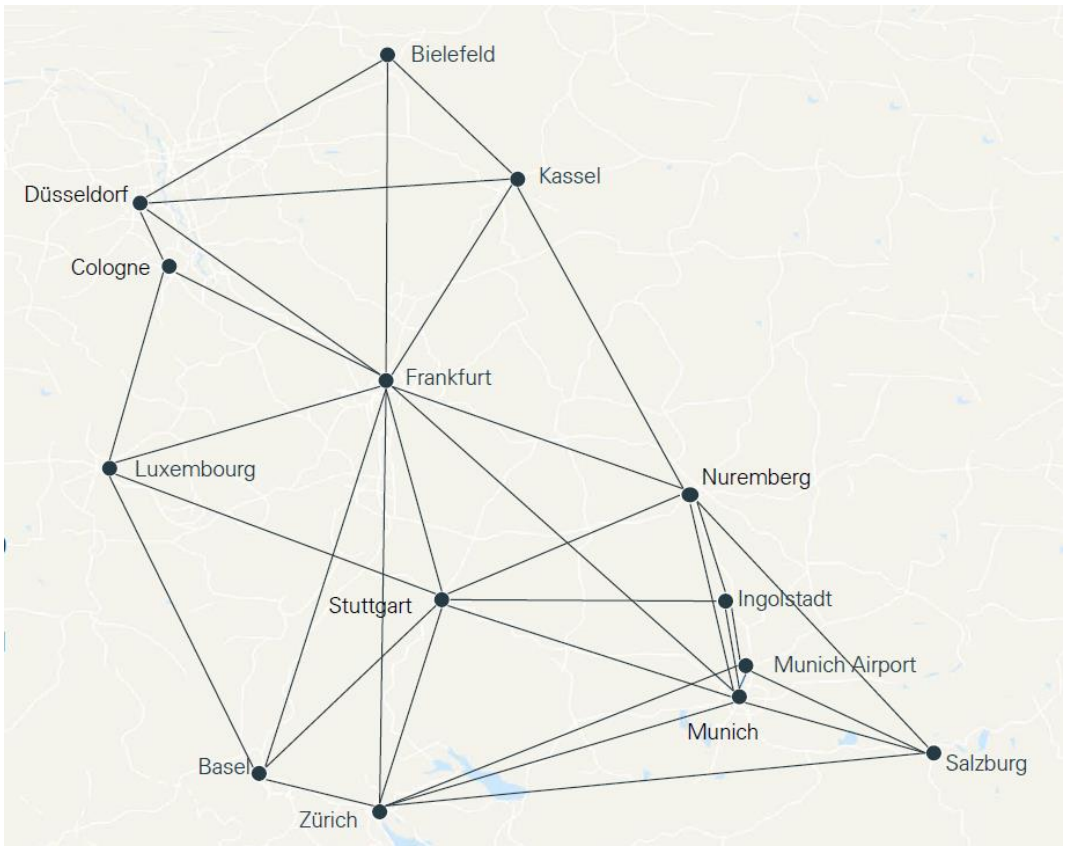
Source: Lilium

ferrovial will secure and develop sites for vertiports, including permitting and construction. ferrovial will then be responsible for ground operations, with Lilium paying landing fees on commencement of operations. ferrovial has committed c.$200m to the network. Lilum expects that the Florida network will drive $600m of revenue with 125 Lilium jets in operation. The relationship with ferrovial has potential to extend to other regions in the US and Europe.

GERMANY

In Germany, Lilium is building a network through commercial relationships including with Munich, Dusseldorf, Nuremburg, Cologne/Bonn and, most recently, Stuttgart airports. The company is also partnering with business aviation company Luxaviation, owners of ExecuJet.

Proposed Lilium network in Germany



Source: Lilium

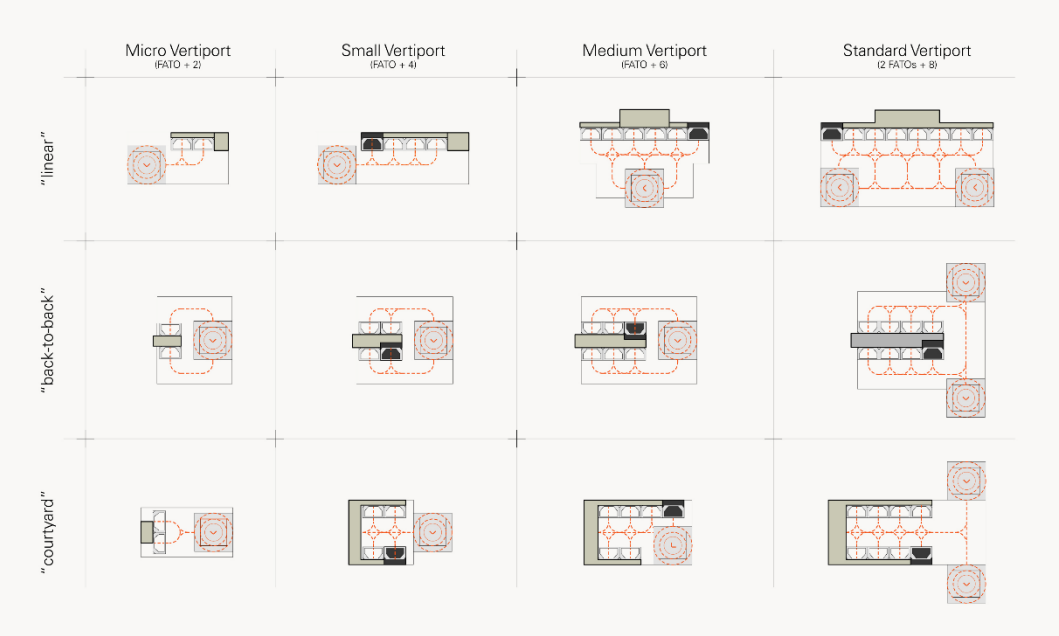
UK AND SPAIN

The Ferrovial partnership has subsequently been expanded to offer a network of 25 vertiports in the UK and 20 in Spain. These will be designed to the specifications of the Lilium jet and target future Lilium operating partners. These are clearly both potentially large markets.

THE VERTIPORT CONCEPT

While the Lilium jet can operate from existing airports and heliports, the company has developed a scalable vertiport design suitable for greenfield and brownfield developments. The landing and take-off area requires a diameter of 1.5x the critical dimension. In the case of the Lilium eVTOL this is the wingspan of the Lilium jet, smaller than rival designs thanks to the ducted thrust propulsion design.

Vertiport options for different sites



Source: Lilium

TO A SIXTEEN SEATER

Lilium plans to develop its jet to a larger 16 seater version. Thanks to the ducted thrust design, this can be done without dramatically increasing the wingspan. As a result the ability of the aircraft to continue to use small landing and take-off sites remains, in contrast to open rotor designs.

Apart from benefiting from scale economics, the sixteen seater design opens up wider markets for passengers moving towards a more mass market offering. The company hopes the larger seating can deliver a cost of less than $1 per passenger mile.

In the freight market the sixteen seat design size takes the cargo space from 6m^3 to 15m^3. This gives it the cargo equivalent of a standard delivery truck bringing the full local delivery market into play.

A BETTER BUSINESS

Lilium stands out for three reasons in our view

- A sector leading aircraft
- A strong mix of experienced personnel
- A strong partnership network

We have explained why we think the company has a sector leading aircraft but the softer issues are important too.

TEAM

Lilium was founded in 2015 by four former graduates of the Technical University of Munich. One of the four, Daniel Wiegand, is now CEO. The company has attracted a strong team of professionals from across the aerospace industry and we see the strength of the team as a stand out point.

In engineering the team is led by a team with experience at senior levels in Rolls Royce, BAE Systems and NextGen Tiltrotor. This brings experience working on engines for Airbus and Gulfstream, the Harrier jump jet, the Eurofighter Typhoon and the NextGen Tiltrotor. Program and certification are led by those with experience at Airbus as is manufacturing. Additionally in certification, the head of airworthiness is ex Boeing and EASA.

Key team members

	Role	Position	Experience
Tom Enders	Board	Chair	Airbus (exCEO)
Alastair McIntosh	Engineering	CTO	Rolls Royce (engines for Airbus A350 and Gulfstream G650)
Brian Phillipson	Engineering	Deputy CTO	BAE Systems (Harrier VTOL, Eurofighter Typhoon)
Luigi Moretti	Engineering	Chief Engineer	NetGen Tiltrotor
Yves Yemsi	Program and Certification	Chief Operating Office	Airbus (Airbus A350 and A380)
Bhavesh Mandalia		Head of Airworthiness	Boeing, EASA
Dirk Gebser		VP Aircraft Assembly	Airbus(Airbus A320 and A380)

Source: Lilium

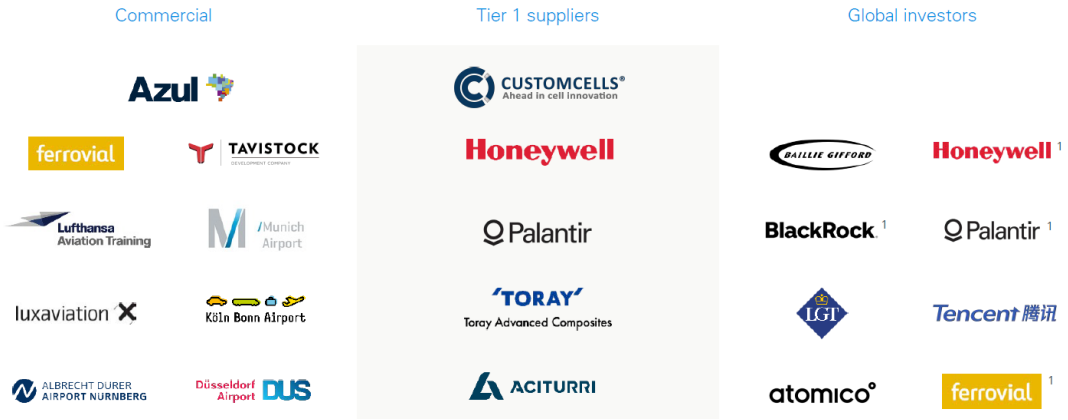
PARTNERSHIPS

Lilium continues to build strong partnerships that will help it deliver aircraft and also establish networks. In terms of delivering a working product, key "tier one" suppliers cover the main components and systems of the Lilium jet.

The network business has been designed to work with key partners such as ferrovial in Florida.

Finally a number of investors in the company can be considered strategic in intent and this may lead to additional business opportunities and in several cases already has.

Key partners

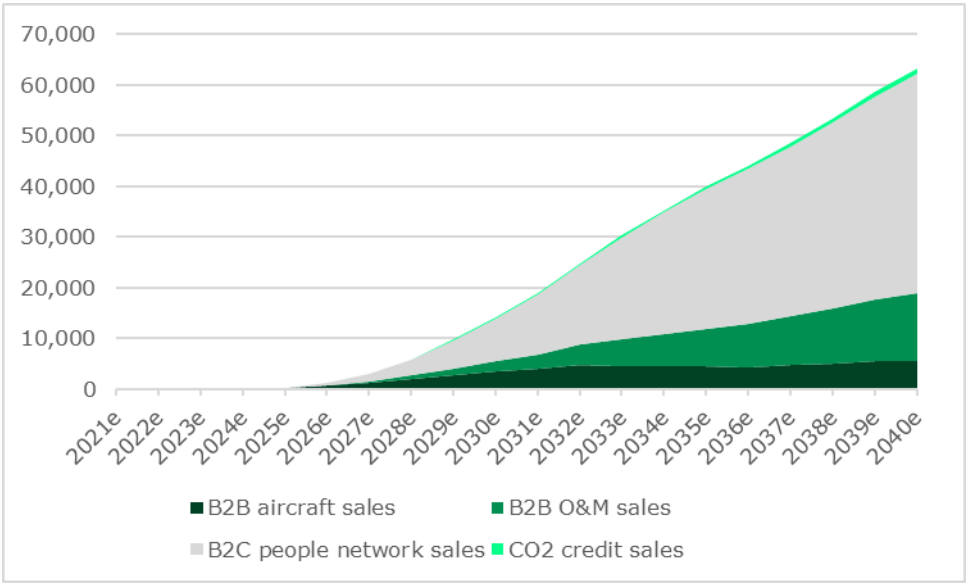


Source: Lilium

SERVICE REVENUE CREATES ANNUITY INCOME

Services revenue is important. The major aircraft manufacturers, Boeing and Airbus, both failed to capitalised on service and spare parts, allowing others to enter these markets in the conventional airliner space. Lilium is focused on these after sales businesses including the high margin provision of software and data services. Over time this will build a strong recurring revenue stream overtaking aircraft sales and boosting network income.

Reveue mix forecast (central scenario)

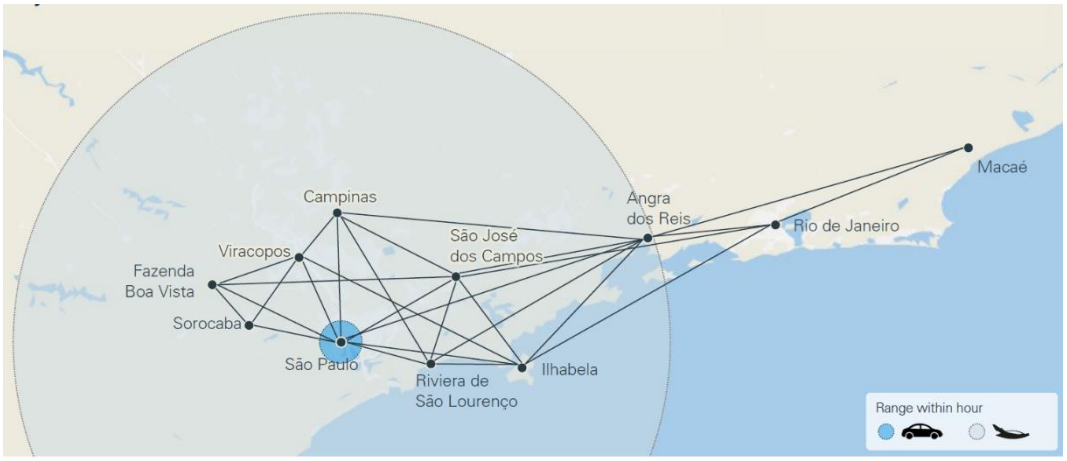


Source: Longspur Research

GAINING TRACTION – FINDING LIFT

Lilium is already gaining traction with the announcement of a deal to sell 220 aircraft to Azul, Brazil's largest airline network. Brazil already has a well-established helicopter and business aviation market with San Paulo having the world's largest helicopter fleet and Brazil overall having the world's second largest business aircraft fleet. Like Florida and Germany there is a geospatial advantage in Brazil's South East Region with the Sao Paulo Macrometropolis one of the most populous urban aggregations in the world.

Proposed Azul eVTOL network in South East Brazil



Source: Lilium

Unmanned aircraft also already fly in Sao Paulo but only in the sense that the suburb of Tambore has a helicopter service operated and run entirely by women.

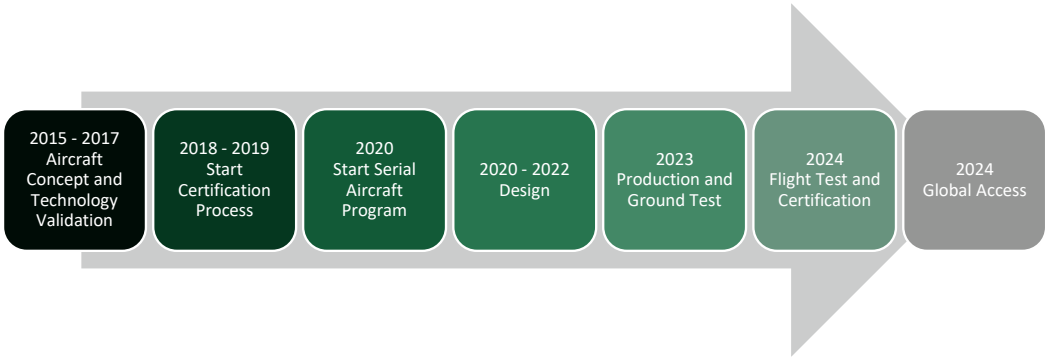
PROGRESS – NEWSFLOW AND TIMETABLE

Towards commercial operations

Lilium is now funded towards commercial operation although some further funding is likely to be needed to hit commerciality. The company still needs to build its aircraft and to that end it has a detailed manufacturing strategy in place with a 10,000ft² prototype manufacturing facility in Munich.

Between now and 2024 the company hopes to complete prototyping and type certification so that initial production can begin in 2024. The factory is capable of building 400 aircraft a year. This will cover initial sales but from 2026 the company will start global production with third parties. This approach represents a capital light manufacturing strategy.

Lilium - progress towards commercial launch



Source: Lilium

In more detail the next few years have a considerable number of milestones around design and certification. We expect this to provide investors with newsflow against which to monitor progress.

The Lilium aircraft has already passed two key stages of development with completion of an aircraft architecture review and a program readiness review. With the preliminary design phase now completed It is on the point of the preliminary design review.

Major strategic milestones

Source: Lilium

CERTIFICATION ROADMAP

Key to creating a commercial aircraft is certification. There are in fact several critical regulatory hurdles to clear before anyone can operate a commercial aviation service using Liliums aircraft

- Aircraft type certification
- Airline operator certification
- Pilot certification
- Vertiport permitting

Aircraft certification is critical. Lilium is pursuing certification in both the USA and the EU with the Federal Aviation Administration (FAA) and the European Union Aviation Safety Agency (EASA) respectively. While eVTOLs are a new type of aircraft they have features that allow them to take advantage of previous certifications. An outline of type certification comparison is seen below.

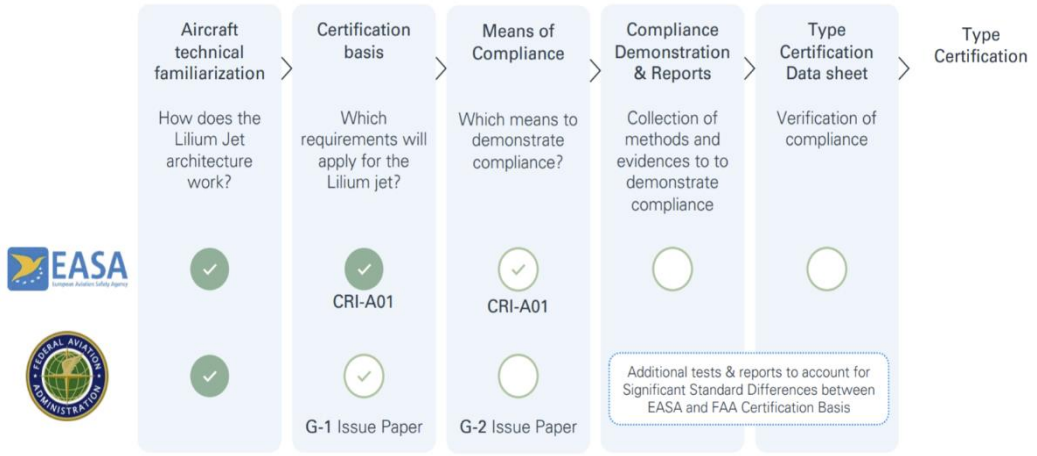
Type certification comparison

<table>
<tr><th></th><th>Fixed Wing</th><th>Rotary</th><th>Hybrid or Special</th><th>Engines</th><th>Propellers</th></tr>
<tr><td rowspan="3">FAA</td><td>Part 21 - Certification Procedures for Products and Parts</td><td>Part 27 – Small Rotorwing</td><td rowspan="3">Part 21.17(b) – Designation of applicable regulations</td><td rowspan="3">Part 33 – Aircraft Engines</td><td rowspan="3">Part 35 – Aircraft Pro-pellers</td></tr>
<tr><td>Part 23 - Small Fixed Wing</td><td rowspan="2">Part 29 – Transport Category Rotorcraft</td></tr>
<tr><td>Part 25 - Transport Category Airplanes</td></tr>
<tr><td rowspan="3">EASA</td><td>CS-22 - Sailplanes and Powered Sailplanes</td><td>CS-27 – Small Rotorcraft</td><td>CS-VLA - Very light aircraft</td><td rowspan="3">CS-E - Engines</td><td rowspan="3">CS-P - Propellers</td></tr>
<tr><td>CS-23 - Normal, utility, aerobatic, and commuter aeroplanes</td><td rowspan="2">CS-29 – Large Rotorcraft</td><td rowspan="2">CS-VLR - Very Light Rotorcraft</td></tr>
<tr><td>CS-25 - Large Aeroplanes</td></tr>
<tr><td rowspan="2">NATO</td><td>STANAG 4671 - UAV System Airworthiness Requirements (USAR), Fixed wing aircraft weighing 150kg to 20,000 kg</td><td>STANAG 4702</td><td rowspan="2">Draft STANAG 4746- Vertical Take-off and landing (VTOL)</td><td>Referenced in STANAG 4703</td><td rowspan="2">Referenced in STANAG 4703</td></tr>
<tr><td>STANAG 4703 – Light unmanned aircraft systems</td><td>Rotary wing unmanned aircraft systems</td><td>STANAG 3372</td></tr>
</table>

Source: Booz Allen Hamilton

In some cases new work is required such as FAA Part 41 for electric propulsion and EASA is working on Special Condition VTOL as a means of compliance. Lilium is now one of only a handful of eVTOLs to have received a CRI-A01 certification basis from EASA which sets out which requirements will apply for the Lilium jet. Overall progress is summarised below.

Lilium's progress to type rating



Source: Lilium

Operation of the Lilium Network will be achieved by partnering with existing certified operators who will be AOC certified.

Pilot certification will be facilitated by pilot training where the company is using Lufthansa to provide training services.

Vertiport permitting is unlikely to be different from that required for heliports. Key planning issues are likely to be dominated by noise where Lilium has a clear advantage and we do not foresee major issues here.

TAM, SAM AND SOM

Market researchers Roland Berger, Frost and Sulivan and Morgan Stanley have all produced forecasts of the total addressable market for global urban air mobility markets. These range from 79,000 units to over 1m by 2050.

We have also looked at the relevant sub-segments of the existing general aviation market (business and air taxi markets). In the US there are currently 33,414 aircraft serving these markets. We have scaled this up to get an estimated global figure of 69,613 units. This feels like a conservative start point for any TAM estimate given what we see as a disruptive market opportunity.

Total addressable market estimates by units in service

	Units in service
Selected current GA market	69,613
Morgan Stanley Bear Case	79,186
Roland Berger	160,000
Morgan Stanley Base Case	409,961
Frost and Sulivan	430,000
Morgan Stanley Bull Case	1,003,472

Source: Longspur Research, FAA, Morgan Stanley, Roland Berger, Frost and Sulivan

FROM TAM TO SAM

The Bass Diffusion model is a well-established model for estimating how a new product diffuses into an existing market. In this case the market is the unban air mobility market, and we want to estimate how eVTOLs will diffuse into it. The model uses a coefficient of innovation to represent the propensity of innovators to buy an unknown product and a coefficient of imitation to represent the rest of the market to follow the innovators. We have chosen coefficients that fit with certain other market estimates including a start point in line with the current US air taxi fleet increased pro-rata for a global market to c.17k aircraft.

Bass Diffusion model output (M=160,000 units, p=0.003, q=0.2)

Units	2021e	2022e	2023e	2024e	2025e	2026e	2027e	2028e	2029e	2030e
New sales	6,431	7,306	8,174	8,987	9,688	10,218	10,522	10,563	10,325	9,824
Cummulative	16,818	24,124	32,297	41,284	50,972	61,189	71,711	82,274	92,599	102,423
Penetration	11%	15%	20%	26%	32%	38%	45%	51%	58%	64%
Replacements	0	0	0	0	0	0	0	1,600	3,462	5,606
Total sales	6,431	7,306	8,174	8,987	9,688	10,218	10,522	12,163	13,788	15,430

Source: Longspur Research

This suggests a total annual market of c. 15,000 units by 2030. If Lilium can take a 10% share of this market it would require production capacity of over 1,500 aircraft.

Serviceable obtainable market

	2021e	2022e	2023e	2024e	2025e	2026e	2027e	2028e	2029e	2030e
Market size	6,431	7,306	8,174	8,987	9,688	10,218	10,522	12,163	13,788	15,430
Market share	0.0%	0.0%	0.0%	0.0%	0.9%	3.2%	5.7%	7.8%	10.0%	10.0%
Production volume	0	0	0	0	90	325	600	950	1,379	1,543

Source: Longspur Research

FINANCIALS

EARNINGS OUTLOOK

We have produced earnings forecasts based on prospectus and updated information published at the company's capital markets day in August. We have estimated market size in number of aircraft produced per annum from the Bass Diffusion model described above.

B2B

From 2024 production of aircraft for direct sales is at fifty percent of factory output. For O&M revenue it is assumed that 1/3rd of a year's production starts to attract O&M revenue moving to 100% the following year. Aircraft selling price is assumed, based initially on the $4 in the prospectus as is the O&M price at $1. O&M gross margin is based on an assumed gross margin on spare parts of 33% and 100% on the digital platform giving a blended gross margin of 50%.

B2C

Aircraft in service is assumed at 50% of aircraft added in year contribute in that year. In line with prospectus guidance we assume initial jet miles per day of 1,000 at launch, rising to 1,500, seats at 6 and load factor 50% at launch and rising to 75% thereafter. Price per passenger mile is taken at $2.25 dropping to $2.0 in 2027. A deadhead ratio of 5% is assumed with maintenance and training at 10%.

CoGS at $1.5 per filled seat mile is based on $1.75 in capital markets day breakdown less depreciation and customer acquisition costs. While the split of variable and fixed costs have been given relative to passenger miles we view these as all fixed relative to aircraft in service, which is our key metric and driver of value. Overheads and SG&A are based on the guidance in the prospectus and at the capital markets day. Looking further out we have regressed the prospectus numbers against B2C aircraft in service to drive a fixed and a variable element.

We have also taken into account the opportunity the company has to sell CO2 credits on flights on its networks. With the difference between a commercial aircraft at 189gCO2/passenger km and Lilium at 13gCO2/pkm we can multiply the spread by the number of passenger miles and by the current EU EFA price of €58/t. This could give marginal revenue of over $100m by 2030.

Capex is assumed in line with prospectus guidance. Capex for B2C is assumed with funding for this in new equity and debt.

BALANCE SHEET

The company raised $584m in gross proceeds through the SPAC process. We think that while this gives it enough cash to move it towards launch, but it is likely to need additional funding to get to breakeven and full launch.

Lilium is likely to have to raise capital again before it reaches full commerciality. However now that the company has successfully listed, it has more options in terms of funding type. It is already envisioning funding its network business entirely through off balance sheet asset financing, most likely through normal aircraft leasing structures. Elsewhere the company now has more options but perhaps the biggest mitigating factor here is time. We do not think the company needs to seek additional funding for some time and given the likelihood of a continuing stream of positive newsflow if development runs to plan, we

expect the company to be able to choose both an efficient time and an efficient structure for additional finance.

For the purposes of our forecasts we have assumed an equity fund raise to fund the network in 2024 as well as access to debt funding for the network going forward.

These assumptions drive our central case earnings outlook for the company.

Ahead of launch the company will burn cash at a rate of c.€200m per annum. Initial sales in 2024 do not reduce this but by 2026 we expect the company to move into positive territory at all levels. We expect growth to be significant thereafter. While aircraft sales will start to level out with our assumption of market share saturation from 2028, continued growth in networks and the effect of the build-up of O&M income keeps growth steady further out.

Revenue and EBIDTA forecasts to 2030

$m	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
B2B	0	0	0	0	180	650	1,200	1,900	2,758	3,395
O&M	0	0	0	0	23	126	358	745	1,327	2,096
B2C	0	0	0	0	77	486	1,506	3,139	5,591	8,486
CO2	0	0	0	0	1	6	20	42	75	121
Total	0	0	0	0	280	1,268	3,084	5,826	9,751	14,097
EBITDA	-191	-194	-197	-257	-297	-72	393	1,225	2,362	3,583

Source: Longspur Research

VALUATION

eVTOL is a new technology and most of companies in the sector will be loss making for some time as the market evolves. This makes PE and EV/EBITDA multiples unusable leaving EV/Sales as the main metric on which to make comparisons. These vary widely. As a result, we think a valuation approach should concentrate on a well-constructed DCF valuation.

We have used a weighted average cost of capital of 12.5%. This is based on the high end of the most recent UK's Competition and Markets Authority assessment on cost of capital. We see this as one of the best contemporary estimates based on thorough work that if required must be able to stand the scrutiny of a judicial review. This gives a risk-free rate of -1.0% which with a 2.5% inflation assumption gives 1.5%. The market premium is 8.5% based on historical ex-post market returns going back to 1900. We have used a beta of 1.5. While the median beta of our comparator group is 0.8 none of these companies have been trading for long enough for beta measurements to be truly useful in our view. We could use a Bayesian adjustment which places weight on a beta estimate of 1.0 but we think, again given the early stage of the industry, something more cautious is appropriate and we have settled on 1.5. With no debt this gives us a WACC of 14.3%.

Weighted average cost of capital

Risk free rate	1.5%
Market premium	8.5%
Loan margin	3.0%
Marginal tax rate	30.0%
After tax cost of debt	3.2%
Debt/total capital	0.0%
Beta	1.5
Cost of equity	14.3%
Weighted cost of capital	14.3%

Source: Longspur Research, CMA

We have forecast cashflows to 2040 based on our discussion under earnings outlook above. We then calculate a terminal value in 2040 based on Gordon's growth model and assuming that long-term cashflows are flat in nominal terms. The terminal EV/EBITDA on this basis is 4.2x which we do not see as onerous.

DCF Valuation – central case

$m	2021e	2022e	2023e	2024e	2025e	2026e	2027e	2028e
Operating cash inflow	-170	-173	-176	-235	-351	-285	-54	394
Cash from associates	0	0	0	0	0	0	0	0
Tax paid	0	0	0	0	0	0	0	-33
Interest tax shield	0	0	0	0	0	0	0	0
Capex & investments	-48	-67	-65	-61	-235	-493	-863	-1,199
Free cashflow	-218	-240	-241	-296	-586	-778	-917	-839
Terminal growth	0.0%							
Terminal valuation	84,956							
Terminal EV/EBITDA	4.2							
Implied enterprise value	10,317							
Implied market cap.	13,369							
Implied share price	**24.0**							

Source: Longspur Research, (*explicit forecasts go to 2040)*

This gives a base case valuation of $24.

SCENARIOS

We see the key uncertainty being on timing and in our central forecast scenario we think it prudent to assume that launch is in 2025 rather than 2024. We also assume that the company will deliver a 16 seater aircraft from 2030 and reach a market share of 10%. Finally, we have assumed a $2.5bn equity raise to fund the build out of the Lilium network in 2024. This latter may be entirely externally funded but again we think it prudent to assume self-funding in our forecasts and for valuation.

We have looked at a number of scenarios. The most optimistic assumes launch in 2024 and a market share of 12.5%. This reduces the network funding to $1.5bn. Our most pessimistic scenario assumes a further delay to 2026, a market share of just 7.5% and required funding of $3.5bn. This also assumes that the company does not develop a 16 seater aircraft.

Our scenarios are set out below and show a valuation range of $7.4to $38.7 with our central cast at $24.0. The extreme values feel like just that with a realistic range from $12 to $32.

DCF Scenarios

Scenario	Seats	Launch	Terminal share	Raise	Valuation ($ per share)
1	7	2026	7.5%	3,500	7.4
2	7	2025	10.0%	2,500	12.0
3	**16**	**2025**	**10.0%**	**2,500**	**24.0**
4	16	2024	10.0%	1,500	31.5
5	16	2024	12.5%	1,500	38.7

Source: Longspur Research

COMPARATIVE MULTIPLES

Comparative multiples both limited and are fairly meaningless at this stage of the industry with companies still developing business models and jostling for market share. We believe Lilium is extremely well placed against the competition both in terms of its offering and also the advantages of building capacity early. We do note that longer-term consensus forecasts show EV/sales ratio converging.

EV/Sales

	2022e	2023e	2024e	2025e	2026e	2027e	2028e	2029e	2030e
Lilium Nv	na	na	19.5	4.1	1.3	0.7	0.4	0.3	0.2
Archer Aviation Inc-A	na	na	14.5	0.6	0.3	0.2	0.1	0.1	0.0
Blade Air Mobility Inc	5.6	2.9	1.8	1.3	0.9	1.4	1.2	1.1	1.0
Wheels Up Experience Inc	0.8	0.7	0.6	0.5	0.4	0.4	0.3	0.3	0.3
Joby Aviation Inc	na	na	na	na	na	na	na	na	na

Source: Bloomberg, Longspur Research

RISKS

REGULATORY DELAYS

Regulators will work to their own timetables although we believe there is a willingness in both the major regulators to facilitate development in this area especially given the emission savings potential. Lilium has started the regulatory approach early with initial certification work commencing in 2017. However, to get to launch in 2024 will be a challenge and we see delay risk here as the biggest threat to valuations.

TECHNOLOGY DELAYS

Along with regulation the potential for technology issues to delay the launch date is an issue for the company. Progress to date should provide reassurance. We have addressed the battery technology which is very new but we see signs elsewhere that silicon anodes are making progress. This remains a risk though.

COMPETITION

There are a large of competing solutions in the eVTOL space. We think the Lilium jet has advantages over these as we have outlined in the note. However, that does not rule out high levels of competitive rivalry and we expect the industry to see some consolidation over time. Because of its range benefit, amongst other things, we think Lilium can target better markets than most of the competition and we see this mitigating this risk.

FUNDING

The recent fund raising has given the company enough cash to move it towards launch, but it is likely to need additional funding to get to breakeven and full launch. This creates risk but as we have pointed out, the company has a lot of optionality around both structure and timing both of which significantly mitigate this risk in our view.

MANAGEMENT

EXECUTIVE MANAGEMENT

Co-Founder & Chief Executive Officer – Daniel Wiegand

Mr. Wiegand became Chief Executive Officer and Executive Director of the board since September 2021 and previously served as a member of the Lilium board from February 2015. Mr. Wiegand is the Lilium co-founder and also served as Lilium GmbH's Chief Executive Officer from February 2015. Mr. Wiegand holds a degree in Aerospace Engineering from Technische Universität München.

Chief Financial Officer – Geoffrey Richardson

Mr. Richardson has served as our Chief Financial Officer since September 2021 and previously served as Lilium's CFO from November 2020. Prior to joining Lilium, Mr. Richardson held a number of positions at Cruise LLC, a self-driving car service company, including Senior Advisor from May 2020 to November 2020 and CFO from September 2017 to May 2020. Prior to Cruise, Mr. Richardson served as CFO of Kinestral Technologies, a developer and manufacturer of glass products, from April 2014 to September 2017. Prior to Kinestral, Mr. Richardson served as VP at Goldman Sachs from 2010 to 2014. Prior to Goldman Sachs, Mr. Richardson served as Executive Director at Morgan Stanley from 2007 to 2010. Mr. Richardson holds a J.D. from Tulane University.

Chief Technology Officer – Alastair McIntosh

Alastair joined Lilium from Rolls-Royce with 30 years of experience at the multinational aerospace and defence company. Alastair led 1,500 engineers at Rolls-Royce Germany as Managing Director and Head of Engineering and Technology.

Chief People Officer – Anja Maassen van den Brink

Anja has over two decades of experience in defining people and culture strategies for a range of leading retail companies. Most recently she led the people function during the merger of Vodafone and Ziggo in the Netherlands.

Chief Strategy Officer – Alexander Asseily

Alexander is a technology entrepreneur and early investor in Lilium. Over a period of two decades he has founded several successful technology companies. He holds a Masters in Mechanical Engineering from Stanford University.

Chief Marketing Officer – Jessica Bryndza

Jessica has over two decades of B2B and B2C experience, she has helped redefine the way both start-up and Fortune 500 companies like American Express, Google, Uber, Eventbrite, and Softbank develop brand marketing strategies and global campaigns.

Chief Operating Officer - Yves Yemsi

Yves oversees the Lilium Jet aircraft program and also leads strategic supplier partnerships. Before joining Lilium, Yves spent the last 17 years at Airbus developing the quality standards and continues to do the same at Lilium.

Chief Manufacturing Officer – Dirk Gebser

Dirk has over 30 years' experience in aerospace manufacturing, most recently VP Industrial at Airbus where he led the assembly of the A380 and A320 aircraft. Prior to that he was also Director of Manufacturing Engineering at Rolls-Royce.

BOARD OF DIRECTORS

Non-Executive Director & Chairman – Dr. Thomas Enders

Dr. Enders joined the board since September 2021 and previously served as a member of the Lilium GmbH board from January 2021. Dr. Enders has served as a member of the Executive Committee and Audit Committee of the board of directors of Linde plc, a global industrial gases and engineering company, since 2018. Prior to joining the Lilium GmbH board, Dr. Enders held a number of positions at Airbus SE, a European multinational aerospace corporation, including Chief Executive Officer of Airbus SE from June 2012 to April 2019 and Chief Executive Officer of Airbus' Commercial Aircraft Division from 2007 to 2012. Dr. Enders also held a number of positions at European Aeronautic Defense and Space Company (EADS) (rebranded as Airbus Group), including co-Chief Executive Officer from 2005 to 2007 and Head of Defense Division from 2000 to 2005. Dr. Enders served as a member of the Executive Committee of Airbus S.E. from its creation in 2000 until 2019. Dr. Enders studied Economics, Political Science and History at the University of Bonn and the University of California, Los Angeles. He holds a degree as Dr. Phil from University of Bonn.

Director – Barry Engle

Mr. Engle has experience in operational, financial and managerial roles within the international automotive sector, as well as growth-oriented companies across various industries. He has spent the past five years serving in senior executive roles at General Motors ("GM"). Most recently, Mr. Engle served as President of GM North America, the company's largest segment with over $100+ billion in sales during the year ended December 31, 2019.

Director – Henri Courpron

Mr. Courpron has served as a member the board since September 2021. Since September 2014, Mr. Courpron has been the Chairman and Co-Founder of Plane View Partners, LLC, a strategic advisory firm for aviation and aerospace management and investments. He was the Chief Executive Officer of International Lease Finance Corporation (ILFC), one of the largest aircraft financing firms in the world, from May 2010 to May 2014. Prior to joining ILFC, Mr. Courpron was President of the Aerospace Division of Seabury Aviation & Aerospace, an advisory and investment banking firm in New York focused on the aviation industry, from 2007 to 2010. Prior to that, Mr. Courpron had a 20-year career with Airbus where he reached the position of Executive Vice President, Procurement at Airbus headquarters in Toulouse, France and held a number of other executive positions, including President and Chief Executive Officer of Airbus, North America. Mr. Courpron has also served as a director of Breeze Airways since September 2020 and previously served as a director of Azul Linhas Aéreas Brasileiras from May 2015 to April 2020 and TAP Portugal from November 2015 to July 2017. Mr. Courpron earned his degree in Computer Science in 1985 from Ecole Nationale Supérieure d'Electrotechnique d'Electronique d'Informatique et d'Hydraulique (ENSEEIHT) in Toulouse, where he specialized in artificial intelligence.

Director – Margaret M. Smyth

Ms. Smyth has served as a member of our board since September 2021. Since July 2021, Ms. Smyth has served as the Senior Advisor, Global Infrastructure of QIC Global Infrastructure ("QIC") and chair of CenTrio, QIC's subsidiary that is the largest pure-play US district energy provider. Previously, Ms. Smyth served as the Chief Financial Officer of

National Grid USA from October 2014 to June 2021, where she oversaw all finance, accounting, transactional, and property services for National Grid. Prior to joining National Grid, Ms. Smyth served as Vice President of Finance for Consolidated Edison, Inc. from August 2012 to September 2014. Ms. Smyth previously served as Vice President and Chief Financial Officer of Hamilton Sundstrand, which is part of the former United Technologies Corp., from October 2010 to June 2011. Ms. Smyth also served as Vice President and Corporate Controller of United Technologies Corp. from August 2007 to September 2010, and Vice President and Chief Accounting Officer of 3M Corporation from April 2005 to August 2007. Ms. Smyth is currently a board member of two subsidiaries of Mutual of America since February 2005, a board member and chair of the Audit Committee of Etsy, Inc. since June 2016, a board member and chair of the Audit Committee of Remitly, Inc. since May 2021, and a board member and chair of the Audit Committee of Frontier Communications Parent, Inc. since June 2021.

Director – Gabrielle B. Toledano

Ms. Toledano has served as a member of the board since September 2021. Since January 2020, Ms. Toledano has served as Chief Operating Officer at Keystone Strategy LLC, a strategy and economics consulting firm. From January 2021 to March 2021, Ms. Toledano served as Chief Talent Officer of ServiceNow Inc., a software company. From May 2017 to October 2018, Ms. Toledano served as the Chief People Officer of Tesla Inc., a manufacturer of electric vehicles and energy storage products. From February 2006 to May 2017, Ms. Toledano served as Chief Talent Officer and Advisor at Electronic Arts Inc., a video game company. Ms. Toledano has served as a director of Velo3D since July 2021, Better.com since April 2021 and Bose Corporation since June 2020. Previously, Ms. Toledano served on the boards of Glu Mobile, Inc. from December 2017 to April 2021 and Jive Software, Inc. from November 2015 to June 2017. Ms. Toledano holds a B.A. in Modern Thought and Literature and an M.A. in Education from Stanford University.

Director – David Wallerstein

Mr. Wallerstein has served as an independent member of the board since September 2021 and previously served as a member of the Lilium GmbH board from September 2017. Mr. Wallerstein has held a number of positions at Tencent Holdings Limited, a Chinese multinational technology conglomerate holding company providing Internet-related services and products, including Chief Exploration Officer since 2014 and Senior Executive Vice President since 2001. Mr. Wallerstein holds an Master's degree from the University of California, Berkeley and a B.A. from the University of Washington.

Director – Niklas Zennström

Mr. Zennström has served as a member of the board since September 2021 and previously served as a member of the Lilium GmbH board from December 2016. Mr. Zennström has served as Chief Executive Officer and Founding Partner at Atomico, a European venture capital firm investing in innovative technology companies around the world, since 2007. Prior to founding Atomico, Mr. Zennström co-founded and served as the Chief Executive Officer of Skype, a proprietary telecommunications application specializing in voice and video communications, acquired by Microsoft, from 2002 to 2007. Prior to Skype, Mr. Zennström co-founded and served as Chief Executive Officer of Kazaa B.V., a peer to peer content distribution provider, from 2000 to 2002. Mr. Zennström also co-founded and served as the Chief Executive Officer of Joltid Ltd., a provider of peer to peer technologies for content distributors, Internet Service Providers, websites and software developers, from 2001 to 2003. Prior to Joltid, Mr. Zennström served in various General Manager positions at Tele2 AB, a European telecommunications operator, from 1996 to 1999. Mr. Zennström holds a Master of Science degree in Engineering Physics and a Bachelor of Science degree in Business Administration from Uppsala University. Mr. Zennström also currently serves on the boards of H&M Hennes & Mauritz AB, Zennström Philanthropies, Varjo, Rekki and Oden Technologies.

FINANCIAL MODEL

Profit and Loss Account

$m, Dec	2020pf	2021e	2022e	2023e	2024e	2025e
Turnover						
eVTOL	0	0	0	0	0	279
CO2	0	0	0	0	0	1
Other	0	0	0	0	0	0
Other	0	0	0	0	0	0
Total	0	0	0	0	0	280
Operating profit						
eVTOL	-354	-201	-213	-224	-291	-362
CO2	0	0	0	0	0	1
Other	0	0	0	0	0	0
Other	0	0	0	0	0	0
Operating profit	-354	-201	-213	-224	-291	-361
P&L Account	**2020pf**	**2021e**	**2022e**	**2023e**	**2024e**	**2025e**
Turnover	0	0	0	0	0	280
Operating Profit	-354	-201	-213	-224	-291	-361
Investment income	0	0	0	0	0	0
Net Interest	-60	-3	-4	-5	-6	-1
Pre Tax Profit (UKSIP)	-414	-204	-217	-229	-298	-362
Goodwill amortisation	0	0	0	0	0	0
Exceptional Items	0	0	0	0	0	0
Pre Tax Profit (FRS3)	-414	-204	-217	-229	-298	-362
Tax	0	0	0	0	0	0
Post tax exceptionals	0	0	0	0	0	0
Minorities	0	0	0	0	0	0
Net Profit	-414	-204	-217	-229	-298	-362
Dividend	0	0	0	0	0	0
Retained	-414	-204	-217	-229	-298	-362
EBITDA	-354	-191	-194	-197	-257	-297
EPS (c) (UKSIP)	-1.53	-0.75	-0.80	-0.85	-0.53	-0.65
EPS (c) (FRS3)	-1.53	-0.75	-0.80	-0.85	-0.53	-0.65
FCFPS (c)	-1.31	-0.81	-0.89	-0.89	-0.53	-1.05
Dividend (c)	0.00	0.00	0.00	0.00	0.00	0.00

Source: Company data, Longspur Research estimates

KEY POINTS

- Company pre-revenue while it develops until 2025 when we assume first revenue begins
- C$200m cost outflow rising ahead of launch in 2024

Balance Sheet

$m, Dec	2020pf	2021e	2022e	2023e	2024e	2025e
Fixed Asset Cost	35	83	150	215	276	511
Fixed Asset Depreciation	-7	-18	-37	-63	-98	-162
Net Fixed Assets	27	65	113	152	178	349
Goodwill	0	0	0	0	0	0
Other intangibles	2	2	2	2	2	2
Investments	64	64	64	64	64	64
Stock	0	0	0	0	0	92
Trade Debtors	0	0	0	0	0	46
Other Debtors	8	8	8	8	8	8
Trade Creditors	-10	-10	-10	-10	-10	-69
Other Creditors <1yr	-6	-6	-6	-6	-6	-6
Creditors >1yr	0	0	0	0	0	0
Provisions	-1	-1	-1	-1	-1	-1
Pension	0	0	0	0	0	0
Capital Employed	84	121	170	208	234	484
Cash etc	686	465	221	-25	2,172	1,691
Borrowing <1yr	122	122	122	122	122	122
Borrowing >1yr	12	12	12	12	10	117
Net Borrowing	-552	-331	-87	159	-2,039	-1,452
Share Capital	46	46	46	46	61	61
Share Premium	1,012	1,012	1,012	1,012	3,498	3,498
Retained Earnings	-556	-760	-977	-1,206	-1,503	-1,865
Other	133	154	175	196	218	243
Minority interest	0	0	0	0	0	0
Capital Employed	84	121	170	208	234	484
Net Assets	636	452	257	49	2,273	1,937
Total Equity	636	452	257	49	2,273	1,937

Source: Company data, Longspur Research estimates

KEY POINTS

- Fixed assets grow with capex accelerating from 2024 with assumed network capex
- Cash is adequate but tight in 2023
- Equity raise assumed in 2024 to fund network capex

Cashflow

$m, Dec	2020pf	2021e	2022e	2023e	2024e	2025e
Operating profit	-354	-201	-213	-224	-291	-361
Depreciation	0	10	19	27	34	64
Provisions	0	0	0	0	0	0
Other	0	21	21	21	22	25
Working capital	0	0	0	0	0	-79
Operating cash flow	-354	-170	-173	-176	-235	-351
Tax paid	0	0	0	0	0	0
Capex (less disposals)	0	-48	-67	-65	-61	-235
Investments	0	0	0	0	0	0
Net interest	0	-3	-4	-5	-6	-1
Net dividends	0	0	0	0	0	0
Residual cash flow	-354	-221	-244	-246	-302	-587
Equity issued	0	0	0	0	2,500	0
Change in net borrowing	0	221	244	246	-2,198	587
Adjustments	0	0	0	0	0	0
Total financing	0	221	244	246	302	587

Source: Company data, Longspur Research estimates

KEY POINTS

- Operating cash outflow and capex dominate ahead of launch
- Capex for network from 2024 assumed in our forecasts but could be external
- Working capital impact with first revenue in 2025

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