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## International Stock Market Weekly

### Aerospace: Other

#### Lilium NV (LILM)

Lilium NV (LILM) is an early mover in the emerging UAM industry and we think it a promising company for the technologies it is developing, which, if it commercializes on time and at scale have the potential to enable the company to grow into an industry leader. Like Joby Aviation (JOBY), Lilium is focusing on next-generation technologies for its eVTOLs. What also make this company particularly interesting, is that it is building larger vehicles relative to the other viable players in the eVTOL space. In addition, through its partnerships, Lilium may become a market leader in the EU. The company has already laid the groundwork to service the business commuter space in the EU with routes for one of the busiest regions on the continent. Stuttgart has recently been added to the planned southern German network which consists of the Munich and Nuremberg. In addition, Lilium has planned western German hubs with Cologne/Bonn and Düsseldorf and a planned network of 14 locations in Florida, with the first passenger flights scheduled to take place in 2024. What is more, Lilium has also announced a planned strategic alliance with Brazilian airline Azul to build an eVTOL network in Brazil in 2025.

With roughly 200 companies involved in the development of electric eVTOLs, the evidence is growing that UAM will provide affordable, rapid, and sustainable travel, and as such many companies are looking to start services as early as late 2022. Among the many eVTOL and UAM names, we find Lilium a company of interest due to its differentiated technology and approach to the UAM business. Indeed, as this is an emerging market, we think it makes sense to gain exposure to several names as each company has a slightly different, albeit attractive approach to the UAM business. Of course, while the entire UAM sector is highly speculative, the industry will develop and evolve, and this will happen at a faster rate than most expect. While it is true that the space is growing increasingly crowded, and the reason for this is quite simply that the potential upside is stratospheric and once the first dominoes fall (i.e., regulatory and technical hurdles are overcome) the growth will likely be unprecedented. Having said that, many of the UAM names being traded now will probably take one of three paths: 1) grow and become viable players in this new industry; 2) be acquired by a larger aerospace firm or automotive company; or 3) crash and burn. And with the aforementioned in mind, our analysis of Lilium's potential give us reason to believe it is among the handful that will make it into one of the first two categories. What is more, the recent severe share price correction offers investors a buy-in opportunity at the sub-USD10/sh level.

## Stock pick for the first week of December

### Lilium NV. (NASDAQ: LILM)

#### About Lilium NV. (LILM)

Lilium NV (LILM) formerly Lilium B.V is a Wessling, Germany-based transportation company. The company designs and develops electric vertical takeoff and landing (eVTOL) aircraft for on-demand air transportation of people and goods. Its flagship product is a seven-seater eVTOL called the Lilium Jet. The Lilium Jet architecture is based on Ducted Electric Vectored Thrust (DEV T) technology. DEV T is made up of electric turbofans mounted within a cylindrical duct. Lilium also operates a digital platform, which provides integration between Lilium Jets and its vertiports. Its online booking channels help customers find flights, make reservations, select travel products and obtain needed passenger information. The company listed on the NASDAQ via a SPAC on Sep 15, 2021.

#### Rationale

Lilium is an early mover in the emerging UAM industry and is a promising company for the technologies it is developing, which if successfully commercialized on time and at scale, have the potential to propel the company into a leading role in the UAM eVTOL ecosystem. Like Joby Aviation, Lilium is focusing on next-generation technologies for its eVTOL. Also interesting it that it is building larger vehicles compared to the other viable eVTOL manufacturers. In addition, the current plans and partnerships which it is putting in place could provide it with a strong market position in the EU. The company has already laid the groundwork to service the business commuter space in the EU.

In San Francisco alone, only one out of 40 helipads is active due to noise pollution

With roughly 200 companies involved in the development of eVTOLs, the evidence is growing that UAM will provide affordable, rapid, and sustainable travel, and as such many companies are looking to start services as early as late 2022. Among the many eVTOL and UAM names, we find Lilium a company of interest due to its differentiated technology and approach to the UAM business. Indeed, as this is an emerging market, we think it makes sense to gain exposure to several names as each company has a slightly different, albeit attractive approach to the UAM business. Of note, Lilium's design and propulsion system is particularly interesting because one of the biggest hurdles to mass public acceptance of UAM is noise pollution. For example, in San Francisco alone, only one out of 40 helipads is active due to noise pollution. Lilium's propulsion system overcomes this issue and is one of, if not the quietest eVTOLs from publicly traded companies. Of course, while the entire UAM sector is highly speculative, the industry will develop and evolve, and this will happen at a faster rate than most expect. While it is true that the space is growing increasingly crowded, and the reason for this is quite simply that the potential upside is stratospheric and once the first dominoes fall (i.e., regulatory and technical hurdles are overcome) the growth will likely be unprecedented. Having said that, many of the UAM names being traded now will probably take one of three paths: 1) grow and become viable players in this new industry; 2) be acquired by a larger aerospace firm or automotive company; or 3) crash and burn. And with the aforementioned in mind, our analysis of Lilium's potential, we have reason to believe

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it is among the handful that will make it into one of the first two categories. What is more, the recent severe share price correction offers investors a buy-in opportunity at the sub-USD10/sh level.

Market research suggests the urban air mobility (UAM) market can reach a total addressable market in excess of USD1tn. Citigroup (C) estimates the market to reach USD650bn by 2030. When considering that major US airlines have annual sales of USD40bn and Boeing (BA) had annual sales of USD100bn, the UAM market targets assigned appear very aggressive.

Among the UAM names that we have written about, Lillium is our fourth pick. Despite its ranking as a stock, we are very enthusiastic about Lillium's technologies, which is among the most-cutting edge among eVTOL companies, and indeed may well be the most advanced—with Joby not far behind. The reason behind its ranking is that the company, while having a team of brilliant technical minds and potentially game-changing technologies, lacks some of the key elements which the other listed eVTOL companies possess. For example, Blade (BLDE), our third ranked, while lacking its own eVTOL, is already running a revenue-generating UAM business with traditional aircraft—and it is doing this while partnering with eVTOL makers so that it can easily transition to electric and then autonomous aviation. Joby, as mentioned in our report published on Nov 15, 2021, leads overall as it has repeatedly demonstrated its technology and is obtaining approvals from US regulators. Just behind Joby is Archer (ACHR). Both Joby and Archer have automobile manufacturing partners which are able to help them bring their costs down and scale up production as needed. And both companies are building extensive partnerships with various government agencies as well. Archer, while not as far along as Joby in terms of its vehicle development, has United Airlines (UA) as an investor and partner, which could prove a valuable opportunity in the near term. Lillium, on the other hand, has neither an automotive nor aerospace manufacturing partner and appear to be going it alone, which we view as very daunting due to the capital-intensive nature of the business. Ultimately, however, the key catalyst for Lillium's growth lay in the successful launch of its groundbreaking eVTOLs. Its unique propulsion system makes the Lillium Jet the quietest eVTOL and could enable the company to deploy them in more markets than those of its rivals due to the regulations on noise pollution in most developed countries. Quiet is the key innovation of eVTOLs and Lillium's design is best-in-class at this.

### **Market outlook**

Morgan Stanley (MS) estimates the eVTOL/UAM industry will reach USD1.5tn by 2040 as we utilize urban air travel to reduce traffic and open up an entirely new dimension of intracity travel. However, investing in eVTOL stocks is somewhat akin to purchasing Tesla stock just a few years ago. Right now, outside of VCs, carmakers, and aerospace companies, few are talking about this industry. However, when it takes off, it will catch most of the investing public by surprise and the massive gains will go to those who are willing to take the risk. In the next few years, people will start traveling from city to city via eVTOLs—this is inevitable. As such, the eVTOL / UAM industry will be immense and could prove to be one of the biggest growth industries of the decade.

Indeed, according to rival eVTOL maker Joby this is at least a USD500bn market in the US and a global market of more than USD1trn. And while we believe Joby is one of the best positioned to capitalize on what is likely to be strong future demand for eVTOL transportation, Lilium is nevertheless an interesting proposition due to its differentiated technologies which can be had for a relatively deep discount. Like Joby, Lilium is poised to potentially become a major disruptor in one of the fastest growing future industries.

**3Q updates and earnings results**

In 3Q21 Lilium obtained the first Vertiport Permitted for Palm Beach International Airport for its exclusive use, and the facilities at the Tampa, Florida vertiport are now under construction

In 3Q21 Lilium obtained the first Vertiport Permitted for Palm Beach International Airport for its exclusive use, and the facilities at the Tampa, Florida vertiport are now under construction. The company expanded its partnership with global infrastructure operator Ferrovial (FRRVY) for the construction and operation of its vertiports. In addition, it secured access to an additional 45 Vertiports in Spain and the UK, building on its growing German network, which also saw the addition of Stuttgart Airport in the quarter. Furthermore, the company entered into an agreement with the Swiss infrastructure company ABB (ABB) to provide the charging infrastructure for the eVTOL maker’s high-speed regional air network, which is slated for commercial launch in 2024. Lilium plans to launch its regional air networks in Brazil, Florida, and Germany. ABB will develop and supply the MegaWatt fast-charging infrastructure for Lilium’s eVTOLs. The charging stations are designed to charge batteries to 100% in 30 minutes and to 80% in 15 minutes. Lilium’s regional air network will be composed of vertiports equipped with parking bays and high-power charging points. The MegaWatt Charging System (MCS) will allow direct current (DC) charging of up to 1000 kW.

For 3Q results, operational spending for 3Q21 USD56.6mn. As of Sep 30, it had roughly UDD529mn of cash on hand. In 4Q, it expects cash spending to increase due to progress on its preliminary design review milestone, and accelerating engineering and flight-testing activities, and the ramping up of activities with its aerospace suppliers. As of the earnings announcement, the company was finalizing its 2022 budget.

**Fig 1. Key investment highlights**



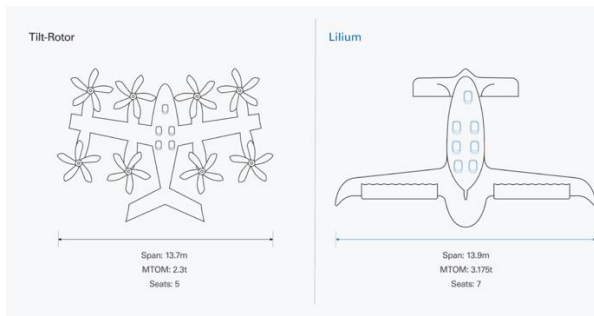
Source: Lilium, Hyundai Motor Securities

**Fig 2. Long-term success drivers**



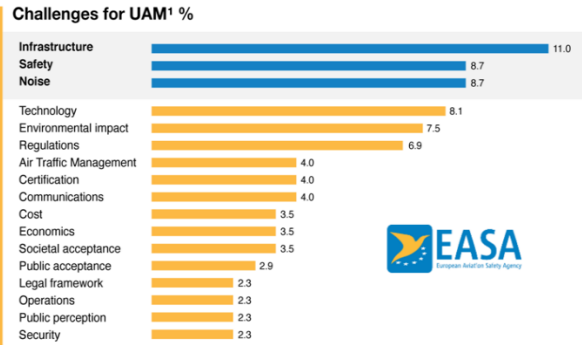
Source: Lilium, Hyundai Motor Securities

**Fig 3. Open rotor concept vs. the Lilium Jet**



Source: Lilium, Hyundai Motor Securities

**Fig 4. What people care about according to the regulators**



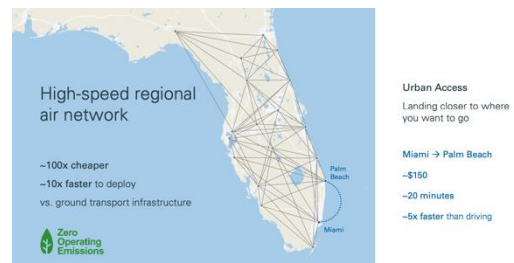
Source: EASA, Hyundai Motor Securities

**Fig 5. Savings & convenience drive customer value**



Source: Lilium, Hyundai Motor Securities

**Fig 6. High-speed regional air network**



Source: Lilium, Hyundai Motor Securities

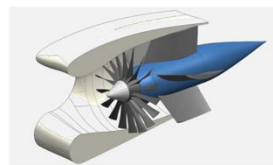
**Fig 7. Positioned to win along three dimensions**

**Product performance**



- Market-leading payload (people & cargo)
- Unmatched customer experience
- Range ideal for regional shuttle flights
- High-speed

**Proprietary technology**



- Very low noise and vibration
- Safer and more redundancy
- Designed for scalability
- Certified tier 1 aerospace suppliers

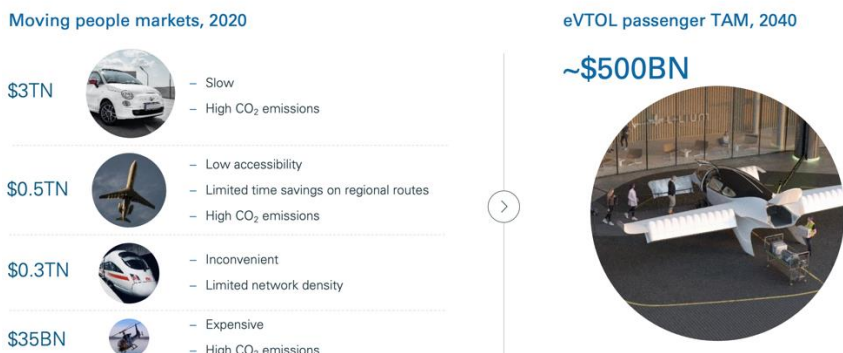
**Business traction**



- Best projected eVTOL unit economics
- Up to \$1BN in commercial contracts
- Azul, Palantir, Ferrovial, Lux Aviation, Munich Airport, Lufthansa as partners
- Global access, significant TAM in moving people and cargo

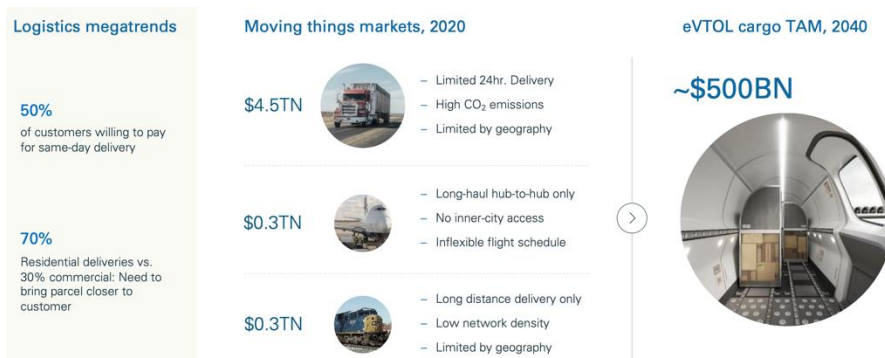
Source: Lilium, Hyundai Motor Securities

**Fig 8. Speed and accessibility enables absorption of shares from traditional passenger transportation modes**



Source: Lilium, Hyundai Motor Securities

**Fig 9. Revolutionizing the middle-mile cargo segment**



Source: Lilium, Hyundai Motor Securities

**Valuation and risks**

Lilium’s current market cap as of Dec 1 is USD1.9mn, making it one of the pricier companies in the UAM market

Lilium’s current market cap as of Dec 1 is USD1.9mn, making it one of the pricier companies in the UAM market. As earnings are not available, we used P/B for our valuation measure. Accordingly, Lilium’s P/B is only 1.1x. Lilium has a P/E of 0, however from the business life cycle point of view, investing in companies such as Blade is about owning stocks in the high-growth stage. Accordingly, key metrics that are used for mature businesses are irrelevant. Dividends and P/E are not how to gauge potential returns with disruptive growth companies. Returns are based on events that take place during the rapid growth stage. If the company secures a leading position, the moat strengthens. The company breaks even and starts making a meaningful profit. As the company grows in size and liquidity, it becomes an investment target to institutional investors and more analysts initiate coverage and it then becomes included in indexes. In short, the company’s intrinsic value grows as it matures. As the UAM industry and some of the companies that represent the vanguard of this industry of the future could undergo exponential growth once the technology and regulatory dominoes begin to fall, we believe traditional valuation metrics do not necessarily apply to these investments.

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Of course, it is not easy to determine the right price of growth stocks and investors must take the risk with a variety of options. While some early-stage companies have a compelling story, they lack the numbers to support this story. In stark contrast, mature companies should be evaluated on numbers alone. As such, only buying stocks in mid and large-cap companies eliminates any opportunity to secure 10x or greater returns. Accordingly, investors should target an optimal mix of story and numbers with a focus on companies within disruptive or soon-to-be-disruptive industries that are about continued growth, not speculative growth. Buy the companies and hold them with a view on the long-term opportunity. We expect continued volatility with the stock price highly sensitive to estimates and market sentiment.

For UAM, passengers seek to avoid urban congestion when commuting, which creates a business case for rapid air transportation. But a major risk is cost, at least in the early stages, which could slow the growth of the market. Among the issues which the industry faces include labor high costs, with pilots being the most prominent. While the industry is moving toward fully autonomous eVTOLs, in the near-mid-term, the labor cost for pilots coupled with the global shortage will remain a risk factor that must be considered until full autonomy is realized. Another labor-cost-related risk is the possibility that the handling of batteries for the eVTOLs could rise. The FAA requires workers who handle aircraft batteries to be registered and have a valid mechanic license. FAA-certified mechanic licenses are difficult to obtain, which makes for an expensive employee. If every vertiport requires such mechanics, achieving economical aerial urban transportation becomes all the more challenging. Another challenge to make this UAM services economical hinges on the way in which the FAA certifies eVTOLs. If eVTOL certifications are like those of traditional aircraft, the cost per ride will be higher. If the costs can be brought down to that of cars, then aerial ride-hailing services should be affordable. And this is where companies working closely with automotive and aerospace companies have an edge, we believe.

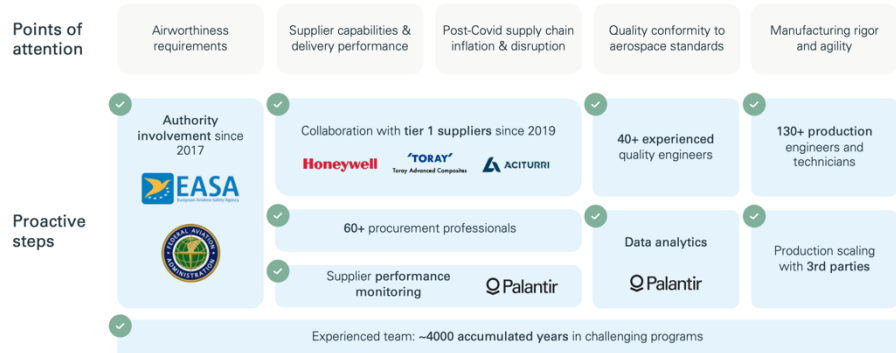
The key takeaway is that Liliium is a promising eVTOL manufacturer and an appealing speculative play at its current sub-USD10/sh price.

#### **The bottom line**

We see Liliium as an attractive, albeit highly speculative play in the UAM space, and while it carries similar risks as do other UAM stocks, it also has a higher degree of uncertainty due to the risks cited earlier. Having said that, the technology that the company is developing is a potential game-changer, and if it is able to successfully launch, then some of the business risk would be mitigated as it would become a very attractive M&A target, in our view. However, investors should note that among the four UAM stocks which we have recommended, Liliium should be viewed as a stock that could hit a home run, richly rewarding those who can tolerate risk but at the same time could strike out. However, we think the company's technology makes the stock a worthy addition to the portfolios of investors with a higher risk-tolerance.

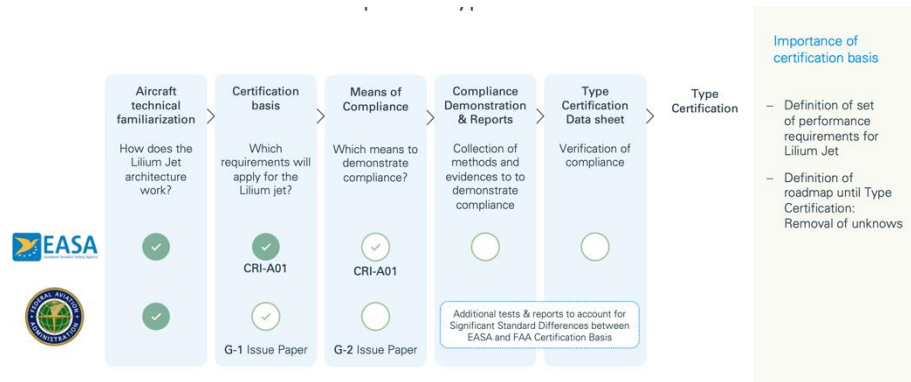
The key takeaway is that Liliium is a promising eVTOL manufacturer. Investing in Liliium is high risk as the company will not generate material revenues until 2025. Liliium is an appealing speculative play at its current sub-USD10/sh price.

**Fig 10. Points of attention**



Source: Lilium, Hyundai Motor Securities

**Fig 11. CRI-A01 certification basis received, roadmap until Type Certification**



Source: Lilium, Hyundai Motor Securities

**Fig 12. Investors unprepared for the scope of the eVTOL revolution**



Source: Lilium, Hyundai Motor Securities

**Fig 13. Ducted Electric Vectored Thrust (DEVT) propulsion system**

**Fig 13. Ducted fans need 10-15X less propulsion area than open propellers**



Lilium's proprietary propulsion technology drives major advantages over open propeller eVTOL

- Lower noise, lower vibration
- Safer
- Larger aircraft with more payload
- Scalable



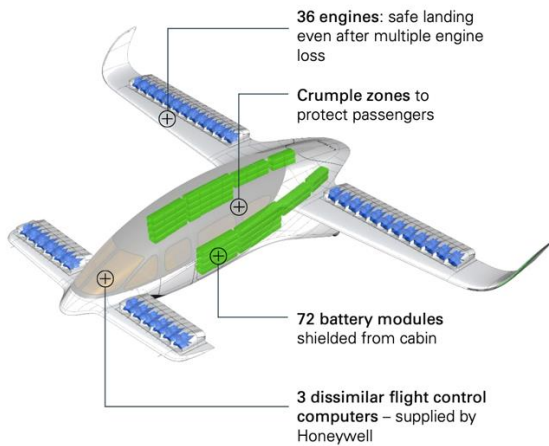
Source: Lilium, Hyundai Motor Securities

Fig 14. Battery strategy

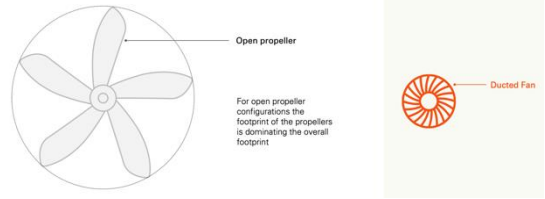
Requirements	Lilium progress
<b>Safety</b>	Full thermal runaway containment in 5 <sup>th</sup> generation flying demonstrator
<b>Cell technology for Entry into Service</b> <ul style="list-style-type: none"> <li>— High energy density</li> <li>— High power density for take-off and landing</li> <li>— Fast charging</li> <li>— Long lifetime</li> </ul>	Silicon-anode lithium-ion pouch technology secured exclusively: <ul style="list-style-type: none"> <li>— &gt;330 Wh/kg, enabling ~155mi range</li> <li>— Power levels of 2.8 kW/kg</li> <li>— 15 minutes to 80%, 30 minutes to 100%</li> <li>— &gt; 800 standard charge/discharge cycles</li> </ul>
<b>Industrialization: Mass production</b>	<ul style="list-style-type: none"> <li>— Leverage standard battery cell production lines</li> <li>— Mass industrialization partner secured </li> </ul>
<b>Next generation technology and capacity</b>	Active interest and dialogue with tier 1 suppliers

Source: Lilium, Hyundai Motor Securities

Fig 16. Designed for highest safety standards

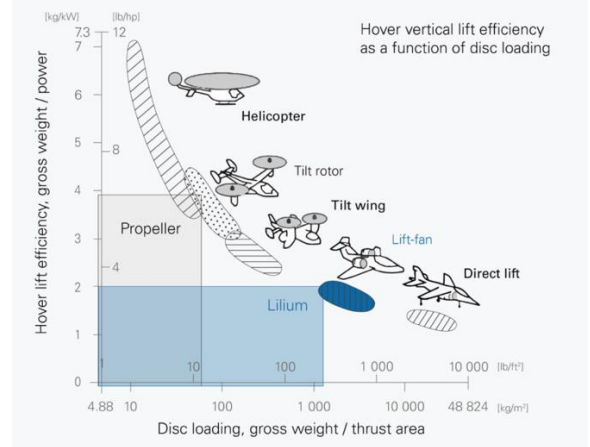


Source: Lilium, Hyundai Motor Securities



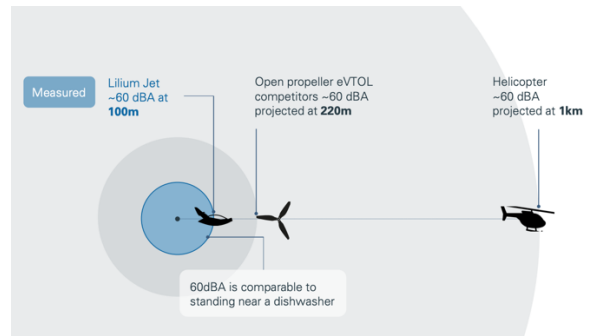
Source: Lilium, Hyundai Motor Securities

Fig 15. Lilium Jet compared to open concepts in terms of disc load and hover efficiency



Source: Lilium, Hyundai Motor Securities

Fig 17. Low noise allows regular landings near communities



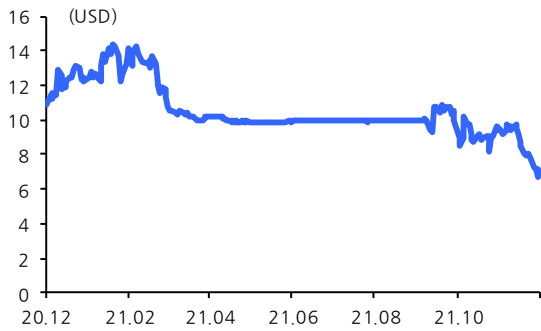
Source: Lilium, Hyundai Motor Securities

**Fig 18. Peer Valuation**

Company	Ticker	Market Cap(USDmn)	P/E Ratio	P/S Ratio	EV/EBITDA	Sales Growth (%)
Lilium N.V.	LILM	2,671	NA	NA	NA	NA
Archer Aviation Inc.	ACHR	1,381	NA	NA	NA	NA
Joby Aviation, Inc.	JOBY	5,495	NA	NA	NA	NA
Broadstone Acquisition Corp.	BSN	379	NA	NA	NA	NA
Blade Air Mobility, Inc.	BLDE	696	NA	NA	NA	NA

Source: Thomson One, Hyundai Motor Securities

**Fig 19. LILM Stock Price**



Source: Bloomberg, Hyundai Motor Securities

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