

ÅAC Microtec

Space to manoeuvre

Initiation of coverage

Aerospace & defence

12 March 2019

Price **SEK3.15**

Market cap **SEK216m**

SEK9.41/US\$

Net cash (SEKm) at 31 December 2018 11.0

Shares in issue 68.7m

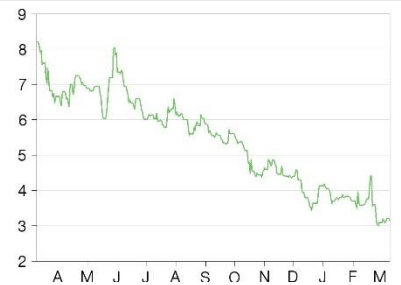
Free float 71%

Code AAC

Primary exchange Nasdaq FN Stockholm

Secondary exchange N/A

Share price performance



% 1m 3m 12m

Abs (11.8) (20.2) (61.6)

Rel (local) (13.5) (26.3) (62.1)

52-week high/low SEK8.06 SEK3.00

Business description

Based in Sweden, ÅAC Microtec is a world leader in nanosatellite end-to-end solutions following the January 2018 merger with Clyde Space in Scotland. The merged company also supplies a range of technology components to other small satellite manufacturers globally.

Next events

FY18 annual report 2 May 2019

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ÅAC Microtec is a research client of Edison Investment Research Limited

Following the acquisition of Clyde Space in January 2018, ÅAC Microtec is at the forefront of the rapidly growing and revolutionary market for small satellites. As nanosatellite build rates and deployments rise sharply over the next decade, increasing systems supply and platform revenues should be enhanced by operational and service revenues, moving ÅAC to a sustainable financial footing. Near-term growth challenges remain but the company delivered on strong growth guidance for 2018 and achieved a positive EBITDA in Q418. Our capped DCF-based value indicates a price of SEK14.7 per share, despite applying a WACC of 12%.

Year end	Net sales (SEKm)	PBT* (SEKm)	EPS* (SEK)	DPS (SEK)	P/E (x)	Yield (%)
12/17	13.3	(27.3)	(0.86)	0.0	N/A	N/A
12/18	77.9	(37.2)	(0.55)	0.0	N/A	N/A
12/19e	120.8	(8.5)	(0.12)	0.0	N/A	N/A
12/20e	200.4	27.5	0.36	0.0	8.7	N/A

Note: *PBT and EPS are normalised, excluding amortisation of acquired intangibles and exceptional items. Clyde Space consolidated for 11 months in FY18.

A global leader in nanosatellite technologies

ÅAC Microtec is aiming to become a leader in the nascent small satellite market (<500kg), with a focus on microsats weighing under 100kg. The merger with Clyde Space in January 2018 has created a strong position in mission design, build, test, deployment and operation of nano/microsatellites (from 1kg to 50kg), primarily using standard 10cm³ CubeSats. Of over 1,000 nanosatellites launched since 1998, ÅAC Clyde is represented on 40%. Over the next five years around 3,000 nanosatellites should be launched as technology development extends the applications for low earth orbit (LEO) constellations, especially for communications.

Rapid market growth should transform financials

While beating its guidance for FY18 revenues of SEK85m and a positive EBITDA for Q418, FY18 still delivered substantial losses. The rapid development of the nanosatellite market is expected to drive strong growth for both subsystems and satellite platform revenues. ÅAC Clyde has the capacity in Glasgow and Sweden to facilitate such expansion as well as develop a 'satellite as a service' offering, while increasing sales of subsystems to third-party satellite providers. As ÅAC Clyde ramps up production from five FY18 deliveries to current capacity of 120 per annum, it should be able to grow revenues, reduce unit cost through learning curve gains from standardised products and sharpen procurement prices due to improved volumes. As seen in Q418, this should allow ÅAC to deliver growing levels of profitability with a medium-term potential of around 20% EBITDA margins.

Valuation: Significant potential as strategy executes

Improving profitability should drive growing cash generation. Our assumptions generate compound sales growth of 30% from 2020 to 2024, driving a capped DCF value of SEK14.7 per share with a WACC of 12%. If ÅAC successfully executes its growth strategy, its ratings should quickly align with more established space peers.

Investment summary

Well positioned in a nascent, growing market

ÅAC Microtec is well positioned to pursue its strategic ambition to become the leading provider of satellites, systems and services in the small satellite market, leveraging off the key elements of developing micro technology capabilities and reducing costs of development, launch and operation. Small satellites are those weighing less than 500kg, compared to larger traditional satellite platforms that typically weigh up to around four tonnes. As an emerging technology that is set to reduce costs of deployment, operation and ownership for customers, the small satellite market appears set for strong growth. ÅAC's focus will be on satellite platforms weighing less than 50kg and subsystems for satellites up to 150kg.

The market for small satellites is expected to grow rapidly over the next decade. Around 7,000 may be launched in that period as the market transitions increasingly towards proposed LEO satellite constellations, especially by communications customers, which should be a key driver of growth. A major facilitator should be an increasing number of launch vehicle options that are expected to reduce launch costs substantially compared to current models. Several are expected to be suited to LEO small satellite payloads. A feature of LEO deployments is the shorter operational lifecycle of about five years before a satellite exits orbit, which should lead to a growing stream of replacement deployments, providing an opportunity for customers to insert new technologies and capabilities.

Clyde Space acquisition underpins strategy

Since deciding to focus on the space market in 2014, ÅAC has listed on the Nasdaq First North exchange in Stockholm. In January 2018 it made its first transformational acquisition, Glasgow-based Clyde Space for SEK376m, a leading designer and manufacturer of CubeSats, as well as subsystems for third-party platforms. CubeSats are 10cm cubes packed with technology (1U) that can be added in modular series to form 1U, 3U or 12U satellite packages weighing up to 20kg including solar panels for power. Clyde extends the product range offered by ÅAC, allowing end-to-end solutions for customers from inception to replacement. The space industry credentials of its experienced executives also strengthen the operational management of the merged entity.

The rapid pace of technological development in the satellite market has resulted in smaller, lighter components and subsystems with improving capability. The modular CubeSat configurations were initially developed for academic purposes over the last two decades, providing nanosatellite technologies that weigh less than 10kg. The increased number of commercial applications these afford is likely to be significant. Due to international regulatory agreements concerning transmission of bandwidths, it is unlikely to replace the dominant geostationary earth orbit (GEO) satellites that provide the bulk of communications services delivery around the world. However, an offering of a lower-cost alternative to customers seeking a dedicated satellite network with potential for global coverage through a constellation of LEO satellites is likely to be compelling.

Early days but growth should drive improving cash flows.

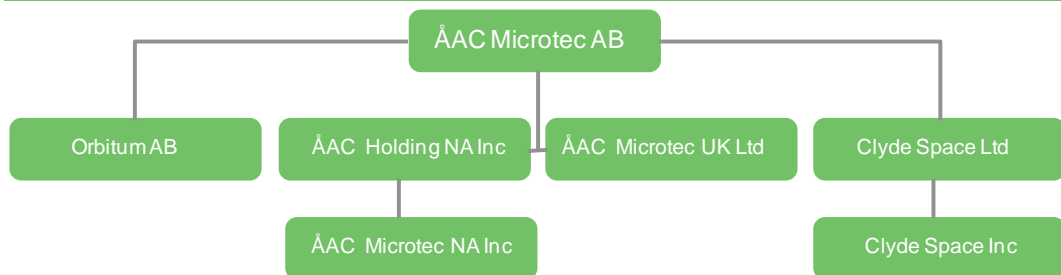
There are many risks in the successful execution of the strategy, including the notorious deferrals and delays apparent in many space programmes. With five successful platform deployments in FY18 and a growing pipeline and backlog, ÅAC seems set to fully participate in the market development. With Clyde already largely invested to deliver a significant increase in satellite deployments and subsystem deliveries, ÅAC should now move into a profitable growth phase, with improving cash flows as it drives down unit costs and leverages its cost base. Our capped DCF valuation, generated by core assumptions driving compound annual net sales growth of 30% from 2020 to 2024 to SEK661m with EBITDA margins of c 26%, indicates a value of SEK14.7 per share.

Company description: Leader in nanosatellites

Formed in 2005 as a spin out from the Ångström Laboratory at the University of Uppsala in Sweden, the company was initially known as Ångström Aerospace Corporation and involved in the development of high-quality avionics products using microelectromechanical systems (MEMS). In 2015 the decision was taken to outsource loss-making MEMS production and focus on the commercial development of the space components and subsystems including the aspiration to build complete small satellites and networks. As a result, AAC Microtec has developed into a world leader in the design, development, deployment and operation of small satellites and networks, in addition to supplying technological components and subsystems to larger satellite systems.

ÅAC was listed on the Nasdaq First North market of the Swedish Stock Exchange on 21 December 2016. Fouriertransform, a wholly owned subsidiary of Swedish venture capital company Saminvest, formed by the Swedish state to invest in domestic businesses, invested SEK25m in the company in 2014 and holds a 14.4% share today. The company raised SEK120m from the listing, enabling it to pursue both organic opportunities as well as strategic M&A. In October 2018 management stated its intention to move the listing to the Premier segment of the Nasdaq First North market by the end of Q119 as a precursor to a main market listing in Stockholm.

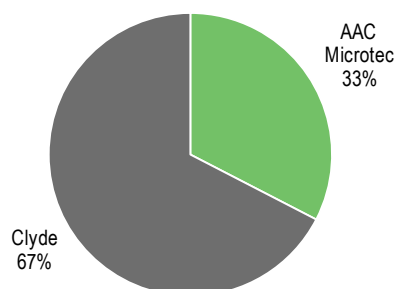
Exhibit 1: Group structure



Source: ÅAC Microtec reports. Note: Orbitum AB is a dormant subsidiary.

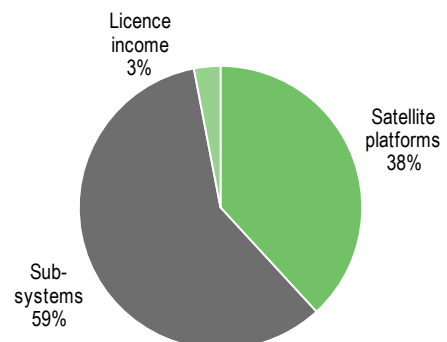
In January 2018 the company acquired Clyde Space, based in Glasgow, Scotland, for SEK376m. The deal was funded by the issue of 30.5m shares at SEK11.62 per share to Clyde shareholders and £2m (SEK22m) of cash. Following the deal, ÅAC also raised SEK50m before expenses through a placing at SEK7.65 per share. As a result, Clyde shareholders own around 44% of the enlarged share capital of the group. The merged company, now called ÅAC Clyde commercially to reflect the combined offering, will operate through two business segments, Satellite Platforms & Space Systems and Subsystems & Components. The company also enters licensing agreements for its technologies to third parties.

Exhibit 2: FY18 sales split by business unit



Source: ÅAC Microtec reports

Exhibit 3: FY18 sales by activity



Source: ÅAC Microtec reports

ÅAC employs around 25 staff primarily at its Uppsala facility, and generated revenues of SEK25.6m from subsystems sales and licence income last year. Clyde employs around 60 people at its main site in Glasgow. In FY18 Clyde added around SEK60m of revenues to the group in its 11 months of consolidation. The large majority of employees are highly qualified engineers providing a comprehensive design and development capability for customer requirements. Around 70% of revenues generated come from repeat customers, suggesting recognition of the quality, reliability and performance of the company's components and systems. A business development team follows up leads from both Glasgow and the UK space agency in Harwell, Oxfordshire. As the industry is relatively small the profile of the executive team also generates introductions, especially from potential customers seeking to enter the market for the first time. Clyde has also developed high-quality manufacturing capable of delivering 10 satellite platforms a month, a rate of production that may not seem spectacular but is a transformation when compared to traditional satellite manufacturing. It also has vibration, thermal cycle and environmental testing facilities on site as well as a network ground station. Radiation testing is outsourced to a facility in Uppsala.

Strategy: Dominate in the 1–50kg satellite market

The company's declared strategy is to dominate the market for small satellites between 1kg and 50kg in weight. To do so it will develop and build small satellites as well as advanced and standardised but mission critical avionics and subsystems. It offers an end-to-end satellite solution to potential customers from system and satellite design, manufacture and launch to operation. It also intends to continue to develop and supply subsystems and components that can be used aboard third-party small satellites as well as larger satellites, while maintaining strong relationships with global space agencies.

The key elements to delivering this strategy are likely to include:

- A commercial focus on constellation customers seeking to launch LEO networks of satellites.
- Continued product range development through improved technology and performance.
- Developing production capacity to meet rapid increases in demand as they emerge.
- Reducing costs substantially through standardisation of platforms and subsystems.
- Developing the offer of satellite as a service, incorporating the end-to-end provision of satellite and networks from analysis and mission design to deployment and operation in service.

ÅAC Clyde has the opportunity to provide solutions and the offer of satellite as a service is a good example of how the company can bring its industry expertise to allow non-space players into the market. Just as software as a service has become an established way of working today, satellite as a service would allow the users to focus on business delivery while ÅAC Microtec provides access to the space economy and ecosystem.

Successful execution of the strategy should drive strong growth in revenues from increased delivery volumes of platforms and subsystems, which should be further enhanced by the development of an increasing services revenue stream as the deployed satellite fleet grows.

Market overview

Key to the growth of the group is the development of the small satellite market. Small satellites is a collective term given to all satellites that weigh up to 500kg. The segment can be broken down into the following defined sub-segments:

- minisatellites weighing between 100kg and 500kg,
- microsattellites weighing between 10kg and 100kg,
- nanosatellites weighing between 1kg and 10kg, and

- picosatellites weighing less than 1kg.

ÅAC Clyde's initial focus will be on the nanosatellite and microsatellite segments.

Historically the length of platform construction and deployment periods, prohibitive costs and a lack of available launch options have all been significant barriers in the traditional satellite market. While cost against capability has progressively improved at a fast rate, the overall market structure has been little changed in recent decades. The emergence and development of microtechnology has provided the opportunity for a step change in the provision of satellite services. CubeSats in particular continue to develop from the base established for academic and research purposes. Technology has developed to include sufficiently powered measurement instruments and radio transmitters to perform functions previously carried out by much larger platforms. The challenge has been to fit ever-improving capability into the same standardised and constrained configurations and both ÅAC and Clyde have been at the forefront in this regard. The modular nature of CubeSat design allows increasing payloads as the key control and operational systems may comprise only up to 2U of a 3U, 6U or 12U platform.

Exhibit 4: CubeSat configuration comparison				
	1U	3U	6U	12U
Payload volume	Up to 0.2U	Up to 1.6U	Up to 4.4U	Up to 10U
Power generation	Up to 8W peak	Up to 50W peak	Up to 90W peak	Up to 150W peak
Payload power (orbit average)	2W	>12W (typical)	>24W (typical)	>30W (typical)
Data downlink	9.6 kbps	Up to 100 Mbps	Up to 100 Mbps	Up to 100 Mbps
Frequency	V/UHF	V/UHF, S-band. X-band	V/UHF, S-band. X-band	V/UHF, S-band. X-band
Orbital attitude/Lifetime	LEO/up to 5 years	LEO/up to 5 years	LEO/up to 5 years	LEO/up to 5 years
Source: ÅAC Clyde				

Demand for space-based information remains the fundamental driver, with lower costs and increased capabilities of small satellites providing new alternative solutions, especially through constellation configurations covering the globe with up to 200 satellites. Indeed, the prospect of megaconstellations of over 1,000 nanosatellites providing reliable real-time connectivity for higher-bandwidth communications customers is increasing. Commercial customers especially in the communications segment are expected to be the main driving force for satellite deployments, with applications expanding as technical capabilities increase. The development of the market is expected to be facilitated by an increasing number of new lower-cost launch systems as well as availability of venture capital support for space-based ventures.

The attractions of small satellite networks

The essential selling point of the small satellite proposition is cost effectiveness. The satellites are cheaper to manufacture with a standard 1U CubeSat costing around SEK1m, and launch costs that may range from around SEK100k/kg to SEK750k/kg (ie from c SEK1m for a 1U nanosatellite). Even a relatively large constellation deployment is likely to be less expensive than a standard GEO platform costing several hundred millions of dollars.

The smaller scale means the testing equipment is less capital intensive and transportation logistics (for test and to launch centres) are easier and lower cost, often by secured courier services. In addition, small satellites are simpler with replication of designs within constellations allowing designs to be optimised for manufacture and test with a positive impact on unit costs. It should be noted that operational control may be more complex as the multiple satellites in a constellation have to be acquired by ground stations as they pass. However, being closer to earth in LEO also means better signal strength, requiring less power for transmission compared to larger GEO satellites. The proximity to the ground also reduces the requirement for shielding.

Modularity provides increasing and flexible payload capacity, which should allow previously unattainable applications to be adopted. The shorter service life of up to five years should also

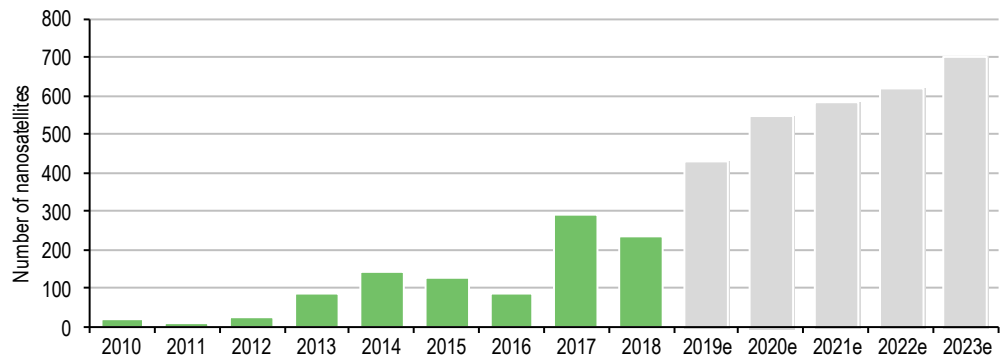
enable spiral upgrades of technologies deployed, as well as providing a growing replenishment stream for the manufacturers.

Scaling the market

Erik Kulu’s Nanosatellites & CubeSat Database (www.nanosats.eu) identifies 1,116 nanosatellites launched through 2018 by 61 countries, of which 1,030 have been CubeSats, with 932 successfully deployed. Of the total launched, 86 have been lost to launch issues, which represent only a few mission failures given that the record for the largest single deployment was via an Indian launch with 103 nanosatellites aboard in February 2018. However, only 576 are operational as around 25% have re-entered the atmosphere, and a further 15% remain in orbit but are non-operational.

After only 80 launches between 1998 and 2009, the number being deployed has increased dramatically is expected to continue growing, as Exhibit 5 shows. According to the forecast in Exhibit 5 below more than 3,000 satellites are to be deployed over the next five years.

Exhibit 5: Number of nanosatellites launched, historical and forecast (2010 to 2023e)



Source: Erik Kulu, Nanosatellites & CubeSat Database, www.nanosats.eu

The forecasts of the number of nanosatellite and microsatellite deployments appear to be starting to converge. Most indicate that from around 250 deployments in 2018, and a trailing five-year average of around 175 per annum, there is likely to be strong growth to more than 500 per annum by 2023 if not sooner. Growth is expected to continue through the next decade at 10–15% per annum.

According Euroconsult’s *Prospects for the Small Satellite Market, 2018* report, 7,000 smallsats are expected to be deployed over the next decade (2018–27), compared to the previous year’s 10-year forecast of 6,214, a 15% increase. It is almost double the 2016 forecast of 3,600 small satellites, reflecting the rapid development of the market and potential for constellation deployments for new applications as technologies advance. According to the Satellite Industry Association, satellite manufacturing sector revenues were around \$15.5bn in 2017. We estimate that only a small proportion (<\$1bn) of that was in the microsatellite and small satellite sectors despite the increasing volumes due to low values. We expect this to grow to around \$2.5bn to \$3.0bn by 2023, assuming 700 or so deployments at around \$4m each.

The end-market adoption of the small satellites technologies is also expected to change the landscape of the market. Telecommunications customers are expected to provide the greatest growth as they start to exploit the new propositions offered. The general expectation is that telecoms operators, including military applications, will account for 50% of small satellite deployments over the coming period, which compares to less than 10% in the previous decade. The number of academically based research and earth observation satellites should continue to grow, but from higher bases at a slower overall pace, as will military and security deployments.

Customers such as Kepler Communications and NSLComm are clearly involved in the communications segment providing ÅAC Clyde with likely exposure to its growth. Given Clyde’s

overall historical market-leading position, its participation in the wider market expansion seems likely.

Competitive landscape also evolving

Apart from the existing traditional fixed and mobile satellite service offerings, which should continue to dominate in areas such as Ku-band and Ka-band frequency high-throughput data transmission, there are a number of emerging companies in the small satellite market. As the concept is relatively straightforward, despite comparatively high technical barriers to entry, we see new potential manufacturers emerging from previously unrepresented countries. Of course, ÅAC Clyde and some of the other major players have operational experience and industry credentials that should provide a competitive advantage. Major competitors include, but are not limited to:

- **Blue Canyon Technologies (BCT)**, a US company founded in 2008 that manufactures nanosatellites and subsystems and components for small satellites.
- **GomSpace**, which is based in Denmark, was formed in 2007 and develops CubeSats and radio communications payloads. It was listed on the Nasdaq Nordic exchange in 2016.
- **Innovative Solutions in Space (ISIS)**, a Netherlands-based company founded in 2006 focusing on subsystems for satellites weighing up to 30kg.
- **NanoAvionics**, a Lithuanian company founded in 2014 that is focused on developing integrated CubeSats, as well as subsystems including novel chemical propulsion solutions for CubeSats.
- **Tyvak**, a US company that, among other things, provides launch products and subsystems for nanosatellites and CubeSats.
- **York Space Systems**, a US company founded in 2015, that develops and manufactures standardised satellite platforms, and with which ÅAC has an established relationship as a systems supplier providing mission avionics, power subsystems and, since 2018, batteries.

In addition, ÅAC Clyde also continues to work with some of the world's leading space agencies. In addition to those in Sweden and the UK, it also collaborated in 2017 with NASA, the European Space Agency (ESA) and the Japanese Space Agency, JAXA.

ÅAC Clyde prepared for growth

Merger creates a leading end-to-end solutions provider in the market

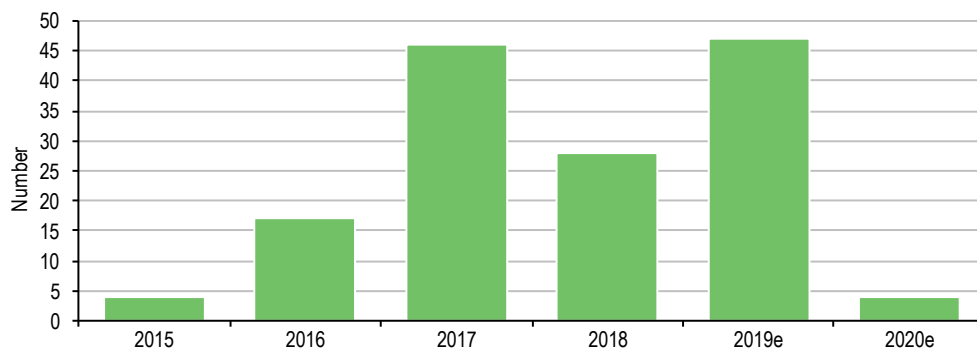
The rationale for the acquisition of Clyde Space is clear as it makes the combined company a leading player in the small satellite segment, offering end-to-end solutions to customers. The purchase of Clyde extended the product offering into the nanosatellite category, which is expected to be a highly disruptive segment in the offering of LEO satellite constellations. The development by ÅAC in collaboration with OHB Sweden of InnoSat, a 40kg satellite platform using ÅAC's Sirius avionics subsystems, is now joined by Clyde's leading position in CubeSat manufacturing and subsystems supply. These are 10cm cubes (1U) packed with microelectronics and power systems that can be modularly expanded to form 3U, 6U and 12U satellite packages weighing from around 1kg up to around 20kg. They provide a disproportionately favourable increase in payload capacity, as less than 2U of a configuration is typically used for mission subsystems.

ÅAC Clyde also benefits from the integrated range of subsystems and components available for both its own and third-party satellite systems, including larger platforms. These are standardised avionics products that are lightweight, compact and robust, providing the platform (or bus) on which the customer payloads can be deployed into orbit. ÅAC's range may be characterised as slightly more bespoke and premium than those of Clyde, with two main computer management product series, RIA and the newer range, Sirius. The latter is a modular design that was launched at the end of 2016 aimed at providing reliability, capacity and high performance for microsatellites. However, the wide range of missions means that there is a certain element of customisation for every application. The group product range includes onboard computers (OBC), battery modules, electrical power systems (EPS), attitude and orbital determination and control systems (ADCS/AOCS) and data management systems. Solar cells for arrays and cables are bought in and integrated into the systems, as are a range of other components.

Having focused on its strategy of providing standardised products for the segment, ÅAC Clyde now has a presence on an estimated 30–40% of already deployed CubeSats with over 2,000 components and subsystems delivered, providing an outstanding validating installed base. A large part of this was for the provision of subsystems for the Spire satellite constellation.

To date the delivery to launch of complete satellites has been more limited. Clyde's first nanosatellite platform (UKube-1, a 3U design) was launched in 2014 and was the UK Space Agency's first national spacecraft, successfully deployed with four payloads on board and achieving a number of significant milestones for the UK industry.

Exhibit 6: Spire Lemur-2 satellite launches



Source: Erik Kulu, Nanosatellite & CubeSat database, www.nanosats.eu

The focus over the next few years was on supplying subsystems to third-party projects, primarily for Spire's current operational constellation of 72 Lemur-2 satellites. Out of around 95 launched to

date, 10 were lost on a launch failure and the others have re-entered and burnt up. A further 45 or so are expected to be launched by the end of 2019, with a few deployments in 2020.

While Spire developed and manufactured its own satellites, the deployment of the constellation is an example of how a constellation may develop. After a few initial test satellites in 2014 Spire launched its first four operational Lemur-2 3U CubeSats in 2015. Volumes subsequently ramped up and in future years are likely to be limited to replenishment of the constellation after five-year deployment lifecycles.

A further example of a potential roll-out comes from another of Clyde's customers, Kepler Communication of Canada. Kepler is developing a constellation of ultimately 140 satellites to provide communications and global data backhaul services for wideband and internet of things applications and in the longer term to provide in-space connectivity. These will be deployed in LEO on polar planes (unlike GEO orbits, which are essentially fixed above the equator). On the polar orbit one satellite can see all of the planet, but a large number are required to provide real-time connectivity. Clyde is building all of the three satellites ordered by Kepler to date.

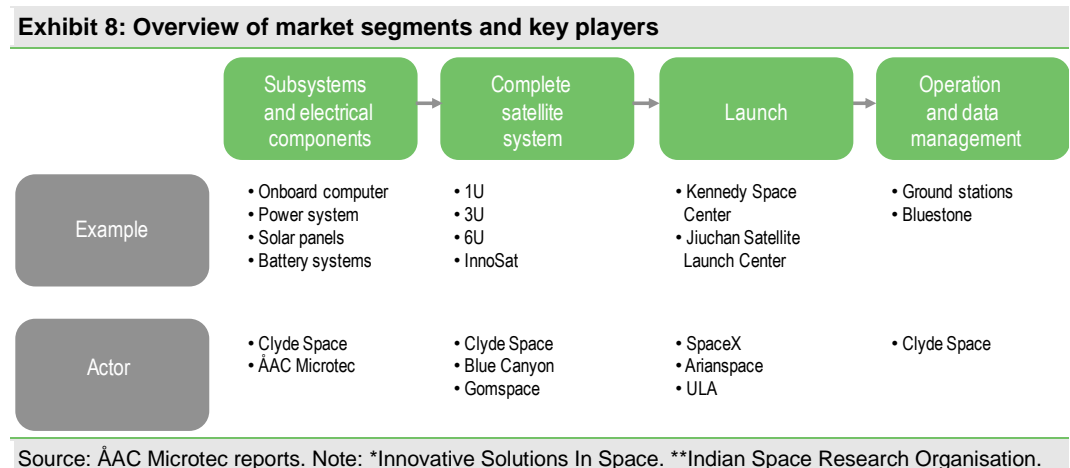
Exhibit 7: Kepler Communications constellation roll-out

Year of deployment	Number	Class	Type	Mission	Frequency
2018	2	KIPP and Case	3U	Technology demonstrator	Ku-band
2019	1	TARS	6U	Market Validation	Ku-band, S-band
2020	15	GEN-1	6U possibly	Constellation satellites	Ku-band, S-band
2021/22	50	GEN-2	6U possibly	Constellation satellites	Ku-band, S-band, Ku-band
2022/23	~85	GEN-3	6U possibly	Constellation satellites	Ku-band, S-band

Source: Kepler Communications

On 15 November 2018, Kepler was one of four companies offering NGSOs (non geosynchronous orbit) satellite systems that received FCC (Federal Communications Commission) approval to deliver satellite communication services to the US market. The approval paves the way for the constellation deployment. GEN-1 satellites are due to be launched in 2020, so we expect the first constellation order in 2019, with Clyde appearing to be in a strong position to supply them.

Exhibit 8 demonstrates AAC Clyde's position in the satellite supply chain.



AAC Clyde saw five of its CubeSat platforms successfully launched in 2018:

- Kepler 1 (KIPP), a 3U CubeSat technology demonstrator launched on 19 January 2018 from Jiuquan Satellite Launch Centre (JSLC) in China for Kepler Communications of Canada carrying a Ku-band software-defined radio payload.
- Kepler 2 (CASE), a sister satellite to KIPP, was launched on 29 November 2019 from India on a PSLV rocket.
- SeaHawk-1, a 3U CubeSat, for the University of North Carolina Wilmington, was launched on 3 December 2018 from Vandenberg Spaceport in California by a SpaceX Falcon 9 launch

vehicle. It is the first of two demonstrators carrying a spectral imager for ocean colour monitoring.

- The DaVinci mission 3U CubeSat, launched on 16 December 2018 from Mahia, New Zealand, by Rocket Lab's Electron rocket. It carried an earth observation payload designed by high school students from Idaho in the US who won a NASA-sponsored payload competition.
- FireSat (ZACUBE-2), a 3U CubeSat launched on 27 December 2018 by a Soyuz-2 rocket from Baikonur in Russia. It is a collaboration between the UK Space Agency, the South African National Space Agency and universities in Africa and the UK to provide an academic testbed primarily for the early detection of forest fires and ship tracking.

Clearly as customers such as Kepler and NSLComm seek to deploy their constellations, the number of CubeSats to be supplied by Clyde should grow rapidly, with replenishments five years after launch providing a sustainable longer-term potential. With annual nanosatellite deployment expected to more than double to over 500 by 2021, even full production at Glasgow of 120 nanosatellites would represent a <25% market share.

As AAC and Clyde integrate and leverage their combined expertise in standardised microtechnology solutions for space applications, we expect the group to consolidate and grow its market position. Primarily from its base in the heart of Glasgow, Clyde already has the capability to take a project from launch to replenishment. It offers mission design, platform and systems development, manufacturing, test and evaluation, launch planning, deployment and commissioning as well as operational services from its ground station. Radiation testing can be carried out at third party facilities in Uppsala, and as service provision increases we expect Clyde to create a global capability by leasing ground station capacity around the globe.

In addition to launches, 2018 saw a significant increase in pipeline conversion activity, both for platforms as well as subsystems:

Exhibit 9: Orders announced in 2018			
Customer	Order	Value (SEK m)	Comment
NSLComm (Israel)	Strategically important first order to provide 'satellite as a service' extending previous order for a 6U demonstrator satellite	16.7	Extends contract scope to design, manufacture, test, launch and operation from ground station in Glasgow.
Japan	Several customer orders totalling SEK13.5m over the last 12 months for Sirius avionics delivered in two rounds	13.5	Repeat order (first order in November 2017) showing recurring business in Japanese market
Aistech Space (Spain)	Several components for 10 satellites (SEK5.6m)	5.6	First subsystems order from a new customer with plans to deploy a 150 satellite constellation
South American customer	Large (+50) batch of battery systems (SEK7.2m with SEK4.9m option)	12.1	South America-based large constellation operator with potential for future orders
York Space Systems (US)	Technical support and delivery of battery subsystem.		Pilot for follow on orders, plus it further strengthens relationship with a very valuable partner who already take data management and power systems
LCF Enterprises (US)	Tests in orbit, commissioning and operations for DaVinci mission	2.6	A new end to end launch and operations contract for the DaVinci mission, confirming satellite as a service concept
Mauritius Research Council	Full integrated 1U satellite and service agreement	3.8	
Kepler Communications (Canada)	Follow up order for third test satellite, TARS, a 6U configuration to be delivered in Q319	3.5	Clyde has supplied all Kepler satellites to date and constellation deployments are slated to start in 2020
Space Systems Engineering Ukraine (SSE)	Order for avionics and power subsystem for in orbit demonstration mission.	10.3	Delivered from Q319 to Q219

Source: AAC Microtec reports

Management

Despite the recently announced departure of the CEO, there should be little disruption to the strategy. Mats Thideman, who has held the role of CFO since 2014 and was interim CEO of AAC before Alfonso Barreiro took office, has stepped up to managing director. Mats has extensive industrial experience at Åkerströms, Image Systems, TracTechnology and most recently Cortus Energy. Together with Chief Strategy Officer and Clyde Space Founder Craig Clark, he will lead the executive team while the search for a new CEO is undertaken. As CEO of Clyde Space, Craig has been involved in its strategic development since it was founded in 2005 and has been CSO of AAC Clyde since the merger. Craig Clark and AAC's Chief Technical Officer Andrew Strain add substantial 'new space' experience to the operational board. Andrew has over 10 years of experience in the design, development and delivery of small satellites, having been with Clyde almost since inception.

Sensitivities

Apart from the normal strategy execution risks, the following are some of the key sensitivities for the company. This list is not exhaustive but aims to highlight some of the issues involved not only in operating in the space arena but also in coordinating and managing day-to-day operations following a significant merger.

- **Merger:** the Clyde Space merger increased the addressable market and significantly changes the overall operating nature of the company. Over the last 12 months the businesses have been integrated with a modest reduction in staff levels, while maintaining focus on market opportunities and business development. However, the ramp up of the business may prove ambitious.
- **Additional M&A:** the company has the intention to develop the business via further acquisition, and hence there is risk in identifying viable targets and integrating them correctly. Additional funding is also likely to be required if any targets are addressed in the near term.
- **Market competition:** while much of the technology involved in the small satellite market is at a nascent stage, there is already growing competition in the market. This risk can also extend to key personnel being attracted to competing firms. Developing technology can be considerably demanding on a company's resources, especially when the pace of growth of competition in the market is considerable. To keep pace with the competition may be too optimistic or too costly to enact. New technologies could yet emerge that disrupt the model assumptions; for example, the emergence of propulsion systems that may extend the operational lifecycle of LEO constellation nanosatellites.
- **Space industry:** while the global space industry is valued at c \$350bn today (Satellite Industry Association), growth is not without risk. From early-stage development to launch costs, there is inherent risk in a business where the majority of assets are positioned in orbit around the earth. In addition, the space market has essentially transitioned from governmental stewardship to commercial entities and sometimes individuals. As this transition continues, it is likely that new risks will become apparent, for example, the successful entry into service of new, lower-cost launch platforms.
- **Political considerations:** the full implications of Brexit remain unclear, although it has already prompted discussion around the Galileo and Copernicus satellite systems. Current discussions may drive an increased focus on UK space spending, especially when national security is in focus, which could play to the strengths of AAC Microtec. A clearer picture of whether Britain remains involved in key programmes should emerge as 2019 progresses, although at present alternative solutions should remain high on the agenda.

- **Financial risks:** the rapid growth of the business presents its own challenges financially. A further round of funding appears likely to ensure sufficient working capital as well as further possible M&A funding. Financial risk is not only internal but also relates to counterparties who may be relative newcomers to commercial space markets with unproven and immature business models. Customer due diligence requirements are therefore heightened especially where long-term satellite-as-a-service models are proposed.
- **FX risks:** the company is operating in an essentially US dollar-based industry, incurring its costs in predominantly Swedish krona or sterling. While there is some natural hedge to transactional risk from US dollar purchases in the supply chain, the company also uses forward exchange contracts to mitigate fluctuations. There is clearly an element of translational risk from Clyde's sterling accounts into krona, but as this is quantitative not qualitative, like other companies it is not hedged. From a competitiveness perspective, any appreciation against the US dollar may have an adverse impact as many of the competitors are US based.

Financials

Adoption of IFRS

As part of its more international outlook following the Clyde purchase and in advance of moving to the Nasdaq First North Premium market segment in Stockholm, ÅAC has adopted IFRS accounting standards for its reports from FY18.

The major element of change under IFRS is that goodwill is no longer amortised and is reduced by purchase price allocation (PPA) intangibles acquired with Clyde, including customer relations, trademarks, software and backlogs. These assets are amortised over their expected useful lives and tested annually, but have no impact on future cash flow. We therefore exclude the amortisation from our adjusted figures and treat it as exceptional alongside impairments of other fixed and intangible assets.

Internally generated intangibles such as capitalised R&D continues to be amortised separately and taken as a charge to profits, with own work capitalised added to group income.

FY18 trading performance

As can be seen, FY18 was one of transformation for ÅAC Microtec following the effective merger with Clyde Space. As it transpired the guidance given early in the year for revenues in excess of SEK85m for FY18 and a positive Q418 EBITDA were both readily achieved.

The highlights of the trading performance in 2018, the first to be reported under IFRS, include the following:

- Net sales of SEK77.9m (FY17: SEK13.5m), including a SEK47.1m contribution from the 11 months of consolidation of Clyde Space, acquired in January 2018. ÅAC Microtec sales more than doubled to SEK30.7m (FY17: SEK13.3m), including SEK6.5m of licensing income.
- Group revenues, which includes other operating income (primarily R&D tax credit and FX), expanded to SEK87.7m (FY17: SEK13.5m), compared to guidance of SEK85m. Clyde contributed revenues of SEK55.9m. Had it been consolidated for the full year, group revenues would have been some SEK4.3m higher at SEK92.0m.
- An EBITDA loss of SEK28.5m (FY17 loss: SEK21.4m), including a positive EBITDA contribution of SEK3.5m in Q418. SEK8.8m of acquisition costs was also included in FY18 operating costs. Excluding these the FY18 EIBITDA loss would have been SEK19.7m, a modest improvement.

- Loss after tax of SEK42.7m (FY17 net loss: SEK27.3m), of which the net loss of Clyde Space was SEK14.9m. The Clyde performance is after SEK8.8m of one-off acquisition costs but includes an R&D tax credit in the UK of c SEK3.5m.
- Loss per share reduced to SEK0.65 compared to SEK0.86 in FY17, largely as a result of the increase in share count during the year for Clyde and the January SEK50m fund-raise.
- We calculate an adjusted loss per share that improved to SEK0.55 compared to SEK0.86 in FY17. The adjustment excludes PPA (purchase price allocation) amortisation arising from the Clyde acquisition and a SEK1.5m fixed asset impairment, which we treat as exceptional.
- Gross cash at 31 December 2018 was SEK12.2m (FY17: SEK37.2m).
- Net cash at 31 December 2018 was SEK11.0m (FY17: SEK35.2m).

The purchase of Clyde Space with full year sales of c SEK60m completed on 30 January and has been consolidated since the start of February. This was funded by the issue of 30.5m shares at SEK11.62 per share to Clyde shareholders and £2m (SEK22.2m) of cash for a total consideration of SEK376m.

Following the deal, the balance sheet was strengthened by a targeted share placing that raised SEK50m before expenses through a placing at SEK7.65 per share. As a result, Clyde shareholders own around 44% of the enlarged share capital of the group.

While cash burn continued through the year, the performance was much improved in Q418 with a cash outflow of just SEK8.5m as EBITDA turned positive. Q218 and Q318 saw cash outflows of SEK15.0m and SEK18.1m, respectively. The Q118 outflow was SEK15.2m adjusting for the cash consideration for Clyde (SEK22.4m), the cash acquired with the business (SEK4.1m), and the proceeds from the Q1 capital raise.

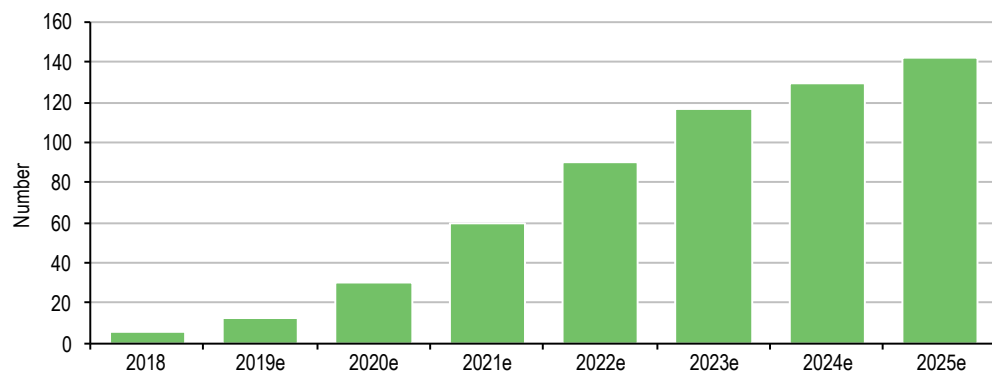
Having more than achieved its guidance for FY18, ÅAC has provided little information with respect to the outlook. Similarly, we only have outline preliminary figures and not full disclosure of detailed financial elements. Nevertheless, we have developed a model based on some key assumptions.

Key forecast assumptions

We estimate that the number of microsatellites below 50kg set to be deployed globally each year should grow at a five-year CAGR of c 16% through 2023. We expect deliveries of subsystems from both Glasgow (nanosatellites/CubeSats) and Uppsala (microsatellites) to outperform this growth rate as new customers continue to be acquired. We expect revenue growth rates to be similar for each location as we assume higher volume growth with lower prices for nanosatellite subsystems equates to Uppsala's more customised, lower volume, premium subsystems.

We expect ÅAC Clyde to deliver 15 satellite platforms this year including some larger 6U units.

Exhibit 10: ÅAC Microtec estimated satellite deliveries



Source: Edison Investment Research estimates

The volume development is expected come from a mixture of development and test satellites as well as initial constellation requirements. We expect the latter to receive a first order this year and to start delivering in FY20, and to broadly equal the number of test satellites in FY19, which we estimate at 15 including some 6U platforms (eg Kepler's TARS platform). The ramp up should then start to accelerate as more constellations are brought into the order book and commence deployment. From 2023, with an increasing number of satellites ending operational lifecycles, replenishment volumes should add to new deployments. A services revenue stream should also start to grow meaningfully once constellation commissioning has commenced. In addition, subsystems licensing agreements with other manufacturers such as York Systems and Ball Aerospace should provide a growing stream of royalties as they increase production volumes.

As the volume of satellites being manufactured increases, often with replication for the same constellation, there should be beneficial learning curve effects reducing the unit costs. In addition, a large proportion of bought-in components should benefit from improved pricing per unit on increased volume commitments.

After a relatively flat period in 2019 as the benefits of the integration of the two businesses are more fully absorbed, we expect staff numbers to grow to reflect the increase in deliveries. Our base assumption is that one 3U satellite construction takes about 1,500 hours, or effectively one fulltime employee a year. As progressive benefits from learning curve advances and product standardisation flow through, we would expect some increase in efficiency to be reflected in unit costs. In addition, we expect improved procurement prices as volumes rise.

Exhibit 11: ÅAC Microtec income statement estimates				
Year to 31 December (SEKm)	2017	2018	2019e	2020e
ÅAC	13.3	30.7	41.4	55.3
Clyde	0.0	47.1	79.4	145.1
Net sales	13.3	77.9	120.8	200.4
Satellite platforms	0.0	17.4	34.9	87.2
Subsystems	13.3	54.0	82.9	105.2
Licence income	0.0	6.5	3.0	8.0
Net sales	13.3	77.9	120.8	200.4
Other operating income	0.2	9.8	3.0	2.0
Revenue	13.5	87.7	123.8	202.4
Development work capitalised	3.9	1.5	2.1	3.2
Group income	17.5	89.2	126.0	105.7
Raw materials & subcontractors	(5.0)	(31.0)	(42.3)	(68.1)
Personnel costs	(20.5)	(53.2)	(56.8)	(61.9)
Other external expenses	(13.0)	(22.8)	(26.0)	(42.1)
Other operating expenses	(0.4)	(0.7)	0.0	0.0
Total operating expenses	(38.9)	(117.7)	(125.1)	(172.1)
EBITDA	(21.4)	(28.5)	0.9	33.6
<i>EBITDA margin</i>	<i>(161.1%)</i>	<i>(36.6%)</i>	<i>2.9%</i>	<i>16.7%</i>
Depreciation	(0.3)	(0.4)	(0.4)	(0.5)
EBITA (underlying)	(21.7)	(28.8)	0.5	33.0
Amortisation (excl PPA)	(5.6)	(8.0)	(9.0)	(5.6)
EBIT (underlying)	(27.3)	(36.9)	(8.5)	27.5
Exceptional items (incl PPA)	0.0	(6.4)	(5.3)	(5.3)
Net financial interest	0.0	(0.3)	0.0	0.0
Profit before tax (underlying)	(27.3)	(37.2)	(8.5)	27.5
Profit before tax (reported)	(27.3)	(43.6)	(13.8)	22.2
Taxation	0.0	0.8	0.4	(2.7)
<i>Tax rate</i>	<i>0%</i>	<i>2%</i>	<i>5%</i>	<i>10%</i>
Net income (ongoing underlying)	(27.3)	(36.4)	(8.0)	24.7
EPS (SEK) - ongoing underlying	(0.86)	(0.55)	(0.12)	0.36
EPS (SEK) - reported	(0.86)	(0.65)	(0.16)	0.29
DPS (SEK)	0.0	0.0	0.0	0.0

Source: ÅAC Microtec reports, Edison Investment Research estimates

Outlook

As a result, we are forecasting that the company moves to a modest EBITDA profit in FY19 and a positive adjusted EBIT of SEK27.5m in FY20.

Using our previously stated assumptions, we expect to see rapid growth in sales from both the satellite platforms and subsystems segments. The acceleration in growth seen in FY20 is expected to come from the rapid increase in satellite deliveries as constellation deployments begin. We expect steadier growth from the subsystems activities as the market continues to expand. The satellite delivery assumption is thus the biggest risk to our estimates although it is possible the risk could be to the upside.

The increase in revenues should move the company towards an EBITDA contribution, and this could be possible in the current year, although our model indicates a SEK1.5m EBITDA loss for FY19. We note that even if satellite platform revenues were flat between FY19 and FY20, we would expect a modest improvement in EBITDA.

Our expectation for cash flow is therefore for a modest outflow this year, as profitability improves but working capital continues to expand to support growth, including increased inventory of standardised products. We expect a more significant cash inflow in FY20 and expect net cash to fall to SEK5.0m this year before rising to SEK24.0m in FY20.

It should be noted that ÅAC does have a SEK5m overdraft facility that remains undrawn, which provides a modest amount of financial headroom. Nevertheless, the margin for mishaps appears relatively modest and we would not be surprised to see a further capital raise in the relatively near future to underpin growth and provide further funds for strategic M&A.

Valuation

The rapid growth of the group should mean that EV-based metrics fall rapidly towards more normal levels for space-based activities.

Capped DCF valuation

We calculate our DCF valuation using a forecast period of six years and then assuming zero terminal growth thereafter, with working capital neutralised to zero and capex normalised to depreciation to reflect that. We believe this is inherently conservative for growth stocks as they should outperform the terminal cash growth expectation. We utilise a calculated WACC in the calculation of 12%, where we adjust the equity risk premium to reflect risk. As ÅAC is a relatively immature model, we have used a 10% premium to a risk-free rate of 2%. The value we derive is SEK14.7 per share.

At the DCF value, the FY20 P/E ratio would 39.7x, but we would expect this to fall rapidly as revenue and profits grow as volumes ramp up.

Exhibit 12: ÅAC Microtec capped DCF sensitivity table for WACC and terminal growth rate									
SEK per share	WACC								
	7%	8.00%	9.00%	10.00%	11.00%	12.00%	13.00%	14.00%	15.00%
<u>Terminal value growth rate</u>									
0%	27.5	23.6	20.6	18.2	16.3	14.7	13.3	12.2	11.2
1%	27.7	23.8	20.8	18.4	16.4	14.8	13.4	12.3	11.3
2%	28.0	24.0	21.0	18.5	16.5	14.9	13.5	12.4	11.4
3%	28.2	24.2	21.1	18.7	16.7	15.0	13.6	12.4	11.4

Source: Edison Investment Research estimates

Peer valuation

There is no directly comparable quoted small satellite company that provides forward-looking metrics, as GomSpace is also in a commercial start-up phase. In our view, this means that a consideration of the valuations afforded to more established space equipment manufacturing companies in Europe and the US is the most appropriate and available.

However, it is worth noting that following its December 2018 rights issue, Gomspace is trading on an EV/sales multiple for 2018 of 4.1x, compared to just 2.5x for ÅAC.

ÅAC Microtec is still in the early stages of its commercial development and has yet to make positive returns, although we are forecasting modest positive EBITDA for FY19. As such, directly comparing traditional profit metrics is unhelpful at present. However, ÅAC Microtec is trading on an FY20e P/E of just 8.7x using our estimates, suggesting the company is trading at a 39% discount to its immediate space peers in Europe. Given its anticipated growth prospects this would appear to be anomalous, as we would expect ÅAC multiples to be at a significant premium in the near term to those of the peer group at this stage. The current share price does not appear to allow for the successful execution of the strategy and achievement of our forecasts. Clearly, there is some concern over a further funding round, but allowing for such a move, the opportunity looks attractive.

Alternatively, to match the 8.8x FY20e EV/EBITDA of the entire peer group, ÅAC's share price would need to rise to close to SEK4.6 even on the immature level of profitability with our FY20 EBITDA estimated at SEK33.6m. The anticipated pace of top-line growth should mean that the EV metrics continue to decline rapidly in the coming years if the strategy is executed as expected, implying significant opportunity. The rate of growth should become increasingly evident as 2019 and 2020 progress, which should be key in determining near-term fair value, as will longer-term, cash-based valuations.

Exhibit 13: Peer group comparison						
	Market cap (m)	P/E (x)		EV/EBITDA (x)		
		2019e	2020e	2019e	2020e	
Europe						
Avio	€305	12.0	11.8	6.9	6.4	
OHB SE	€568	19.8	16.9	8.8	7.9	
Gomspace	SEK906	N/M	N/M	N/M	N/M	
US						
Aerojet Rocketdyne	US\$2,867	25.8	22.2	10.3	9.6	
Northrop Grumman	US\$48,715	19.3	17.1	11.2	10.6	
Peer group average		18.2	16.0	9.6	8.8	
ÅAC Microtec*	SEK216m	(26.9)	8.7	232.9	5.7	
Premium/(discount) to peer group			(46%)		(35%)	

Source: Refinitiv estimates. Note: *Edison Investment Research estimates. Prices as at 4 March 2019.

Exhibit 14: Financial summary

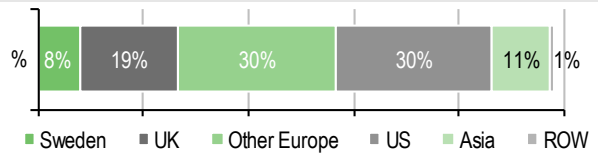
	SEKm	2017	2018	2019e	2020e
Year end December		IFRS	IFRS	IFRS	IFRS
PROFIT & LOSS					
Net sales		13.3	77.9	120.8	200.4
Own work capitalised and other operating income		4.2	11.3	5.2	5.2
Group income		17.5	89.2	126.0	205.7
EBITDA		(21.4)	(28.5)	0.9	33.6
Operating Profit (before amort. and except.)		(21.7)	(28.8)	0.5	33.0
Intangible Amortisation		(5.6)	(8.0)	(9.0)	(5.6)
Exceptionals		0.0	(6.4)	(5.3)	(5.3)
Other		0.0	0.0	0.0	0.0
Operating Profit		(27.3)	(43.3)	(13.8)	22.1
Net Interest		(0.0)	(0.3)	(0.0)	0.0
Profit Before Tax (norm)		(27.3)	(37.2)	(8.5)	27.5
Profit Before Tax (FRS 3)		(27.3)	(43.6)	(13.8)	22.2
Tax		(0.0)	0.9	0.7	(2.2)
Profit After Tax (norm)		(27.3)	(36.4)	(8.0)	24.7
Profit After Tax (FRS 3)		(27.3)	(42.7)	(13.1)	19.9
Average Number of Shares Outstanding (m)		31.7	65.6	68.7	68.7
EPS - fully diluted (SEK)		(0.86)	(0.55)	(0.12)	0.36
EPS - normalised (SEK)		(0.86)	(0.55)	(0.12)	0.36
EPS - (IFRS) (SEK)		(0.9)	(0.7)	(0.2)	0.3
Dividend per share (SEK)		0.0	0.0	0.0	0.0
EBITDA Margin (%)		(161.1)	(36.6)	0.8	16.7
Operating Margin (before GW and except.) (%)		(163.3)	(37.0)	0.5	16.5
BALANCE SHEET					
Fixed Assets		16.3	396.8	384.4	376.4
Intangible Assets		15.9	392.6	380.4	372.8
Tangible Assets		0.4	4.2	4.0	3.6
Investments		0.0	0.0	0.0	0.0
Current Assets		46.0	46.4	59.7	110.4
Stocks		1.9	6.5	10.0	16.3
Debtors		3.6	10.1	18.1	30.1
Cash		37.2	12.2	5.0	24.0
Other		3.3	17.5	26.6	40.1
Current Liabilities		(16.4)	(25.8)	(41.1)	(63.9)
Creditors		(14.4)	(25.8)	(41.1)	(63.9)
Short term borrowings		(2.0)	0.0	0.0	0.0
Long Term Liabilities		(1.0)	(2.5)	(1.2)	(1.1)
Long term borrowings		0.0	(1.2)	0.0	(0.0)
Other long term liabilities		(1.0)	(1.3)	(1.2)	(1.1)
Net Assets		44.9	414.9	401.8	421.8
CASH FLOW					
Operating Cash Flow		(24.9)	(40.3)	(4.2)	25.2
Net Interest		(0.0)	(0.3)	(0.0)	0.0
Tax		(0.0)	0.8	0.4	(2.7)
Capex		(4.0)	(1.6)	(2.3)	(3.4)
Acquisitions/disposals		(9.5)	(376.2)	0.0	0.0
Financing		0.1	393.5	0.0	0.0
Dividends		0.0	0.0	0.0	0.0
Net Cash Flow		(38.4)	(24.1)	(6.1)	19.0
Opening net debt/(cash)		(73.5)	(35.2)	(11.0)	(5.0)
HP finance leases initiated		0.0	0.0	0.0	0.0
Other		0.1	(0.0)	0.0	0.0
Closing net debt/(cash)		(35.2)	(11.0)	(5.0)	(24.0)

Source: AAC Microtec accounts, Edison Investment Research

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Net sales by geography



Management team

Chairman: Rolf Hallencreutz

Rolf Hallencreutz is the independent non-executive chairman. He has extensive experience in positions as chairman, CEO and sales manager in a range of early-stage and fast-growing entrepreneurial companies, as well as larger multinational companies. His industry experience includes IT, manufacturing, life sciences and logistics.

Managing Director and CFO: Mats Thideman

Mats Thideman has stepped up to the role of managing director while the search for a new CEO takes place. He has been CFO of ÅAC since joining in 2014, and was previously interim CEO. He is responsible for the company processes, organisation, finance, IT and personnel. He has extensive experience as CFO at growing industrial companies, as well as public and venture capital owners, including Åkerströms, Image Systems, TracTechnology and most recently Cortus Energy AB.

Chief Strategy Officer: Craig Clark

As CSO, Craig Clark sits on the group steering committee and is responsible for the strategic development of the group. Previously he has worked as a power system engineer at Surrey Satellite Technology Limited, where he worked with over 25 different assignments and as head of Power Team for seven years. In 2005, he founded Clyde Space, Glasgow's first space company.

Chief Technology Officer: Andrew Strain

Andrew Strain previously worked at Clyde Space, where he had been since its inception. He has over 10 years of experience in the design, development and delivery of small satellites. In his role as group CTO, Andrew provides a broad spectrum of relevant expertise, such as system development, product development, manufacturing, project management and quality and business development.

Principal shareholders

	(%)
UBS Switzerland AG	21.6
Fouriertransform	14.4
SIX SIS AG	12.6
RP Ventures	3.9
Avanza Pension	3.3

Companies named in this report

Gomspace

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