Mynaric

Technology

27 April 2018

Price	€50.1
Market cap	€135m

Connectivity of the future

During FY17, the successful demonstration of its innovative laser communications technology put Mynaric in a strong position to become preferred supplier to the airborne internet systems planned by Facebook and Google and the mega-constellations of thousands of small satellites proposed by SpaceX and OneWeb. The €27.3m (gross) from the October 2017 placing are being used to accelerate development of the spaceborne terminal, implement the in-house assembly and test capability needed for volume roll-out in FY19, and expand Mynaric's presence in the US.

Significant technical progress

During FY17 Mynaric's air-to-ground terminal achieved data transmission rates of 10Gbps, which management believes is the fastest reported wireless connection from an aircraft to the ground. This confirms Mynaric's position as a technology leader in the emerging wireless laser communications sector. An agreement with French research institute, Leti, gives Mynaric exclusive access to components that will enable it to significantly extend link communication distances and decrease system complexity. This will give Mynaric significant cost advantages over its competitors, which is particularly important when supplying equipment for constellations of several thousand satellites or airborne platforms.

FY17 strongest year to date

Mynaric's FY17 results show significant intensifying of customer engagement and development activity as it gets closer to commercialisation. Total income, which includes sales from development projects for customers, funded development and work on prototypes for delivery in FY18 grew by 140% year-on-year during FY17 to €3.2m. Loss before tax widened from €1.8m to €3.1m, reflecting a substantial increase in people engaged in engineering and sales. In October Mynaric raised €27.3m gross through a placing at €54.0/share, leaving €26.8m net cash at the year-end. We estimate that annualised cash burn is c€3m.

Valuation: Analysis of potential revenues

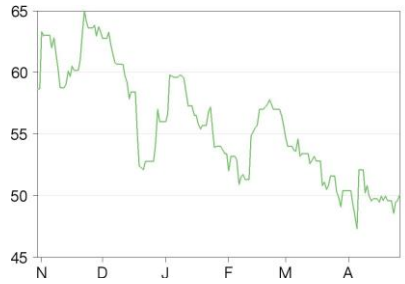
As Mynaric is still at a pre-commercial stage, we show a scenario analysis looking at potential revenues derived from deployment of the technology in airborne and satellite communications networks of differing sizes. We calculate that a cluster of 250 airborne communications platforms could need €125m of Mynaric's equipment, and a constellation of 100 small satellites could need €100m.

Consensus estimates for Mynaric Lasercom

Year end	Revenue (€m)	EBITDA (€m)	PBT (€m)	PAT (€m)	DPS (€)	P/E (x)
12/16	1.3	(1.7)	(1.8)	(1.8)	0.0	N/A
12/17	3.2	(2.9)	(3.1)	(3.1)	0.0	N/A
12/18e	12.2	(3.6)	(3.7)	(3.7)	0.0	N/A
12/19e	37.3	2.8	0.6	0.6	0.0	223

Source: GBC AG

Share price graph



Share details

Code	MOY
Listing	Deutsche Börse Scale
Shares in issue	2.7m
Last reported net cash at end Dec 2017	€26.8m

Business description

Mynaric (formerly Vialight Communications) has developed free space laser communication equipment that uses light to transmit data in high-capacity communication networks in the air and in space.

Bull

- Wireless laser technology gives faster data rates than conventional microwave transmission.
- Wireless laser technology potentially brings internet connectivity to remote regions.
- Mynaric technology is cost-effective for mega-constellations.

Bear

- Technology not proven in complete communications networks.
- Rate of commercial roll-out dependent on network operators securing funding.
- Limited number of potential network operators to which it can sell equipment.

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FY17 technical and commercial progress

At this stage of Mynaric's evolution, technical progress is key. Over the last year, the company has made significant advances in terminals for both stratospheric and space deployment, putting it on track for commercial roll-out in both sectors during FY19 and positioning it as a key supplier to the mega-constellations being developed by the likes of Facebook and Google.

Units shipped for airborne tests

In April 2017 Mynaric signed a Memorandum of Understanding (MOU) with Airborne Wireless Network (AWN). AWN is developing a broadband wireless communications system that uses commercial aircraft flying along their normal routes to form a meshed network of airborne repeaters, which deliver broadband connectivity to subscribers on the ground along the flight path as well as in-flight entertainment services to passengers on the aircraft. The complete communications system will be a microwave/wireless laser hybrid. The MOU was followed in August by a design and manufacturing services agreement under which Mynaric's communications equipment will be integrated into AWN's proposed network, the Infinitus Super Highway. In December Mynaric shipped two air-to-air laser communication terminals and associated components to AWN. These are for a test using two Cessnas or similar aircraft to demonstrate the ability of aircraft to act as airborne repeaters/routers using Mynaric's laser terminals, rather than the much slower microwave links that were used in an earlier test. The test will also confirm that lighter aircraft are also suitable carriers for the transmission equipment. The previous test used two Boeing 767-300 jetliners. In March, AWN announced that it has made arrangements with California-based South Bay Aviation for the flight test. This two-plane test is preparatory to a test involving a cluster of 20 jetliners in H218 and potential commercial roll-out during H119. We note that Mynaric is involved in trials with other developers of airborne platforms. These made a significant contribution to FY17 revenues, but Mynaric is barred by confidentiality agreements from releasing details.

First live trials onboard a satellite scheduled

In January 2018, Mynaric announced that it had reached a critical development milestone for its space terminal on schedule, although details were not disclosed because of concerns about commercial sensitivity. Following this, a communications subsystem will be launched on a third-party satellite in H118 to enable the first trials of ground-to-space links on a satellite rather than a laboratory environment. The move puts Mynaric on track to complete development and qualification of its smallsat laser communication product in early 2019, which is in line with the timeline stated at the IPO. This paves the way for serial production and deployment on low Earth orbit (LEO) mega-constellations thereafter.

Exclusive agreement with Leti to enhance system performance

Earlier this month Mynaric announced that it had formed an exclusive partnership with French research institute Leti, in which Leti's next generation of Avalanche Photodiodes (APDs) will be used in Mynaric's communication systems. The new APDs, which are currently under development, will be around 10 times more sensitive than existing variants. This will enable Mynaric to significantly extend link communication distances and decrease system complexity. This reduced system complexity is expected to lead to lower production costs, size, weight and power consumption of Mynaric's laser communication units, increasing their attractiveness to people designing constellations of interconnected aircraft, drones and satellites. The exclusive agreement positions Mynaric as prime supplier for these constellations of several hundred interconnected aircraft, drones and satellites.

Senior appointments made in the US

At the time of the IPO, management noted that around a quarter of the funds raised were allocated for strengthening the group's presence in North America and Asia. The US represents the single largest market for Mynaric's products, with demand from both governmental and commercial sectors. As preference is given to US domiciled suppliers, it is important for Mynaric to establish its own engineering and manufacturing capability in the country as well as a sales presence. In November, Mynaric announced that it had recruited Joe Fehrenbach as the CEO of Mynaric USA from Hexagon, a €3.1bn global provider of technology solutions. Joe was formerly president of Hexagon US Federal, an independent subsidiary serving US governmental customers. Mike Soutullo, who joined Mynaric USA in late 2016 from Teledyne Brown Engineering, an aerospace contractor, was appointed CTO of the US operation. Mike led the development of the MUSES platform on the International Space Station, and now heads development of Mynaric's space terminal. The US operation was formed in 2016 and is located in Huntsville, Alabama, where there is a cluster of companies involved in the aerospace and space industries. Mynaric USA is already engaged in significant projects with commercial customers such as AWN.

FY17 financials

Strong growth in revenues during FY17

Our analysis of operating performance looks at the income statement of the main operating subsidiary, Mynaric Lasercom GmbH, as this gives a better view of performance than an examination of the income statement of the top-level entity, Mynaric AG. Mynaric Lasercom reported sales of €1.6m during FY17 (FY16: €0.5m). This includes revenues from the delivery of a ground station and an airborne terminal, and the successful demonstration of these products in an air-to-ground scenario for a major US customer, as well as revenues relating to the attainment of technical development milestones on an optical ground station for communication with satellites. This ground station is scheduled for delivery to a customer for trials during FY18, potentially leading to volume production from FY19 onwards. Mynaric also reported €1.2m (FY16: €0.0m) for work on customer projects that has been categorised as 'other own work capitalised' because the projects have not yet been completed and do not include milestones against which revenues can be recognised. This work relates to the development of the new terminal for satellite constellations, as well as equipment and prototypes built as part of two funded projects. Other operating income of €0.4m (FY16: €0.6m) was derived from five sponsored development projects, three of which were successfully completed in 2017. At €3.2m, total income, which comprises sales, inventory movement, 'own work capitalised' and 'other operating income', was more than double the prior year value.

Personnel expenses rose by 60% year-on-year to €3.1m, reflecting investment in the US operation and intensified engineering activity. 23 members of staff were recruited for technical, administrative and specialist roles, taking the staffing total to 56 by the end of the year. Management expects to have over 100 staff working in the group by the end of 2018. Other operating expenses include payments to third parties for technical assistance with customer projects and in-house development, as well as normal operating and administrative costs. These doubled year-on-year to €1.6m, in line with management expectations. Annual losses after tax rose by 66% year-on-year to €3.1m in FY17, following the trend observed between FY14 and FY16. The parent company, Mynaric AG, reported a €3.0m loss after tax for FY17, of which €2.3m related to the IPO in October 2017.

Funds raised at IPO to support commercialisation

Mynaric listed on the Scale index of the Deutsche Börse on 30 October 2017. Immediately before listing it raised €27.3m (gross) at €54.0/share. The price was at the upper bound of the target

range, and the placing was covered over four times. The funds raised are being used to establish assembly and test capability sufficient to output up to 1,000 transceiver units a year, to accelerate development of space-qualified terminals, and higher data rate terminals, to expand in the US and for general company development. Mynaric ended FY17 with €26.8m cash. There is no debt. Since Mynaric is exempted from providing a cash flow because of its size, details of cash consumption are not available. The value of Mynaric Lasercom's tangible fixed assets increased by €1.2m during FY17 to €1.8m. About two-thirds of this relates to the space terminal currently under development, terminals used for demonstrations and prototypes developed for publicly funded projects. The other third relates to laboratory equipment and hardware. Inventory and receivable levels at the end of FY17 were similar to prior year levels, with €0.4m inventory relating to the two air-to-air terminals awaiting shipment. Stripping out depreciation and amortisation from the reported loss after tax, we estimate that total cash consumption during FY17 was c €3m. Management estimates that cash burn will remain at around this level during FY18, with the cost of additional staff required for supporting in-house assembly and test capability for small-scale serial production balanced by additional sales revenues. The cost of equipment to support in-house assembly and test is not expected to be significant.

Outlook

Mynaric expects to see a continuation of the strong growth in revenues during 2018. It has already delivered its first terminals for airborne trials and expects to see a ramp-up of production later this year to equip larger-scale trials in H218 and potential commercial deployment in 2019. It also expects to deliver equipment for space-to-ground trials before completing development of the satellite terminals in FY19.

Looking further out, key projected constellations are getting closer to actual implementation. For example, towards the end of 2017, Facebook stated that it "continue[s] to demonstrate the viability of HAPS (high-altitude pseudo-satellite) systems for providing broadband connectivity" and it is working with Airbus to lobby the International Telecommunication Union to allocate more spectrum for HAPS use. In late 2017 Google used two Loon balloons to provide internet access to remote areas of Puerto Rico following the deactivation of entire cell phone networks by hurricanes. In March this year, the Federal Communications Commission (FCC) approved SpaceX's applications for its planned 4,500 satellite constellation, Starlink. Most of the proposed mega-constellations are intending to deploy laser communications to provide their backbone connectivity as this will give the data rate required. Mynaric is well-placed to become the preferred supplier for these links, not only because of its track record in demonstrating the technology, but also because its terminals are designed to be a cost-effective option for constellations of hundreds of satellites. This is in contrast to the few competitors operating in the space sector, which are used to supplying bespoke equipment for subsidised government programmes. There still remains some risk associated with successful completion of trials for both the airborne and spaceborne variant (the latter is still under development) and with the mega-constellation programmes securing the funding they need.

Valuation

Mynaric's share price has been fairly volatile since the IPO. It peaked at €65.0 in November, but is currently below the placing price of €54.0/share.

Mynaric is still at the pre-commercial phase and is not expected to be profitable until FY19. This limits the value of any analysis based on peer multiples, which do not ascribe any value for the substantial growth that may be realised after FY19 when many of the proposed mega-constellations will potentially be deployed. Nevertheless, we note that Mynaric's FY19 EV/Sales multiple is similar to the average for our sample of listed peers involved in opto-electonics components and

subsystems, suggesting that the share price is fairly valued based on assumptions of only modest sales growth beyond FY19.

Exhibit 1: Comparison of peer multiples

Name	Market cap ($m)	EV/Sales 1FY (x)	EV/Sales 2FY (x)	EV/EBITDA 1FY (x)	EV/EBITDA 2FY (x)	PE 1FY (x)	PE 2FY (x)
Accelink Technologies Co-A	2,629	3.7	2.8	38.2	28.9	46.7	34.9
Emcore Corp	128	0.7	0.6	7.9	4.4	56.6	13.9
Finisar Corporation	1,769	1.0	0.9	6.1	5.7	16.5	16.5
Infinera Corp	1,749	2.0	1.8	37.0	16.8	-	59.3
Intelliepi Inc	106	3.1	2.8	12.7	10.0	20.5	16.7
LandMark Optoelectronics	992	9.7	7.0	16.8	11.1	27.6	18.6
Lumentum Holdings Inc	3,683	2.8	2.3	11.2	8.6	16.9	12.8
Oclaro Inc	1,404	2.0	1.9	8.8	8.9	16.4	17.8
Neophotonics Corp	268	0.8	0.7	18.6	7.1	-	-
Visual Photonics Epitaxy Co	631	6.8	6.2	19.6	17.0	31.4	28.4
Mean		**3.3**	**2.7**	**17.7**	**11.9**	**29.1**	**24.3**
Mynaric AG	163	8.8	2.9	-	38.8	-	223.3

Source: Bloomberg. Note: Prices at 24 April 2018.

We therefore supplement the peer-based approach with a scenario analysis showing potential revenues achievable if the technology is deployed in communication systems of different sizes. We split the analysis into two types of system. The first looks at communication networks based on smaller LEO satellites, which typically have more than 100 satellites each. The second looks at communication networks based on many more, less expensive platforms, which may be either unmanned aerial vehicles (UAVs), aircraft or balloons. A communications satellite has space-qualified terminals, which are more expensive than those on an airborne platform.

Exhibit 2: Analysis of potential revenues

Internet LEO system				
Cost of payload* (€m)	2			
% payload composed of Mynaric systems	50%			
Number of satellites in constellation	50	100	200	300
Revenues attributable to Mynaric (€m)	50	100	200	300
UAV, aircraft, balloon-based system				
Cost of payload (€m)	1			
% payload composed of Mynaric systems	50%			
Number of platforms in constellation/cluster	50	100	250	500
Revenues attributable to Mynaric (€m)	25	50	125	250

Source: Edison Investment Research. Note: *Payload is the part carrying out the communications or sensing function.

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