

## Mynaric

**Technology**
**20 April 2021**

### Industrial age of laser communications

In FY20 Mynaric was selected to provide laser communications terminals for two separate US government constellations. This is clear evidence that satellite networks are beginning to deploy optical inter-satellite links and that Mynaric is seen as having the technical expertise and production capacity to deliver terminals in relatively high volumes. This puts Mynaric in a good position to take market share as demand for terminals starts to grow.

### US government programmes mark turning point

The satellites for the US government's Blackjack programme are scheduled for launch in H221, so Mynaric is preparing to ship terminals for the programme this summer. It has already shipped some commercial product, having delivered airborne terminals for a customer towards the end of FY20 for use in trial deployments. After building close to a dozen terminals in FY20, primarily for in-house testing, the company is preparing to construct around 50 terminals during FY21, around three-quarters of which will be available to meet customer demand. It is expanding capacity to support production of over 100 terminals per year by FY22.

### Gearing up for production

Total operating performance (including capitalised development) in FY20 was €9.4m. This was 20% higher than FY19 as development work on space and airborne terminals intensified. Losses after tax trebled year-on-year to €22.7m reflecting a doubling in personnel costs and cost of materials. Net cash (there is no debt apart from finance leases) increased by €36.8m to €43.2m, as €31.9m free cash outflow was offset by fundraising activities raising €66.7m (net). Mynaric has recently announced its intention to pursue an IPO and listing in the US to improve the company's access to US capital markets, potentially in H221.

### Valuation: Analysis of potential revenue

Mynaric does not expect to start delivering significant numbers of commercial units until H221, so we present a scenario analysis rather than a peer group comparison of multiples. This analysis shows a constellation of 100 low earth orbit (LEO) satellites could require €75m of Mynaric's laser communications terminals and a cluster of 250 airborne communications platforms could require equipment with an estimated €113m in revenues attributable to Mynaric.

#### Consensus estimates

Year end	Revenue (€m)	EBITDA (€m)	EBIT (€m)	EPS (€)	DPS (€)	P/E (x)
12/18*	1.4	(7.4)	(7.8)	(2.9)	0.0	N/A
12/19	0.4	(6.5)	(7.7)	(2.8)	0.0	N/A
12/20	0.7	(19.7)	(21.7)	(6.8)	0.0	N/A
12/21e**	N/A	N/A	N/A	N/A	N/A	N/A

Source: Company data, \*Restated \*\*Consensus estimates have not been updated since FY20 results were published providing new guidance for volume roll-out.

**Price** €67.20  
**Market cap** €275m

#### Share price graph



#### Share details

Code	MOY
Listing	Deutsche Börse Scale
Shares in issue	4.1m
Net cash at end December 2020 (excluding €8.0m lease liabilities)	€43.2m

#### Business description

Mynaric designs and manufactures laser communication terminals for airborne and spaceborne networks. Its objective is to become the world's leading provider of network equipment for the aerospace communication industry using its serially produced, low-cost laser communication products.

#### Bull

- Wireless laser technology gives faster data rates than conventional microwave transmission.
- Wireless laser technology brings internet connectivity to remote regions without installing fibre optic cables.
- Tech is cost effective for mega-constellations.

#### Bear

- Technology not proven in complete satellite or airborne communications networks yet.
- 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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## FY20 technical and commercial progress

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### First wins in US governmental market

In September Mynaric announced its US subsidiary had been selected as vendor for laser communication products by an undisclosed customer, stating the selection represented Mynaric's first win in the US governmental market. The value of the contract associated with this is in the mid-seven-digit euros range. We have previously inferred that this contract is related to the first phase of a satellite communications network for the Space Development Agency (SDA). In August 2020 the SDA [announced](#) it had awarded a \$187m contract to build 10 satellites for the first phase of its LEO communications network to Lockheed Martin, which we have inferred is purchasing optical communications equipment from Tesat and a \$94m contract to build 10 satellites to York Space Systems, which we have [previously inferred](#) is purchasing equipment from Mynaric's US operation and SA Photonics. Seven satellites of each batch of 10 will have four optical inter-satellite links, the other three will have two optical crosslinks. Each batch of 10 satellites must be delivered and ready for launch by September 2022. The Transport Layer of the constellation being planned by the SDA will eventually consist of 300–500 satellites.

In October Mynaric announced it had been selected by Telesat to supply multiple units of its CONDOR optical inter-satellite link terminals to Defense Advanced Research Projects Agency's (DARPA's) Blackjack Track B programme. The terminals are scheduled to be delivered in mid-2021 to DARPA's Blackjack System Integrator, with satellites scheduled to launch in the latter part of 2021. Telesat aims to use the mission to demonstrate the capabilities, as well as the interoperability, of laser communication products from different vendors as part of the DARPA Blackjack programme. Mynaric will establish the industry's first laser communication interoperability lab at its Los Angeles premises as part of the deal. This lab will be equipped with a link testbed capable of emulating conditions in space and testing inter-vendor operability, which is a key requirement of both the DARPA and SDA programmes.

While the US governmental market is by far the most important market for Mynaric at present, it is also attracting the attention of other customers. For example, in January 2020 the company signed a multi-million-euro contract with a customer based in Europe.

### First shipment of airborne terminals

Mynaric constructed close to a dozen pre-serial non-sale models of terminals in FY20, with feedback from each iteration used to improve the quality of the product and the production process including the supply chain. This iterative process took longer for the HAWK AIR terminal than had initially been expected because Mynaric's key customer for this product, who is based in the US, wanted to be able to demonstrate the terminal to its potential customers in live deployments. Mynaric worked through additional iterations, enabling the customer to start its demonstration programme by the year end. Mynaric will use feedback from these trials to define a second-generation product, potentially for widespread deployment on unmanned aerial vehicles. Mynaric successfully passed the 'critical design review' stage of development of the CONDOR space-borne terminal during the year, triggering dialog with initial prospective buyers about the refinement of product specifications, which has helped define a second generation product.

### Getting ready for volume production

Mynaric started pilot production of both the HAWK AIR and CONDOR terminals in FY20. Management expects Mynaric will manufacture around 50 terminals in 2021, around three-quarters of which will be available to meet anticipated customer demand. As part of getting ready for volume shipments, during FY20 Mynaric started preparation for a new production facility in Germany, which management expects will commence operation in H221 and support annual laser terminal

production in the triple-digit range when fully staffed and fitted out. Importantly, Mynaric has brought manufacturing of critical optical components in-house. It has also brought most of the testing in-house, significantly accelerating the development cycle.

## FY20 financials

### Transition to pre-series production

The German accounting metric 'operating output' is more significant than revenue for Mynaric at its stage of evolution, as it includes the value of the increase in finished goods and work in progress, and the amount of development activity on projects that are not linked to specific customer contracts. The total during FY20 was €9.4m, a 20% increase compared with FY19, reflecting intensifying work preparing space and airborne terminals for customer deployment. We note that the German government's ban on Mynaric shipping satellite terminals to a Chinese customer means the step-change in revenues attributable to product delivery has been pushed back from FY20 to FY21.

#### Exhibit 1: Analysis of total operating performance

€m	FY20	FY19	Notes
Sales revenues	0.7	0.4	Primarily sales of Hawk AIR terminals in FY20.
Increase in finished goods and work-in-progress	0.2	0.6	
Write-downs	(1.2)	0.0	Write down on inventories of first-generation Hawk Air terminals and prototype GS-200 and GS-400 ground stations to net realizable value.
Capitalised development work	6.9	6.1	Cost of development activity.
Property, plant and equipment	1.1	0.1	Capitalised cost of own construction work.
Capitalised borrowing costs	1.1	0.0	Production/construction costs of qualifying assets as per IAS 23.
Other operating income	0.6	0.7	FY20 includes €0.3m grant income.
Total operating performance	9.4	7.9	

Source: Mynaric data

The cost of materials (€6.2m) more than doubled as the company prepared for pre-serial production. Personnel costs also doubled (€16.7m) as the total number of employees increased from 99 at the end of December 2019 to 186 a year later, with additions in test, production, design, business development and marketing. Other operating expenses almost doubled to €6.2m, with increased costs in most areas reflecting expansion of development and production capacity, though there was also a €1.1m jump in legal and consulting fees, primarily related to the public share offering, and €0.6m expenses associated with foreign currency translation. Finance costs totalled €1.0m (€0.0m FY19) because of the interest on the €2.5m interim financing taken out and repaid during the year and on a convertible bond (see below). FY20 losses after tax were treble the prior year period at €22.7m.

### Continuing to raise finance to support product development

Net cash increased by €36.8m during FY20 to €43.2m (excluding €8.0m IFRS 16 lease liabilities) at end FY20. In addition to €18.2m cash consumed in operations, the company invested €7.0m in intangible assets, primarily the capitalised costs of developing the CONDOR and HAWK AIR terminals and €6.7m in fixed assets, most of which related to production capacity and test equipment. In February 2020, Mynaric raised €12.3m (gross) through a private placement, which was substantially oversubscribed, at €42.50/share. This was followed in October by a placing and subscription collectively raising €52.8m (gross) at €66.0/share. In August Mynaric issued a convertible bond of €5.0m to a qualified investor, which was converted to shares at a fixed conversion price of €56.00/share in December. The funds raised are being used to increase production capabilities, to accelerate customer acquisition, particularly in the US, and to secure and strengthen Mynaric's market position by investing in advanced developments underpinning next-generation technologies. Mynaric has recently announced its intention to pursue an IPO and listing

in the US, the details of which have not been disclosed, to improve its access to US capital markets. Depending on market conditions, this could be completed in H221.

## Outlook: Faster ‘internet-in-the-sky’

### Negligible impact of pandemic on Mynaric’s operations

The global COVID-19 pandemic appears to have had a negligible effect on the day-to-day operation of Mynaric and does not seem to have had any material impact on potential customers’ plans for launching satellite constellations. If anything, the pandemic has highlighted the importance of providing broadband-quality communications to people across the globe, including those in remote or rural locations where it is not economically practical to provide terrestrial optical communications networks. For these people, provision of broadband via a satellite-based or airborne-based optical communications networks represents a viable alternative. This topic was explored in more detail in our [interview with Bulent Altan](#), Mynaric’s CEO and a SpaceX veteran.

### Increasing acceptance of free-space optical communications

The SDA and Blackjack constellations demonstrate that free-space optical communications links are starting to be deployed in satellite networks. The new US administration appears likely to continue investing in satellite communications infrastructure. In February the deputy commander of US Space Command noted that he expected policy guidance from the current administration to ‘be along similar lines’ to that issued by the Trump administration. In the commercial arena, SpaceX already has over 1,200 satellites in orbit in its Starlink (see our report [The small satellite market – Small is beautiful](#) for more detail) and has tested in-house optical communications terminals on some of them. If Starlink can demonstrate enhanced data rates using optical rather than traditional microwave links, it is likely other satellite operators will adopt laser communications technology that, not being so vertically integrated, they will need to purchase from third parties.

## Valuation

Exhibit 2: Analysis of potential revenues				
Internet LEO system				
Cost of payload* (€m)	2.0	1.5	1.0	0.75
% payload composed of Mynaric systems	50%	50%	50%	50%
Number of satellites in constellation	50	100	300	1000
Revenues attributable to Mynaric (€m)	50	75	150	375
UAV, aircraft, balloon-based system				
Cost of payload (€m)	1.00	0.90	0.68	0.51
% payload composed of Mynaric systems	50%	50%	50%	50%
Number of platforms in constellation/cluster	50	250	500	1000
Revenues attributable to Mynaric (€m)	25	113	169	253
Source: Edison Investment Research. Note: *Payload is the part carrying out communications/sensing function.				

Because Mynaric is still at a pre-commercial phase and is not expected to generate operating profit until FY22 or later (we note that none of the estimates forming consensus has been updated since Mynaric’s FY20 results were published), an analysis based on peer multiples is of limited use. We continue to present a scenario analysis (Exhibit 2) 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 unmanned aerial vehicles or aircraft. A communications satellite such as that used in the first scenario requires space-qualified terminals, which are more expensive than those on an airborne platform.

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