



## Research report (note)

# mynaric

**“The market for laser-based communication networks offers enormous growth potential and is starting to gain momentum”**

**“Series production of ground stations has started”**

**“Cooperation with CEA-Leti has enabled further technological advances in the field of laser communications technology”**

**Target price: €108.50**

**Rating: Buy**

#### IMPORTANT INFORMATION:

Please note the disclaimer/risk notice

as well as the disclosure of potential conflicts of interest according to Section 85 of the German Securities Trading Act (WpHG) and Art. 20 MAR from page 20

Note on research as a “minor non-monetary benefit” according to the MiFID II regulation: This research meets the requirements for being classified as a “minor non-monetary benefit”. For more information, see the disclosure under “I. Research under MiFID II”

#### English version

Date and time of completion of the report: 14/01/2019 (09:51 am)

Date and time of the first distribution: 14/01/2019 (10:30 am)

Validity of the price target: until max. 31/12/2019

#### German version

Date and time of completion of the report: 20/12/2018 (8:35)

Date and time of the first distribution: 20/12/2018 (10:00)

Validity of the price target: until max. 31/12/2019

## Mynaric AG<sup>\*5a;5b;11</sup>

**Rating: Buy**  
**Target price: EUR 108.50**

Current price: 32.00  
19/12/2018 / Xetra (close)  
Currency: EUR

### Master data:

ISIN: DE000A0JCY11  
WKN: A0JCY1  
Ticker symbol: M0Y  
Number of shares<sup>3</sup>: 2.70  
Marketcap<sup>3</sup>: 86.53  
Enterprise Value<sup>3</sup>: 82.08  
<sup>3</sup> in m/ in EUR m  
Free float (<5%): approx.  
33.0%

Transparency level:  
Scale

Market segment:  
Open market

Accounting:  
HGB [German Commercial  
Code]

Financial year: 31/12

Designated sponsor:  
HAUCK & AUFHÄUSER  
PRIVATE BANKERS

### Analysts:

Marcel Goldmann  
goldmann@gbc-ag.de

Cosmin Filker  
filker@gbc-ag.de

\* Catalogue of potential con-  
flicts of interest on page 21

### Corporate profile

Industry: Technology

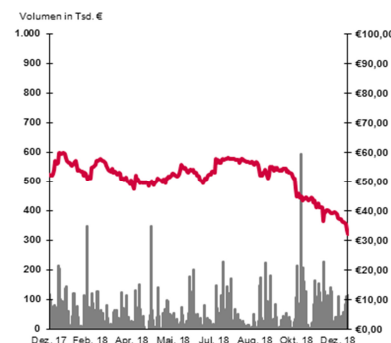
Focus: Laser-based communications technology

Employees (average): 68 (as at 1st HY 2018)

Founded: 2009

Registered office: Gilching (near Munich)

Management Board: Dr Wolfram Peschko, Joachim  
Horwath, Dr Markus Knappek



Mynaric was founded in 2009 by former employees of the German Aerospace Centre (DLR) research institute. This technology company is a manufacturer of laser communications technology, which is used to set up dynamic communications networks from flying objects (e.g. aircraft) and satellites in the air and in space. Its wireless data transmission products include ground stations and laser terminals, which enable large amounts of data to be transmitted at high speed over long distances and are highly efficient and secure at the same time. Mynaric's laser technology enables flying objects and satellites to communicate wirelessly with one another and with the ground. Mynaric has developed a wireless laser communications technology, which provides the structural basis for making access to the Internet "above the clouds" and in space. Globally, the demand for faster Internet availability anywhere and everywhere is growing dynamically. The laser communication specialist Mynaric is positioned as a pioneer in this growth market. Potential customers include international corporations, such as Google, Facebook, SpaceX, OneWeb and Telesat.

### P&L in €m\* \ FY-

End	31/12/2017	31/12/2018e	31/12/2019e	31/12/2020e	31/12/2021e	31/12/2022e
Total output	3.20	9.20	22.60	70.30	258.16	406.21
EBITDA	-2.95	-4.25	-2.37	8.23	59.57	109.47
EBIT	-3.09	-4.57	-3.09	5.85	50.27	98.74
Net profit	-3.06	-4.57	-3.09	4.97	35.19	69.19

### Key financials

EV/Total output	25.65	8.92	3.63	1.17	0.32	0.20
EV/EBITDA	neg.	neg.	neg.	9.97	1.38	0.75
EV/EBIT	neg.	neg.	neg.	14.03	1.63	0.83
P/E ratio	neg.	neg.	neg.	17.41	2.46	1.25
P/B ratio		40.06				

\* Data and estimates are based on the operating subsidiary, Mynaric Lasercom GmbH

### Financial dates

26-28/11/2018:	Equity forum
4-5/12/2018:	Geneva Midcap Event
April 2019:	Half year report 2019
7-8/05/2019:	27th Munich Capital Market Conference

### \*\*Most recent research by GBC:

Date:	Publication/price target in €/rating
17/05/2018 / RS / 95.00 / Buy	
11/12/2017 / RS / 95.00 / Buy	

\*\* The research studies listed above can be viewed at [www.gbc-ag.de](http://www.gbc-ag.de) or requested from GBC AG, Halderstr. 27, D86150 Augsburg

## EXECUTIVE SUMMARY

- Mynaric has specialised in the development, production and sale of laser communications products for use in laser-supported communications networks in the aerospace sector. This business segment is still a young, less developed market; however, in our opinion, it is clearly beginning to pick up speed. For this segment, we are expecting very dynamic market growth and believe that over the long term, market volume in the double-digit billions range will be possible.
- In the past, Mynaric has mainly concentrated on the development of pre-series products, so as to use them with potential customers for testing and demonstration purposes. However, the main focus has changed to the transition from product development to series production. In this context, the company began series production of laser-based ground stations in November 2018. The company intends to transition further product groups to series production in the future.
- As a result of technological cooperation with the renowned Leti CEA Tech Research Institute entered into in 2018, Mynaric has access to technologies that will enable further market-moving improvements to the company's laser communications products. As a result, Mynaric's laser products are expected to achieve significant performance improvements in the near future. Additionally, the cost structure and range of applications are also expected to improve.
- In November 2018, Mynaric announced the opening of an office in Shanghai (China) in order to take advantage of the booming Asian aerospace market. This has enabled the company to further pursue its aim of internationalisation and to establish itself as a global player.
- In addition, Mynaric has continued to further expand its previous product portfolio in the current financial year. After previously mainly focusing on developments in the air sector, the company began to develop terminals for the space sector in 2016. According to the company, the development of the space laser terminal is proceeding according to plan and is intended for completion at the beginning of 2019, so that the first devices can be delivered in the same year for use on satellites.
- The company also announced in June 2018 that it had started developing laser terminals for use in precision agriculture. Specifically, it intends to develop a new lightweight laser terminal for use in compact drones for precision agriculture applications. In our opinion, this strategic step, which follows the precision agriculture market trend, should open up additional potential business. There is also further economic potential in other sectors (drone industries) that also manufacture and market drones (e.g. the security industry).
- Mynaric also announced in November 2018 that it had received an order from UK company ArQit to carry out a study to develop a global high-security communications system. Laser communication is a core component of this study in terms of guaranteeing the highest possible IT security (cyber-security). After successfully completing the study, the company could become the exclusive supplier of hardware for laser communications solutions.
- Overall, Mynaric has established a good base from which to profit significantly from the expected dynamic growth in the laser-based communications networks market. We have revised our short and medium-term forecasts to take into account a slower pace of growth than initially expected. However, our long-term forecasts remain valid. For the current financial year 2018, we are now expecting total output of €9.20m and EBITDA of -€4.25m. In the following year 2019, the previously mentioned series production should result in a rapid growth in total output to €22.60m. In parallel, operating earnings should improve significantly to -€2.37m. For the subsequent financial years, we expect a strong rise in operating results (EBITDA) based on an expected dynamic total output trend and economies

of scale. As a consequence of this, 2020 should significantly exceed the operating profit threshold and double-digit EBITDA margins should be achievable in the long-term.

- **It is on this basis that we have evaluated the technology company using our DCF model and calculated a fair value of €108.50 per share (previously: €95.00 per share). The increase in the target price is due to the “roll-over effect” (technical rise in target price, as the target price now relates to the following financial year 2019 (previously: 2018)) and a change in the risk-free interest rate. The revision of our short and medium-term forecasts has prevented an even sharper rise in the target price. Based on the current share price level, this once again results in a BUY rating.**

## TABLE OF CONTENTS

<b>Executive Summary .....</b>	<b>2</b>
<b>Company .....</b>	<b>5</b>
Shareholder structure .....	5
Corporate structure .....	6
Historical events.....	7
<b>Market and Market Environment .....</b>	<b>8</b>
<b>Company Performance &amp; Forecast.....</b>	<b>12</b>
Business performance HY1 2018 .....	12
Development in total output.....	12
Earnings performance .....	13
Forecasts and model assumptions .....	14
Total output forecasts.....	14
Profit forecasts .....	16
<b>Valuation .....</b>	<b>18</b>
Model assumptions.....	18
Determining the capital costs .....	18
Valuation result .....	18
DCF model.....	19
<b>ANNEX.....</b>	<b>20</b>

## COMPANY

In 2009, Mynaric was founded by former employees of the Institute for Navigation and Communication of the DLR (German Aerospace Centre) in the form of Mynaric Lasercom GmbH (formerly trading under the name of ViaLight Communications GmbH), which was integrated into Mynaric AG later on. The founders, including two of the present Management Board Members, had accumulated many years of experience in the field of wireless laser communications with the DLR before founding the company.

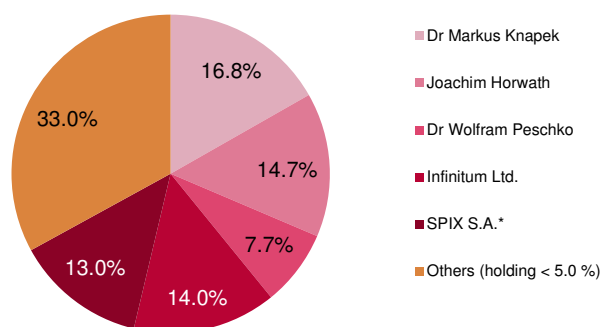
Currently, the Mynaric Group is mainly active in the field of research and (further) development of laser communications technologies and the development and production of ground stations and laser terminals. These laser communications technologies can be used in the air (aircraft, unmanned aircraft/drones, high-altitude platforms, such as stratospheric balloons or gliders) and in space (satellites) for setting up global data networks. The ground stations provide the link from the air or space to the ground. Mynaric's laser technology (known as the backbone technology) provides high-speed Internet "above the clouds", in space and anywhere in the world (via laser-supported satellite technology).

There are also further application fields in laser communications technology in the drone industry, for example, in drone-based marine surveillance and precision agriculture.

### Shareholder structure

Shareholders in %	08/11/2018
Dr Markus Knapek	16.8%
Joachim Horwath	14.7%
Dr Wolfram Peschko	7.7%
Infinitum Ltd.	14.6%
SPIX S.A.*	13.3%
Other shareholders (<5.0%)	33.0%

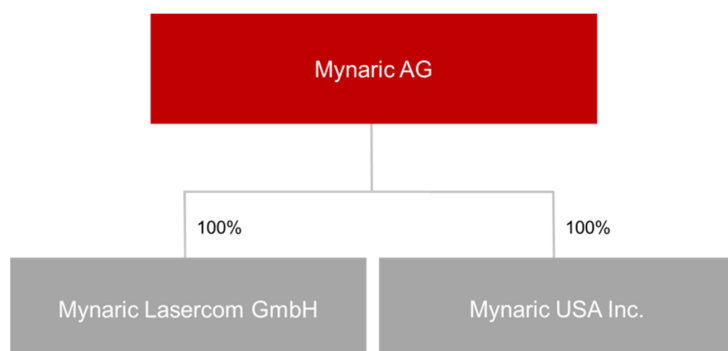
Source: Mynaric AG; GBC AG \* to be assigned to the supervisory board to Dr Gerloff



## Corporate structure

Mynaric AG constitutes the strategic management and financial holding company of the Mynaric Group and performs key management functions, providing jointly used services in the fields of Finance, Administration, Human Resources, Investor Relations, IT, Strategy and Public Relations, Quality Management and Corporate Affairs for the Group. The parent company mainly focuses on Strategy, Public Relations, Management and Controlling of its shareholdings, as well as the development of the entire group of companies. Operating activities are performed by the subsidiary, Mynaric Lasercom GmbH (registered office: Gilching). At the start of 2016, Mynaric established the US subsidiary Mynaric USA Inc. (with its registered office in Huntsville, Alabama) with the aim of exploiting the US market. In addition, in November 2018, the company announced the opening of an office in Shanghai (China), thereby taking a further significant step towards internationalisation.

### Organisational structure (as at October 2018)



Source: Mynaric AG; GBC AG

### Selected partnerships



## Historical events

Date	Event
May 2009	Founding of Mynaric Lasercom GmbH (formerly ViaLight Communications GmbH) with its registered office in Gilching (near Munich). The business purpose of this company is the development and sales of laser-based communications technologies and related systems and components.
May/June 2013	Conclusion of a cooperation and licence agreement between Lasercom GmbH and the DLR (German Aerospace Centre).
2012	The first customer order for the manufacture of a pre-series laser terminal device for aircraft to provide laser-based communications technology between the ground and air and to conduct the first successful test series in cooperation with the DLR in 2013.
2014	First large customer order (volume > €1m) for the delivery of two laser terminal pre-series products to provide laser communications from air to air in the stratosphere, including a successful test series in 2016.
January 2016	Mynaric USA, Inc. (previously ViaLight Space, Inc.) founded with its registered office in Huntsville, Alabama (USA), as well as the start of development of a laser terminal for laser communication from satellites to satellites in Low Earth Orbit (LEO).
2016	First large customer order (volume > \$1m) for the US subsidiary, Mynaric USA, Inc. The customer order was to supply an optical ground station for laser communication from satellite to ground.
April 2017	Mynaric AG founded
August 2017	All Mynaric Lasercom GmbH company shares transferred to Mynaric AG as part of a capital in kind increase in conjunction with a €1.95m share capital increase to €2.0m.
August 2017	Announcement of a design and manufacturing contract with the company, Airborne Wireless Network, which links passenger and cargo aircraft using laser-based communications technology and thus aims to set up a dense communications network in airspace.
September 2017	Implementation of three cash capital increases from authorised capital. The new shares were placed with selected investors by increasing the share capital by a total of €198,304 to €2,198,304.
October 2017	Initial public offering (IPO) of Mynaric AG, gross issue proceeds: €27.3m).
December 2017	Delivery of two laser terminals for flight use and the related components to Airborne Wireless Network for further tests on the "ABWN-patented Infinitus Super Highway Technology"
January 2018	Announcement that the first electronic components are to be sent to a customer satellite in space in the first half of 2018. This is simultaneously a development milestone for satellite laser terminals and confirms their expected completion at the beginning of 2019.
April 2018	Conclusion of an exclusive partnership with the French research institute, Leti CEA Tech, for the further development of its laser communications products
June 2018	Development of laser communication terminals for applications in precision agriculture.
September 2018	Start of series production of ground stations for ground-to-air and ground-to-space laser communication.
October 2018	Signing of an initial declaration of intent (MOU) with a satellite network provider to deliver laser-based key components for a demo mission, which is the precursor to the intended development of an extensive satellite network (a satellite constellation).
November 2018	Received Innovation Award in Deloitte's Technology Fast 50
November 2018	Opened an office in China (Shanghai) due to the booming Asian aerospace market.
November 2018	Awarded an order from UK company ArQit for a study to develop a global high-security communications system.

Sources: Mynaric AG; GBC AG



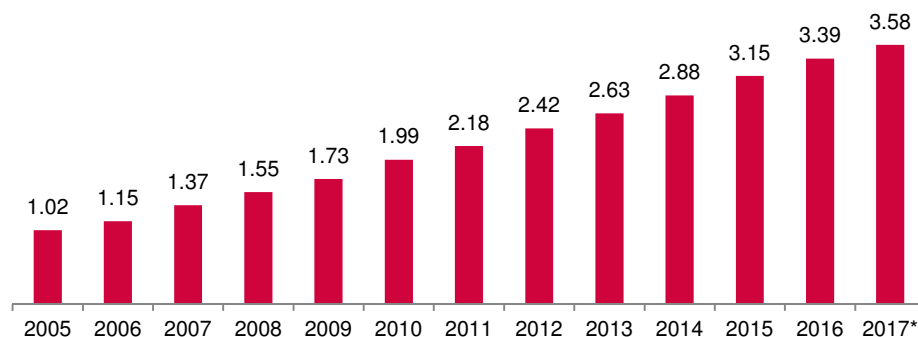
## MARKET AND MARKET ENVIRONMENT

The laser-based products (laser terminals, ground stations) developed and manufactured by Mynaric are to be used in future by customers for transmitting very high data volumes between aviation and aerospace objects (aircraft, stratosphere balloons, satellites, etc.) and/or between such objects and the ground, as part of large communications networks.

In this context, future customers such as Facebook, Google, SpaceX, Telesat and Airbus are planning to set up an Internet “above the clouds” in the form of large networks of flying objects (known as constellations), which are linked to one another via laser technology. The laser-based networks carried by the satellites and aircraft can deliver high-speed Internet, even in the most remote and inaccessible regions of the planet. And, thus, the 3.0 billion people without Internet access (as estimated by analysts from “Internet World Stats”) or people with an inadequate Internet connection can be supplied with high-speed Internet (broadband).

Further demand for broadband provided by laser-based constellations could come from the automated agriculture, autonomous driving, commercial shipping and international aviation sectors, as well as from the Internet of Things. Laser-based constellations promise to provide secure broadband connection to places where ground-based telecommunications networks have not so far penetrated or cannot be installed for logistic or economic reasons.

### Number of global Internet users (in billions)



Sources: Statista; GBC AG

\*Expected number of Internet users

According to company information, at the present time, wireless laser communications technology in the aviation and aerospace segment is only used for data transmission purposes for pilot projects and demonstrations. The market for wireless laser communication using laser terminals and ground stations is therefore still quite a young and not particularly developed market. It is now just starting to develop.

After the first companies, such as Google, Facebook, OneWeb and SpaceX announced their plans to set up the above-mentioned communications networks, they are now working more intensively on implementing their plans in order to keep to their targeted project implementation dates.

In addition, interest of companies and organisations in communications networks in the aerospace sector for various applications has further increased. Thus, new players are also increasingly active in this sector.

Accordingly, the above-mentioned companies have also intensified discussions with the partners they need to implement their plans. The individual companies' initial plans have now crystallised into more concrete steps towards communications networks in the air or in space. According to Mynaric, laser communications technology is the ideal solution for building such comprehensive and high-performance (data) networks.

Consequently, selected companies that have been working on communications networks consisting of flying objects or satellites for the provision of broadband Internet should now be reaching significant milestones.

At the end of March 2018, the US regulatory authority, the Federal Communications Commission (FCC) approved an application from **SpaceX** for its initial Starlink constellation (plan: 4,500 satellites). Previously, in February, SpaceX launched two small demonstration satellites (Tintin A and B), which also successfully established a communications link with the ground station. Both small satellites are designed to be able to communicate with each other via optical laser links.

In addition, midway through the year, **Facebook** announced that it had given up its plans to build its own Internet drones (Aquila project). This had also been intended to provide Internet services from high-altitude platforms (consisting of drones). However, the Internet company is still adhering to its primary goal of enabling everyone across the world to have Internet access. To this end, the company is planning to work together with leading companies in the aerospace industry, such as Airbus, to develop its own high-flying pseudo-satellites (Zephyr S).

In June 2018, business portal Business Insider announced a previously unknown collaboration between Facebook and Mynaric. At that time, the aim of this cooperation was to work on implementing a 10-Gbps air-to-ground laser link in the United States. Shortly afterwards, Facebook announced its plan to develop a satellite network (Athena project). The technology corporation expects to launch its own satellites as early as the start of 2019, and will be in a position to supply people with broadband Internet who were previously not connected or were under-supplied.

Further, Google's Project Loon was transformed into an independent company called **Loon** in July 2018. In our view, this marked the project's move from experimental status to the commercialisation phase. **Loon** also announced that it had received an initial commercial order to supply parts of Kenya with Internet access by means of high-altitude balloons. Previously, Loon's high-altitude platform had already successfully proven itself in practical use in Peru and Puerto Rico. The technology company also announced that it was developing a data connection across more than 1000 km, using seven balloons at an altitude of 20 km.

Moreover, in summer 2018, **Telesat** selected Airbus (Airbus Defence & Space) and the two companies Thales Alenia Space and Maxar Technologies for a system and design study for its (planned) constellation comprising 117 satellites. In the next step, both consortia will refine their system solutions and offerings, before Telesat awards a production order for an initial part of the constellation to one of the two teams in mid-2019.

**LeoSat Enterprises**, like SpaceX, also received approval from the US communications authority (FCC) for its planned satellite constellation in low earth orbit (LEO) in November 2018. According to information from the company, it is planning to launch the fastest, most secure and widest coverage data network in the world via a constellation of low-earth-orbit satellites. The company also announced that it had achieved an important milestone by securing commercial agreements valued at over \$1.0bn.

In September 2018, **Airbus** (Defence & Space division) reported two key developments in its high-altitude platform project. The company reported that stratospheric 4G/5G defence applications had been successfully tested in a high-altitude balloon demonstration. According to the company, the technology tested, an Airbus LTE AirNode, represents a key part of Airbus's secure networked airborne military communications project, Network for the Sky (NFTS). The technology company tested its communications solution in Canada with a stratospheric balloon at altitudes up to 21 km, creating a high-altitude airborne cell site. In its payload, the balloon carried an Airbus LTE AirNode, which provided a 30 km-wide footprint of coverage for private and secure communications. The balloon was tracked by a test team over 200 km, exchanging 4k video between the different stations.

This update preceded the corporate message that the company's unmanned aerial vehicle (UAV) – Zephyr S – successfully made its first flight over a span of more than 25 days. This was the longest UAV flight to date.

In October 2018, aviation company **Boeing** announced the development of a new division for Disruptive Computing and Networks (DC&N) to “develop computing and communications solutions for advanced commercial and government aerospace applications”. The company stated that it would be looking for external partners to collaborate on developing and speeding up solutions in the field of secure communication, artificial intelligence and complex systems optimisation. Boeing previously publicised that it was investing in US satellite communications company **BridgeSat**. **BridgeSat** intends to develop a global network with ten laser-based ground stations by 2019 to enable ground-to-space communications connectivity.

In November 2018, Internet group **Amazon** announced that its cloud division (AWS) will provide a ground station service for satellites – AWS Ground Station. This new offer from AWS is particularly aimed at satellite operators and enables satellite data to be downloaded, processed and analysed faster around the world. As part of this, it plans to establish 12 ground stations by 2019. The AWS service aims to provide an easier and cheaper way of analysing satellite data. Following Amazon's venture into the growing satellite industry, we believe it is very likely that other technology companies, such as Microsoft and IBM, will follow suit.

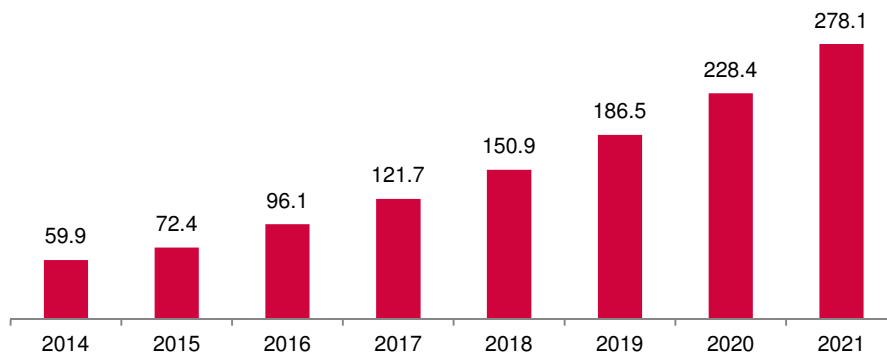
According to Mynaric's own information, there are currently more than 70 companies involved in developing or planning satellite networks in the space sector (“LEO constellations”). These include large technology companies such as SpaceX with business plans for 11,000 satellites, as well as small startups with plans involving around 50 satellites.

In the air segment, notably Google (Loon), Facebook and Airbus are working on communications networks using flying objects (high-altitude platforms). The initiatives taken by these technology companies in the field of high-altitude platforms to commercialise the Internet could, in turn, encourage other companies to copy them and thus bring this sector to the forefront once again.

The above-mentioned communications networks in the aerospace sector have been particularly characterised by high data transfer rates. These have also been designed to meet the global increase in the amounts of data to be transferred.

The increase in Internet data transfers is particularly due to greater use of video. According to study estimates by the network specialist, Cisco, data volume grew by 103.2% from 59.8 exabytes/month in 2014 to 121.7 exabytes/month in 2017. In future, analysts also expect a significant rise in data transfer volume.

**Estimated global Internet data transfer (exabytes/month; 1 exabyte = 1 billion gigabytes)**



Sources: Cisco; GBC AG

All in all, we assume that the future market for the development of laser-based aerospace communications networks may reach a similar volume as the present market for optical communications networks on the ground using fibre optics technology. According to the analysts at "Markets and Markets", the market for optical communications networks reached an estimated volume of \$17.0bn in 2017 and further market growth of 10.5% per year is expected in future.

**In our view, Mynaric is well positioned in this emerging dynamic sector as a laser communications specialist that can supply the market with aerospace terminals and laser-based ground stations, which the above-mentioned companies need in order to achieve or optimally implement the business plans/projects they have announced.**

## COMPANY PERFORMANCE & FORECAST

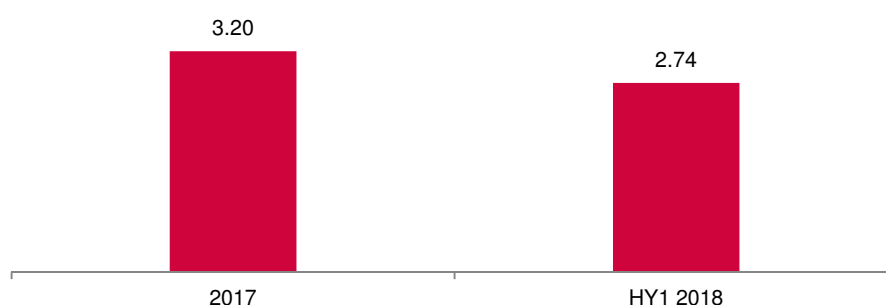
### Business performance HY1 2018

#### *Development in total output*

Mynaric completed a successful first six months of the current 2018 financial year. The period was particularly shaped by the transfer of product developments to series production, the further development of laser technology and the expansion of the product portfolio.

At an economic level, Mynaric's operating subsidiary (Mynaric Lasercom GmbH) generated total output of €2.74m in HY1 2018 and thus has already achieved 85.6% of the previous year's total output. Total output was particularly driven by sales revenues from delivered laser communications products (€1.22m) and its own work capitalised (€1.77m).

#### Development of total output (in € million)



Sources: Mynaric AG; GBC AG

In the past, Mynaric mainly concentrated on developing pre-series products, but its main focus is now on transitioning product developments to series production. Accordingly, processes and systems were implemented in HY1 which are intended to rapidly turn the company into a serial manufacturer of laser communications terminals.

A first step in this is to begin series production of the ground stations product group. On 11 September 2018, Mynaric announced the official start of series production of ground stations for ground-to-air and ground-to-space laser communications. The company achieved a significant milestone with the transition to series production of two designs of optical ground stations for bi-directional data transfer from ground-to-air and ground-to-space stations. Series production, which has now started, should have a positive effect on economic performance in HY2.

Additionally, in April 2018, Mynaric announced its exclusive technological cooperation with the renowned Leti CEA Tech Research Institute (based in France). This cooperation gives Mynaric the opportunity to integrate state-of-the-art technology, while shifting processes to production. As a result of the Leti cooperation, the company is now making use of a new photodiode that promises a sensitivity at least ten times higher than has previously been achieved. In the future, this should significantly improve the performance and application areas for Mynaric's laser technology. According to a statement by the company, the sector cooperation entered into by Mynaric should give it an advantage in product development.

Mynaric has also started to expand its product portfolio. The company announced in June 2018 that it had started developing laser terminals for use in precision agriculture.

Specifically, it intends to develop a new lightweight laser terminal for use in compact drones for precision agricultural applications. In our opinion, this strategic step which follows the precision agriculture market trend should open up additional potential business. There is further economic potential in other sectors (drone industries) that also manufacture and market drones (e.g. the security industry).

Alongside this, Mynaric also announced when publishing its half-year figures that development of its space laser terminals, which it had already started, is on schedule and thus it has achieved all its key development milestones in HY1 2018. In this context, in October 2018, Mynaric signed an initial declaration of intent (MOU) with a satellite network provider to deliver laser-based key components (space terminal) for a demo mission, which is the precursor to the intended development of an extensive satellite network ("satellite constellation").

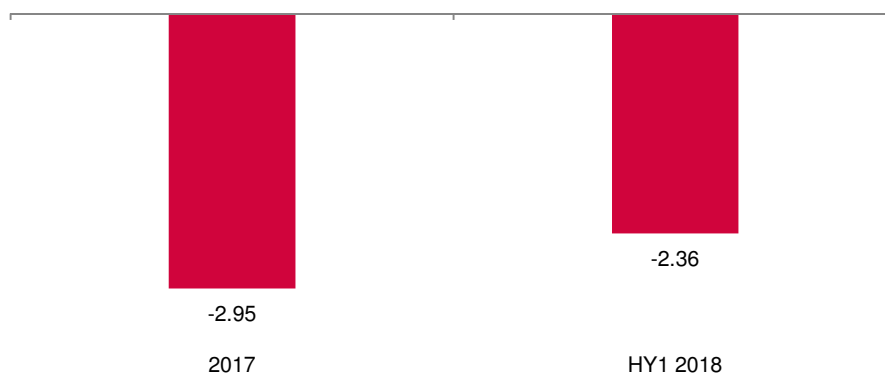
Mynaric also announced in November 2018 that it had received an order from UK company ArQit to carry out a study to develop a global high-security communications system. Laser communication is a core component of this study in terms of guaranteeing the highest possible IT security (cyber-security). After successfully completing the study, the company could become the exclusive supplier of optical ground stations and laser terminals for the project.

### **Earnings performance**

Operating earnings (EBITDA) are moving in the opposite direction to total output. This is mainly due to costs arising in connection with implementation of series production and R&D costs for developing terminals suitable for space and further development of the air terminal. The overall increase in the workforce also had a negative effect on net earnings.

The company achieved EBITDA of -€2.36m, associated with the still low total output level resulting from test and demonstration sales.

### **Development of operating result (EBITDA in € million)**



Sources: Mynaric AG; GBC AG

Overall we can confirm that Mynaric is still in growth mode and has undertaken significant strategic steps. The series production measures now implemented have set the company on course to establishing itself as a series production manufacturer and pushing forward into new revenue areas. Additionally, the company has started to consolidate its technology leadership through the exclusive sector cooperation entered into with the Leti CEA Tech Research Institute.

## Forecasts and model assumptions

P&L (in €m)	FY 2018e (new)	FY 2018e (old)	FY 2019e (new)	FY 2019e (old)	FY 2020e (new)	FY 2020e (old)	FY 2021e	FY 2022e
Total output	9.20	12.20	22.60	37.34	70.30	92.31	258.16	406.21
EBITDA	-4.25	-3.56	-2.37	2.76	8.23	16.37	59.57	109.47
EBIT	-4.57	-3.68	-3.09	0.59	5.85	9.32	50.27	98.74
Net profit	-4.57	-3.68	-3.09	0.59	4.97	7.92	35.19	69.12

Source: GBC AG

### Total output forecasts

In the past, Mynaric has concentrated very intensively on the development of laser-based communications solutions for “constellations” in the air segment, and has thereby developed and delivered initial market-ready (air terminals) products.

Alongside this, it has also developed market-ready optical ground stations and delivered them to various customers for testing and demonstration purposes. After successful testing, series production of ground stations has now begun. In parallel with this, the main focus is now on transferring product developments to series production.

Further, Mynaric has started to expand its product portfolio and is developing a space terminal (for space-to-space links) and a laser communications terminal for precision agriculture applications. The company aims to complete the space terminal by the start of 2019.

It also aims to improve the performance and cost structure of its laser products, thereby increasing customer benefit. In the course of this, in 2018 Mynaric entered into an exclusive development partnership with the renowned Leti CEA Tech Research Institute based in France. This development cooperation should further strengthen the company's technology advantage.

After formerly conducting single-connection-based demonstrations and tests (e.g. air-to-air communication links or air-to-ground links) mainly with US customers, more extensive tests will now be increasingly conducted using several flying objects in the aerospace sector.

Against this background, we assume that, in the near future, a laser-based communications network of several aircraft will be established and tested, e.g. as part of the Airborne Wireless Network (ABWN) cooperation. Accordingly, this should make use of several of Mynaric's air terminals.

After series production was set up and launched in the ground station segment, we also anticipate that production capacities will be increased in the air terminals segment in the future. This is needed to be able to deliver the larger number of items expected for the pending extensive tests and to prepare for the planned series production in this segment.

Additionally, the company plans to further continue its internationalisation in order to better serve and support existing and potential customers, as well as exploiting business potential locally. In this context, the company has recently announced the opening of an office in Asia. The opening of this office in China (Shanghai) aims to benefit from the booming Asian aerospace market. Through doing this, our view is that Mynaric is taking a further strategic step towards being a global player and will also meet the increasing needs of major potential customers for global partner companies.

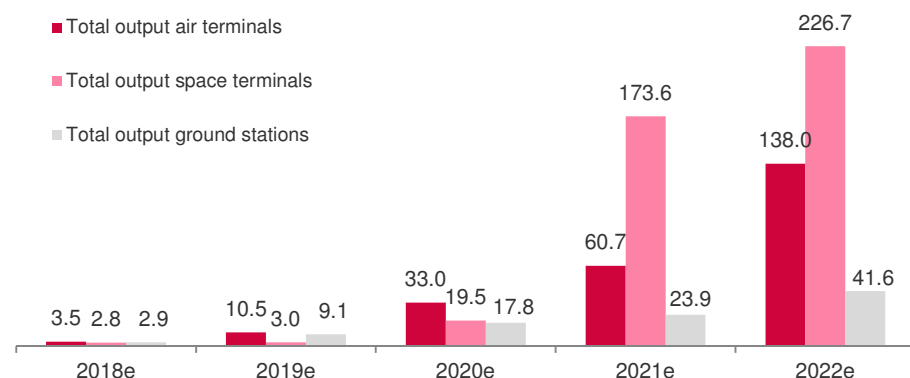
With its first-mover advantage, which is primarily based on its innovative laser technology, we also assume that Mynaric will succeed in achieving a significant market share in the future market of laser-based aerospace communications networks. Technological cooperation should improve the performance of Mynaric's laser communications products and thus make them more attractive for existing and potential customers. This should also further strengthen the company's technological leadership.

Against the background of the company's innovative product portfolio and the positive development of the future market of laser-based communications networks, we expect Mynaric to achieve very dynamic revenue and total output growth in the future.

Due to an initially overestimated growth rate, we have revised our short and medium-term total output forecasts downwards. However, our long-term total output forecasts remain the same, as existing and potential major customers are still pursuing their long-term major projects and business plans in connection with extensive laser-based communications networks in the aerospace industry.

Mynaric serves a total of three customer groups or customer bases (air terminals, space terminals and ground stations). As a result, the total Group output can be divided into the air, space and ground segments/divisions.

#### Expected development of total output by segments (in € million)



Source: GBC AG

We expect the air sector, which has traditionally accounted for a large part of total output, to also make a significant contribution to total output in the current financial year. We also estimate that this segment will continue to show significant growth in the next few years and will account for the majority of the Group's output. Existing or potential major customers from the air-based communications network sector, such as Airborne Wireless Network and potential customers from the drone industries (precision agriculture, laser-based drone monitoring, etc.) will contribute to this. The specific reason for this is that, in comparison to the space segment, Mynaric is already developing the necessary hardware for customers and has already concluded a manufacturing contract with Airborne Wireless Network.

We also expect similarly positive performance from the ground station segment, which has managed to achieve a significant milestone by launching series production. This segment should also make a significant contribution to total output in the current financial year 2018 through a ground station that has already been delivered and the start of series production. Based on the successful tests already carried out with ground stations and the launch of series production, we estimate that there will be follow-up orders and further orders in the future. These should then lead to dynamic business performance in this segment in the coming years.



In the space sector, due to the orderly progressing development of the space terminal, we expect that this project will be successfully completed at the start of 2019 with a qualification unit. Our view is that successful tests should already have taken place with electronic components with a customer from the satellite sector during the current financial year 2018. In the following year, we expect that initial test series will be conducted with the developed space terminal on one or more satellites.

After completing the initial successful test runs, we expect a large number of follow-up orders, as satellite network operators can only provide their (planned) service with an extensive number of satellites and this is also only worthwhile in such a magnitude. Accordingly, we have also assumed very dynamic business performance in the space segment in the next few years and expect very high growth rates as a result. Consequently, this business area should represent a large part of total output over the long term.

**Based on the good market position in the area of laser-based communications networks (technology leadership in laser communications technology) and the further development of its service offering (space terminal, laser terminal for drone industry, development cooperation with Leti CEA Tech Research Institute), Mynaric should succeed in quickly increasing its total output in what aims to be a multi-billion dollar market in the future. This sector continues to gain momentum, meaning the market conditions for Mynaric continue to improve.**

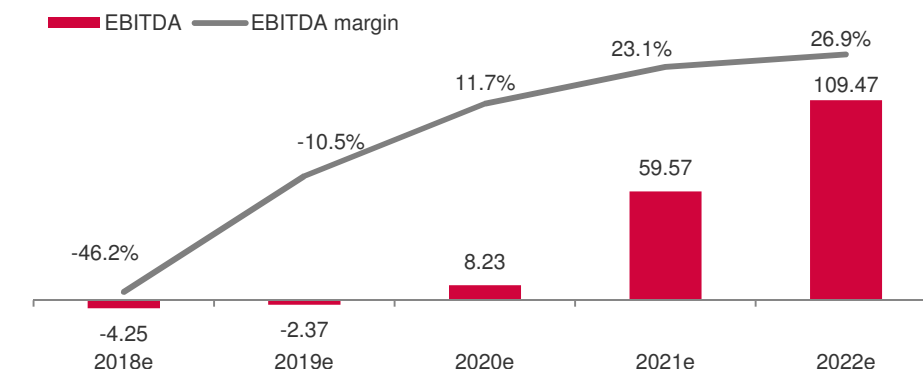
### **Profit forecasts**

The dynamic total output development, which we expect, is also reflected in our earnings forecasts. Due to the lowering of our short and medium-term total output forecasts, we have also reduced our earnings forecasts for this time horizon. However, we continue to expect a significant improvement in earnings.

For the current financial year 2018 and the following year, we have assumed that the company will still achieve negative operating earnings due to the still low level of total output and the high level of investment, particularly in the area of R&D (developing and extending the product portfolio) and building production capacity.

From 2020 the operating profit level should be achieved, thereby generating significantly positive operating earnings (EBITDA) of €8.23m. In the following years, EBITDA should continue to increase dynamically and we expect it to reach over €100.00m in 2022. In parallel, the EBITDA margin of 11.7% which we have forecast for 2020 will increase rapidly to 26.9% in 2022.

### **Expected development of the EBITDA (in € million) and the EBITDA margin (%)**



Source: GBC AG

This dynamic increase in profitability should be achieved by the economies of scale, learning curve effects and increased buying power, which we anticipate. Due to the expected high momentum in total output, the fixed costs incurred like administration costs, for example, should be distributed across a higher business volume (total output) and thereby lead to an improvement in the fixed cost ratio (fixed cost depression) and thus to higher profitability.

In general, Mynaric's business model is not very personnel or capital-intensive (low depth of added value). The focus of the technology company is mainly on design, engineering the hardware and software development in relation to its product range.

Furthermore, the modular construction of laser communications products allows for the quick final assembly of the modules supplied, which allows correspondingly high product turnover and production volumes from a production plant. Mynaric only performs the final assembly on its production premises and the modules are supplied by selected partner companies.

**Mynaric has positioned itself well in order to benefit significantly from the expected dynamic growth in the future market of laser-based communications networks. With a stronger focus on series production, the company should succeed in achieving its operating profit threshold as soon as 2020. In light of the high total output dynamics we expect that, together with the economies of scale introduced, double-digit EBITDA margins should be achievable.**

## VALUATION

### Model assumptions

We rated Mynaric AG using a three-stage DCF model. We started with the specific estimates for the years 2018 to 2022 in phase 1 and for the years 2023 to 2025 in phase 2. We have included the tax rate in phase 2 at 30.0%. Additionally, after the end of the forecast horizon, a residual value is determined in the third phase by means of a perpetual annuity along with a long-term tax rate of 30.0%. As the final value, we assume a growth rate of 2.0%.

### Determining the capital costs

The weighted average cost of capital (WACC) of Mynaric AG is calculated from the equity cost and the cost of debt. The market premium, the company-specific beta, as well as the risk-free interest rate have to be determined in order to determine the equity cost.

The risk-free interest rate is derived from the current structured interest rate curves for risk-free bonds in accordance with the recommendations from the Fachausschuss für Unternehmensbewertung und Betriebswirtschaft (FAUB, Special Committee for Business Valuation and Business Management) of the Institut der Wirtschaftsprüfer in Deutschland e.V. (Institute of Public Auditors in Germany). This is based on the zero bond interest rate calculated using the Svensson Method published by the German Bundesbank. In order to compensate for short-term market fluctuations, average returns for the previous three months are used and earnings are rounded up to the nearest 0.25 basis points.

**The value currently used for the risk-free interest rate is 1.00% (previously: 1.25%).**

We set the historical market premium of 5.50% as a reasonable expectation of the market premium. This is supported by historical analyses of equity market returns. The market premium reflects in a percentage the improved return expected from equity markets relative to low-risk government bonds.

According to GBC estimates, a beta of 2.36 is currently determined. This relatively high value takes account of the high risk. To date, Mynaric has only achieved sales based on customer tests and demonstrations. The high total output and earnings expectations are fraught with uncertainty.

The cost of equity of 13.96% was calculated using the assumptions made (previously: 14.21%) (beta multiplied by risk premium plus risk-free interest rate). As we assume a sustainable weighting of the equity cost of 90.0%, the result is a weighted average cost of capital (WACC) of 13.06% (previously: 13.28%).

### Valuation result

Discounting of future cash flows is based on the entity approach. We have calculated the corresponding weighted average cost of capital (WACC) to be 13.06%. The resulting fair value per share at the end of the 2019 financial year corresponds to the stock target price of €108.50 (previously: €95.00).

Note: The increase in the target price is due to the “roll-over effect” (technical rise in target price, as the target price now relates to the following financial year 2019 (previously: 2018)) and a change in the risk-free interest rate. The reduction in our short and medium-term total output and earnings forecasts has prevented an even sharper rise in the target price.

## DCF model

### Mynaric AG - Discounted Cashflow (DCF) model scenario

Value driver of the DCF - model after the estimate phase:

consistency - phase		final - phase	
Revenue growth	5.0%	Eternal growth rate	2.0%
EBITDA margin	26.9%	Eternal EBITA margin	18.5%
Depreciation to fixed assets	15.0%	Effective tax rate in final phase	30.0%
Working Capital to revenue	25.0%		

### Three phase DCF - model:

phase	estimate					consistency			final
in mEUR	FY18e	FY 19e	FY 20e	FY 21e	FY 22e	FY 23e	FY 24e	FY 25e	final value
Revenue	9.20	22.60	70.30	258.16	406.21	426.52	447.84	470.24	
Revenue change	222.6%	145.6%	211.1%	267.2%	57.3%	5.0%	5.0%	5.0%	2.0%
Revenue to fixed assets	1.84	1.19	1.28	4.16	5.68	5.42	5.47	5.88	
EBITDA	-4.25	-2.37	8.23	59.57	109.47	114.94	120.69	126.72	
EBITDA margin	-46.2%	-10.5%	11.7%	23.1%	26.9%	26.9%	26.9%	26.9%	
EBITA	-4.57	-3.09	5.85	50.27	98.74	103.14	108.40	111.72	
EBITA margin	-49.6%	-13.7%	8.3%	19.5%	24.3%	24.2%	24.2%	23.8%	18.5%
Taxes on EBITA	0.00	0.00	-0.88	-15.08	-29.62	-30.94	-32.52	-33.52	
Taxes to EBITA	0.0%	0.0%	15.0%	30.0%	30.0%	30.0%	30.0%	30.0%	30.0%
EBI (NOPLAT)	-4.57	-3.09	4.97	35.19	69.12	72.20	75.88	78.21	
Return on capital	-165.0%	-39.2%	19.8%	48.5%	54.6%	41.7%	40.9%	40.3%	31.5%
Working Capital (WC)	2.90	6.10	17.58	64.54	101.55	106.63	111.96	117.56	
WC to revenue	31.5%	27.0%	25.0%	25.0%	25.0%	25.0%	25.0%	25.0%	
Investment in WC	-1.96	-3.20	-11.47	-46.96	-37.01	-5.08	-5.33	-5.60	
Operating fixed assets (OAV)	5.00	19.00	55.00	62.00	71.50	78.70	81.90	80.00	
Depreciation on OAV	-0.32	-0.72	-2.39	-9.30	-10.73	-11.81	-12.29	-15.00	
Depreciation to OAV	6.3%	3.8%	4.3%	15.0%	15.0%	15.0%	15.0%	18.8%	
Investment in OAV	-3.49	-14.72	-38.39	-16.30	-20.23	-19.01	-15.49	-13.10	
Capital employment	7.90	25.10	72.58	126.54	173.05	185.33	193.86	197.56	
EBITDA	-4.25	-2.37	8.23	59.57	109.47	114.94	120.69	126.72	
Taxes on EBITA	0.00	0.00	-0.88	-15.08	-29.62	-30.94	-32.52	-33.52	
Total investment	-5.45	-17.92	-49.86	-63.26	-57.24	-24.08	-20.82	-18.70	
Investment in OAV	-3.49	-14.72	-38.39	-16.30	-20.23	-19.01	-15.49	-13.10	
Investment in WC	-1.96	-3.20	-11.47	-46.96	-37.01	-5.08	-5.33	-5.60	
Investment in Goodwill	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
Free cashflows	-9.70	-20.30	-42.51	-18.77	22.61	59.92	67.35	74.51	526.31

Value operating business (due date)	268.84	324.24
Net present value explicit free cashflows	45.90	72.18
Net present value of terminal value	222.95	252.05
Net debt	10.53	30.83
Value of equity	258.31	293.41
Minority interests	0.00	0.00
Value of share capital	258.31	293.41
Outstanding shares in m	2.70	2.70
Fair value per share in €	95.52	108.50

### Cost of capital:

Risk free rate	1.0%
Market risk premium	5.5%
Beta	2.36
Cost of equity	14.0%
Target weight	90.0%
Cost of debt	6.5%
Target weight	10.0%
Taxshield	25.0%
WACC	13.1%

Return on Capital	WACC				
	12.5%	12.8%	13.1%	13.4%	13.7%
31.0%	115.32	110.99	106.92	103.09	99.48
31.2%	116.18	111.81	107.71	103.85	100.21
31.5%	117.04	112.64	108.50	104.60	100.94
31.7%	117.91	113.46	109.29	105.36	101.66
32.0%	118.77	114.29	110.08	106.12	102.39

## ANNEX

### I.

#### **Research under MiFID II**

- 1 There is a contract between the research company GBC AG and the issuer regarding the independent preparation and publication of this research report on the issuer. GBC AG is remunerated for this by the issuer.
- 2 The research report is simultaneously made available to all interested investment services companies.

### II.

#### **Section 1 Disclaimer and exclusion of liability**

This document is intended solely for information purposes. All data and information in this study come from sources that GBC regards as reliable. In addition, the authors have taken every care to ensure that the facts and opinions presented here are appropriate and accurate. Nevertheless, no guarantee or liability can be accepted for their correctness – whether explicitly or implicitly. In addition, all information may be incomplete or summarised. Neither GBC nor the individual authors accept liability for any damage which may arise as a result of using this document or its contents, or in any other way in this connection.

We would also point out that this document does not constitute an invitation to subscribe to or to purchase any securities and must not be interpreted in this way. Nor may it or any part of it be used as the basis for a binding contract of any kind whatsoever, or be cited as a reliable source in this context. Any decision relating to the probable offer for sale of securities for the company or companies discussed in this publication should be taken solely on the basis of information in the prospectuses or offer documents which are issued in relation to any such offer.

GBC does not provide any guarantee that the indicated returns or stated target prices will be achieved. Changes to the relevant assumptions on which this document is based can have a material impact on the targeted returns. Income from investments is subject to fluctuations. Investment decisions should always be made with the assistance of an investment adviser. This document cannot replace the role of an adviser.

#### **Sale outside the Federal Republic of Germany:**

This publication, if sold in the UK, may only be made available to those persons who, in the meaning of the Financial Services Act 1986 are authorised and exempt, or persons as defined in section 9 (3) of the Financial Services Act 1986 (Investment Advertisement) (Exemptions) Decree 1988 (amended version) and must not be transmitted directly or indirectly to other persons or groups of persons,

Neither this document nor any copy of it may be taken into, transferred to or distributed within the United States of America or its territories and possessions. The distribution of this document in Canada, Japan or other jurisdictions may be restricted by law, and persons who come into possession of this publication should find out about any such restrictions and respect them. Any failure to respect these restrictions may represent a breach of US, Canadian or Japanese securities laws or the laws of another jurisdiction.

By accepting this document, you accept all disclaimers of liability and the restrictions cited above.

You can find the details of this disclaimer/exclusion of liability at:

<http://www.gbc-ag.de/de/Disclaimer.htm>

#### **Legal information and disclosures as required by section 85 of the German Securities Trading Act (WpHG) and Financial Analysis Directive (FinAnV)**

This information can also be found on the internet at the following address:

<http://www.gbc-ag.de/de/Offenlegung.htm>

#### **Section 2 (I) Updates**

A detailed update of the present analysis/analyses at any fixed date has not been planned at the current time. GBC AG reserves the right to update the analysis without prior notice.

#### **Section 2 (II) Recommendation/ Classifications/ Rating**

Since 1/7/2006, GBC AG has used a 3-level absolute share rating system. Since 1/7/2007, these ratings have related to a time horizon of a minimum of 6 to a maximum of 18 months. Previously the ratings related to a time horizon of up to 12 months. When the analysis is published, the investment recommendations are defined based on the categories described below, including reference to the expected returns. Temporary price fluctuations outside of these ranges do not automatically lead to a change in classification, but can result in a revision of the original recommendation.

**The recommendations/classifications/ratings are linked to the following expectations:**

BUY	The expected return, based on the calculated target price, including dividend payments within the relevant time horizon, is $\geq +10\%$ .
HOLD	The expected return, based on the calculated target price, including dividend payments within the relevant time horizon is $> -10\%$ and $< +10\%$ .
SELL	The expected return, based on the calculated target price, including dividend payments within the relevant time horizon is $\leq -10\%$ .

GBC AG's target prices are determined using the fair value per share, derived using generally recognised and widely used methods of fundamental analysis, such as the DCF process, peer-group benchmarking and/or the sum-of-the-parts process. This is done by including fundamental factors such as share splits, capital reductions, capital increases, M&A activities, share buybacks, etc.

### **Section 2 (III) Past recommendations**

Past recommendations by GBC on the current analysis/analyses can be found on the internet at the following address:

<http://www.gbc-ag.de/de/Offenlegung.htm>

### **Section 2 (IV) Information basis**

For the creation of the present analysis/analyses, publicly available information on the issuer(s) (where available, the last three published annual and quarterly reports, ad hoc announcements, press releases, share prospectuses, company presentations, etc.) was used, which GBC believes to be reliable. In addition, discussions were held with the management of the company/companies involved, for the creation of this analysis/these analyses, in order to review in more detail the information relating to business trends.

### **Section 2 (V) 1. Conflicts of interest according to section 85 of the German Securities Trading Act (WpHG) and Art. 20 of the Market Abuse Regulation (MAR):**

GBC AG and the analyst responsible hereby declare that the following potential conflicts of interest exist for the company/companies described at the time of publication, and in so doing meet the requirements of section 85 of the German Securities Trading Act (WpHG) and Article 20 of the Market Abuse Regulation (MAR). A detailed explanation of potential conflicts of interest is also listed in the catalogue of potential conflicts of interest under section 2 (V) 2.

**In relation to the security or financial instrument discussed in this analysis the following possible conflict of interest exists: (5a;5b;11)**

### **Section 2 (V) 2. Catalogue of potential conflicts of interest:**

- (1) GBC AG or a legal person connected to them holds shares or other financial instruments of this company at the time of publication.
- (2) This company holds over 3 % of the shares in GBC AG or a legal person connected to them.
- (3) GBC AG or a legal person connected to them is a market maker or designated sponsor for the financial instruments of this company.
- (4) GBC AG or a legal person connected to them has, over the previous 12 months, organised or played a leading role in the public issue of financial instruments for this company.
- (5) a) GBC AG or a legal person connected to them has over the last 12 months agreed to create research reports for this company in return for payment. As part of this agreement the issuer was shown the draft of this analysis (excluding the valuation section) prior to publication,
- (5) b) After receiving valid amendments by the analysed company, the draft of this analysis was changed.
- (6) a) GBC AG or a legal person connected to them has over the last 12 months agreed to create research reports with a third party for this company in return for payment. As part of this agreement the issuer was shown the draft of this analysis (excluding the valuation section) prior to publication.
- (6) b) After receiving valid amendments by the third party, the draft of this analysis was changed.
- (7) The analyst responsible for this report holds shares or other financial instruments of this company at the time of publication.
- (8) The analyst responsible for this company is a member of the company's Executive Board or Supervisory Board.
- (9) The analyst responsible for this report received or purchased shares in the company analysed by said analyst prior to the time of publication.
- (10) GBC or a related legal party has closed an agreement with the underlying company regarding consulting services during the previous 12 months.
- (11) GBC or a related legal party has a significant financial interest in the analysed company, for example to get mandated by the analysed company or to provide any kind of services (like the organization of fair, roundtables, road shows, etc.).
- (12) At the time of the financial analysis, the analysed company is in a financial instrument or financial product (e.g. certificate, fund, etc.) managed or advised by GBC AG or its affiliated legal entity.

**Section 2 (V) 3. Compliance:**

GBC has taken internal regulatory precautions to prevent potential conflicts of interest and to disclose these where they are present. The Compliance Officer, currently Kristina Bauer, email: bauer@gbc-ag.de, is responsible for compliance with these regulations.

**Section 2 (VI) Responsibility for report**

The company responsible for the creation of this analysis/these analyses is GBC AG, with registered office in Augsburg, which is registered as a research institute with the responsible supervisory authority (Federal Financial Supervisory Authority or BaFin, Marie-Curie-Str. 24–28, 60439 Frankfurt, Germany).

GBC AG is currently represented by its board members Manuel Hölzle (CEO) and Jörg Grunwald.

The analysts responsible for this analysis are:

**Marcel Goldmann, M.Sc., financial analyst**

**Cosmin Filker, Dipl. Betriebswirt (FH), deputy chief financial analyst**

**Other persons involved in this study:**

Jörg Grunwald, member of the Managing Board

**Section 3 Copyright**

This document is protected by copyright. It is made available to you solely for your information and may not be reproduced or distributed to any other person. Any use of this document outside the limits of copyright law shall, in principle, require the consent of GBC or of the relevant company, should the rights of usage and publication have been transferred.

GBC AG  
Halderstraße 27  
D 86150 Augsburg  
Tel.: 0821/24 11 33-0  
Fax.: 0821/24 11 33-30  
Internet: <http://www.gbc-ag.de>

E-Mail: [compliance@gbc-ag.de](mailto:compliance@gbc-ag.de)



**GBC AG<sup>®</sup>**  
**- RESEARCH & INVESTMENT ANALYSEN -**

GBC AG  
Halderstraße 27  
86150 Augsburg  
Internet: <http://www.gbc-ag.de>  
Fax: ++49 (0)821/241133-30  
Tel.: ++49 (0)821/241133-0  
Email: [office@gbc-ag.de](mailto:office@gbc-ag.de)