Foresight Autonomous Holdings

Well placed for China's coming ADAS revolution

Foresight Autonomous (FRSX) is a developer of solutions for advanced driver assistance (ADAS) and fully autonomous (FA) driving applications, based on stereo and quadric camera algorithms. It has completed its daytime ADAS proof of concept and successfully completed three pilot trials with major Chinese OEMs. At the same time China has adopted new regulations, which should rapidly boost take-up of ADAS systems. FRSX also plans to develop an aftermarket driver alert system for sale in the subsidised Israeli market as well as abroad. Associate, Rail Vision, is also forging ahead as an ADAS pioneer in the rail sector, helped by successful trials. With greater market share and market growth prospects in China, we have increased our DCF valuation from NIS3.45 to NIS5.15 per share.

Year end	Revenue ($m)	EBITDA* ($m)	PBT* ($m)	EPS* ($)	DPS ($)	EV/revenue (x)	P/E (x)
12/16	0.0	(3.3)	(3.4)	(0.08)	0.00	N/A	N/A
12/17e	0.0	(5.8)	(5.7)	(0.06)	0.00	N/A	N/A
12/18e	1.1	(11.5)	(11.5)	(0.11)	0.00	98.6	N/A
12/19e	14.6	(8.6)	(8.7)	(0.08)	0.00	7.9	N/A

Note: *EBITDA, PBT and EPS (diluted) are normalised, excluding amortisation of acquired intangibles, exceptional items and share-based payments.

Pilot trials, boost to Chinese demand & new products

Foresight's strategy to target Chinese OEMs looks especially well timed with the recent announcement by Chinese auto regulators of testing rules which should dramatically boost Chinese levels of active driver alert installations by 2020. Its marketing efforts in China have also paid off with the completion of three successful pilot trials this year with major OEMs. We expect pilot trials to start in EU and other world markets in 2018 and first revenues to be in H119. Demand for the planned aftermarket driver alert system should be boosted in Israel by government subsidies for ADAS installations and FRSX's links with Israeli vehicle importers.

Self-funding still achievable with warrant conversions

During H117 the company experienced average quarterly cash burn of $1.4m, treble the H216 level on expansion of marketing and sales activities. With costs related to new launches building rapidly we now expect the group to reach free cash flow break-even in H220, rather than 2019. Nevertheless, we forecast mid-year cash reserves of $18.3m to last until H219, leaving an estimated further $8-10m external funding requirement before FCF break-even. We see good potential for this to be bridged with the $39m that could be generated in the meantime from conversion of warrants with exercise prices of up to NIS4.0 per share.

Valuation: Increased to NIS5.15

We have increased our DCF valuation from NIS3.45 to NIS5.15, of which NIS0.98 reflects new products, NIS0.35 reflects faster expected growth in the Chinese market from new C-NCAP regulations and NIS0.37 per share arises from the increase in our 2025 market share target for the group's systems in China from 6% to 8%. This reflects the recent success of FRSX's systems in Chinese pilot trials.

Outlook

Software & comp services

31 October 2017

Price per share*	**NIS3.99**
Price per ADR*	**$5.48**
Market cap	**NIS428m**
Market cap ADR	**$118m**

*Priced at 27 October 2017   NIS3.5306/US$
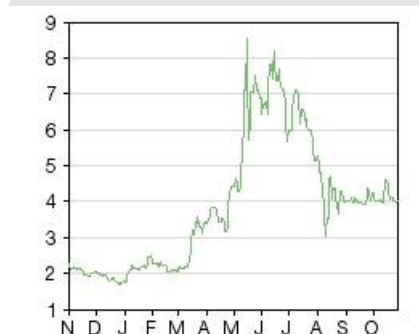Net cash ($m) at 30 June 2017   18.3

Shares in issue	107.3m
Free float	66.6%
Code	FRSX
Primary exchange	TASE
Secondary exchange	Nasdaq

Share price performance

%	1m	3m	12m
Abs	(4.8)	(26.4)	70.0
Rel (local)	(6.7)	(27.2)	61.4
52-week high/low	NIS8.5	NIS1.7	

Business description

Foresight Autonomous (FRSX) is a development-stage technology company in Israel developing ADAS systems based on technology developed by its parent company Magna BSP. FRSX also has a 24.8% stake in rail ADAS specialist Rail Vision.

Next events

Q317 results   November 2017

Analysts

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Investment summary

Progress in the next phase: Successful pilot trials

Foresight has leveraged on the know-how of its parent company Magna BSP, to develop algorithms for forward stereo and quadric (four) camera systems in vehicles to achieve near 100% object detection in all weather and light conditions. Following recent successful pilot trials in China, we see good prospects for FRSX to build market share in both the Advanced Driver-Assistance Systems (ADAS) and Fully Autonomous (FA) vehicle markets, for which all-weather performance is a key requirement. The company will then follow it up with Sensor fusion/V2V software in 2020. We also see Foresight's 24.8% stake in Rail Vision (RV) as an investment with significant potential. RV's system has a 1.5km object detection range for night/day/all-weather use using far infrared and CCD/CMOS cameras. In addition to systems sales, RV plans to generate ongoing revenues from data collected by sensors on the trains. RV's technology has already undergone significant testing by Israel Railways and Deutsche Bahn (DB).

Financials: Strong growth potential

Our forecasts are based on ongoing milestone achievements (see Exhibit 2), penetration of the new car market by forward cameras rising from an estimated c 10% in 2016 to 74% (previously 73%) in 2025 and FRSX achieving 2025 market shares of 8% in China (up from a previous 6%) and 2% in the rest of the world. During H117, the company experienced average quarterly cash burn of $1.4m, treble the H216 level on expansion of marketing and sales activities. We expect the group to reach free cash flow break-even in H220. Helped by subsequent warrant conversions raising $5.7m, cash reserves at 30 June of $18.3m are expected to last until H219, leaving an estimated further $8-10m external funding requirement. Nevertheless, with the potential to raise up to $39m from conversions of warrants with exercise prices of NIS4.0 and lower, we believe that the group is in a good position to remain self-funding until it reaches free cash flow breakeven.

Exhibit 1: Changes in forecasts

	EPS ($ per share)*			PBT* ($m)			EBITDA ($m)		
	Old	New	% chg.	Old	New	% chg.	Old	New	% chg.
12/17e	(0.044)	(0.061)	37.8	(4.23)	(5.68)	34.3	(3.52)	(5.77)	63.7
12/18e	(0.042)	(0.107)	153.9	(4.21)	(11.45)	172.0	(4.20)	(11.50)	174.1
12/19e	(0.025)	(0.081)	221.2	(2.52)	(8.70)	244.6	(3.83)	(8.58)	124.2
12/20e	0.059	0.012	(78.9)	8.600	1.82	(78.8)	3.400	2.16	(36.5)

Source: Edison Investment Research. Note: *PBT and EPS are normalised, excluding amortisation of acquired intangibles, exceptional items and share-based payments. EPS is also diluted.

Valuation: DCF valuation NIS5.15/share

As FRSX is a pre-revenue, development-stage company, we have valued it using a DCF analysis applying a 15% WACC. With FRSX having successfully completed its proof of concept and piloted its ADAS stereo system in China, we have increased our 2025 target market share in China from 6% to 8%, which together with new product revenues (see Exhibit 13) leads to a DCF value of NIS5.15/share. Assuming further successful pilot trials in Europe and the US, this valuation may rise to NIS6.26 on an increase in our 2025 rest-of-world target market share from 2.0% to 3.0%.

Sensitivities: Development-stage product, funding, delays

FRSX is a development-stage business with potentially disruptive technology moving towards commercialisation. As such there are significant risks, uncertainties and potential. Even with the completion of the proof of concept of its key stereo software, there is no guarantee that targeted object detection rates and lower accident rates will be achieved. FRSX may struggle to gain

targeted prices for its system in a highly competitive market and may experience delays or struggle to gain regulatory approval for its products. We forecast the company to require $8-10m in funding before it becomes cash flow break-even in H220. Longer than expected time to convert pilot trials to volume sales or faster than expected price erosion could increase this shortfall. Systems sales are typically denominated in US dollars, but the bulk of FRSX's costs are in Israeli shekels. Sales in China could be significantly higher if the country achieves its plan to meet Euro NCAP standards by 2018. EBITDA margins at RV could be higher than we model if it retains market leader position and generates significant big data revenues. We see potential for sector consolidation.

Company description: Building better vision systems

Foresight was created in 2015 to develop unique ADAS algorithms, leveraging its parent company Magna BSP's know-how and technology of its 3D multi-camera based intruder detection system. Magna BSP's technology is deployed around the world in sensitive facilities such as airports, nuclear reactors and prisons. Its success is based on a claimed 99.9% detection rate in every terrain and climate using image and infrared (IR) camera surveillance systems. Magna BSP invested $2m into Foresight's R&D and has transferred the rights to Foresight to use its video motion detection and object tracking know-how in the auto industry without charge. After reversing into a listed shell, FRSX listed on the Tel Aviv Stock Exchange on 5 January 2016 and completed proof of concept of its first ADAS software with a targeted near 100% object detection probability in daylight in Q117. Foresight also has a 24.8% stake in Rail Vision, an Israeli company that uses systems based on ADAS technology to prevent rail accidents and generate big data from on-train sensors. RV plans to start selling its first systems in Q318.

Product profile: ADAC tests show need for better detection

Foresight is looking to bring about a step change in object detection rates in vehicle forward vision systems using innovative algorithms to achieve object detection rates of near 100% in all-weather/light conditions. The timing is good. Tests by German auto association ADAC in August 2016 showed surprisingly poor results by the automatic emergency braking (AEB) systems of six major marques (including the BMW 3 series, Volvo V60 and Mercedes C Class) in avoiding collisions, particularly with smaller road users such as cyclists and children. With regulators and OEMs currently promoting ADAS with a view to safety and product differentiation, before all else detection matters now. One of the most pressing problems of OEMs developing FA vehicles is the need to build consumer confidence in self-driving cars in the face of recent high-profile accidents. Given this, we expect products offering significant safety advances to benefit from both market share gains and participation in the fast-growing market for vehicle automation.

Strategy: Leveraging stereo vision into road and ADAS into rail

Strategic objectives: Automotive (ADAS & FA vehicles), system-on-a-chip, global scope

- **Develop full aftermarket product to capture new car and fleet segment:** Introduction of an aftermarket product extends the reach of ADAS to new vehicles without ADAS systems, as well as older vehicles in the consumer and fleet markets.

- **Develop quadric system proof of concept (demo)** by Q118 allowing for reliable function at night as well as during daylight in all road and weather conditions. The system is to work with two CMOS (complementary metal-oxide semiconductor) cameras and two infrared cameras, as one system.

- **Change to system-on-a-chip (SOC) model:** With the increase in interest from OEMs, Foresight has modified its previous strategy to adapt software to conform to the chip standards

of the platforms of established tier one players and plans to sell SOCs, which is more the usual method of delivering software direct to OEM's.

- ■ **Develop ADAS fusion software** Proof of concept (POC) in 2019 to process inputs from stereo cameras and other sensors with vehicle-to-vehicle (V2V) communication capabilities. This product will have particular applications for the fast-developing FA vehicle market.

- ■ **Focus on the fast-growth, less penetrated Chinese and other developing markets** to enable tier one suppliers to provide high-quality, low-cost alternatives for local manufacturers.

Rail Vision: A complete solution, software and hardware; initially European/US focused

- ■ **Create a complete platform** for the railway industry: hardware and software.

- ■ **Develop rail AEB product** utilising thermal (FIR) camera stereo technology enabling object detection to a range of 1.5km. First product prototype planned Q218.

- ■ **Develop ongoing revenue streams** from sensors attached to the train including weather feeds, mapping of rail infrastructure and the surrounding area, pre-maintenance checks on rail/train infrastructure and security applications.

Key products

In Exhibit 2 we summarise the key industry and company milestones to track out to 2020.

Exhibit 2: Milestone history and outlook – FRSX and Rail Vision
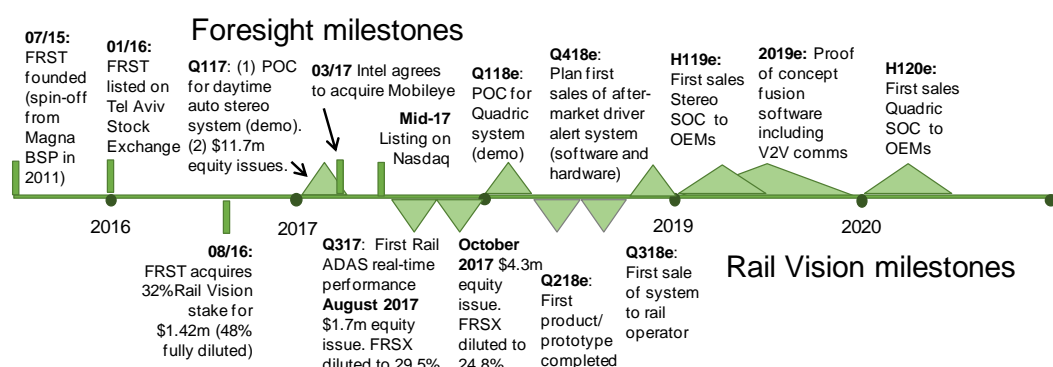
Source: Edison Investment Research, Foresight Autonomous Holdings

Exhibit 3: Existing products

Product type	Description
"Eyes-On" stereo vision camera system: Stereo camera system for superior performance in daylight	FRSX launched the proof of concept for its first stereo vision ADAS product in Q117 involving live demonstrations and data from road trials of the product. The system currently offered is for the creation of 3D stereo images from light cameras positioned 30cm apart for use in daylight conditions. Features currently on offer include AODW (All Obstacle Detection Warning) - ability to detect any critical obstacle in front of the vehicle regardless to its shape or material and lane departure warning (LDW). Under development are features such as TSR (traffic sign recognition), PCW (predictive collision warning) and HCW (high clearance warning). We understand that pilot trials in China have shown superior performance over a commercial mono system in terms of object detection rates. The system also aims to detect and risk-assess all objects rather than only those that are recognised by the system, with targeted near 100% object detection.
"Multi Eyes-On" Quadric camera system. Combined CMOS and infrared – all weather and night vision system	FRSX's quadric camera night-vision system uses two CMOS (image) and two infrared cameras. The POC (demo) is expected to be completed in Q118, but the product is likely to take longer to translate into sales than the stereo system which is more suited to the current state of the ADAS market. As such, we assume first sales of this system in 2020. To date infrared cameras have principally been deployed to assist drivers by providing infrared images on in-car screens. This has led some analysts to predict that sales of infrared cameras would peak in 2025 as driverless cars became the norm. Nevertheless, FRSX will use infrared primarily to enable the ADAS system to detect obstacles in all weather and lighting conditions, so we see the product as having applications in both ADAS and fully autonomous driving.

Source: Edison Investment Research, Foresight Autonomous

FRSX advanced stereo and quadric systems

Foresight aims to achieve a significant advance in the reliability of forward cameras with the launch of its proof of concept for a stereo ADAS system in 2017 (for a comparison of stereo and mono-camera systems and their relative advantages, see our note from September 2016, Driving the autonomous revolution).

Using software to process stereo camera images, the stereo ADAS system aims for object detection of near 100%. It also aims for zero false positives to avoid unnecessary braking and swerving. Recent tests by the German auto association ADAC appears to show significant potential for improvement in AEB object detection systems in the market. Rating performance on a scale of 0 to 100% (100% being an untouched dummy, 0% a run-over dummy), all but one of the six vehicles tested (the Audi A4) scored 25% or less in encounters with a cyclist at 4 0km/hour, and the same vehicles scored 54% or less testing for a partly obscured child at 50km/hour. Subaru's stereo system was best in class at night and with adult pedestrians.

We summarise FRSX's advantages/key advances as follows:

- **Extensive 16-year experience of Magna BSP of stereo detection systems based on IR/CCD stereo camera fusions**.

- **Superior coping in bad weather/light** conditions versus mono camera systems.

- **Superior coping in all-weather/light** conditions with the addition of Far Infrared (FIR) thermal technology which is normally used for night vision, but overcoming the complexity of creating a stereo coupling with an image (CMOS) camera provides all-weather reliability.

- **Superior separating out of objects from background noise**, which, for example, boosts object detection rates in the countryside where the signal from smaller objects, such as children, can be less strong than the background surroundings.

- **It expects to offer a competitive range of ADAS functions**, as can be seen from Exhibit 4.

Exhibit 4: Planned product launches	
Product type	**Description**
"Eyes-On" driver warning system for aftermarket (2018): Helping drivers to drive more safely	FRSX plans to launch an "Eyes-On" branded aftermarket driver warning system in H218.The system offers users passive warning systems including lane departure warning (LDW), all obstacle detection warning (AODW), which encompasses vehicle, pedestrian and cyclist as well as other object detection and warnings. In the near future, it plans to add a few more functions such as traffic sign recognition (TSR) and predictive collision warning (PCW). In addition the "Eyes-On" system will be offered to OEMs as an ADAS system in 2019.
Sensor Fusion/V2V Software (2019): Getting all the sensors to work together	FRSX plans to release a proof-of-concept product for Sensor Fusion Software incorporating vehicle-to-vehicle communication in 2019. The software will include surround view functionality and be aimed at level 3, 4 and 5 automated vehicles making use of advanced processing platforms and multiple sensor inputs to make intelligent decisions in complex road situations as well as accurately positioning the vehicle. The addition of V2V communication will enable the platform to talk to other components in the car and other vehicles.
Other products under consideration	■ The company is developing a smartphone app to alert drivers and vehicles to the nearby presence of pedestrians and vice versa using mobile communications and satellite positioning technology.
Source: Edison Investment Research, Foresight Autonomous	

Exhibit 5: Tier one/competitive landscape								
		Camera system	FCW/AEB/LDW	BSCW	Sign recognition	PCW	Small animals	Surround view
Foresight*	Developer	**Stereo**	X		X	X	X	X**
Mobileye	Developer	Mono	X		X	X		
Intellivision	Developer	Mono aftermarket	X					
Magna	Tier 1	Mono (Mobileye)	X		X	X		
TRW	Tier 1	Mono (Mobileye)	X		X	X		
Valeo	Tier 1	Mono		X				
Harman Int.	Tier 1	Unknown	X			X		X
Denso/Toshiba	Tier 1	Stereo with radar	X		X	X		X
Hitachi	Tier 1	Stereo	X					
Bosch	Tier 1	Stereo	X		X	X		
Autoliv	Tier 1	Mono/Stereo	X		X	X		
Google	OEM	Mono	X	X		X	X	X
Subaru	OEM	Stereo	X			X		

Source: Foresight Autonomous Holdings, Edison Investment Research. Note: *Planned. **Planned for 2019. FCW = forward collision warning, BSCW = blind spot collision warning, PCW = passenger collision warning.

New aftermarket product: Eyes-On

In H218, Foresight plans to launch an aftermarket driver alert system, as part of its "Eyes-On" brand, which includes a stereo vision camera system with software. The group is looking to make its first sales of the system in 2018. FRSX intends to provide Eyes-On driver alert users with lane departure warning (LDW), all obstacle detection warning (AODW). In the near future, it plans to add more functions such as traffic sign recognition (TSR) and predictive collision warning (PCW).

Exhibit 6: Eyes-On passive warning system	Exhibit 7: All obstacle detection system
Source: Foresight Autonomous	Source: Foresight Autonomous
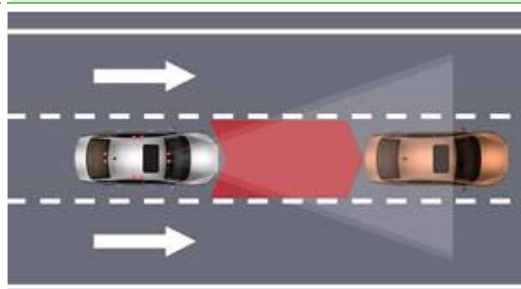
We expect Mobileye to be FRSX's chief competitor, given its estimated 80% market share in ADAS products (Gartner 2017), particularly with Israeli vehicle importers. With sales to fleets, we see mainstream telematics companies as another key source of competition. Mobileye grew aftermarket sales by 38% in 2015, generating revenues of $82m from customers including Coca-Cola Hellenic, UPS, DHL, ICEE and Abbott Pharmaceuticals. It brands its aftermarket system for fleets as Advanced Driver Assistance, the features of which include LDW, FCW, PCW and CDW as well as headway monitoring warning (HMW), which alerts drivers to unsafe distances from the vehicle in front. FRSX will be offering All Obstacle Detection Warning (which encompasses vehicle, pedestrian and cyclist as well as other object detection and warnings), and LDW. In the near future, Foresight plans to add more functions such as traffic sign recognition (TSR) and predictive collision warning (PCW). Other key features offered by Mobileye are speed limit indicators, turn-signal reminders and intelligent high beam control. Similar to Foresight its product is easy to install and integrate with telematics.

A competitive advantage versus telematics operators is that the Foresight (and Mobileye) products are priced as a one-off payment rather than as ongoing charges, which are the norm with

telematics companies. Helped by this, Foresight will target smaller fleets, where fewer features are required than in the large fleet segment, typically serviced by telematics firms.

Market: Growth potential until ADAS becomes standard in new vehicles

Over the next few years, the aftermarket appears to have significant growth potential. MiX Telematics research from 2017 indicates that only one in 10 fleet vehicles in the UK, which is highly advanced for telematics, contain behaviour monitoring systems. Applying this to the 12.3m total commercial vehicles and trucks in fleets in the US of as of 2015 according to US Bureau of Transportation Statistics data, gives rise to a potential market in the US alone of 11.1m vehicles.

In the longer term, we expect the take-up of driver behaviour systems to migrate from aftermarket installations to telematics suppliers and OEM-installations as standard. We expect Foresight to derive early revenues streams from the aftermarket product, complementary to its core software revenue streams.

Route to market

We believe that FRSX is in a good position to drive early sales into the Israeli aftermarket helped by its strong relationships with Israel's car importers, six of whom have shareholdings in Foresight and combined imports of over 35% of the total imports market of 287,000 units. With subsidies based on the number of features offered and structured such that they are likely to cover the bulk of the purchase and installation cost of the units, importers are given a strong financial incentive to reject the OEM's own ADAS offerings and to install aftermarket products. Helped by this we assume at its peak that Foresight's aftermarket reaches 13% penetration of vehicles imported into Israel in 2021.

For modelling purposes, we have assumed a price per unit of $350 and that demand for FRSX's standalone aftermarket product will peak in 2021 in Europe and the US. Nevertheless, we expect demand from markets such as China to continue to grow, reflecting the expected continued lag in ADAS implementation in its OEM market, as well as less competition relative to developed markets from telematics providers (see Exhibit 9).

Exhibit 8: Foresight: Edison estimated aftermarket driver assistance systems unit sales to total new fleet vehicles by country (%)	Exhibit 9: Foresight: Edison estimated sales of aftermarket driver assistance systems units by market
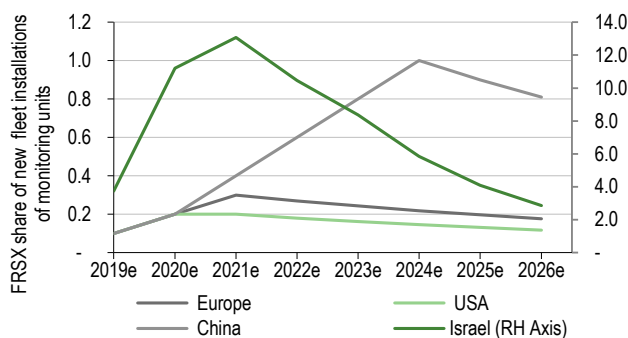
Source: Edison Investment Research
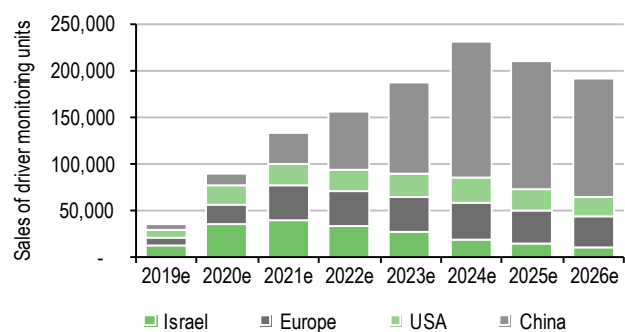
Source: Edison Investment Research

ADAS Market: Major boost from Chinese regulation

Regulation key driver of growth

ADAS is one of the fastest growing markets in the auto industry, with regulation being a key driver of active systems such as AEB which drive demand for forward camera systems. ABI Research forecasts total spending in the ADAS market to grow at a 29% CAGR over the next decade, with

sales of vulnerable user (cyclists/pedestrians) detection systems, which are principally reliant on forward camera systems, forecast to achieve a 49% CAGR during this period. From 2020, the growth of FA vehicle production should further boost demand for forward camera systems. Key market drivers, therefore, are:

- **New C-NCAP regulations in China expected to boost AEB to c 40% in 2020:** From a very cautious approach to incorporation of AEB features, China's NCAP body's new regulations indicate a new approach and are likely to drive a sharp increase in ADAS take-up from 1 January 2019. Over the next three years, the weighting given to active ADAS features as part of the assessment of 5-star rated new vehicles will be increased such that it will effectively be a requirement by 2020. With 76% of new vehicle models rated 5-stars in China, we see the potential for AEB penetration to reach 40% of new car production by 2020 and 70% by 2025 (see discussion in China market discussion below).

- **New Euro NCAP** regulations requiring AEB as standard in top rated cars in EU.

- **Industry-wide agreements to make AEB standard:** Agreed in the US from September 2022. The EU wants a similar deadline. More deals are likely in developed nations from 2022-27 and others from 2027.

- **Ongoing ADAS feature development and OEM product differentiation**.

- **Familiarity increases demand:** Once tried, ADAS repurchase rates are 87-89% (McKinsey Survey on Connected Cars, 2015).

- **Growth in consumer demand for ADAS and FA vehicles due to savings** from lower running costs, lower insurance premiums and ride-sharing (FA vehicles), and **ageing populations**.

- **Lower production costs** driven by falling equipment costs and increasing economies of scale.

Europe and in particular Germany lead the way in ADAS. As early as 2014, 20% of new German cars were fitted with AEB and 21% with lane keeping assist (LKA) functions (source: Bosch). In the US, in 2016 AEB was available in 51% of all vehicle models, but standard in only 6% of new cars (vs 7% in the UK). Volvo and Tesla were the only OEMs to offer it across their entire ranges in that year (source: Jato Dynamics Ltd).

In June 2016, research company Research In China estimated global automotive forward camera shipments to have been 9.1m units in 2015. This implies global AEB penetration of c 5-7% of new vehicles based on an average 1.5-2.0 front cameras per car. Based on regional estimates, we estimate global penetration of AEBs in new cars to have been c 11% in 2016, and boosted by Chinese regulatory pressure, forecast 41% in 2020 and 77% in 2025.

Exhibit 10: AEB (Autonomous Emergency Brake) market forecasts

	Total vehicle sales* (m)				CAGR (%)		AEB new car penetration (%)			AEB unit sales (m)		
	2015	2016	2020e	2025e	2015-20	2020-25	2016e	2020e	2025	2016e	2020e	2025
North America	21.2	21.5	21.2	21.2	0.0	0.0	18	57	100	3.9	12.1	21.2
Western Europe	15.2	16.1	17.2	20.6	2.5	3.7	19	58	90	3.1	10.0	18.6
Eastern Europe	3.8	4.0	5.3	6.4	7.0	3.7	4	20	60	0.2	1.1	3.9
China	24.7	28.0	30.0	32.6	4.0	1.7	5	40	70	1.4	12.0	22.8
India	3.4	3.7	4.6	5.0	6.1	1.7	1	8	24	0.0	0.4	1.2
Other Asia	15.3	15.2	15.3	15.3	0.0	0.0	8	30	70	1.2	4.6	10.7
South America	4.5	4.1	4.7	5.8	0.8	4.2	4	20	60	0.2	0.9	3.5
Africa	1.5	1.3	1.6	2.0	0.8	4.2	1	5	10	0.0	0.1	0.2
Total	**89.7**	**93.9**	**100.0**	**106.9**	**2.2**	**1.4**	**10.6**	**41.1**	**76.7**	**9.9**	**41.1**	**82.0**
CAGR from 2015 (%)	N/A	4.6	2.2	1.8	N/A	N/A	108.4	52.0	31.2	118.1	55.3	33.5

Source: Edison Investment Research, OICA (historic vehicle sales data) * All vehicle types

Initial target market – China

China is the world's largest vehicle producer, with sales of 28m vehicles in 2016, representing 30% of global output. Vehicle demand is being driven by low current levels of car ownership, increasing

urbanisation and rapid growth in the proportion of middle-income earners, while ADAS demand should be driven by much greater focus on ADAS installation in vehicle testing by C-NCAP (see ADAS market discussion above). With very few local tier ones selling ADAS products in China, the market also has lower barriers to entry for new players than is the case in the US and Europe.

From a very cautious approach to AEB features following some high profile product recalls in the West, in coming years China looks set to become a leader in regulatory driven ADAS implementation. From 1 January 2019 the C-NCAP safety rating process for 5-star vehicles (which form 76% of new vehicle models and so are not the preserve of the premium segment) will give 26% weighting for AEB, including pedestrians and vehicles collision avoidance features, rising to 38% in 2019 and 55% in 2020. With 76% of rated new car models in China currently attracting 5-star ratings and C-NCAP guidelines showing that testing should be widespread (it is to be mandatory testing of all models with over 3k unit sales), we see the 55% weighting leading to all 5-star cars requiring AEB installations by 2020. Bearing in mind that new lower-rated mass market models are likely to have higher production runs than 5-star models, this has led us to increase our 2020 forecast for AEB installations in new vehicles in China from 20% to 40% of new cars, and from 60% to 70% in 2025 (see Exhibit 10).

After regulation, we see affordability as the key factor governing stereo camera ADAS take-up in the Chinese market. The country has a very high output of budget class cars; in 2015, 29% were priced at $12k or less. Nevertheless, many car owners are young professionals, for whom safety is a significant consideration, who have already bought entry-level cars and are looking to upgrade to larger vehicles. In 2015, 31% of cars sold were in the $22,500 or higher price category and McKinsey forecasts this to grow to 33% by 2020. Helped by falling hardware costs and rising economies of scale, we see this as the key addressable market for well-priced ADAS stereo camera systems, on a five- to 10-year view, taking into account the $26k starting price of stereo-camera-as-standard Subaru cars in the US.

Product positioning

We expect FRSX to position its products as:

- **Stereo**: A quality ADAS system aimed at OEMs/aftermarket consumers offering superior detection and safety features versus competitors.
- **Quadric**: A superior-quality CMOS (image) and IR-enabled stereo solution, initially providing premium vehicles and then higher-priced/mass-market vehicles with unique all-weather, day/night solutions, with expectation of a solution for Fully Autonomous vehicles at a later stage.

Route to market

FRSX originally intended to focus its attention on tier one suppliers to reach OEMs, but in China it has gained direct access to OEMs, having completed three pilot trials with major OEMs. The next step is typically introduction to the OEM's favoured tier one supplier, and the supply of its software on a System on Chip (SOC).

Exhibit 11: Market participants

Competitor type	Description
Developers	**Mobileye** (now part of the Intel Group) is the pioneer in the ADAS vision market and the dominant ADAS equipment supplier with 15m systems installed and some 25 OEM and tier one customers, giving it a c 80% market share in ADAS in 2017 (Gartner). The company has focused exclusively on mono camera solutions, and solely sells hardware and software solutions on its own proprietary chipsets. In 2016 it announced an agreement with tier one Delphi to develop a fully autonomous driving platform to sell directly to OEMs, which could result in a number of smaller OEMs reaching parity with the majors much more quickly than previously expected. Further out, we believe that Mobileye's lack of stereo camera products could become a competitive disadvantage. In terms of other developers, unlisted video analytics company **Intellivision** is arguably the most similar to FRSX. It offers an aftermarket ADAS solution, being software to run a windshield-mounted camera to provide FCW and LDW. We do not see mono-camera Intellivision as a competitor to FRSX, which has higher-quality product targeted purely at the OEM market.
Tier ones	**Magna** and **TRW** (ZF), two of the largest auto suppliers globally, are currently working with **Mobileye** to develop mono camera-based AEB fusion platforms, while **Hitachi** has developed its own stereo system that it supplies to **Suzuki**. **Autoliv** has a stereo product with a 100m range, but we are not aware of its use by any OEMs. **Bosch** and **Denso** also develop stereo systems. **Valeo** remains focused on mono systems. **Continental** incorporated a stereo camera into its ContiGuard ADAS system in 2011, but replaced it with a more expensive mono camera and Lidar combination, in keeping with its focus on the top-end OEM target market.
Semiconductor manufacturers	Semiconductor firms that provide chips to the auto industry, including **Intel**, **Qualcomm**, **NVIDIA**, **Samsung**, **Panasonic** and **Sony**, are also pursing ADAS opportunities. According to McKinsey (2017), they are looking to broaden their exposure to the sector with acquisitions bringing know-how in sensors, systems and software.

Source: Company websites, Research In China, Edison Investment Research, McKinsey

Market participants/competition

As can be seen in Exhibit 5, a number of tier ones already have significant engagement with stereo, so there is considerable potential competition in the market from external and in-house software developers. Nevertheless, we still see them as part, if not a key part, of FRSX's addressable market. As mentioned earlier, the key challenge for FRSX will be to demonstrate that its solutions represent a substantial step forward in safety terms, which it is working to do via extensive pilot test driving. If it does this, then tier ones already supplying OEMs with stereo rigs in their models are likely to be a receptive audience in their quest to retain these OEMs as customers.

Tier one Autoliv and OEM Subaru both claim a similar c 100m stereo camera range to FRSX, so the company does face direct competition in longer-range stereo. While it is not possible to exclude the possibility that other tier ones are aiming for similar improvements in object detection rates to those targeted by FRSX, we believe FRSX has the advantage of access to Magna BSP's 16 years' know-how in stereo camera object detection for better interpretation of the infrared and image (CMOS) camera output.

Rail Vision

Rail Vision is a development-stage company working on a collision avoidance system using thermal camera imaging and military technology. The aim is to detect objects in the path of trains and apply autonomous braking systems, if necessary. In addition, it will incorporate sensors and cameras into the on-board system to collect and sell a range of data from the trains' surroundings including weather metrics, network mapping, infrastructure conditions, etc, to generate recurring revenues.

The business was founded in 2014 by four scientists: Elen Katz, CEO, who has a robotics background with Homeland Security; Shahar Hania (VP, master's physics/electro optics) and Dr Yuval Isbi (PhD physics/electro optics), both with backgrounds at defence contractor Elbit Systems; and Noam Taich (COO), who has extensive experience in complex stills and videos in defence. RV was incorporated in May 2016 and FRSX acquired a 13.5% stake in August 2016 for NIS2.3m ($0.6m). In August 2016 FRSX increased its stake to 32.0% by exercising warrants, but this year has been diluted back to 24.8% by not taking part in two capital issues totalling $6.0m in August and October 2017. Foresight has warrants to increase its stake to 38.7% for an outlay of $11.4m.

RV was founded to apply ADAS solutions to rail systems, and in particular the problems arising from the extreme high speeds of modern trains vs slow reaction times of humans. At 300-400km per hour, two seconds can see a train move 200m along the track before the brakes are applied.

According to the company, many attempts to solve the problem with video cameras have failed because they do not work at night time or in low visibility. RV employs thermal (far infrared) and CCD (image) cameras mounted on top of a driving unit to enable the system to "see" up to 1.5km ahead (in clear line of sight) and autonomously apply brakes while alerting the driver and central controllers of a dangerous object ahead. While the CCD camera provides rich data in the daytime, the infrared camera picks up the different thermal signatures of objects, including "cold" concrete, which has a heat factor 50 times that of rails. This enables the system to operate at night time and in poor light and in a range of severe weather including fog, sand, dust and snow.

Route to market: Gaining traction with major operators

RV is currently approaching the leading European and North American railway operators with the aim of selling complete systems (hardware and integrated software) directly to them. Management believes that it has first-mover advantage in long-range detection based on its discussions with leading European rail companies. RV's system has successfully completed six trials with Israel Railways and in late 2016 undertook a pilot trial with the Italian national rail operator, FS Italiane, for safety and network mapping services. In February 2017, RV also completed a successful demonstration of its system with Deutsche Bahn, after being selected to take part in DB's Start-up accelerator programme.

The company plans to release its prototype for its collision avoidance system in Q218 and hopes to achieve sales of several units shortly thereafter to a major European or Israeli railway. It intends to demonstrate the following KPIs in its prototype:

■ Ability to detect objects 1.5km down the track, where there is line of sight.

■ Ability to identify humans, vehicles and small animals to decide if train needs to stop.

■ Provision of highly accurate and reliable object recognition with the lowest rate of false alerts.

■ Conveyance of real-time information to drivers' controls as well as rail controllers.

■ Ability to be deployed in driven and driverless trains.

State of the market: Safety a key driver, limited competition

To date camera and sensor technology has only been located at key points on the rail networks (eg level crossings) and under track monitoring equipment. Siemens is currently developing a system placing sensors along rail lines to sense objects in the track area and halt trains in the area, if needed. We can see considerable utility for the system in smaller EU rail networks, but believe that capital costs could act as a barrier to widespread application in larger and poorer countries.

RV expects the greatest initial demand to come from highly safety-oriented Europe and the US. Looking at the case for the EU, based on an estimated notional initial $80-100k installed unit cost, we estimate that the system would cost $6.6-8.2bn to install across the EU fleet of 82k locomotives and railcars/ multiple units. According to the European Railway Agency, significant rail accidents cost €2.5bn ($2.8bn) in 2011. In over 85% of cases, the accidents were caused by collisions with objects, not other trains. On this basis, a 25-50% reduction in these collisions would give rise to an attractive 9-21% ROI.

In the US, regulators have introduced a requirement for lines carrying heavy passenger traffic or dangerous cargos to implement positive train control (PTC) systems, originally by end 2015 but extended out to 2020 in the face of poor compliance by railways, some of which threatened to close rather than implement the investments. PTC systems require on-board computers on trains, track-side sensors and a central control radio station, which enable the system to stop trains in the face of a potential collision. Implementation requires complete mapping of the system, and considerable infrastructure investment.

We believe taking cost and distances involved, that there is not a good case for such systems to be deployed in large-scale networks in Russia, China, India and Brazil. Unguarded crossing points and signalling problems pose significant dangers of accidents and derailments, while the large scale of the networks makes trackside infrastructure less economic. On this basis, we expect initial orders for RV's train-mounted systems from Europe to be followed reasonably swiftly by demand from Russia and Asia.

We see sales of data as being a key part of the business model. With many rail networks crossing remote areas, sensors on trains have applications including weather monitoring, track assessment and mapping of infrastructure. RV intends to actively pursue revenue streams from this area.

Rail Vision: Revenue forecast and valuation

We have modelled Rail Vision's revenues based on an estimate of the proportion of the existing global PRU fleet that will adopt ADAS systems. We assume that RV will complete its prototype in Q218 and commence sales of its product in the next quarter, with the sale of five units. We assume a gradual increase in the percentage of the global rail fleet to have ADAS systems installed, reaching 1% in 2020 and 5% by 2025. At present, we are not aware of other operators with similarly advanced ADAS systems for rail networks. Nevertheless, given the potential for other small players to emerge in coming years, we have adopted conservative market share assumptions starting at c 40% in 2018-20 and falling to below 20% by 2023.

We have also forecast big data revenues per ADAS-installed PRU at $1,000 per annum, reflecting the wide range of data which will potentially attract buyers, including data on the state of the rail network, surrounding terrain/crops, and weather etc. Based on the above we derive an equity valuation of the company of $79.3m, equivalent to NIS0.0.65 per diluted FRSX share.

Exhibit 12: Rail Vision revenue forecast and valuation

$m	2017e	2018e	2019e	2020e	2021e	2022e	2023e	2024e	2025e
Global powered rail unit fleet (units)*	807,594	810,017	812,447	814,884	817,329	819,781	822,240	824,707	827,181
Change (%)	0.0	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3
Market for ADAS systems (% of fleet)	0.00	0.02	0.16	1.03	1.52	2.04	2.76	3.75	5.06
Total ADAS market (units)	0	166	1,335	8,400	12,444	16,740	22,686	30,913	41,861
Rail Vision market share (%)	100	39	37	40	33	25	19	17	16
Rail Vision sales (units)	0	65	498	3,391	4,108	4,143	4,209	5,133	6,524
Sales price ($k)	80	68	58	49	47	44	42	40	38
Maintenance charge ($pa/unit fitted)	5,600	4,760	4,046	3,439	3,267	3,104	2,949	2,801	2,661
Revenues	0.0	4.6	30.4	176.6	217.4	225.3	233.8	277.6	338.8
EV/Revenue multiple**		4.2	4.2						
Enterprise value		19.2	127.7						
EV discounted to 2017 (WACC 15%)		16.7	127.7						
Average EV: 2018/2019	72.2	FRST stake (%)			24.8				
Net cash YE16 pro forma plus $6m equity issue in 2017 (estimate)	7.1	Value of FRST stake ($m)			19.6				
Company valuation	79.3	**Value of FRST stake (NIS/share)**			0.65				

Source: Foresight Autonomous Holdings, Edison Investment Research. Note: *We believe that UIC (International Union of Railways) data implying the number of PRUs in the EU, Europe and worldwide at 91k, 124k and 201k are significantly understated, reflecting large-scale privatisation in the industry and poor reporting standards. To overcome this we have applied German multiples of PRU per train km, rail passenger km and rail freight tonne km to the corresponding data for the regions less 30% and 50% discounts, respectively, to the European and worldwide figures to reflect longer trains and heavier cargos, resulting in revised PRU estimates of 121k, 340k and 808k in the EU, Europe and worldwide, respectively. **Based on average EV/Revenue of Tesla (ADAS auto hardware), BII Railway transportation technology (Railway traffic management systems) and Nvidia (Interactive 3D graphics).

Visibility with Rail Vision is very poor as it is unlisted and makes few financial disclosures. Nevertheless, based on our assumption of $1.1m cash at end-2016 and the addition of $6.0m in equity financing during this year ($1.7m in August and $4.3m in October), we apply estimated adjusted cash resources of c $7.1m in Exhibit 12.

Assuming that RV's products live up to their promise, we expect further funding to come from warrants held by existing shareholders. FRSX has warrants to increase its stake further to 47% by February 2019 for an additional $11.3m.

We have undertaken a valuation of Rail Vision applying EV/revenue multiples of 4.2x. With no real direct listed competitors, we have derived this number from the average current multiples of three companies representing different facets of the Rail Vision business: Tesla (TSLA), which is involved in cutting edge driverless auto technology (trading on an EV/revenue 3.5x), BII Railway (HKG:1522) transportation technology, active in global railway traffic management systems (EV/revenue 4.7x) and Nvidia (NVDA), engaged globally in Interactive 3D graphics with numerous applications including autonomous driving (EV/revenue 4.4x). While Tesla is at a more advanced stage in its development than Rail Vision, we believe that the strong potential upside of both businesses if their autonomous driving products are successful and their focus on selling hardware rather than software provide useful parallels.

Management

The management team at FRSX is headed by **Haim Siboni**, the founder and CEO of both Foresight and parent company Magna BSP. Since its foundation in 2001, Mr Siboni has led Magna BSP to successfully develop stereo camera technology to achieve 99.5% object detection accuracy and built a leading position in global facilities and border security. **COO and Co-CEO Ariel Dor** has more than 10 years' experience in technology management, including telematics firm Galooli Ltd, and defence technology firm Elbit Systems Ltd. **CTO Levy Zruya** joined Magna BSP (where he continues as CTO) at its inception and is an engineer with 30 years' experience in high-tech industries, including the Israel Defense Forces and Israel Aircraft Industries. He is an expert in real-time software development, image processing and sensors. **CFO Eli Yoresh** has over 15 years' financial experience and an automotive background, having formerly been CEO of Tomcar Global Holdings, an international manufacturer of off-road vehicles. **VP R&D Dror Elbaz** brings 12 years' experience in multidisciplinary electro-optical systems, image processing and 3D reconstructions from a global B2B environment as well as further technology experience from the Israeli Navy. **VP Operations Oren Bar-on** has extensive international supply procurement experience via Lumenis while **VP Business Development Doron Cohadier** has extensive international management experience in strategic business development.

Sensitivities

Moving from development to marketing phase, growth sector

Our forecasts and valuation are affected by the following sensitivities:

- **A number of products still in development stage:** FRSX has yet to release the proof of concept for its quadric and sensor systems, and there is no certainty that these products or the aftermarket product will achieve their aims of close to 100% object detection or a substantial improvement in the functioning of ADAS systems.
- **Competitors:** Mobileye's plans to offer a complete standalone ADAS platform could reduce FRSX's addressable market if the lure of R&D cost savings attract a significant share of OEMs.
- **Funding requirements:** We forecast, based on existing end-June cash reserves of $18.3m, plus $5.7m from more recent warrant conversions, that FRSX is funded to cover cash burn until H219. We estimate a further funding requirement in 2019 and 2020 of $8-10m before the company becomes self-funding in H220, but note good prospects for this to be met with warrant conversions.

- **Exchange rates**: System sales are typically denominated in US dollars, but the bulk of FRSX's costs are salary payments in Israeli shekels.

- **Automotive regulation is likely to accelerate demand:** We see the potential for an increased focus on higher-quality object detection by regulators with the increased adoption of ADAS systems to create faster than forecast market growth.

- **Demand for AEB units in China** could be greater than forecast if China meets its ambitious target of attaining Euro NCAP standards in 2018 or pursues more ambitious ADAS targets.

- **RV could generate higher margins and revenues** from data sales if it is able to maintain market dominance for longer than we forecast or is able to generate data revenues from data collected by on-board sensors without being required to share the income with rail operators.

Financials

Exhibit 13: FRSX revenue and earnings assumptions

($m)	2017e	2018e	2019e	2020e	2021e	2022e	2023e	2024e	2025e
Chinese AEB market (m)	2.2	3.9	6.9	12.0	13.6	15.5	17.6	20.1	22.8
Foresight Chinese market share (%)	0.0	0.0	0.6	1.4	2.7	4.0	5.4	6.7	8.0
Foresight Chinese stereo systems, unit sales (000s)	-	-	41	168	371	627	945	1,340	1,824
ROW AEB market (m)	12.0	16.5	22.5	29.1	33.5	38.7	44.6	51.4	59.2
Foresight ROW market share (%)	0.0	0.0	0.1	0.4	0.7	1.1	1.4	1.7	2.0
Foresight ROW stereo systems, unit sales (000s)	-	-	22	121	246	406	609	865	1,184
Foresight aftermarket product, unit sales (000s)	**-**	**-**	**24**	**56**	**94**	**123**	**161**	**213**	**196**
Foresight stereo systems, unit CSAs (000s)	-	-	64	289	617	1,033	1,554	2,204	3,008
Foresight quad systems, unit CSAs (000s)	-	-	-	11	33	67	120	152	192
Foresight Sensor fusion systems, unit CSAs (000s)	-	-	64	289	617	1,033	1,554	2,204	3,008
Foresight total systems, unit CSAs* (000s)	**-**	**-**	**127**	**589**	**1,267**	**2,133**	**3,229**	**4,561**	**6,208**
Revenue	**0.0**	**1.1**	**14.6**	**42.1**	**65.1**	**102.6**	**144.0**	**186.5**	**224.4**
Employee numbers	56.0	76.0	91.0	137.0	153.0	171.3	185.5	177.2	168.9
EBITDA**	**(5.8)**	**(11.5)**	**(8.6)**	**2.2**	**11.8**	**32.2**	**43.5**	**55.7**	**66.5**
EBITDA margin** (%)	N/A	(1,003)	(59)	5.1	18.1	31.4	30.2	29.9	29.6

Source: Edison Investment Research. Note: *CSA = commercial sale agreements. **Normalised.

Earnings: Getting in on the ground floor in China

During H117 FRSX reported EBITDA losses of $4.1m (H216: $1.8m), which were boosted by $1.6m in ESOP share payments. Normalised loss before tax (stripping our ESOP payments) reached $2.2m up from $1.7m, on rising operating costs related to the intense marketing and pilot trial activity. Our forecasts for FRSX depend on it reaching a number of key milestones as shown in Exhibit 2, and discussed in Exhibit 3 and 4, above. The most important events for our model are first sales from the aftermarket product and ADAS software and timing for the POC and first pilot trials for fusion and V2V software in 2019. We forecast FRSX to become profitable at the EBITDA level and to start generating free cash flow in H220, which is later than management, which is looking for positive PBT by end 2019, reflecting our more conservative sales ramp assumptions.

Key revenue and earnings assumptions

Our key revenue and earnings assumptions are shown in Exhibit 13. We assume:

- First commercial sales agreements and revenues in 2018.

- First sales of aftermarket driver alert systems in Q418. First sales of stereo camera systems to OEMs from H119.

- First sales of Quad Stereo vision/infra-red camera systems in H120.

- For the sake of our model, and lacking existing price points from the company, we assume sales prices for the stereo and quad SOCs of $50-60 and $100-120 per unit over the next three years.

- Reported EBITDA margins capped at 28.5% representing a premium of 0.0-1.5% points to the four-year averages for the semiconductor and software sectors of 27% and 28.5%, respectively (NB: Adjustments for ESOP payments bring the normalised EBITDA margins to 1-1.5% points above this level). The most recent margin for Mobileye is 35.6%, while its five-year average is 26.0% (Thomson).

- With the move to sales of systems on chips, we have modified our revenues to include 33% higher sales prices for the stereo and quadric software, to include the chip cost and have modified costs of goods sold to include chip sales and hardware costs associated with the planned driver warning aftermarket product.

Cash flow: Multiple sources of potential funding

Foresight no longer publishes interim cash flow statements. Working from the balance sheet, adjusting for $16.3m in new equity funds during H117, arising from a private placement raising a net $10.7m and warrant conversions raising $5.6m, indicates a potential total cash burn (operating and investing cash flows) in H117 of c $2.9m. This compares with $2.3m in 2016, excluding equity investments in Rail Vision, reflecting increased product launch activity. We forecast cash burn at $6.2m this year made up of $5.8m in operating cash outflows and $0.4m in capex. We expect cash outflows to increase in 2018 and 2019 to $11.6 and $11.7m as more of the group's products move to pilot trial stage and marketing and selling costs continue to grow.

Balance sheet: Cash to fund development

Following $10.7m in cash raised from private placements and a further $5.6m from warrant conversions, Foresight finished H117 with $18.3m in cash reserves and no financial debt. With the addition of a further $5.7m to cash from warrant conversions since the mid-year point, we estimate that the company has sufficient funding to take it through to H219, and later if there are further warrant conversions during this period. We estimate a further funding requirement in H219 and H120 of $8-10m before the company becomes self-funding in H220. We expect warrant conversions to fund a significant proportion if not all of this potential gap, based on the $39.3m potential funds inflow from conversion of warrants with exercise prices of up to NIS4.0 per share (see Exhibit 14).

Exhibit 14: Outstanding warrants

As of 26 October 2017	Total issued	Exercise prices up to NIS4.0	Exercise price	Theoretical funds from conversion	
			NIS*	NISm**	$m**
Series A total (NIS3 exercise)	2,028,568	2,028,568	3.00	6.1	1.7
Series B total (NIS4 exercise)	11,781,552	11,781,552	4.00	47.1	13.3
Series C total (NIS3 exercise)	1,000,000	1,000,000	3.00	3.0	0.8
Series C Vesting over 36 mths from 1/10/16 at 1.95	533,667	533,667	1.95	1.0	0.3
Series C Vesting over 36 mths from 27/08/17 at 6.96	550,000	-	6.96	0.0	0.0
Series C Vesting over 36 mths from 1/01/17 at 3.57	970,000	970,000	3.57	3.5	1.0
Series D: vesting from 01/01/2016 in 10 equal portions over 36 months at NIS0.3	1,794,205	1,794,205	0.30	0.5	0.2
Series D: ESOP vesting in 36 months from 01/10/16 at NIS1.95 per share	900,000	900,000	1.95	1.8	0.5
Series D: ESOP vesting in 36 months from 01/1/17 at NIS1.95 per share	2,525,000	2,525,000	1.95	4.9	1.4
Series D: ESOP vesting in 36 months from 01/1/17 at NIS2.31 per share	2,150,000	2,150,000	2.31	5.0	1.4
Series D: ESOP vesting in 36 months 0.6m from 01/10/16, 0.6m from 27/08/17 at NIS6.13 per share.	1,200,000	-	6.13	0.0	0.0
Series E: Exercisable for 36 months at NIS3 per warrant	2,790,056	2,790,056	3.00	8.4	2.4
Series F: Exercisable for 24 months at $0.8 per share	19,220,514	19,220,514	2.82	54.3	15.4
Series G: Exercisable for 18 months at $0.95 per share	1,001,665	1,001,665	3.35	3.4	1.0
Total	**48,445,227**	**46,695,227**	**2.97**	**138.9**	**39.3**

Source: Foresight Autonomous Holdings, Edison Investment Research. Note: *At NIS3.5306/US$ as of 27 October 2017. ** At exercise price up to NIS4.00

Valuation

We have utilised a DCF to value Foresight based on its current pre-revenue state. Helped by an increase in our market share assumption in China and the addition of aftermarket product sales, we have increased our valuation from NIS3.45 to NIS5.15 per share or $7.30 per ADR (see Exhibit 15). The key factors driving the valuation increase are (a) the addition of new revenue streams from the anticipated launch of the aftermarket driver assistance product which has added NIS0.98 per share to the valuation; (b) Faster growth expectations for the Chinese active driver assistance market arising from new C-NCAP regulations discussed above adding NIS0.35 per share; and (c) an increase in forecast market share in 2025 in China from 6% to 8%, which adds NIS0.37 per share to the valuation. Our key assumptions are:

■ A WACC of 15% to reflect the development-stage risk of the company and a terminal growth rate of 3%, reflecting the still-moderate growth potential we see for the sector from 2025.

■ We apply a value of $19.6m to Foresight's 24.8% stake in Rail Vision reflecting our EV/revenue valuation of the company (see Exhibit 12).

■ Our valuation is fully diluted for outstanding in-the-money warrants (which at the current price includes all outstanding warrants) and employee share options.

Exhibit 15: Foresight Group, DCF valuation

$m	2017e	2018e	2019e	2020e	2021e	2022e	2023e	2024e	2025e	2026e	2026e norm.
Revenue	0.0	1.1	14.6	42.1	65.1	102.6	144.0	186.5	224.4	262.3	262.3
change y-o-y	N/A	N/A	1175.6%	188.0%	54.5%	57.7%	40.3%	29.5%	20.4%	16.9%	0.0%
EBITDA*	(7.4)	(12.4)	(9.6)	0.7	9.8	30.0	41.0	53.1	64.0	74.8	70.8
EBITDA margin	N/A	N/A	N/A	1.6%	15.1%	29.2%	28.5%	28.5%	28.5%	28.5%	27.0%
Change in working capital	0.0	0.0	(2.8)	(4.3)	(3.5)	(6.5)	(5.6)	(6.6)	(6.0)	(6.4)	(5.2)
Capex	(0.4)	(0.2)	(0.3)	(0.4)	(1.4)	(1.4)	(1.8)	(2.3)	(2.6)	(3.0)	(5.2)
EBITDA - capex	(7.8)	(12.6)	(9.9)	0.3	8.4	28.5	39.2	50.9	61.3	71.7	65.6
Tax	0.0	0.0	0.0	0.0	0.0	0.0	(10.2)	(13.2)	(15.9)	(19.3)	(17.6)
Change in working capital	0.0	0.0	(2.8)	(4.3)	(3.5)	(6.5)	(5.6)	(6.6)	(6.0)	(6.4)	(5.2)
Other non-cash items	1.6	0.9	1.1	1.5	2.0	2.2	2.5	2.6	2.5	2.5	2.5
Free cash flow	(6.2)	(11.7)	(11.6)	(2.5)	6.9	24.2	25.8	33.6	42.0	48.5	45.2
Terminal value										388.0	
Total cash flow	(6.2)	(11.7)	(11.6)	(2.5)	6.9	24.2	25.8	33.6	42.0	436.5	
Discounted cash flows	(5.4)	(8.8)	(7.7)	(1.4)	3.4	10.5	9.7	11.0	11.9	107.9	

Enterprise value	131.1			
Equity valuation	179.6	Net debt (cash) end 2016	(3.8)	NIS/US$ FX rate applied	3.5306
Value of Rail Vision stake	19.6	Adjustment for:		WACC	15.0%
Total group value	199.2	Equity issues/merger funding 2017 YTD	(22.0)	Terminal growth rate	3.0%
Number of shares, diluted	136.5	Theoretical cash from warrant exercise**	(22.7)	Terminal value/EV	73%
Value per share (NIS)	**5.15**	Adjusted net debt (cash)	(48.4)		

Source: Edison Investment Research. Note: *Reported EBITDA, not normalised. **In-the-money and vested warrants only.

Moving our 2025 rest of the world (ROW) market share assumption up to 3.0% gives rise to a valuation of NIS6.26 per share. Our optimum case of 2025 market shares of 10% in China and 3.0% in the ROW gives rise to a valuation of NIS6.63 per share. The sensitivity of the valuation to 2025 market share assumptions is shown in Exhibit 16.

Exhibit 16: Sensitivity to market shares in China and rest of world 2025 (NIS/share)

		ADAS market share 2025: China, %						
		2.0	**4.0**	**6.0**	**8.0**	**10.0**	**12.0**	**25.0**
	0.0	1.95	2.32	2.67	3.05	3.37	3.75	6.09
	0.5	2.48	2.86	3.19	3.56	3.94	4.33	6.63
	1.0	3.06	3.37	3.75	4.13	4.42	4.79	7.18
ADAS	1.5	3.56	3.94	4.32	4.60	4.97	5.34	7.73
market	2.0	4.13	4.42	4.78	**5.15**	5.53	5.90	8.27
share	2.5	4.60	4.97	5.35	5.72	6.08	6.45	8.82
2025:	3.0	5.15	5.53	5.90	6.26	6.63	6.99	9.37
rest of	3.5	5.72	6.08	6.44	6.81	7.17	7.54	9.72
world, %	4.0	6.26	6.63	6.99	7.36	7.72	8.09	10.35
	4.5	6.81	7.17	7.54	7.90	8.27	8.63	10.89

Source: Edison Investment Research

Exhibit 17: Financial summary

$m	2016	2017e	2018e	2019e	2020e
31 December	US GAAP	US GAAP	US GAAP	US GAAP	US GAAP
INCOME STATEMENT					
Revenue	0.0	0.0	1.1	14.6	42.1
Cost of Sales	N/A	0.0	(1.7)	(9.4)	(20.2)
Gross Profit	N/A	0.0	(0.6)	5.2	21.9
EBITDA	(3.3)	(5.8)	(11.5)	(8.6)	2.2
Normalised operating profit	(3.3)	(5.8)	(11.5)	(8.6)	2.1
Amortisation of acquired intangibles	0.0	0.0	0.0	0.0	0.0
Exceptionals	0.0	0.0	0.0	0.0	0.0
Share-based payments	(0.4)	(1.6)	(0.9)	(1.1)	(1.5)
Reported operating profit	(3.8)	(7.4)	(12.4)	(9.7)	0.6
Net Interest	0.1	0.1	0.1	(0.1)	(0.3)
Joint ventures & associates (post tax)	(0.1)	0.0	0.0	0.0	0.0
Exceptionals	1.8	(23.1)	0.0	0.0	0.0
Profit before tax (norm)	(3.4)	(5.7)	(11.5)	(8.7)	1.8
Profit before tax (reported)	(1.9)	(30.4)	(12.3)	(9.8)	0.3
Reported tax	0.0	0.0	0.0	0.0	0.0
Profit after tax (norm)	(3.4)	(5.7)	(11.5)	(8.7)	1.8
Profit after tax (reported)	(1.9)	(30.4)	(12.3)	(9.8)	0.3
Minority interests	0.0	0.0	0.0	0.0	0.0
Discontinued operations	0.0	0.0	0.0	0.0	0.0
Net income (normalised)	(5.2)	(5.7)	(11.5)	(8.7)	1.8
Net income (reported)	(1.9)	(30.4)	(12.3)	(9.8)	0.3
Basic average number of shares outstanding (m)	67.3	92.8	107.1	107.3	107.3
EPS – basic normalised ($)	(0.077)	(0.061)	(0.107)	(0.081)	0.017
EPS – diluted normalised ($)	(0.077)	(0.061)	(0.107)	(0.081)	0.012
EPS – basic reported ($)	(0.028)	(0.327)	(0.115)	(0.091)	0.003
Dividend ($)	0.00	0.00	0.00	0.00	0.00
Revenue growth (%)	N/A	N/A	N/A	1,175.6	188.0
Gross margin (%)	N/A	N/A	-51.8	35.6	52.1
EBITDA margin (%)	N/A	N/A	-1002.8	-58.6	5.1
Normalised operating margin (%)	N/A	N/A	-1004.8	-58.9	5.0
BALANCE SHEET					
Fixed assets	1.4	1.8	2.0	2.2	2.6
Intangible assets	0.0	0.0	0.0	0.0	0.0
Tangible assets	0.1	0.5	0.7	1.0	1.3
Investments & other	1.3	1.3	1.3	1.3	1.3
Current assets	3.9	20.0	8.4	3.5	8.0
Stocks	0.0	0.0	0.0	0.0	0.0
Debtors	0.0	0.0	0.0	2.4	6.9
Cash & cash equivalents	3.8	19.9	8.2	1.0	1.0
Other	0.1	0.1	0.1	0.1	0.1
Current liabilities	(0.5)	(0.5)	(0.5)	(4.6)	(7.7)
Creditors	(0.5)	(0.5)	(0.5)	(0.1)	(0.3)
Tax and social security	0.0	0.0	0.0	0.0	0.0
Short-term borrowings	0.0	0.0	0.0	(4.5)	(7.3)
Other	0.0	0.0	0.0	0.0	0.0
Long-term liabilities	(0.1)	(14.2)	(14.2)	(14.2)	(14.2)
Long-term borrowings	0.0	0.0	0.0	0.0	0.0
Warrent conversion and other long-term liabilities	(0.1)	(14.2)	(14.2)	(14.2)	(14.2)
Net assets	4.7	7.0	(4.4)	(13.1)	(11.3)
Minority interests	0.0	0.0	0.0	0.0	0.0
Shareholders' equity	4.7	7.0	(4.4)	(13.1)	(11.3)
CASH FLOW					
Operating cash flow before WC and tax	(3.3)	(5.8)	(11.5)	(8.6)	2.2
Working capital	0.8	0.0	0.0	(2.8)	(4.3)
Exceptional & other	0.2	0.0	0.0	0.0	0.0
Tax	0.0	0.0	0.0	0.0	0.0
Net operating cash flow	(2.4)	(5.8)	(11.5)	(11.3)	(2.1)
Capex	(0.1)	(0.4)	(0.2)	(0.3)	(0.4)
Acquisitions/disposals	(1.3)	0.0	0.0	0.0	0.0
Net interest	0.0	0.1	0.1	(0.1)	(0.3)
Equity financing	6.3	22.0	0.0	0.0	0.0
Dividends	0.0	0.0	0.0	0.0	0.0
Other	1.2	0.0	0.0	0.0	0.0
Net cash flow	3.8	15.9	(11.6)	(11.7)	(2.8)
Opening net debt/(cash)	0.0	(3.8)	(19.9)	(8.2)	3.5
FX	0.0	0.2	0.0	0.0	0.0
Other non-cash movements	0.0	0.0	0.0	0.0	0.0
Closing net debt/(cash)	(3.8)	(19.9)	(8.2)	3.5	6.3

Source: Foresight Autonomous Holdings accounts, Edison Investment Research. Note: EBITDA, PBT and EPS (diluted) are normalised, excluding amortisation of acquired intangibles, exceptional items and share-based payments. Diluted EPS calculated using diluted shares in issue as calculated by company.

Contact details	Revenue by geography
3 Golda Meir Nes-Tziona, Israel +972 (0)77 9709030 www.foresightauto.com	N/A

Management team

CEO & Founder: Haim Siboni

Haim Siboni is the founder and CEO of Foresight as well as its major shareholder, Magna BSP Ltd, a leading security technology company and developer of innovative 3D multi-camera based intruder detection systems. Magna BSP was founded in 2001 and its systems are in place at international borders and sensitive facilities such as airports and nuclear reactors in countries around the world.

COO: Ariel Dor

Ariel Dor is a business strategy expert with more than 10 years' executive and technology management experience with particular expertise in business development and product management. He served for eight years in the IAF as a fighter pilot, graduating with honour, as squad commander deputy.

CTO: Levy Zruya

Levy Zruya has 30 years' experience in high-tech industries, including five years with the Israeli Defense Forces and 15 years with Israel Aircraft Industries. He is an expert in real-time software development including sensors, electro-optic modelling and performance evaluation, and image processing algorithms for missiles.

CFO: Eli Yoresh

Eli Yoresh has over 15 years' experience in financial management as well as extensive experience in the automotive industry. He is former CEO of Tomcar Global Holdings Ltd, a global manufacturer of off-road vehicles.

VP Operations: Oren Bar-on

Recent started at Foresight, Oren Bar-on's last position was the Global Operational Purchasing, Sourcing Management and Procurement Engineering teams in Europe, North America and Asia at Lumenis. Previous positions were Director of Operations and Materials Management at Philips. Education includes an MBA with honours from the University of Haifa as well as a BSc in Engineering and Industrial management at the Israel Institute of Technology.

VP R&D: Dror Elbaz

12 years of R&D experience with multidisciplinary electro-optical systems, image processing and 3D reconstruction in global B2B env. Four years of service in the Israeli navy in the fields of operations and naval electronic systems (RADARs, vision sensors, sonars, active scanners and electronic counter measures). Holds BSc in computer engineering and MBA in technological companies' management.

VP Business Development: Doron Cohadier

An entrepreneurial, highly motivated, strategic Business Development VP with managerial experience in large global companies. In addition, holding a rich variety of senior managerial positions ranging from Project Management, Supply Chain Management and Logistics, topped with the relevant educational background (BSc in Engineering, followed by an Executive MBA).

Principal shareholders	(%)
Magna BSP	33.44
Free float	66.56

Companies named in this report

Mobileye, Magna BSP, Suzuki, Mercedes, BMW, Volvo, Audi, Magna, TRW (ZF), Autoliv, Bosch, Denso, Fujitsu, Continental, Valeo, Hitachi, Suzuki, Subaru, Intel, Qualcomm, NVIDIA, Samsung, Panasonic, Sony, Intellivision

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