Foresight Autonomous Holdings

Driving the autonomous revolution

Foresight Autonomous (FRST) is developing software solutions for advanced driver assistance (ADAS) and fully autonomous (FA) driving applications using stereo camera vision algorithms developed over a decade with the Israeli military. The company aims to reach 100% daytime object detection probability in all-weather/light conditions. If successful and able to demonstrate material improvements in the safety of ADAS functions we expect the company to gain significant market share in the vulnerable user detection market, which ABI Research forecasts to achieve a 49% CAGR over the next decade.

Year end	Revenue (NISm)	EBITDA* (NISm)	PBT* (NISm)	EPS* (NIS)	DPS (NIS)	P/E (x)
12/16e	0.0	(8.4)	(8.7)	(0.12)	0.0	N/A
12/17e	0.0	(11.3)	(14.7)	(0.20)	0.0	N/A
12/18e	0.6	(13.6)	(16.0)	(0.22)	0.0	N/A
12/19e	6.0	(11.8)	(13.3)	(0.18)	0.0	N/A

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

Technology developed from tried and tested base

Foresight's know-how is based on systems developed by parent company Magna BSP and the Israeli military to protect secure facilities worldwide. FRST aims to launch its first proof-of-concept software in Q317, for stereo image cameras as well as infrared and image cameras in stereo. The other string to Foresight's bow is a 31.5% stake in Rail Vision (RV) (after minimum planned warrant exercises), which looks set to be first to market in Q317 with an innovative rail crash avoidance system, offering rail networks high ROIs and providing potential big data revenue streams.

Aiming for a market-beating product

Foresight will initially target Chinese OEMs to benefit from short time to market cycles, but plans ultimately to sell worldwide. FRST's stereo image camera only software will be targeted at mass-market OEMs in China and elsewhere, while the premium image/infrared camera software should appeal to OEMs serving the safety-conscious middle classes. Key challenges are to develop a clearly market-beating product by Q317, build traction in global markets and fund development to 2020. With the current NIS 4.7m equity issue, we expect cash reserves to last to Q118. A planned $7-10m Nasdaq equity issue in Q416 should provide all or most of the estimated NIS30.0m ($7.9m) funding required until break-even.

Valuation: A base case DCF value of NIS3.15/share

As FRST is still in development stages, we have deployed DCF models to value both FRST and RV. Based on early successes in trials we have assumed that FRST achieves its targeted 100% object detection levels in all weather for its premium product and demonstrates material safety advances over the market. On this basis we forecast a global share of the market for forward camera software in both ADAS and FA driving applications of 3.0% by 2025 (6% China, 2% ROW), giving a company value of NIS3.15/share, including a NIS0.55/share value for Rail Vision.

Initiation of coverage

Price*	**NIS2.07**
Market cap	**NIS150m**

*Priced at 23 September 2016
NIS3.77/US$

Net cash (NISm) at 30 June 2016	19.4
Shares in issue*	72.7m
Warrants in issue*	31.8m

*Including announced 2.7m share issue/2.8m warrants issue due for completion by 20 October 2016

Free float	44.5%
Code	FRST
Primary exchange	TASE
Secondary exchange	N/A

Share price performance

%	1m	3m	12m
Abs	8.5	1.2	11.6
Rel (local)	9.5	(2.1)	20.3

52-week high/low	NIS2.3	NIS1.6

Business description

Foresight Autonomous (FRST) is a development stage technology company in Israel developing ADAS systems based on technology developed by its parent company and the Israeli military. FRST also has a stake in rail ADAS specialist Rail Vision, which it plans to raise to at least 31.5% in Q416.

Next events

Q3 results	End-November 2016

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Investment summary

Taking leading technology in a new direction

Foresight is a development stage company using the know-how of parent company Magna BSP, developed with the Israeli military, to develop algorithms for forward stereo camera systems in vehicles. Its aim is to achieve 100% object detection in all weather and light conditions – well ahead of company estimates of current industry norms of c 85%. If successful FRST should be able to build market share in both the ADAS and FA vehicle markets, the latter with the planned launch of sensor fusion software in 2020. The company is looking to accelerate its market entry with a focus on the large and fast-to-market Chinese auto industry where the authorities are looking to bring safety standards to EU levels by 2018. After planned warrant exercises, FRST will shortly have a 31.5% stake in Rail Vision Ltd, which is currently the only known company developing an ADAS-type solution for the rail industry. Its system has a 1.5km object detection range for night/day/all-weather use using far infrared and CCD cameras. In addition to sales of the systems, RV will generate revenues from data collected by sensors on the trains. RV's technology has already undergone significant testing by Israel Railways and its proof of concept (POC) is due in Q317.

Financials: Strong growth potential

Our forecasts are based on milestone achievements (see Exhibit 1), and penetration of the new car market by forward cameras in both ADAS and increasingly the FA vehicle market rising from c 10% in 2016 to 73% in 2025 and FRST achieving 2025 market shares of 6% in China and 2.0% in the rest of the world. We forecast EBITDA to turn positive in 2020.

Monthly cash burn excluding equity investments at FRST is forecast at NIS880k ($230k) in H216 rising to NIS1.1m ($285k) in 2017. Cash at the end of H116 plus recent funds raised (c NIS4.7m) should fund FRST until Q118 including the planned $0.8m outlay to increase the company's holding in RV to 31.5%. We believe that FRST has the potential to close most if not all of its NIS30.0m ($7.9m) funding gap until 2020 with the proposed $7-10m Nasdaq issue.

Valuation: DCF valuation NIS3.15/share

As FRST is a pre-revenue development stage company, we have valued it using a DCF analysis with a 15% WACC. Based on FRST hitting its key milestones and our market share and earnings targets (see Exhibits 1 and 9), we value FRST shares at NIS3.15. After the launch of the POC we see potential for this valuation to increase towards NIS4.52. This assumes the company is able to demonstrate sufficiently superior performance of its software versus that of its competitors, to justify revising 2025 target market shares from 6% to 8% in China and from 2.0% to 3.5% in the ROW.

Sensitivities: Development stage product, funding, delays

FRST is a development stage business with potentially disruptive technology moving towards commercialisation. As such there are significant risks, uncertainties and potential. With the technology still unproven, successful launch of the POC is the critical near-term milestone. There is no guarantee that targeted object detection rates and lower accident rates will be achieved and FRST may struggle to gain targeted prices for its software in a highly competitive market. We estimate that the company will need to raise NIS30.0m ($7.9m) by Q118 but this may be satisfied by a planned Nasdaq equity raising later this year. Longer than expected time to convert pilot trials to volume sales or faster than expected price erosion could increase this shortfall. Software sales are typically denominated in US dollars, but the bulk of FRST'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 2011 to develop software to adapt parent company Magna BSP's 3D multi-camera based intruder detection system for ADAS use. 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. 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, FRST listed on the Tel Aviv Stock Exchange on 5 January 2016 and plans to launch a proof of concept of its first ADAS software with a targeted 100% object detection probability in daylight in Q317. In September, Foresight announced its intention to exercise warrants to increase its stake to a minimum of 31.5% in Rail Vision, a company that aims to use ADAS technology to prevent rail accidents as well as to create big-data revenues from on-train sensors. RV plans to start selling its first systems in Q317.

Product profile: Targeting 100% detection rates

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 100% in all-weather/light conditions. The timing is good. Recent tests by German auto association ADAC showed surprisingly poor results by the AEB systems of six major marques (including the BMW 3 series, Volvo V60 and Mercedes C Class) in avoiding collisions, particularly with smaller objects 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. Going forward, 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.

Growth strategy: Leveraging stereo vision into road and rail

Strategic objectives: Automotive (ADAS & FA vehicles), software-only product, global scope

- **Develop stereo vision software proof of concept** by Q317 allowing for reliable function in daylight in all road and weather conditions with a basic product for stereo light (CCD cameras and a premium product for stereo light and infrared camera combinations.

- **"Open-source" solution:** Adapt software to conform to the chip standards of the platforms of at least four established Tier One players to reduce time to market and widen potential market.

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

- **Develop infrared night vision software** employing near infrared (NIR) and far infrared (FIR) technology, with proof of concept planned in 2020.

- **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.
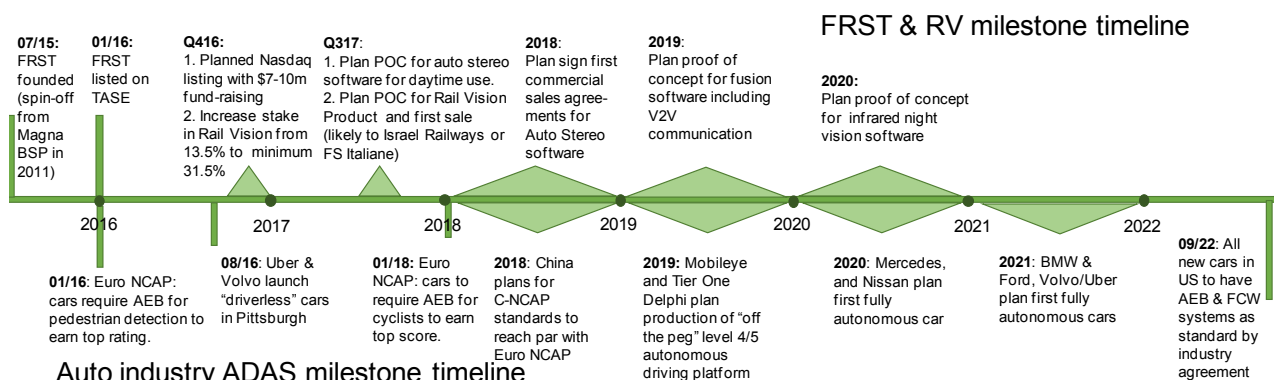
Rail Vision: a complete solution, software and hardware; initially European/US focused

- **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. Proof of concept planned in Q317.

- **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 1 and 2 we summarise the key industry and company milestones to track out to 2022.

Exhibit 1: Milestone outlook – FRST, Rail Vision and auto industry ADAS timeline

FRST & RV milestone timeline

07/15: FRST founded (spin-off from Magna BSP in 2011)

01/16: FRST listed on TASE

Q416: 1. Planned Nasdaq listing with $7-10m fund-raising 2. Increase stake in Rail Vision from 13.5% to minimum 31.5%

Q317: 1. Plan POC for auto stereo software for daytime use. 2. Plan POC for Rail Vision Product and first sale (likely to Israel Railways or FS Italiane)

2018: Plan sign first commercial sales agreements for Auto Stereo software

2019: Plan proof of concept for fusion software including V2V communication

2020: Plan proof of concept for infrared night vision software

2016   2017   2018   2019   2020   2021   2022

01/16: Euro NCAP: cars require AEB for pedestrian detection to earn top rating.

08/16: Uber & Volvo launch "driverless" cars in Pittsburgh

01/18: Euro NCAP: cars to require AEB for cyclists to earn top score.

2018: China plans for C-NCAP standards to reach par with Euro NCAP

2019: Mobileye and Tier One Delphi plan production of "off the peg" level 4/5 autonomous driving platform

2020: Mercedes, and Nissan plan first fully autonomous car

2021: BMW & Ford, Volvo/Uber plan first fully autonomous cars

09/22: All new cars in US to have AEB & FCW systems as standard by industry agreement

Auto industry ADAS milestone timeline

Source: Edison Investment Research, FRST, Euro NCAP, BMW, Ford

Exhibit 2: Planned product launches

Competitor type	Description
Stereo Vision (Q317): Stereo cameras for all-weather/light performance	FRST plans to launch the proof of concept – involving the release of prototypes with live demonstrations and data from ongoing road trials of the product – for its first stereo vision ADAS product in Q317. It will be offered in the OEM market in two versions: Basic, which will drive stereo camera for use in normal light conditions, and Premium, using a normal camera and near infrared or infrared sensing in the short wave (SWIR) cameras, to give very high all-weather and all-light detection accuracy. Pricing is planned at c $45 for the Basic software and $90 for the Premium. Features on offer will include FCW, AEB, LDW and RSR.
	The key remaining tasks ahead of the Q317 launch are to (1) further develop system capabilities at night and under extreme lighting, (2) accumulate operation and driving hours, (3) adapt software to embed on four different chips – starting with NXP – which typically takes three to four months per chip, and (4) prepare proof of concept.
	FRST looks to be making solid progress in achieving its product target. It reported that tests completed in August 2016 that were run in daylight and high-glare light conditions found that the software was alert to insufficient following distance, cyclists, pedestrians and objects of 50cm x 50cm in the driving path and it outperformed another manufacturer's assisted driving system in the case of several threats. Management believes that 90-95% accuracy should be sufficiently high for the proof of concept.
Sensor Fusion/V2V Software (2019): Getting all the sensors to work together	FRST 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.
Night vision (2020): Infrared – driving the car, not just assisting the driver	FRST plans to launch night-vision software using ordinary and infrared cameras 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, FRST will use infrared primarily to enable the ADAS system to detect obstacles, so we see the product as having applications in both ADAS and autonomous driving.
Other products under consideration	■ In August the company trialled an alpha version of a smartphone app to alert drivers and vehicles to the nearby presence of pedestrians. ■ Low-cost aftermarket stereo ADAS systems using smartphone technology to cut the typically $800 aftermarket cost of ADAS and mapping products – using stereo cameras to locate the position of the car within 10cm, vs the typical 10-15m of GPS products. ■ Pedestrian detection, especially children between parked cars based on mobile communication and satellite positioning. The solution to detect a child between two parked cars will be part of the overall system to prevent road accidents. ■ Accident prevention for vehicles that are not in line of sight through V2V communication.

Source: Edison Investment Research. Foresight Autonomous Note: Please click here for Glossary of terms and acronyms.

FRST "building a better mousetrap" to gain stereo market share

Foresight aims to achieve a significant advance in the reliability of forward cameras with its first product launch in Q317. Using software to process stereo camera images, it aims for functional object detection of 100% (classing objects by categories, eg "pedestrians", "cyclists", "other small objects"), compared with its estimate of current industry levels of c 85%. 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 40 km/h, and the same vehicles scored 54% or less testing for a partly obscured child at 50 km/hr. Subaru's stereo system was best in class at night and with adult pedestrians.

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

- **Extensive 12-year experience of Magna BSP of IR/CCD stereo camera combinations**.

- **Superior coping in bad weather/light** versus mono camera systems without image cameras

- **Superior coping in all weather/light** with the addition of infrared: near infrared (NIR) thermal technology is normally used for night vision, but overcoming the complexity of creating a stereo coupling with an image (CCD) 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.

- **Longer stereo range:** Most stereo systems used in ADAS today have ranges of only c 50 metres as they use solely classic stereo (which creates a 3D image of objects) processing methods. By combining classic stereo (CS) and stereo assist (which uses one camera both in mono and stereo mode), FRST boosts the range of its systems to 80-150 metres.

- **Expecting to offer a competitive range of ADAS functions,** as can be seen from Exhibit 3.

Exhibit 3: 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
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. Please click here for Glossary of terms and acronyms.

Stereo camera systems: Set to take market share from mono

Most autonomous and semi-autonomous driving systems employ at least one image camera (a charge-coupled device [CCD]) and another sensor at the front of vehicles. Cameras are low-cost and enable the identification of objects. Radar is very good at calculating distance and speed of objects but cannot be used to identify objects. Lidar is very good at determining the position and shape of an object, but cannot be used to determine colour, signs and images and is very high cost. Within the camera space, mono cameras use a single camera to analyse the content of images, while stereo cameras operate like human eyes, using the parallax shift between images to accurately measure distance and size.

Exhibit 4: Stereo vs mono camera systems

Parameter	Stereo vision (CS +SA blended)	Mono vision
Small non-linear object detection probability	Very high (classic stereo)/high (stereo assist)	Low
Measurement of distance from object	Accurate	Estimate
Measurement of obstacle dimension	Accurate	Estimate
Measurement of distance to high/aerial objects	Accurate	Prone to error
False alert rate	Very low	Medium to low
Image shadows and reflections	Differentiation capabilities	No inherent differentiation capabilities
Mounting hardware cost	Higher	Lower
Software complexity/computational load	Very high (CS)/high (SA)	Lower

Source: Edison Investment Research, Foresight Autonomous Holdings

Stereo has major safety advantages over mono, especially in object detection...

- **Typically better recognition of children, animals and road abnormalities.** Mono cameras most accurately identify objects from strong vertical lines often lacking in smaller objects.

- **Accurate measurement vs mono estimate:** Stereo cameras can accurately calculate the size, distance and speed of objects but mono cameras estimate distances by reference to other items. Errors can occur in the case of poor-quality road surfaces, or objects located overhead.

- **Stereo typically gives better results in poor contrast situations such as shady, reflective or poor light conditions** by using two images to eliminate differences and reinforce outlines.

- **Stereo can cope better against high-background image noise** (for the same reason).

- **Performance redundancy:** If teamed with lidar or radar sensors, stereo systems can perform the functions of lidar and radar in daylight conditions if either sensor malfunctions.

...which has led to stereo cameras being widely used in luxury cars

As can be seen in Exhibit 5, leading automakers BMW, Jaguar, Mercedes-Benz and Land Rover all use stereo camera technology in their top specification vehicles. New stereo housings in the latest Model X suggest that Tesla is also looking to switch to forward stereo cameras.

Exhibit 5: Stereo camera ADAS – OEM/Tier One products					
Offered in vehicles	**ADAS features**	**Included as standard**	**Add-on cost**	**Supplied by Tier One/OEM**	**3D distance (m)/ vision degree**
BMW (luxury)	LDW, ACC, RSR, BSA, AEB, LKA	Series 7	N/A	N/A	N/A
Jaguar (luxury)	FCW, CMB	XF range	N/A	N/A	N/A
Land Rover (luxury)	AEB	Land Rover Discovery Sport	N/A	Bosch	50m +/ 50 degrees
Mercedes-Benz (luxury)	BSA, LKA, AEB	S Class (S 600 and above)	N/A	LG	50m / 45 degrees
Subaru (mass-market)	AEB, ACC, LDW, LKA, BSA	Outback models (UK) (priced from c $26,000)	c $800 (Japan)	Subaru	up to 110m
Suzuki (mass-market)	AEB, LDW, LKA, USP	Spacia (light vehicle), Solio, Hustler	c $620 (Japan)	Hitachi	N/A
Autoliv (Tier One)	RSR, LDW, FCW, PCW, CMB	N/A	N/A	N/A	100m / 50 degrees
Foresight target	**FCW/AEB/LDW, RSR**	N/A	N/A		**80-150m / 50-70 degrees**
OEM testing in experimental models	VW, Toyota, Honda and Nissan				
Tier One testing in experimental models	Neso, Fujitsu, Delphi				

Source: Company websites, autoconnectedcar.com. Note: Please click here for Glossary of terms and acronyms.

We see stereo challenging mono for dominance in mass-market cars by 2020 as:

- **Stereo hardware costs – a key barrier to mass-market implementation – are falling:** Subaru now fits stereo as standard in its Outback range, starting at $26k and the add-on price is set to fall from a current $800 in Japan to $300-500 in the US in 2017.

- **Rapid advances in on-board computing power in vehicles** are overcoming concerns about the higher computational requirement of stereo systems.

- **AEB adoption in Europe and North America is expected to soar by 2022 under regulatory pressure.** Since January auto regulator Euro NCAP has required all top-safety-rated cars to have AEB as standard, while the US auto industry has committed to fitting AEB as standard in all new cars from 2022. As computers take over emergency braking functions, better object detection and avoiding false alarms (stereo strengths) will become more important to drivers.

- **Euro NCAP is to test AEB performance in both daylight and obscure lighting conditions**, which favours the two-image advantage of stereo in poor light.

- **The rapid rise of FA vehicles will increase the need for confidence-building technology.** A 2016 McKinsey survey showed that 48% of people have safety concerns about FA vehicles, but that 55% of this group said that they would be willing to use FA vehicles if their concerns were addressed, which should give demonstrably safer tech a material sales advantage.

- **...and should find consumers willing to pay more:** OEMs are likely to be in a good position to pass extra costs for FA vehicles to buyers. Cost savings for consumers/fleet managers will include time saved by not driving, worth over $18,000 if valued only at $10 an hour for journeys of one hour a day in a car over five years, as well as expected lower insurance costs.

Forward camera systems software market

ADAS is one of the fastest growing markets in the auto industry. 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 forward camera demand. Key market drivers, therefore, are:

- **New Euro NCAP** regulations requiring AEB as standard in top rated cars (see above).

- **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 other regions from 2027.

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

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

- **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 is 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 (source: Jato Dynamics Ltd).

Research in China estimates global automotive forward camera shipments at 9.1m units in 2015. This implies global forward camera 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 forecast global penetration of forward cameras in new cars at c 10% in 2016, rising to 36% in 2020 and 73% in 2025.

Exhibit 6: Forward camera system market forecasts

	Vehicle sales (m)				CAGR (%)		Forward camera system new car penetration (%)			Forward camera system unit sales (m)		
	2015	2016e	2020e	2025e	2015-20	2020-25	2016e	2020e	2025	2016e	2020e	2025
North America	20.8	20.8	20.8	20.8	0.0	0.0	18.0	57.0	100.0	3.7	11.8	20.8
Western Europe	15.2	15.6	17.2	20.6	2.5	3.7	19.0	58.0	90.0	3.0	8.8	15.5
Eastern Europe	3.8	4.1	5.3	6.4	7.0	3.7	4.0	20.0	60.0	0.2	0.8	3.2
China	24.6	25.6	30.0	32.6	4.1	1.7	1.5	20.0	60.0	0.4	4.9	18.0
India	3.4	3.6	4.6	5.0	6.1	1.7	1.0	8.0	24.0	0.0	0.3	1.1
Other Asia	15.8	15.8	15.8	15.8	0.0	0.0	8.0	30.0	70.0	1.3	4.7	11.1
South America	4.5	4.5	4.6	5.7	0.8	4.2	4.0	20.0	60.0	0.2	0.9	2.8
Africa	1.6	1.6	1.6	2.0	0.8	4.2	1.0	5.0	10.0	0.0	0.1	0.2
Total	**89.7**	**91.6**	**100.0**	**106.9**	**2.2**	**1.4**	**9.6**	**36.1**	**72.6**	**8.7**	**32.3**	**72.6**
CAGR from 2015 (%)*	N/A	2.1	2.2	1.8	N/A	N/A	N/A	48.0	30.5	N/A	48.0	31.9

Source: Edison Investment Research, OICA. Note: *2015 penetration and unit sales estimated at 5.1% and 4.6m, respectively.

Initial target market – China

China is the largest global vehicle producer, with sales of 24.6m units in 2015, representing 27% of global output. Demand is being driven by low current levels of car ownership, increasing

urbanisation and rapid growth in the proportion of middle-income earners. Positively for FRST, there are currently no local Tier Ones selling ADAS products in China.

Among developing countries, China has above-average standards in passenger car safety regulation. Seat belt use is mandatory and assisted braking systems, mandatory crash tests and airbags are all compulsory in new cars, well ahead of the requirements in India, Brazil or Mexico. With an eye on Western export markets, the Chinese authorities recently announced ambitious plans to catch up with the world-leading Euro NCAP standards by 2018. This would imply mandatory AEB for detection of pedestrians and cyclists for top-rated cars by 2018. Realistically, in view of the challenge this represents and reluctance among Chinese OEMs to link ADAS to brakes at present, probably owing to high-profile AEB recalls, we assume that such measures will be introduced in 2020-25 and mandatory AEB in all cars will take place in 2027-30 (vs 2022 in the US).

After regulation, we see affordability as the key factor governing 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. Assuming 30% penetration of this market and full penetration of the luxury market (forecast at 10% of sales in 2020), by 2020 we forecast forward camera based ADAS penetration to reach 20% of new car sales in China, rising to 60% in 2025.

Product pricing and positioning

FRST plans initially to price its basic and premium software (including IR) at $45 and $90, respectively. The company estimates that by 2020 when it should be selling in volume in China the cost of a pair of CCD stereo cameras should have fallen to c $150 (vs c $230 for the CCD/IR stereo cameras for the premium software). Adding platform costs of c $50 and FRST's basic software (by then forecast at c $30) should enable OEMs makers to install high-quality stereo ADAS for c $230 per car, representing c 1% additional cost in the addressable market. It is worth noting that Mobileye's third-generation EyeQ3 mono system on a chip currently sells at c $50, so with a c $100 mono camera costs c $150, and so FRST is not looking to undercut Mobileye, but win on quality.

We accordingly expect FRST to position its products as:

■ **Basic**: A relatively low-cost route into quality ADAS for local OEMs when teamed with low-cost hardware enabling them to offer superior safety features to more expensive foreign brands.

■ **Premium**: A superior-quality IR-enabled solution, enabling mass market and luxury OEMs to offer high-spec output, with the ability to vary cost by sourcing lower- or higher-spec hardware.

Route to market

Foresight is looking to work primarily with Tier One and Tier Two auto suppliers to bring its product to market. This has a number of advantages; by placing its software on an existing Tier One platform the company is not encumbered with concerns about attaining ASIL (automotive safety integrity level) standards or hacker/security issues. Additionally, the time to market is considerably lower than working directly with OEMs as new software can be integrated into a Tier One's platform and introduced as an upgrade to an existing vehicle in relatively short time.

With the intention to enable as wide a possible addressable market of Tier Ones, FRST is working ahead of the launch of its POC to make its algorithms available on at least four commonly used chipsets compatible with the platforms of a wide array of Tier One suppliers. It is worth contrasting this approach with that of market leader Mobileye, which has an estimated 60-70% market share in

mono camera ADAS, and sells its software only on its own proprietary chip. We believe that Mobileye's recent agreement with Tier One Delphi to create a complete "off the shelf" ADAS platform for OEMs could shrink the addressable market for independent ADAS software if a high proportion of auto manufacturers adopt its system.

Market participants/competition

The Tier One and Tier Two market is global but, reflecting its fragmented nature, highly competitive. According to IHS Automotive, in 2015 65% of light vehicle production was supplied by global platforms, but major OEMs such as Ford typically deal with over 1,000 authorised suppliers.

As can be seen in Exhibits 3 and 7, 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 FRST's addressable market. As mentioned earlier, the key challenge for FRST will be to demonstrate that its solutions represent a substantial step forward in safety terms, which it is working to do via extensive driving hours. 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 FRST, 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 FRST, we believe FRST has the advantage of access to Magna BSP's 12 years' know-how in stereo camera object detection for better interpretation of the infrared and image (CCD) camera output).

Exhibit 7: Market participants	
Competitor type	**Description**
Developers	**Mobileye** is the pioneer in the ADAS vision market and the dominant ADAS equipment supplier with some 27 OEM and Tier One customers. The company has focused exclusively on mono camera solutions and according to Frost and Sullivan has a 60-70% share of this segment. Unlike software-only, chip agnostic FRST, Mobileye sells hardware and software and only provides solutions on its own proprietary chipsets. It recently 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 FRST. It offers an after-market ADAS solution, being software to run a windshield-mounted camera to provide forward collision warning (FCW) and lane departure warning (LDW). We do not see Intellivision as a competitor to FRST, 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**, **Denso** and **Fujitsu** are understood to be developing stereo system. **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, 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

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) with extensive experience in complex stills and videos in defence. RV was

incorporated in May 2016 and FRST acquired a 13.5% stake in August 2016 for NIS2.3m ($0.6m). In Q416 FRST plans to raise this to a minimum 31.5% by exercising warrants worth at least $0.8m, which will also result in it having warrants to increase the stake to 47% by February 2019 for a further $11.3m.

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 of thought can see a train move 200m along the track before brakes are even 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 a range of severe weather including fog, sand, dust and snow.

Route to market

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. We understand that Siemens has worked on a similar idea but achieved only sub-100m camera ranges similar to that of Bombardier's system for light rail (trams). RV's system has successfully completed six trials with Israel Railways and this month started a pilot trail with the Italian national rail operator, FS Italiane, for safety and network mapping services. RV is also exploring an autonomous train pilot with Rio Tinto and an alliance with GE Israel for infrastructure inspection. The company plans to release the proof of concept for its collision avoidance system in Q317 and to achieve sales of several units shortly thereafter to either Israel Rail or FS Italiane. In its POC it intends to demonstrate the following KPIs:

- 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 the expected initial $50k unit cost and assuming $5k installation, we estimate a cost of $6.6bn to install the system across the EU powered rail unit (PRU) fleet. 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 a 9-18% ROI. The planned $50k module price can also be equated to a fairly low 1.5-2.5% insurance policy against the typical $2-3m overall cost of locomotives and potentially high cargo values.

We believe that a stronger case for such systems can be made in large-scale networks in Russia, China, India and Brazil. Unguarded crossing points and signalling problems pose significant dangers of accidents and derailments. On this basis, we expect initial orders from Europe and the US to be quickly followed 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: Earnings and valuation

We have modelled the market for Rail Vision's modules based on an estimate of the proportion of the existing global PRU fleet that will adopt ADAS systems. We assume that RV will launch its product in Q317, with the immediate sale of five units probably to Israel Rail or FS Italiane. We assume an initial 50% addressable market as RV will focus initially on Europe/North America, rising to 100% in 2020 as the sales effort expands. See Exhibit 8 for other key revenue assumptions.

We have conservatively forecast EBITDA margins at Rail Vision of 15.0% from 2020, representing a 75% weighting of tech hardware sector EBITDA margins of 10.6% over last four years and a 25% weighting of software and semiconductor margins of 27.7% over the same term. We see the potential for RV to achieve higher margins if it maintains market leadership and is able to enhance hardware sales with higher big data revenues. We have also forecast big data revenues per ADAS-installed PRU at $500 per annum, which is less than half of management expectations based on our concern that some rail companies may seek to retain a share of such revenues, or forbid the use of sensors on the trains. Based on the above we derive a valuation of the company of NIS129.2m ($34.2m), equivalent to NIS0.55 per diluted FRST share.

Exhibit 8: Rail Vision financial summary

NISm	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**
Market for ADAS systems (% of fleet)	**0.00**	**0.02**	**0.15**	**0.40**	**0.66**	**1.10**	**1.82**	**3.02**	**5.00**
Addressable market (%)	N/A	50.0	70.0	100.0	100.0	100.0	100.0	100.0	100.0
RV share of addressable market (%)	100.0	75.0	50.0	40.0	32.0	24.0	18.0	16.2	15.4
Rail Vision sales (units)	5	61	427	1,304	1,734	2,161	2,694	4,031	6,365
Sales price ($k)	50	43	36	31	29	28	26	25	24
Big data/maintenance charge ($pa/unit fitted)	1,750	1,563	1,403	1,268	1,229	1,193	1,158	1,125	1,094
Revenues	**0.9**	**9.9**	**59.6**	**156.5**	**203.1**	**246.7**	**298.3**	**424.4**	**634.9**
EBITDA	**(10.5)**	**(18.3)**	**(0.4)**	**23.5**	**30.5**	**37.0**	**44.8**	**63.7**	**95.2**
EBITDA margin (%)	(1,111.5)	(183.5)	(0.6)	15.0	15.0	15.0	15.0	15.0	15.0
Total capex	(0.8)	(1.3)	(1.2)	(1.6)	(2.0)	(2.5)	(3.0)	(4.2)	(6.3)
Free cash flow	**(11.3)**	**(19.8)**	**(3.4)**	**17.2**	**22.3**	**18.0**	**21.7**	**30.9**	**46.2**
Sum of FCF	123.5	FRST(31.5%) (after initial warrant conv.)			31.5	WACC			15%
Net debt/(cash)	(5.7)	Value of FRST stake (NISm)			40.7	Terminal growth rate			3%
Company valuation	**129.2**	Value of FRST stake (NIS/share)			0.55	TV/total EV			79%

Source: Foresight Autonomous Holdings, Edison Investment Research. Note: *We believe that UIC 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.

As of mid-2016 we understand that the company had cash of c $700k (with no debt). According to FRST management, cash burn since incorporation in May is currently averaging c $100k/month. First sales revenues are expected in Q317 but we see a potential funding need to EBITDA break-even in 2020 of NIS31.8m ($8.4m). A further $0.8m will come from FRST as it has announced plans to exercise at least this value of warrants to bring its stake to at least 31.5% in Q416. More funding may also come from other equity injections, with FRST having warrants to potentially increase its stake further to 47% by February 2019 for an additional $11.3m.

Management

The management team at FRST is headed by **Haim Siboni**, the founder and CEO of both Foresight and parent company Magna BSP. Since the foundation of 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.

Sensitivities

Development-stage product, growth industry

Our forecasts and valuation are affected by the following sensitivities:

- **Product still in development stage:** FRST is not due to release the proof of concept for its key product until Q317, and there is no certainty that the product will achieve its 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 FRST's addressable market if the lure of R&D cost savings attract a significant share of OEMs.

- **Funding requirements:** We expect existing end-June cash reserves of NIS19.4m ($5.0m) plus the NIS4.7m ($1.25m) equity funds raised this month to cover cash burn until Q118 allowing for the increased investment in RV. We see the potential for the company to close most if not all of its NIS30.0m ($7.9m) funding gap until 2020 with the proposed $7-10m Nasdaq issue.

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

- **Length of delays to OEM installation/pilot testing:** From 2019 we assume an average 12 months (up from 18 months) between signing commercial orders and the installation of the software in vehicles. If longer, it will negatively affect our early year revenue forecasts.

- **Automotive regulation is likely to accelerate demand:** We expect accidents with ADAS systems, such as the recent Tesla crash, to lead to increased regulatory focus on object detection that could lead to faster market growth than employed in our forecasts.

- **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

Earnings: Getting in on the ground floor in China

FRST was incorporated at the start of 2016 with the reverse takeover of a listed Israeli company. The H116 results were therefore dominated by merger related expenses. The group reported an EBITDA loss of NIS43.0m, which after exceptionals of NIS33.2m and share-based expenses of NIS6.2m produced a normalised EBITDA loss of NIS3.6m.

Our forecasts for FRST are dependent on the company reaching a number of key milestones as shown in Exhibit 1, and discussed in Exhibit 2 above. The most important event for our model is the planned launch of the proof of concept for the Basic and Premium versions of the ADAS software in Q317. We forecast FRST to become profitable at the EBITDA level and to start generating free cash flow in 2020, later than management, which is looking for positive PBT by end 2019.

Key revenue and earnings assumptions

Our key revenue and earnings assumptions are shown in Exhibit 9. We assume:

- Pilot testing of stereo systems from Q417, with first commercial sales agreements in 2018.

- In 2018, 15% down-payment (rising to 25% in 2019 and 35% in 2021) on signing commercial sales agreements and the balance in 18 months when the software is installed.

- Basic stereo makes up 60% of unit sales of the stereo software from 2019. Night Vision launched as an upgrade of Premium Stereo in 2021.

- EBITDA margins capped 27.7% in line with the four-year averages for the semiconductor and software sectors of 27% and 28.5%, respectively. This compares with a 30.6% adjusted EBITDA margin for market leader Mobileye over the four quarters to 30 June 2016.

Exhibit 9: FRST revenue and earnings assumptions

	2017e	2018e	2019e	2020e	2021e	2022e	2023e	2024e	2025e
Chinese forward camera market (m)	0.8	1.5	3.0	6.0	7.6	9.6	12.2	15.4	19.5
Foresight Chinese market share (%)	0.0	0.6	1.5	2.7	3.4	4.0	4.7	5.3	6.0
Foresight Chinese stereo software, unit sales (000s)	**0**	**9**	**45**	**162**	**255**	**387**	**570**	**824**	**1,173**
ROW forward camera market (m)	11.7	16.3	22.3	30.1	34.4	39.4	44.9	51.2	58.1
Foresight ROW market share (%)	0.0	0.0	0.3	0.6	0.9	1.2	1.4	1.7	2.0
Foresight ROW stereo software, unit sales (000s)	**-**	**5**	**67**	**175**	**299**	**453**	**644**	**878**	**1,162**
Foresight basic stereo software package, unit CSAs (000s)	-	4	67	202	332	504	729	1,021	1,400
Foresight premium stereo software package, unit CSAs (000s)	-	10	45	135	222	336	486	681	934
Foresight Sensor fusion unit CSAs (000s)	-	4	67	202	332	504	729	1,021	1,400
Foresight total unit CSAs (000s)	**-**	**18**	**179**	**540**	**886**	**1,344**	**1,943**	**2,724**	**3,735**
Basic stereo price ($/unit)	45.0	45.0	40.5	34.4	29.3	24.9	21.1	18.0	15.3
Premium stereo price ($/unit)	90.0	90.0	81.0	68.9	68.9	58.5	49.7	42.3	35.9
Sensor fusion price ($/unit)				150.0	127.5	108.4	92.1	78.3	66.6
Revenue ($000s)	**0.0**	**159**	**1,595**	**11,763**	**34,918**	**34,040**	**49,332**	**64,726**	**84,936**
Revenue (NISm)	**0.0**	**0.6**	**6.0**	**44.4**	**131.7**	**128.4**	**186.1**	**244.2**	**320.4**
Employee numbers	**24**	**28**	**34**	**44**	**57**	**65**	**73**	**82**	**91**
EBITDA (reported) (NISm)	**(48.1)**	**(12.2)**	**(14.1)**	**(12.2)**	**12.3**	**36.5**	**35.6**	**51.5**	**67.6**
EBITDA margin (%)	N/A	N/A	(2,351)	(203)	27.7	27.7	27.7	27.7	27.7

Source: Edison Investment Research. Note: CSA = commercial sale agreements, assumed to trigger a 15% down-payment.

Cash flow: Multiple sources of potential funding

Helped by share issues raising a net NIS18.6m ($4.9m) in H116, FRST finished the six months to 30 June with NIS19.4m ($5.0m) cash and no financial debt. With the recent additional NIS4.7m ($1.25m) capital raising earlier this month at NIS1.75 per share, our model indicates that the company has sufficient funding to take it through to Q118. This is based on an estimated cash burn for H216 and 2017 of NIS4.8m ($1.3m) and NIS12.9m ($3.4m), respectively, plus the NIS5.3m ($1.4m) outlays on increasing its stake to 31.5% of Rail Vision. We estimate a further funding requirement in 2018 and 2019 of c NIS30.0m ($7.9m) before the company becomes self-funding from 2020. FRST has announced plans for a Nasdaq listing and capital raising of $7-10m later this year. Furthermore, the company currently has 12.6m warrants outstanding with an exercise price of NIS3 that mature in H217, which if exercised would bring in a further NIS37.8m ($10.0m).

Balance sheet: Cash to fund development

FRST had cash reserves at mid-2016 of NIS19.4.6m ($5.0m) and NIS3.0m liabilities made up of working capital and a government grant.

Valuation

As FRST is a development stage company with no readily comparable listed peers, we have employed a DCF model for our valuation (see Exhibit 10). 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 NIS40.7m ($10.8m) for the 31.5% RV stake based on a DCF, incorporating its mid-2016 cash reserves of $0.7m and the planned $0.8m warrant conversion by FRST.

- We adjust the number of shares and the theoretical cash balance for the employee share option scheme (ESOP) involving 1.8m shares with an exercise price of NIS0.3.

This gives rise to a valuation of NIS3.15 per share, of which Rail Vision comprises NIS0.55 per share. Our optimum case of a 2025 8% market share in China and 3.5% ROW gives rise to a valuation of NIS4.52 per share. The sensitivity of the valuation to 2025 market share assumptions is shown in Exhibit 11 and its sensitivity to WACC and terminal growth assumptions in Exhibit 12.

Exhibit 10: DCF valuation

NISm	2016e	2017e	2018e	2019e	2020e	2021e	2022e	2023e	2024e	2025e	2025e norm
EBITDA (reported)	(48.1)	(12.2)	(14.1)	(12.2)	12.3	36.5	35.6	51.5	67.6	88.7	88.7
EBITDA margin	N/A	N/A	-2351%	-203%	28%	28%	28%	28%	28%	28%	28%
Change in working capital	(0.5)	0.0	0.0	(0.1)	(6.2)	(3.2)	(0.9)	(4.1)	(4.5)	(5.8)	(6.4)
Capex	(0.2)	(1.5)	(1.5)	(1.6)	(2.0)	(3.5)	(2.8)	(3.4)	(4.0)	(4.7)	(6.4)
Tax	0.0	0.0	0.0	0.0	0.0	0.0	0.0	(12.7)	(16.7)	(22.0)	(22.0)
Other non-cash items	38.9	0.9	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.5	0.5
Free cash flow	(9.9)	(12.8)	(15.2)	(13.5)	4.6	30.2	32.3	31.8	42.9	56.7	54.4
Total cash flow	(9.9)	(12.8)	(15.2)	(13.5)	4.6	30.2	32.3	31.8	42.9	523.8	
Sum of discounted CFs		165.1	Net debt (cash) end 2015					0.0	WACC		15.0%
Adjusted net debt (cash)		-28.6	Adjustment for:						Terminal growth rate		3.0%
Equity valuation		193.7	Equity issues 2016 ytd					(28.0)	Terminal value/EV		80%
Value of Rail Vision stake		40.7	Theoretical cash from in-the-money ESOP/warrant exercise					(0.5)	Terminal value 2025		467.1
Total group value		234.4	**Adjusted net debt (cash)**					(28.6)			
Number of shares, diluted		74.5									
Value per share (NIS)		3.15									

Source: Edison Investment Research

Exhibit 11: DCF sensitivity to 2025 market share assumption

NIS/share		2025 China market share (%)						
		1.0	2.0	4.0	6.0	8.0	10.0	12.0
2025 ROW market share (%)	0.0	0.95	1.14	1.48	1.84	2.16	2.51	-1.21
	0.5	1.32	1.48	1.84	2.16	2.51	2.86	0.32
	1.0	1.65	1.80	2.15	2.51	2.86	3.15	1.91
	1.5	1.97	2.15	2.50	2.80	3.15	3.50	3.54
	2.0	2.32	2.50	2.80	**3.15**	3.49	3.84	5.11
	2.5	2.62	2.79	3.14	3.49	3.84	4.18	6.68
	3.0	2.96	3.14	3.48	3.83	4.18	4.53	8.25
	3.5	3.30	3.48	3.83	4.18	4.52	4.87	9.80
	4.0	3.65	3.82	4.17	4.52	4.87	5.22	11.36
	4.5	3.99	4.16	4.51	4.86	5.21	5.56	12.91

Source: Edison Investment Research

Exhibit 12: WACC and terminal growth sensitivity table

NIS/share		Terminal growth rate				
		1.0%	2.0%	3.0%	4.0%	5.0%
WACC	21.0%	1.77	1.82	1.86	1.91	1.97
	19.0%	2.04	2.10	2.17	2.24	2.33
	17.0%	2.39	2.48	2.57	2.69	2.82
	15.0%	2.86	2.99	**3.15**	3.33	3.54
	13.0%	3.52	3.73	3.98	4.29	4.67
	11.0%	4.49	4.85	5.29	5.85	6.61
	9.0%	6.01	6.67	7.54	8.76	10.59

Source: Edison Investment Research

Exhibit 13: Financial summary

NIS'm	2016e	2017e	2018e	2019e
31 December	IFRS	IFRS	IFRS	IFRS
INCOME STATEMENT				
Revenue	0.0	0.0	0.6	6.0
EBITDA	(8.4)	(11.3)	(13.6)	(11.8)
Normalised operating profit	(8.4)	(11.3)	(13.7)	(12.0)
Amortisation of acquired intangibles	0.0	0.0	0.0	0.0
Exceptionals	(32.6)	0.0	0.0	0.0
Share-based payments	(7.1)	(0.9)	(0.4)	(0.4)
Reported operating profit	(48.1)	(12.2)	(14.1)	(12.4)
Net Interest	0.0	(0.1)	(0.6)	(1.3)
Joint ventures & associates (post tax)	(0.3)	(3.3)	(1.7)	0.0
Exceptionals	0.0	0.0	0.0	0.0
Profit before tax (norm)	(8.7)	(14.7)	(16.0)	(13.3)
Profit before tax (reported)	(48.4)	(15.6)	(16.4)	(13.7)
Reported tax	0.0	0.0	0.0	0.0
Profit after tax (norm)	(8.7)	(14.7)	(16.0)	(13.3)
Profit after tax (reported)	(48.4)	(15.6)	(16.4)	(13.7)
Minority interests	0.0	0.0	0.0	0.0
Discontinued operations	0.0	0.0	0.0	0.0
Net income (normalised)	(8.7)	(14.7)	(16.0)	(13.3)
Net income (reported)	(48.4)	(15.6)	(16.4)	(13.7)
Basic average number of shares outstanding (m)	73	73	73	73
EPS – basic normalised (NIS)	(0.12)	(0.20)	(0.22)	(0.18)
EPS – diluted normalised (NIS)	(0.12)	(0.20)	(0.22)	(0.18)
EPS – basic reported (NIS)	(0.67)	(0.21)	(0.23)	(0.19)
Dividend (NIS)	0.00	0.00	0.00	0.00
Revenue growth (%)	N/A	N/A	N/A	905.6
EBITDA margin (%)	N/A	N/A	-2280.6	-196.3
Normalised operating margin (%)	N/A	N/A	-2294.2	-198.9
BALANCE SHEET				
Fixed assets	5.4	3.6	3.3	4.7
Intangible assets	0.0	0.0	0.0	0.0
Tangible assets	0.1	1.6	3.1	4.5
Investments & other	5.3	2.0	0.2	0.2
Current assets	14.6	4.9	5.0	4.8
Stocks	0.0	0.0	0.0	0.0
Debtors	1.1	1.2	1.2	1.0
Cash & cash equivalents	13.5	3.8	3.8	3.8
Other	0.0	0.0	0.0	0.0
Current liabilities	(0.6)	(3.8)	(19.5)	(34.1)
Creditors	(0.6)	(0.7)	(0.7)	(0.3)
Tax and social security	0.0	0.0	0.0	0.0
Short-term borrowings	0.0	(3.1)	(18.9)	(33.7)
Other	0.0	0.0	0.0	0.0
Long-term liabilities	(1.5)	(1.5)	(1.5)	(1.5)
Long-term borrowings	0.0	0.0	0.0	0.0
Other long-term liabilities	(1.5)	(1.5)	(1.5)	(1.5)
Net assets	17.9	3.2	(12.8)	(26.1)
Minority interests	0.0	0.0	0.0	0.0
Shareholders' equity	17.9	3.2	(12.8)	(26.1)
CASH FLOW				
Operating cash flow before WC and tax	(8.4)	(11.3)	(13.6)	(11.8)
Working capital	(0.5)	(0.0)	(0.0)	(0.1)
Exceptional & other	(0.8)	0.0	0.0	0.0
Tax	0.0	0.0	0.0	0.0
Net operating cash flow	(9.7)	(11.3)	(13.7)	(12.0)
Capex	(0.2)	(1.5)	(1.5)	(1.6)
Acquisitions/disposals	(5.3)	0.0	0.0	0.0
Net interest	0.0	(0.1)	(0.6)	(1.3)
Equity financing	23.3	0.0	0.0	0.0
Dividends	0.0	0.0	0.0	0.0
Other	5.0	0.0	0.0	0.0
Net cash flow	13.2	(12.9)	(15.7)	(14.9)
Opening net debt/(cash)	0.0	(13.5)	(0.6)	15.1
FX	0.3	(0.0)	0.0	0.0
Other non-cash movements	0.0	0.0	0.0	0.0
Closing net debt/(cash)	(13.5)	(0.6)	15.1	30.0

Source: Foresight Autonomous accounts, Edison Investment Research

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. Founded in 2001 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.

Principal shareholders	(%)
Magna BSP	49.4
Kfir Silberman	6.2
Free float	44.5

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