EDISON

Pixium Vision

CE mark filed

Introducing the second-generation implant

Medical technology

Pixium Vision has received approval to begin human trials of its second-generation epi-retinal implant, Iris 150. Application for CE mark was filed based on data from the first-generation implant. The first-generation implant has proved to be well tolerated and enables vision restoration to the object recognition level. Iris 150 theoretically should allow better vision. Using a risk-adjusted NPV model, we value the company at €10.27, adjusted down by €0.24 to reflect updated cash of €28.08m.

Year end	Revenue (€m)	PBT* (€m)	EPS* (€)	DPS (€)	P/E (x)	Yield (%)
12/13	1.5	(6.1)	(0.23)	0.00	N/A	N/A
12/14	2.4	(11.6)	(1.18)	0.00	N/A	N/A
12/15e	5.3	(16.1)	(1.27)	0.00	N/A	N/A
12/16e	7.4	(21.4)	(1.68)	0.00	N/A	N/A

Note: *PBT and EPS are normalised, excluding intangible amortisation, exceptional items and share-based payments.

More electrodes should improve vision

Pixium won approval for human trials using its second-generation epi-retinal implant, Iris 150. This model increases the number of electrodes on the Iris device from 49 to 150. These electrodes stimulate the light-sensitive area of the eye, the retina, to produce images in patients with damaged photoreceptors. Increasing the density of electrodes is expected to increase the visual acuity provided by the implant. The first Iris 150 implant is likely to occur in Q116.

CE mark application filed

Given the successful human data from Iris 49 and the similarity of Iris 49 and Iris 150, CE mark application was submitted for the Iris implant based on data from the eight patients already implanted with Iris 49. These eight patients have tolerated the device well. The Iris 49 allows patients to see large objects and lights. Some are able to navigate a room with minimal assistance. Iris 150 is likely to bring materially improved vision. Pending approval, this would allow for the beginning of Iris commercialisation in H216. We expect the first Iris 150 patients to be implanted in Q116 under protocol to prove equivalency or superiority to Iris 49. This is in line with our prior estimate of first Iris sales in H216.

Valuation: €10.27 per share

We use a risk-adjusted NPV model with a 12.5% discount factor to achieve a valuation of €10.27 per share. The company is expected to acquire more human data to validate Iris 150 in H116 and, if CE mark approval is granted, to begin sales in H216. This is in line with our previous projections of first revenue in H216. Prima human trials are expected to begin in 2016 and will require additional R&D expenses, which will be partially offset by decreasing R&D costs of Iris. While our fundamental assumptions remain stable, the net cash position at Q315 was €28.08 with a burn rate of approximately €20m per year. The change in cash position reduced the value per share from €10.51 at initiation to €10.27.

8 January 2016

Price	**€5.77**
Market cap	**€73m**

Net cash (€m) at 30 September 2015	28
Shares in issue	12.7m
Free float	26%
Code	PIX
Primary exchange	Euronext Paris
Secondary exchange	N/A

Share price performance

%	1m	3m	12m
Abs	2.9	6.9	(15.3)
Rel (local)	11.0	12.2	(21.0)

52-week high/low	€7.40	€4.99

Business description

Pixium Vision is a French medical device company developing retinal implants for patients with retinitis pigmentosa and macular degeneration. A CE mark application was submitted on its lead product, Iris. A sub-retinal implant is being developed simultaneously.

Next events

Iris 150 human trial	Q116
Prima human trial	Q316

Analysts

George Magrath	+1 843 333 5241
Maxim Jacobs	+1 646 653 7027
Christian Glennie	+44 (0)20 3077 5727

healthcare@edisongroup.com

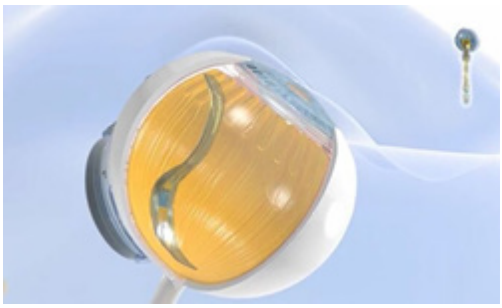
Edison profile page

Iris 150: Introducing the second generation

Pixium Vision is a French medical device company that aims to provide vision to the profoundly blind with a retinal implant, Iris. Iris is an epi-retinal implant that transforms light into electrical pulses to stimulate the retinal nerve ganglion cell layer, thereby giving the patient crude vision. The second-generation Iris implant (Iris 150) was introduced and has received approval for human trials. Patients will be implanted in H116 with Iris 150 to ensure equivalent safety, tolerability and visual acuity with Iris 49. Iris 150 contains more electrodes, which gives a possibility of increased visual acuity. The Iris 49 allowed patients to see lights and crude large shapes, while Iris 150 could allow improved vision of smaller shapes.

Iris is expected to be the second product to market behind Argus II by Second Sight. We believe that improved cameras, software, increased number of electrodes, an easier surgical implantation and the proposed ability to explant and upgrade the device will give Iris a competitive advantage compared with Argus II. Pixium is simultaneously developing a sub-retinal implant, Prima, which delivers the electrical impulses to a more natural location in the retina. By exciting the retina at the location of damaged photoreceptors, there is potential for higher-quality vision than the epi-retinal implants because there is natural propagation and regulation of the signal through the inner retinal network.

Exhibit 1: Iris epi-retinal implant



Source: Company Images

Increasing the number of electrodes: Iris 150

Pixium recently announced EU approval to begin implanting the second generation of its Iris device. The original device contained 49 electrodes, while the new device contains 150. The electrodes sit on the light-sensitive part of the eye and stimulate the nerve fibres to send visual signals into the brain. An increased number of electrodes provides the ability to give more precise stimulation, which it is hoped will translate into finer visual acuity.

A case study of one patient receiving Argus and Argus II indicates that an increased number of electrodes may improve visual acuity. The University of Southern California implanted one patient with the original Argus (Second Sight) 16 electrode implant 11 years ago. This year the patient's second eye was implanted with the Argus II, which contains 60 electrodes. The patient reported that he "was able to immediately see what it took the original device two years to let me see" in the eye with Argus II compared to Argus I.[1] While no masked, comparative trials exist to validate this observation, it is encouraging that the Iris 150 may provide improved quality of vision. Given the inability to mask observers with this device and the less stringent regulatory requirements of medical devices in contrast to pharmaceuticals, Pixium is not likely to require a large comparative

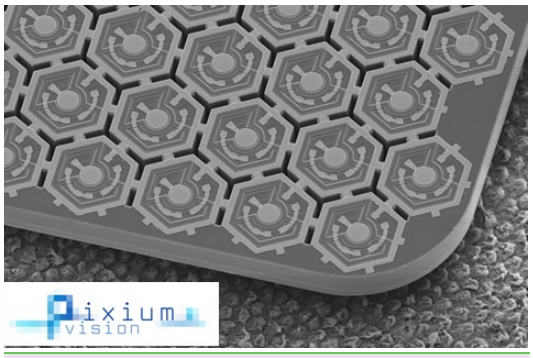
[1] Keck Medicine of USC. (2015). USC researchers discover way to improve image sharpness for blind people with retinal implants.

study of the Iris 49 and Iris 150. The Iris 150 patients in H116 will need to show similar safety and visual acuity allowing recognition of large shapes. Pixium has positive safety and efficacy data from eight patients implanted with the Iris 49. These data have been submitted for CE mark and Pixium expects the CE mark to apply to the Iris 150 upgrade. The EU may require data specifically for the Iris 150 but, given the similarity of the devices, we believe this will be minimal. Currently, both Iris 49 and Argus II allow patients to see shapes and crudely navigate a room, although they cannot recognise faces. Iris 150 could allow crude facial recognition.

Pressing Prima in 2016

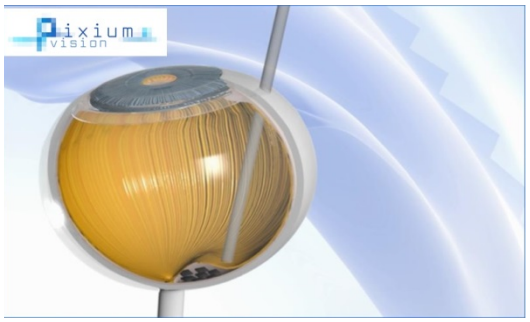
In parallel to the epi-retinal Iris implant, Pixium is continuing preclinical development of Prima, which is a sub-retinal implant. The natural anatomy of the retina has the photoreceptors in the outer retinal layers transforming light stimuli into electrical signals. RP and AMD both culminate with photoreceptor disruption in the outer retina leading to vision loss. The Prima implant is situated under the retina in the more natural position to create the stimuli. This enables bipolar cells of the inner retina to be stimulated and propagate the stimulation to the retinal nerve ganglion layer in a more natural mechanism. The sub-retinal placement also allows for easier surgical fixation of the implant. Prima is a modular design carrying several thousand electrodes and uses an optical delivery of information to the implant. It is powered by a wireless photovoltaic approach, which eliminates the need for trans-scleral wires and allows the eye to remain intact, compared with the permanent wires required by Iris and competitors. In a recent report in Nature,[2] the Prima implant showed good safety, tolerance and highly localised responses in the retinal degeneration rat model. The corresponding visual acuity may be improved over the epi-retinal models and may even reach 20/250 in humans, or crude facial recognition. First-in-human (feasibility) trials are planned for H216.

Exhibit 2: Prima is the first retinal prosthesis to be completely wireless



Source: Company images

Exhibit 3: Surgical implantation of Prima is more simple than the Iris epi-retinal implant



Source: Company images

Road to market

Pixium has developed a good track record of safety and efficacy using the Iris 49 implant. Eight patients have now been implanted and tolerated the implant well, reporting that it delivers vision capable of recognising lights, some shapes and large objects. This is similar to the Argus II implant from Second Sight.

With the clinical trial approval for Iris 150, Pixium will begin implanting the second-generation product in Q116. Data will be compiled with the Iris 49 data. In parallel the Prima sub-retinal implant will continue to be progressed through preclinical and feasibility studies in 2016, and we do not expect CE mark submission until at least 2017.

2 Lorach H, Goetz G, Smith R, Lei X, Mandel Y, Kamins T, Mathieson K, Huie P, Harris J, Sher A, Palanker D. Photovoltaic restoration of sight with high visual acuity Nat Med. 2015 May;21(5):476-82. doi: 10.1038/nm.3851. Epub 2015 Apr 27. PubMed PMID: 25915832.

If granted CE mark, Iris 150 would likely be rolled out in phases throughout the EU. There are approximately 30 sites in the EU that will be targeted for implanting the Iris 150. Our assumptions are for peak sales of Iris in the EU and US of €109m in 2020, assuming a peak market penetration in profoundly blind RP patients of 15%.

Making progress towards restoring sight

Pixium continues to make progress towards restoring sight in profoundly blind patients. The approval of the Iris 150 for clinical trials is a big step forward, representing 3x the number of electrodes compared to the Iris 49. The improvement in visual acuity over the Iris 49 is unknown at this point, but we expect to find out in Q116 when the first patients begin to receive the Iris 150. If the visual acuity is improved, it will represent an advantage over the Argus II, currently on the market in the EU, and will be encouraging for the forthcoming trials of Prima, a modular concept allowing configurations with several thousand electrodes.

Sensitivities

Successful trials in Iris 49 and the approval of trials in Iris 150 have mitigated some of the developmental and regulatory sensitivities for Pixium. There is still sensitivity with regard to Prima development and we should have more insight once Prima begins human trials in 2016. There is regulatory sensitivity pending the outcome of the recently submitted Iris CE mark application.

Iris is potentially the second implant to market and offers significantly more electrodes than the Argus II implant. Trials in Q116 will provide insight on how the Iris 150 compares to Argus II.

Even with success of the Iris and the potential commercialisation in 2016, there will be additional capital requirements in 2017 to continue the commercialisation of Iris and development of Prima. We do not account for this potential dilution in our model.

Valuation

Using a risk-adjusted NPV model with a 12.5% discount rate, we value the company at €130.42m or €10.27 per fully diluted share. We have maintained our previous 40% likelihood of achieving projected peak sales of €109m in the EU and US markets. If EU CE mark approval is granted, the risk adjustment for Iris will likely be revised. Our fundamental assumptions including market penetrations, timing to market, peak sales and cost of goods sold remain unchanged. However, the valuation reflects the new cash position announced in October 2015 of €28m. This decreases our valuation from €10.51 to €10.27 per share.

Prima is modelled for both RP and AMD indications, as it seems to be more amenable to AMD than the Iris implant. With the product still in preclinical trials, we assigned a 10% likelihood of success in each indication. Given the large market for Prima in AMD, if feasibility studies are positive and the risk adjustment increased, there is significant upside potential in our model. If Prima fails, we would expect the company to trial Iris in the AMD population and possibly mitigate the risk of complete failure in that market.

Pixium does have a conceptual programme for cortical brain stimulation, which we will learn more about in the future. At this point we will not include this in our valuation of the company given the very early stage of development. However, in the future this could add significant value to the company.

Exhibit 4: Valuation summary

Product	Setting	Status	Launch	NPV (€m)	Peak sales (€m)	Probability of success	rNPV (€m)	rNPV per share (€)
Iris	Retinitis Pigmentosa	CE mark application filed	2016	96	109	40%	32	2.55
Prima	Retinitis Pigmentosa	Preclinical	2018	122	111	10%	9	0.71
Prima	AMD	Preclinical	2018	610	416	10%	61	4.80
Cortical brain stimulation	Optic neuropathies (glaucoma)	Preclinical	2021	1148	1,996	0%	0	0.00
Portfolio total				1975			102.34	8.06
Cash (as of 30 September 2015)							28.08	2.21
Overall valuation							130.42	10.27

Source: Edison Investment Research, company accounts

Financials

Pixium had €28m in cash at the end of Q315. The company receives the French Research Tax Credit, which is a cash payment of 30% of eligible research spending each year. With a burn rate of approximately €20m per year, Pixium is capitalised through the next set of inflection points. We anticipate those inflection points at CE mark approval in 2016 and Prima first-in-man trials in 2016. We do not expect Pixium to be cash flow positive until at least 2019, most likely 2020. R&D expenses may increase as Prima begins development, and we model overall R&D expenses at €22m for 2016, increasing to €28m in 2017. Our model anticipates the need for a €40m funding requirement by 2018 to reach profitability in 2019. For illustrative purposes only, we have added this requirement to long-term debt. Note that our financial and valuation models do not include the potential dilution impact of future equity offerings.

Exhibit 5: Financial summary

€'000s	2013	2014	2015e	2016e	2017e	2018e
Year end 31 December	IFRS	IFRS	IFRS	IFRS	IFRS	IFRS
PROFIT & LOSS						
Revenue	1,478	2,427	5,303	7,366	9,808	25,809
Cost of Sales	0	0	0	(850)	(1,132)	(2,978)
Gross Profit	1,478	2,427	5,303	6,516	8,676	22,831
R&D expenses	(6,590)	(10,963)	(17,677)	(22,096)	(27,620)	(28,173)
SG&A expenses	(1,035)	(3,111)	(3,991)	(5,987)	(8,980)	(13,470)
EBITDA	(6,147)	(10,834)	(16,136)	(21,325)	(27,845)	(18,698)
Operating Profit (before GW and except)	(6,147)	(11,647)	(16,180)	(21,386)	(18,812)	(27,924)
Intangible Amortisation	0	0	(185)	(181)	0	0
Exceptionals	0	0	0	0	0	0
Operating Profit	(6,147)	(11,647)	(16,365)	(21,567)	(27,924)	(18,812)
Other	0	0	82	0	0	0
Net Interest	1	36	(46)	(6)	0	2
Profit Before Tax (norm)	(6,146)	(11,611)	(16,144)	(21,392)	(27,924)	(18,811)
Profit Before Tax (FRS 3)	(6,146)	(11,611)	(16,329)	(21,573)	(27,924)	(18,811)
Tax	0	0	0	0	9,215	6,207
Profit After Tax (norm)	(6,146)	(11,611)	(16,144)	(21,392)	(18,709)	(12,603)
Profit After Tax (FRS 3)	(6,146)	(11,611)	(16,329)	(21,573)	(18,709)	(12,603)
Average Number of Shares Outstanding (m)	27.3	9.8	12.7	12.7	12.7	12.7
EPS - normalised (c)	(22.51)	(118.48)	(126.82)	(168.05)	(146.97)	(0.99)
EPS - FRS 3 (c)	(0.23)	(1.18)	(1.28)	(1.69)	(1.47)	(0.99)
Dividend per share (€)	0.0	0.0	0.0	0.0	0.0	0.0
BALANCE SHEET						
Fixed Assets	8,965	9,932	11,413	12,932	14,666	16,420
Intangible Assets	8,277	9,259	9,080	8,905	8,912	8,918
Tangible Assets	641	627	2,287	3,980	5,708	7,456
Other	47	46	46	46	46	46
Current Assets	11,327	44,867	24,515	4,747	12,950	10,443
Stocks	0	0	0	500	1,000	1,500
Debtors	0	0	0	0	0	0
Cash	9,420	42,132	21,780	1,512	0	0
Other	1,907	2,735	2,735	2,735	11,950	8,942
Current Liabilities	(2,038)	(4,050)	(4,076)	(4,076)	(4,076)	(4,076)
Creditors	(1,379)	(1,729)	(1,729)	(1,729)	(1,729)	(1,729)
Short term borrowings	0	0	(26)	(26)	(26)	(26)
Short term leases	0	0	0	0	0	0
Other	(659)	(2,321)	(2,321)	(2,321)	(2,321)	(2,321)
Long Term Liabilities	(30)	(245)	(245)	(245)	(28,891)	(40,741)
Long term borrowings	0	0	0	0	(28,646)	(40,496)
Long term leases	0	0	0	0	0	0
Other long term liabilities	(30)	(245)	(245)	(245)	(245)	(245)
Net Assets	18,224	50,504	31,607	13,358	(5,351)	(17,954)
CASH FLOW						
Operating Cash Flow	(5,188)	(8,389)	(18,667)	(18,546)	(28,391)	(19,245)
Net Interest	0	0	0	0	0	0
Tax	0	0	0	0	0	9,215
Capex	(303)	(1,773)	(1,710)	(1,761)	(1,814)	(1,868)
Acquisitions/disposals	0	0	0	0	0	0
Financing	11,822	42,705	0	0	0	0
Dividends	0	0	0	0	0	0
Other	1	169	(1)	40	47	48
Net Cash Flow	6,332	32,712	(20,378)	(20,268)	(30,158)	(11,850)
Opening net debt/(cash)	(3,088)	(9,420)	(42,132)	(21,754)	(1,486)	28,672
HP finance leases initiated	0	0	0	0	0	0
Other	0	0	0	0	0	0
Closing net debt/(cash)	(9,420)	(42,132)	(21,754)	(1,486)	28,672	40,522

Source: Edison Investment Research, company accounts

Edison, the investment intelligence firm, is the future of investor interaction with corporates. Our team of over 100 analysts and investment professionals work with leading companies, fund managers and investment banks worldwide to support their capital markets activity. We provide services to more than 400 retained corporate and investor clients from our offices in London, New York, Frankfurt, Sydney and Wellington. Edison is authorised and regulated by the Financial Conduct Authority (www.fsa.gov.uk/register/firmBasicDetails.do?sid=181584). Edison Investment Research (NZ) Limited (Edison NZ) is the New Zealand subsidiary of Edison. Edison NZ is registered on the New Zealand Financial Service Providers Register (FSP number 247505) and is registered to provide wholesale and/or generic financial adviser services only. Edison Investment Research Inc (Edison US) is the US subsidiary of Edison and is regulated by the Securities and Exchange Commission. Edison Investment Research Limited (Edison Aus) [46085869] is the Australian subsidiary of Edison and is not regulated by the Australian Securities and Investment Commission. Edison Germany is a branch entity of Edison Investment Research Limited [4794244]. www.edisongroup.com

Frankfurt +49 (0)69 78 8076 960
Schumannstrasse 34b
60325 Frankfurt
Germany

London +44 (0)20 3077 5700
280 High Holborn
London, WC1V 7EE
United Kingdom

New York +1 646 653 7026
245 Park Avenue, 39th Floor
10167, New York
US

Sydney +61 (0)2 9258 1161
Level 25, Aurora Place
88 Phillip St, Sydney
NSW 2000, Australia

Wellington +64 (0)48 948 555
Level 15, 171 Featherston St
Wellington 6011
New Zealand