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Frontier IP Group: A differentiated IP technology play

Unquoted technology companies have taken a hit this year as investors have become more cautious. However, one investment company has created a differentiated business model that de-risks its portfolio of early stage innovators and is proving highly profitable, too

Frontier IP Group (Aim:FIPP)

Ticker	FIPP
Current price	56.5p
12-month target price	80p
Market cap	£28.2m
52-week high	89p
52-week low	50p
Net cash	£5.26m (pro forma post-placing on 6 Nov'19)
Shares in issue	50.4m (post-placing on 6 Nov'19)
Financial year-end	30 Jun
Next event	Half-year results in late Mar 2020
Company website	frontierip.co.uk

Frontier IP Group share price

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Simon Thompson's view:

Frontier IP has turned the business model of investing in technology companies on its head. Instead of investing cash from its balance sheet, the company takes 'free equity' stakes in spin-out companies from universities in return for providing services to them as they scale up and commercialise their technology. This low-cost and capital efficient business model sets the company apart from cash hungry peers that have traditionally provided the seed and follow-on funding to early stage technology companies. Key to the company's success is validating the intellectual property (IP), and selecting the winners from a rich crop of opportunities provided by educational institutions in the UK and overseas. The 159 per cent increase in Frontier IP's pre-tax profits in the 2018/19 financial year highlights just how successful this strategy is proving.

Bull points

- Management team proactive in sourcing potential spin-outs with high-quality IP, through formal and informal partnerships.
- Stake in largest portfolio company, Exscientia, could be worth more than Frontier IP's entire market capitalisation on exit.
- Valuation of investee companies underpinned by grant funding and milestones.
- Founder equity received in return for support provided, not capital invested.
- Risk diversified across a wide range of technologies.
- Shortage of similar early-stage providers in the UK and continental Europe.
- Pressure on universities to generate income streams creates a rich crop of IP to validate.
- Strong cash-rich balance sheet and working capital position.
- Oversubscribed share placing earlier this month.
- Portfolio valued in relation to third-party funding rounds.

Bear points

- Brexit risk to future research and grant funding of UK universities.
- Share price underperformance since May 2019 as investors more cautious towards small unquoted stocks after implosion of funds managed by Woodford Investment Management.
- Operating cash flow negative as value held in portfolio is effectively deferred income.
- No dividend.

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"The core focus is on the commercialisation of intellectual property"

Investors are rightly questioning the valuations attributed by investment companies to their unquoted holdings after the implosion of funds managed by Woodford Investment Management. The high profile fund manager held a substantial amount of its portfolios in illiquid loss-making technology companies at an early stage of their development, the value of which has proved elusive to realise.

The situation has been compounded by the fact that some investors looking for the next unicorn have been willing to put their cash into early-stage companies even before the technology is proven, thus encouraging management to ramp up cash burn unnecessarily to create a business to justify a hyped-up valuation. As a result, in a world awash with cash, many valuations in the unquoted technology sector reflect more the sums that a company is able to raise rather than business fundamentals and the potential commercial value of the technology.

That's not an issue that **Frontier IP Group** faces. That's because the Aim-traded company provides a range of commercialisation services to university spin-outs in return for 'free equity' stakes, rather than investing cash. The core focus is on the commercialisation of intellectual property (IP) with a view to creating a portfolio of successful spin-out companies through:

- Establishing formal and informal relationships with academics, universities and other partners as sources of IP and deal flow.

- Identifying early stage companies with strong IP and helping them scale up their business in partnership with the industry.

- Taking 'free' equity stakes in spin-out companies in return for strategic, commercial support and proactive, hands-on support ahead of arranging third party capital investment in the companies.

- Building a wide network of sources of capital, including raising third party funds for development once milestones have been achieved.

- Creating value for shareholders through significant deferred earnings which crystallise when exits are made from Frontier IP's equity stakes.

The approach is both innovative and capital-efficient, based upon proving the commercial worth of the IP first and foremost, and then working closely in partnership with universities, academics and industrial partners.

The focus is on validating the technology and, through early industry engagement, understanding how it can be scaled up and what market needs or demands are being met. IP can have applications across several different sectors, so the company's management uses its expertise to assess IP based on the underlying technologies, industrial processes and potential partners. Clearly, it is impossible for the company to develop a granular understanding of all the markets it can potentially reach through portfolio companies. However, Frontier IP's industry partners do have this knowledge, and ensure technology can be developed to meet real-world demands and needs.

The cluster approach to technology investment

A good example is portfolio company Fieldwork Robotics, a business that is developing robots to harvest soft fruit and vegetables that, three years ago, was a spin-out from Frontier IP's partnership with The University of Plymouth. The initial product is a raspberry picking robot system that uses sophisticated software and artificial intelligence, including machine learning image recognition techniques, to identify and pick ripe raspberries which meet stringent supermarket specifications on size and colour. At the same time, the robot is gathering data on things such as the health of the plants and noting the exact location of unripe raspberries, so it can return to them later.

Fieldwork Robotics fits into at least two clusters, one technological, the other industrial. The technology underpinning the robots correlates with fellow portfolio companies such as Exscientia, a leader in artificial intelligence-driven drug discovery and a holding that could be worth more than Frontier IP's own market capitalisation alone (see Valuation matrix on page 8). Fieldwork Robotics' technology also correlates with that of Cambridge Simulation Solutions, a company whose software models discontinuous processes, and logistics software firm Celerum, a spin-out from Robert Gordon University, Edinburgh.

Fieldwork Robotics also forms part of Frontier IP's food and agritech cluster where it sits alongside other portfolio companies which address opportunities throughout the food production and supply chain. These include: Molendotech, a developer of a rapid assay to screen water for faecal contamination and other harmful bacteria; Nandi Proteins, a developer of patented technology to reduce or replace sugars, fats and additives in a wide range of processed foods; and Tarsis Technology, a developer of morphous metal-organic frameworks for use in the delivery of active ingredients.

This highlights how Frontier IP's portfolio companies fall into clusters where they have either potential industry part-

"The business model enables the company to exploit synergies in expertise to drive value"

ners or underlying technologies in common. The benefit of the business model is that it enables the company to exploit synergies in expertise and across networks to drive value in a more effective way than taking a narrower sector-based approach.

Importantly, Frontier IP's approach is specifically designed to ensure that valuations are based on reality, unlike the pie in the sky valuations of some of Woodford's unquoted and illiquid holdings. It also reflects a view that the best way to develop spin-outs is by working in partnership with universities, academics and industry, and managing them for the long term.

Sourcing IP deal flow

Frontier IP has long standing relationships with eight top-ranked universities to source spin-out companies, including **Cambridge University** and other institutions, such as:

- **Robert Gordon University**, Aberdeen is one of the oldest technology institutes in the UK and has particular strengths in health, computer science and informatics and oil, gas and renewable energies.

- **Dundee University** is internationally recognised for its expertise across a range of disciplines, including life and biomedical sciences.

- **Plymouth University** is a world-class institution for research in marine sciences, medical sciences, computer science and informatics, and environmental sciences.

In addition, the company entered into partnerships three years ago with two leading educational establishments in Portugal, to assist with their spin-off and licensing activities: Universidade Nova de Lisboa Faculty of Science and Technology; and Universidade de Évora. Also, Frontier IP has a partnership agreement with the UK government's Department for International Trade (DIT), whereby The British Embassy in Lisbon provides strategic support to Frontier IP through regular meetings with the Ambassador and DIT staff, and provides introductions to potential industry partners and key decision makers in the Portuguese government and economy.

These overseas partnerships are bearing fruit as Frontier IP has taken equity stakes in three spin-out companies in the past 15 months including a 31.8 per cent stake in NPTE, a company that is developing novel technology to print electronic circuits, sensors and semiconductors onto any cellulose-based paper. The technology replaces the silicon used in electronics with eco-friendly metal oxides and cellulose to create inks that can be used in specially adapted printers and printing technologies, such as ink-jet heads. Industrial applications for the technology include paper-based diagnostic kits and smart packaging. Also, because it is possible to store data in the cellulose, there are potential applications in fraud prevention – for example, to replace microchips with electronic pages in passports and other identity documents which need to be tracked.

Meeting the needs of early stage spin-out companies

Spin-out businesses do not always need significant sums of money to prosper, but when they do then funding is typically raised for portfolio companies from third parties once milestones are achieved, to finance their future development. More often though, what portfolio companies need most is time to overcome the inevitable scientific, technological and commercial obstacles that arise.

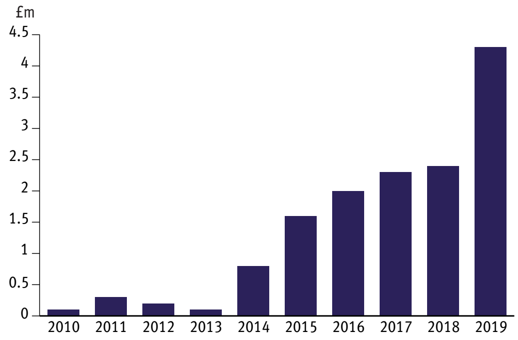
Frontier IP's 'free equity' approach to building a portfolio of companies instils commercial and financial discipline on its management team. The whole purpose is to back companies with IP that can be commercialised in the real world and generate capital upside for shareholders on exit. Frontier IP may commit small sums at an early stage to portfolio companies through loan advances to enable them to meet working capital requirements, which may be repaid from future funding rounds or exchanged for additional equity.

Portfolio companies may also take advantage of non-dilutive grant funding, but generally Frontier IP doesn't invest cash for its equity stakes. This is a key differentiator to the business models of other quoted IP-commercialisation companies which acquire an initial stake in the spin-out company, and participate in future funding rounds, too.

That's well worth noting because in order to ensure that interests are aligned across all parties involved in building up a portfolio company, typically, no shareholder has a controlling stake. True, Frontier IP's initial equity stake in a spin-out company (typically up to 40 per cent) will be diluted over time as it doesn't participate in the funding rounds, but more important, it will benefit if successive third-party funding rounds attribute a higher value to the portfolio company's equity.

Fundraising activity for spin-out companies not only enhances value in the portfolio, but can generate revenues for Frontier IP, too. The company generates additional revenue from its portfolio through board retainers and fees for bespoke business development, corporate and strategic advisory work, and for fundraising. Frontier IP has created an extensive network of sources of capital ranging from institutions, industry investors through to private individuals.

Frontier IP's revenue surge as portfolio matures



Source: Frontier IP annual report and London Stock Exchange

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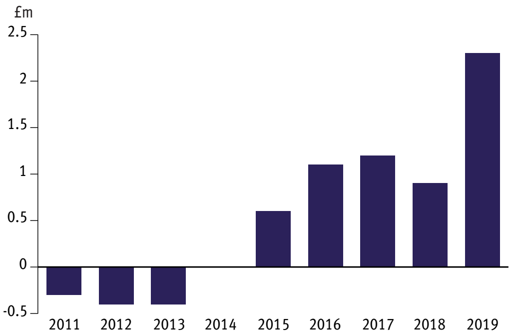
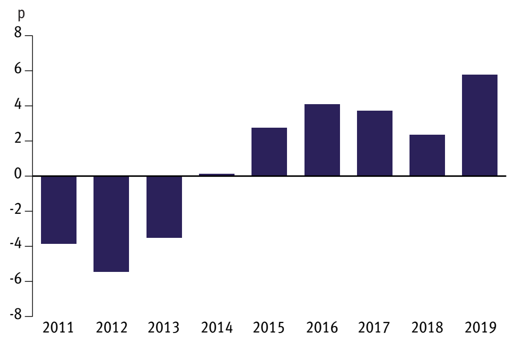
Pre-tax profit growth driven by valuation gains



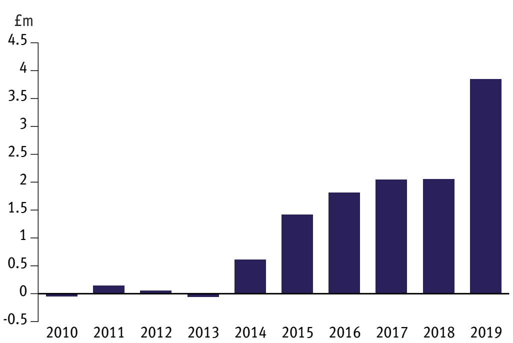
Source: Frontier Group annual report and London Stock Exchange

Frontier IP's record of sustained earnings per share



Source: Frontier Group annual report and London Stock Exchange

Frontier IP valuation gains gaining momentum



Source: Frontier IP annual report

Frontier IP Group (Aim:FIPP)

Ord Price: 56p
Touch: 55-57p
Dividend yield: -nil
Net Asset Value: 42.4p**
Market Value: £28.2m
12-Month High: 89p **Low:** 50p
PE Ratio: 10
Net cash: £5.2m**

12 Months to 30 Jun	Revenue (£m)	Pre-tax profit (£m)	Earnings per share (p)	Dividend per share (p)
2010	0.14	-0.33	-6.55	nil
2011	0.31	-0.27	-3.86	nil
2012	0.22	-0.38	-5.45	nil
2013	0.12	-0.37	-3.51	nil
2014	0.79	0.03	0.13	nil
2015	1.59	0.65	2.76	nil
2016	2.03	1.13	4.08	nil
2017	2.31	1.23	3.73	nil
2018	2.36	0.90	2.36	nil
2019	4.27	2.33	5.77	nil
% change	81%	159%	144%	–

**Net cash and net asset value per share adjusted to reflect £3.8m net proceeds from placing on 6 Nov 2019
Normal market size: 1,500 Setsqx
Source: Frontier Group annual report, London Stock Exchange

Valuation gains driving share value creation

As the 10-year performance table shows, Frontier IP has come a long way since the company floated on London's junior market in 2011 with a market capitalisation of £3.5m. The fact that corporate broker N+1 Singer has just raised £4m (£3.8m net of expenses) in an oversubscribed placing of 8m new shares, at 50p, exactly 12 months after the company raised £2.3m in another oversubscribed placing in November 2018, highlights that institutional investors are recognising the shareholder value being created by Frontier IP's differentiated approach to investing in early stage technology companies.

The institutional demand also highlights the fact that the fair value of Frontier IP's equity portfolio of 18 companies rose by almost half to £13.2m in the 12 months to 30 June 2019, buoyed by £3.85m of unrealised gains (up from £2m in the 2017/18 financial year). The company also has five spin-out companies which are modestly valued.

That thumping investment gain equated to double the business' annual operating expenses of £1.9m, highlighting that as the portfolio matures, and more portfolio companies attract third party funding, then the hidden value embedded in the directors' conservative valuation approach reveals itself. The valuation gain and revenue earned from services provided by Frontier IP (up by 40 per cent to £0.42m) meant that the company reported an eye-catching 159 per cent surge in pre-tax profits to £2.3m in the 2018/19 financial year.

Frontier IP valuation gains gaining momentum

Year to 30 Jun	Valuation gains
2010	-£0.05m
2011	£0.15m
2012	£0.06m
2013	-£0.06m
2014	£0.61m
2015	£1.42m
2016	£1.81m
2017	£2.05m
2018	£2.06m
2019	£3.85m

Source: Frontier IP annual report

Taking into account the new capital raised earlier this month, Frontier IP has a proforma net asset value of £21.4m, of which its investment portfolio accounts for £13.65m (including loans to portfolio companies of £397,000) and net cash of £5.26m.

Effectively, this means that although the company's current market capitalisation is £28.2m, the value being placed on Frontier's IP management team and potential returns from the current batch of (and future) spin-out companies, is only £9m. That's far too low a valuation once you consider how Frontier IP values its companies (see valuation matrix section below).

Frontier IP net asset value rebounds as portfolio matures

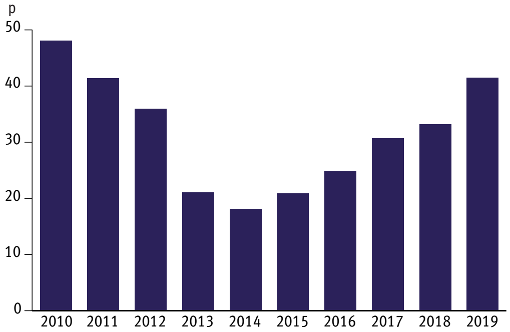
Year to 30 Jun	Shares in issue at year-end	Equity raised	Issue price	Net asset value	Net asset value per share
2010	4.97m	£0.00m	na	£2.39m	48.1p
2011	6.97m	£1.00m	50p	£2.89m	41.4p
2012	6.97m	£0.00m	na	£2.51m	36.0p
2013	13.05m	£0.61m	10p	£2.75m	21.1p
2014	22.53m	£1.14m	10p/20p	£4.07m	18.1p
2015	26.61m	£0.85m	21p	£5.56m	20.9p
2016	30.78m	£1.00m	24p	£7.67m	24.9p
2017	38.28m	£3.00m	40p	£11.76m	30.7p
2018	38.28m	£0.00m	na	£12.72m	33.2p
2019	42.43m	£2.49m	65p	£17.59m	41.5p
2020**	50.43m	£4.00m	50p	£21.59m	42.8p

Source: Frontier IP annual peport, London Stock Exchange; **Pro forma figures to reflect placing of shares in November 2019

It's also too low a valuation once you take into account that in the past five financial years the company has banked £11.2m of investment gains and made an aggregate pre-tax profit of £6.2m after accounting for all operating expenses, thus generating an impressive track record of profit growth as well as validating the business model as the portfolio scales up and matures.

In the same five-year trading period, Frontier IP has raised gross proceeds of £11.3m through share placings (net proceeds of £10.7m), which have clearly created shareholder value as equity shareholder funds have risen by £17.4m (up from £4.07m in June 2014 to £21.5m in

Frontier IP net asset value rebounds as portfolio matures



Source: Frontier IP annual report and London Stock Exchange

November 2019), a reflection of £6.2m of net profits earned in the same period. This value creation helps explain why the company's net asset value (NAV) per share has more than doubled from 18.1p in June 2014 to a proforma figure of 42.8p post this month's placing.

It's reasonable to expect the maturing portfolio to generate further valuation gains which will not only cover Frontier IP's annual operating expenses, but create further shareholder value by enhancing NAV per share as profits are booked.

Frontier IP's valuation matrix

Investments are primarily in seed, start-up and early-stage companies often with no short-term earnings, revenue or positive cash flow, making it difficult to assess the value of its activities and to reliably forecast cash flows.

Consequently, the directors consider that the price of a recent third-party funding provides the best estimate of fair value. The company normally receives its initial equity prior to any third-party funding, and some companies progress without third party funding. In deciding the most appropriate technique in estimating fair value, the board uses a standard valuation matrix to categorise companies. The process works as follows:

Stage one

When Frontier IP has received its initial equity prior to transfer of IP to the portfolio company, the portfolio company is valued at a notional £50,000. This figure is derived from the transaction price at which it has received equity stakes from its university partnerships, and which the board considers to be a materially correct representation of fair value.

In the 2018/19 annual accounts, Frontier valued five new spin-outs at £78,000 in total, suggesting upside potential when these companies move on to stage two and beyond.

Stage two

Once the IP is transferred to the portfolio company, the valuation is increased by between £50,000 and £950,000 depending on the value attributed to the IP. The technique used is the comparable company valuation, specifically comparing the entry price at which investors would typically invest in investor-ready pre-revenue companies with IP and adjusting for management's assessment of the company's IP.

The range of values may therefore change over time. In addition, where grant funding is awarded in relation to product development costs, the value of the grants is included in the company valuation to the extent that man-

“Grants indicate a business is likely to improve its performance over time, increasing chances of a successful future exit”

agement is satisfied that the company will derive commensurate economic benefit. That’s worth noting because data shows that grants indicate a business is likely to improve its performance over time, increasing chances of a successful future exit. Grant funding also provides further validation for the technology being developed and, from a shareholder’s perspective, there is the added advantage that such funding is non-dilutive.

Frontier IP’s portfolio companies enjoyed considerable success in winning grant funding to support commercialisation over the 2018/19 financial year. This included UK government backing for Fieldwork (an agricultural robot technology for harvesting soft fruits and vegetables); Pulsiv Solar (a company that commercialises breakthrough research into the efficiency of photovoltaic solar panels and power converters); Amprologix (developer of new classes of antibiotics to help tackle the threat of antimicrobial resistance); and Nandi (developer of patented technology to reduce or replace sugars, fats and additives in a wide range of processed foods). In addition, The Vaccine Group and its partners are party to more than $9m in grants from the US, UK and Chinese governments to develop a novel technology to combat zoonotic viruses (diseases that jump between different animal species, including into humans).

Frontier IP holds five investments at stage two, which have a combined carrying value of £2.5m.

Stage three

When the portfolio company commences trading, Frontier IP considers if this indicates a change in fair value.

The seven investments at this stage have a combined carrying value of £180,000, suggesting that as these portfolio companies engage with industry to validate their technology, helping third party funders understand how it can be scaled up to address real-world market needs and demands, then Frontier IP’s valuations of these portfolio companies could be materially adjusted upwards once they attract third party funding.

Stage four

If the portfolio company receives third party funding, the price of that investment provides the basis for the valuation. The period of time for which it remains appropriate to continue to use the price of the third-party funding round depends on specific circumstances. The directors consider whether any changes or events subsequent to the investment would indicate a change in fair value. Any adjustment made is, whenever possible, based on objective data from the company in addition to management’s judgement.

"Frontier IP has five portfolio companies at stage four which have a combined book value of £5.3m"

Growing portfolio value is driven by external markers such as third-party investment and commercial milestones, both of which show that Frontier IP is consistently and successfully identifying strong IP that can be commercialised.

During the 2018/19 financial year, the following blue chip or market-leading companies entered into partnerships with Frontier IP's respective portfolio companies: AB Foods and Agrii, part of Origin Enterprises (Nandi); Bosch UK (Pulsiv Solar); Parkside Architectural Tiles, the commercial arm of Topps Tiles (Alusid, a company that recycles industrial waste, most of which ends in landfill, to create top-quality tiles and other surfaces); Hall Hunter Partnership (Fieldwork Robotics); G's Group (Molendotech, developer of a rapid assay to screen water for faecal contamination and other harmful bacteria); and Ingenza (Amprologix).

Frontier IP has five portfolio companies at stage four which have a combined book value of £5.3m.

Stage five

As the portfolio company develops and generates predictable cash flows, then a combination of valuation techniques is applied as appropriate. These include discounted cash flow, industry specific valuation models and comparable company valuation multiples.

Frontier IP has one investment in stage five, and it's a big one: Exscientia, one of the world's leading artificial intelligence-driven drug discovery companies. Earlier this year, Exscientia raised $26m (£20m) through a Series B funding round. It has signed new drug discovery collaboration agreements with Roche and Celgene. Post year-end, it also entered partnership with Rallybio, an exciting early-stage biopharmaceutical company. Along with existing collaborations with GlaxoSmithKline, Sanofi and Evotec, Exscientia now has upfront and potential milestone payments of £320m. This highlights the value these billion-dollar drug giants attribute to Exscentia's patented cutting edge Centaur Chemist AI drug delivery platform, that helps them to discover pre-clinical drug candidates.

Frontier IP holds a 3.25 per cent stake in Exscientia which was revalued from £3.3m to £5.16m in the 2018/19 annual accounts, implying an equity valuation of £159m. However, management note that they "have exercised a degree of caution" in the revaluation. That could be the understatement of the year given that Benevolent AI, Exscientia's direct competitor and a similar-sized company, recently raised £109.5m of new funds at an equity valuation of £1.4bn.

In fact, it's not beyond the realms of possibility that

Frontier IP's 3.25 per cent shareholding in Exscientia could be worth more than the UK company's £28.2m market capitalisation on an exit. This highlights the conservative undervaluation in Frontier IP's accounts and the potential for another material upwards revaluation in the year ahead. That distinct possibility is simply not being priced into Frontier IP's valuation.

Portfolio companies

Core portfolio companies must meet two out of three criteria:

- Frontier IP holds at least 10 per cent of the company's equity.
- Shareholding is worth at least £500,000.
- Substantial opportunity for a favourable exit, either through trade sale or IPO.

The company had a core portfolio of 17 companies valued at £13.2m at the 30 June 2019 financial year-end. These companies announced 10 agreements with commercial partners in the 2018/19 financial year, a strong indication of their success in driving industry engagement, as well as completing two fund raisings and securing seven grant awards. Four new spin outs were incorporated including the first three in Portugal. In addition, Frontier IP holds equity stakes in a further six companies which do not meet the test for inclusion in its core portfolio. At 30 June 2019, the aggregate value of these six holdings was £13,500.

Post the year end, Frontier IP announced it had taken a 43 per cent equity stake in Elute Intelligence Holdings Limited. Elute develops novel software tools to intelligently search complex documents, such as patents and contracts, and to detect evidence of plagiarism, collusion and copyright infringement.

Frontier IP's core portfolio November 2019

Portfolio company	Issued share capital	About	Source
Alusid Limited	35.6%	Recycled materials	University of Central Lancashire
Amprologix Limited	10.0%	Novel antibiotics to tackle antimicrobial resistance	Universities of Plymouth and Manchester
Cambridge Raman Imaging Ltd	33.3%	Medical imaging using ultra-fast lasers	University of Cambridge & Politecnico di Milano
Cambridge Simulation Solutions Ltd	40.0%	Methods to simulate and control complex chemical processes	University of Cambridge
CamGraPhIC Limited	33.3%	Graphene-based photonics	University of Cambridge and CNIT
Celerum Limited	10.0%	Near real-time automated fleet scheduling	Robert Gordon University
Des Solutio LDA	25.0%	Green alternatives to industrial toxic solvents	FCT Nova
Elute Intelligence Holdings Ltd	43.0%	Novel software tools to intelligently search complex documents, such as patents and contracts.	Formed from CFL Software Limited and includes complementary IP developed by Frontier IP
Exscientia Limited	3.3%	Novel informatics and experimental methods for drug discovery	University of Dundee
Fieldwork Robotics Limited	27.5%	Robotic harvesting technology for challenging horticultural applications	University of Plymouth
Insignals Neurotech Lda	33.0%	Wearable medical devices supporting deep brain surgery	INESC TEC
Molendotech Limited	14.1%	Rapid detection of water borne bacteria	University of Plymouth
Nandi Proteins Limited	20.1%	Food protein technology	Heriot-Watt University, Edinburgh
NTPE LDA	31.6%	Novel technology to print electronic circuits, sensors & semiconductors onto paper	FCT Nova
PoreXpert Limited	15.0%	Analysis and modelling of porous materials	University of Plymouth
PulsiV Solar Limited	18.9%	High efficiency power conversion and solar power generation	University of Plymouth
Tarsis Technology Limited	18.0%	Controlled delivery of agrochemicals using metal-organic frameworks	University of Cambridge
The Vaccine Group Limited	19.2%	Herpes virus-based vaccines for the control of bacterial and viral diseases	University of Plymouth

Source: Frontier IP 2019 annual report and London Stock Exchange RNS

(Details of the individual holdings can be read in the appendix of this report).

Meet the management

■ The company is led by 51-year old **chief executive and founder Neil Crab**. He co-founded **Sigma Capital Group (SGM)**, a specialist asset management and advisory group, and has considerable experience as an investor and director of a wide range of technology and university spin-out companies. He was previously an investment manager at Duncan Lawrie, having responsibility for a range of managed portfolios in smaller UK and unquoted technology companies.

■ Mr Crabb is supported by **chief operating officer, Jackie McKay**. She has substantial experience of the university IP and venture capital industries and has been working with Frontier IP since its inception to help develop new and existing commercialisation relationships. Ms McKay spent nearly a decade at Sigma Capital Group, latterly as corporate development director, where she was responsible for structuring and setting up venture funds and university partnerships.

■ **Finance director Jim Fish** has over 25 years' experience in senior financial positions and has a wide range of commercial experience across venture capital funded small/medium-sized enterprises and start-up companies. He is a qualified chartered accountant and was previously interim finance director at The One Place Capital Limited, an online technology start-up.

■ The company has made a number of new appointments in the past year, a reflection of the growing maturity of the business and the technologies under development throughout the portfolio, which has resulted in increasing interest and traction from industry. **Matthew White** was appointed **director of commercialisation** in September 2018. He has over 23 years' experience in technology, product and service innovation, business development and marketing. He was previously Head of Innovation at AB Sugar, part of FTSE 100 group AB Foods. Mr White has a natural sciences degree majoring in Chemistry from the University of Cambridge, and has extensive experience working with university partners. He started his career at Neotronics Scientific, one of the first companies to commercialise electronic odour sensing.

■ **Technology commercialisation director Lucy Rowbotham** is another recent recruit. She has over 30 years' experience of transforming technology knowhow into product innovations, for market leading companies in the healthcare, industrial and consumer sectors. Her prior role was as a consulting director in the MedTech division of Cambridge Consultants, a design and development company. She has an MA in Natural Sciences, Physics from the University of Cambridge.

■ Other notable appointments this year include the recruitment of **John Price and Air Vice-Marshal Gary Waterfall CBE** as **specialist advisers** to provide expertise, insight and advice across the food and agriculture, and defence industries, respectively, and support Frontier IP and its portfolio companies. Mr Price spent 25 years working for global food and petcare group, Mars, Inc, where he was latterly Vice-President Operations Europe. Mr Waterfall served for 34 years in the Royal Air Force. His final role before retirement was as Chief of Staff at The Permanent Joint Headquarters at Northwood, where he was responsible for planning and executing joint operations involving all three services around the world. He is also a fellow of the Royal Aeronautical Society.

■ The board is chaired by 53-year old **Andrew Richmond** who has substantial experience of the healthcare, stockbroking and private equity industries. In the 2018/19 financial year, employee costs and share-based payments accounted for £1.4m of Frontier IP's £1.9m operating costs, a fair reflection of the cost of the 14 people employed in business and corporate development. The eight board members were paid a total remuneration of £668,000 which is not excessive in relation to the £2.35m net profit the company reported for the financial period.

■ The board own 4.45m of the 50.4m shares in issue post the November placing, or 8.8 per cent of the issued share capital, a significant holding. Both Mr Crabb and Mr White acquired 100,000 shares in the placing, a sign of confidence. Moreover, four directors – Mr Crabb, Ms McKay, Mr Fish and Mr White – have share options over a total of 2.6m shares (representing 5.2 per cent of the issued share capital), which expire between 2023 and 2028 at exercise prices of between 10p to 65p. This provides a further incentive for senior management to maintain their impressive track record.

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Major shareholders

The November placing was supported by major shareholders Canaccord Genuity, which acquired 2m new shares to take its holding to 9.8m, or 19.5 per cent of the enlarged issued share capital, and Quilter Cheviot, which acquired 873,076 new shares to take its holding to 8.8m, or 13.6 per cent of the enlarged issued share capital. The top five institutional shareholders and the board control a combined 66 per cent of the issued share capital which does mean that a higher number of shares than average are not in public hands.

It also means that Frontier IP's share price is likely to react disproportionately to both buying and selling trading activity. This explains why the share price has been marked down from a high of 89p in May this year to a low of 50p given that the fall-out from the Woodford funds wind down has meant that investors have become more cautious in their valuations of companies holding unquoted illiquid holdings. However, Frontier IP has clearly been performing well, one reason why it's profitable, unlike many of its rivals. As noted earlier, the board's valuation approach is conservative, too.

Frontier IP major shareholders

Shareholder	Number of shares	Percentage held
Canaccord Genuity	9.81m	19.45%
Miton Group	6.60m	13.09%
Quilter Cheviot	6.86m	13.61%
AXA Investment Managers	3.51m	6.96%
Neil Crabb	2.93m	5.81%
Legal & General Investment Management	2.09m	4.14%
Total		63.07%

Source: London Stock Exchange RNS post November 2019 placing, based on issued share capital of 50.4m shares

The fact that the major shareholders and the board have supported the placing, the proceeds of which will enable the company to convert its pipeline and exploit future investment opportunities, is an indication of both their confidence and the undervaluation of the shares which are being priced on a price/earnings (PE) ratio of 10 for the year just ended. They are also rated on 1.3 times book value, a valuation that fails to take into account the real possibility of further material valuation gains from portfolio companies in the year ahead.

In fact, it wouldn't take much in the way of positive news flow for Frontier IP's share price to re-rate back towards the 89p highs seen earlier this year given that only 17m of the 50.4m shares in issue are not controlled by the board or the five major institutional investors.

It's also worth bearing in mind that the shares can be traded between the bid-offer spread of 55p to 57p, and in bargain sizes well above the London Stock Exchange normal market size of 1,500 shares. In fact, trades as large as 22,000 shares have been traded between the spread this month.

Peer group comparison and target price

There are other listed companies operating in this space, the largest being **IP Group (IP)**. Asset manager and technology investment group **Mercia Asset Management (MERC)** is another. Both of these companies are cash-rich and trade on respective share price discounts to NAV of 47 per cent and 23 per cent. Mercia is one of my Bargain Shares for 2019 and I remain very positive on the company's investment case.

However, the difficulty with comparing Frontier IP with Mercia and IP Group is that it has a fundamentally different business model. That's because Frontier doesn't seek to invest cash for its equity stakes in portfolio companies, so is operating a low-cost, capital efficient business model. In stark contrast, other players in the sector are capital hungry as they deploy cash on the balance sheet to fund follow-on funding rounds for portfolio companies, and take equity stakes in new ones, before releasing cash through a trade exit or IPO.

"The company now has a five-year track record of delivering healthy valuation gains"

Also, given the high level of due diligence the investment team at Frontier IP carry out to validate the commercial potential of the IP, and the conservative valuations it places on portfolio companies, there is a case to be made that the shares should be trading at a high premium to book value, to take account of the proven ability of the management team to create value from the 'free equity'. The company now has a five-year track record of delivering healthy valuation gains.

Add to that the potential for a material cash windfall from the holding in Exscientia, and it's not difficult to arrive at a valuation of 80p for Frontier IP's equity, implying a target market capitalisation of £40.3m. This is based on an enterprise valuation of £35m after deducting the current cash pile, a price-to-book value of 2.3 times for the core portfolio of 18 companies, a multiple that could drop well below one times on a successful exit from Exscientia.

From a technical perspective, the share price appears to have found support around 50p, coinciding with the previous major low in September 2018, adding further weight to the positive fundamental investment case.

So, having taken into account all the risk factors below, a 12-month target price of 80p, and one offering 40 per cent potential share price upside, seems realistic. **Buy.**

Risk assessment
No investment is without risks, and Frontier IP has several to consider:

■ **Fall in portfolio value and goodwill impairments.** The principal financial risks of the business are a fall in the value of the portfolio and impairment of the value of goodwill. With regards to the value of the portfolio itself, the fair value of each portfolio company represents the best estimate at a point in time and may be impaired if the business does not perform as well as expected, directly impacting its value and profitability. This risk is mitigated as the size of the portfolio increases, thus diversifying capital concentration risk.

The value of goodwill is linked to the progress of the existing portfolio and to continued identification and acquisition of equity stakes in new portfolio companies. Frontier IP only carries £1.97m of goodwill on its balance sheet, or less than 10 per cent of proforma shareholders' funds of £21.4m, so the amount of goodwill is not excessive given that the management team have now reported five consecutive years of material annual profits.

■ **Recovery of overdue debt from portfolio companies.** There is a risk that certain portfolio companies will be unable to repay outstanding loans or trade debt owed to Frontier IP. The directors aim to mitigate this risk by helping to ensure that portfolio companies meet planned milestones and can finance their business plans, typically through fundraising, and repay the debt when due.

Including the £3.8m net proceeds from the November 2019 placing, Frontier IP has net current assets of £6m, of which £258,000 represents trade receivables more than 90 days outstanding from portfolio companies, Nandi (£204,000) and Fieldwork Robotics (£43,000). There is a non-current trade receivable of £114,000 owed by Nandi and other debtors include interest free loans to Nandi and Alusid of £80,000 and £31,000, respectively. Frontier IP's directors are "confident that Nandi, Alusid and Fieldwork Robotics will be able to raise sufficient funds to finance their business plans and commence payment of the debt."

■ **Economic downturn.** The principal operational risk of the business is management's ability to continue to identify spin-out companies from its formal and informal university relationships, increase the revenue streams that will generate cash in the short term, and achieve realisations from the portfolio.

Early-stage spin out companies are particularly sensitive to downturns in the economic environment. Any downturn would mean considerable uncertainty in capital markets, resulting in a lower level of funding activity for such companies and a less favourable exit environment. The impact of this may be to constrain the growth and value of the portfolio and reduce the potential for revenue from funding advisory work. The directors seek to mitigate these risks by maintaining relationships with co-investors, industry partners and financial institutions.

■ **Reduction in public funding to the higher education sector.** This could result in lower research funding; universities changing their approach to research, which generates intellectual property, and subsequent commercialisation; or consolidation among Higher Education Institutions.

Any uncertainty in the sector may have an impact on the company's IP-commercialisation partnerships in terms of lower levels of IP generation and commercialisation activity. The board tries to mitigate these risks by continuing to seek new sources of IP from a wide range of institutions both within and outside of the UK. The company's partnerships in Portugal are a good example of how this works in practice.

■ **Brexit.** The UK's exit from the EU poses potential risks for the business, including: the unknown impact on funding for research and development in both the higher education sector for portfolio companies; and potential for uncertain economic conditions that could impact the ability of portfolio companies to grow, in particular potentially making it more difficult to recruit and retain skilled staff. There may also be risks to certain portfolio companies of potential tariffs, shipping delays and large foreign currency fluctuations.

The ongoing uncertainty surrounding Brexit makes it difficult to take any mitigating steps currently, but the board will work closely with portfolio companies to mitigate the impact of issues arising from Brexit when these are known.

■ **Negative operating cash flow.** Until the company generates cash through an investment realisation it relies on raising additional capital to fund operations. The uncertainty centres on the ability of management to identify and effect realisations from the portfolio and generate service revenue streams to reduce the reliance on raising money from capital markets.

To manage this risk, the board continues to pursue its aim of actively seeking realisation opportunities within its portfolio and growing service revenue to reduce the requirement for additional capital raising. The company's current cash pile covers four years of the cash outflow needed to support its operating activities at last year's run rate, so this risk is not significant.

■ **Staff retention.** Frontier IP has a small executive team and is dependent on key individuals for its success and there can be no assurance that it will be able to retain their services. Recruiting additional skilled personnel, offering rewards and incentives, and encouraging key personnel to hold direct interests in shares of the company, mitigates this risk.

Appendix: Frontier IP portfolio holdings

Alusid's tiles and surfaces are made of no less than 98 per cent recycled materials

Alusid

Frontier IP stake: 35.6 per cent

Preston-based Alusid's innovative formulations and processes create premium-quality tiles, table tops and other surfaces by recycling industrial waste ceramics and glass, most of which would otherwise be sent to landfill. Its processes also use less energy than conventional tile manufacturing. Alusid made significant strides during the year to June 2019.

In September 2018, the company raised £1.34m to support development work on scaling up. Following this, in May 2019, Parkside Architectural Tiles, the commercial arm of Topps Tiles, launched Sequel, an exclusive range of tiles made by Alusid. It successfully completed trials for volume production using industry-standard equipment and is looking to move up to volume production through Spanish subcontractors.

Amprologix

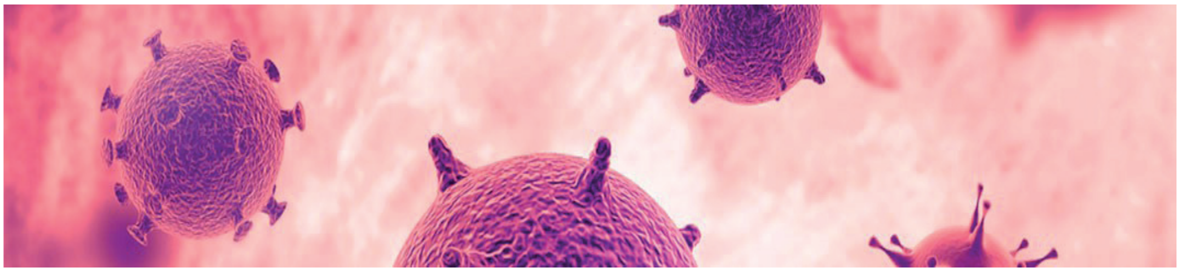
Frontier IP stake: 10 per cent

Amprologix is the latest spin out stemming from the partnership with the University of Plymouth. The company was incorporated in 2018 to commercialise the work of Mathew Upton, Professor of Medical Microbiology at Plymouth's Institute of Translational and Stratified Medicine.

Amprologix is initially developing a new family of antibiotics, helping to tackle antimicrobial-resistant MRSA and other superbugs, a major threat to human health globally, based on epidermicin, which is derived from bacteria found on human skin. Progress to date has been rapid and industry involvement is already secured. Ingenza, a leader in industrial biotechnology and synthetic biology, is a shareholder and is working with Amprologix on scale up.

In February 2019, Amprologix won a £1.2m UK Department of Health and Social Care contract to accelerate development of its lead antibiotic candidate, epidermicin NI01.

Image below: Amprologix is introducing new classes of antibiotics to help tackle the threat of antimicrobial resistance



Cambridge Raman Imaging

Frontier IP stake: 33.3 per cent

Cambridge Raman Imaging was Frontier IP's first graphene spin-out, the result of a partnership between the University of Cambridge and the Politecnico di Milano, in Italy. It has been incorporated to commercialise research undertaken into graphene-based ultra-fast lasers, initially for use in Raman-imaging microscopes to diagnose and monitor tumours.

CamGraPhIC

Frontier IP stake: 33.3 per cent

A second graphene spin-out, this time from the University of Cambridge and Italian research institute CNIT, CamGraPhIC was incorporated earlier this year to develop graphene-based photonics for high-speed data and telecommunications. Graphene photonics are seen as a key enabler for 5G technologies by the company's industrial partners.

Cambridge Simulation Solutions

Frontier IP stake: 40 per cent

Cambridge Simulation Solutions is a 2014 spin-out from the University of Cambridge. The company is developing advanced software to simulate and control complex, discontinuous processes, such as the way neural transmitters work in the brain. There are several potential industrial and medical applications for the spin-out to explore.

Cambridge Simulation Solutions is developing the way neural transmitters work in the brain

Celerum Limited

Frontier IP stake: 10 per cent

Celerum was formed to commercialise research know-how and IP arising from the work of the Computational Intelligence research group at Robert Gordon University. The company has expertise in translating complex business logic into software models which, when combined with data, can be used for automated fleet scheduling.

Des Solutio

Frontier IP stake: 25 per cent

Frontier IP announced its second spin out from Portugal in October 2018. Des Solutio is developing safer and greener alternatives to the toxic solvents currently used to extract active ingredients by the pharmaceutical, personal care, household goods and food industries. The company is developing strong relationships with potential industry partners.

Des Solutio was established to commercialise the research of Associate Professor Ana Rita Duarte and Dr Alexandre Pavia of the NOVA University Lisbon, NOVA School of Science and Technology.

Elute Intelligence Holdings Limited

Frontier IP stake: 43 per cent

Elute is a specialist in commercialising university intellectual property. The company is developing novel software tools to intelligently search complex documents, such as patents and contracts, and to detect evidence of plagiarism, collusion and copyright infringement.

Elute was formed in October 2019 from an existing UK business, CFL Software Limited, and includes complementary IP developed by Frontier IP in return for an equity interest. Frontier IP will also earn its equity by providing a range of commercialisation services, such as facilitating scale up and direct, hands-on support for technical development through its in-house development capability. No cash consideration has been paid for its equity stake in Elute.

The technology, based on computational forensic linguistics, compares and analyses documents to identify similarities between them by mimicking the way people read. It was developed by CFL founder David Woolls, an expert in forensic linguistics, who continues to work for Elute. CFL's business development director Peter Fischer is joining the Elute board alongside Matthew White, Frontier IP's chief commercialisation officer.

Elute's customers include the Universities and Colleges Admissions Service (UCAS), which is using a version of the software called Copycatch to detect plagiarism in students' personal statements. Others include academic institutions, commercial researchers and lawyers.

Exscientia

Frontier IP stake: 3.25 per cent

Exscientia, a spin-out from the University of Dundee, now based in Oxford, is a world leader in artificial intelligence-driven drug discovery. Apart from the large number of collaboration agreements the company has struck with major global pharamceutical groups, Exscientia has signed a partnership agreement with GT Apeiron Therapeutics, a Shanghai-headquartered drug-discovery platform launched with backing from specialist investor GT Healthcare Capital Partners.

In other developments, the company achieved its first milestone payment resulting from its collaboration with GSK, and completed a $26m Series B financing round backed by new investors Celgene Corporation and GT Healthcare Capital Partners. Existing investor Evotec AG, which originally subscribed €15m (£13m) for a minority stake in September 2017, also participated in the January 2019 funding round.

Exscientia is at the forefront of artificial intelligence (AI)-driven drug discovery and design

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Fieldwork Robotics

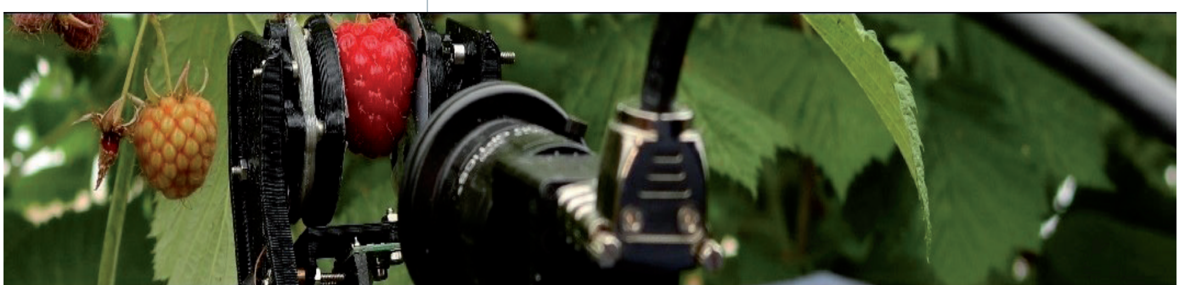
Frontier IP stake: 27.5 per cent

A prototype of Fieldwork Robotics raspberry-harvesting robot technology successfully completed initial field trials in May 2019. The data gathered has enabled further refining of the hardware and software as work progresses on developing a robot capable of harvesting more than 25,000 raspberries a day.

The trials were held at a farm owned and operated by Hall Hunter Partnership, one of the UK's biggest soft-fruit growers, and were the result of a 2018 collaboration agreement between the grower and Fieldwork Robotics. In April 2019, the University of Plymouth spin-out unveiled further validation for the technology with the announcement of a £547,250 Innovate UK Industrial Strategy grant to accelerate development of the system.

The academic behind the technology, Dr Martin Stoelen, has also trialled technology to harvest cauliflowers and tomatoes.

Image below: Fieldwork Robotics is developing and commercialising robot technology to harvest soft fruit and vegetables



Insignals Neurotech

Frontier IP stake: 33 per cent

Insignals Neurotech is developing wearable devices supporting deep brain surgery to alleviate the symptoms of Parkinson's disease and other neurological disorders. In February 2019, the company was spun out of the Portuguese Institute for Systems and Computer Engineering, Technology and Science (INESC TEC), with the support of São João University Hospital, part of the University of Porto. It is commercialising the work of João Paulo Cunha, Associate Professor with Agregoção at the University of Porto and senior researcher at INESC TEC.

Molendotech

Frontier IP stake: 14.1 per cent

Palintest, a subsidiary of FTSE 100 group Halma (HLMA), started commercial roll out of Siren, a kit to test bathing water for faecal matter based on Molendotech's proprietary bacterial detection technology. The kit, which can be used on site, cuts testing times from up to two days to under 30 minutes because samples do not need to be sent to a laboratory. Molendotech, a 2017 spin-out from the University of Plymouth, is now developing water tests to specifically detect E.coli after signing a collaboration agreement with G's Group, one of Europe's leading fresh produce suppliers, as announced in October 2018.

Molendotech raised £500,000 in its first fundraise in February 2018 which diluted Frontier IP's 20 per cent stake to 14.1 per cent, but the company has an equity interest in a more valuable business as a result.

Image below: Molendotech is developing a rapid test to screen water for faecal contamination and other harmful bacteria

Nandi Proteins

Frontier IP stake: 20.1 per cent

Nandi Proteins develops processes and process control technology to create new ingredients from whey, collagen and vegetable proteins to replace chemical E-number additives, fat and gluten in processed food. The technology is in the process of being scaled up following successful small-scale trials in collaboration with industry partners including Devro and Kerry Foods Group. Coeliac UK and Innovate UK awarded a Nandi-led project a £180,697 grant to improve the taste and texture of gluten-free bread. Other partners include AB Mauri, the ingredients division of AB Foods, and Agrii, part of agri-services group Origin Enterprises.

With its expertise in vegetable proteins and a growing consumer demand for more meat-free products, the company is attracting strong interest from major companies in the food industry. Nandi raised £600,000 in November

Image below: Nandi Proteins is developing a platform technology to improve the functional properties of proteins in food manufacturing

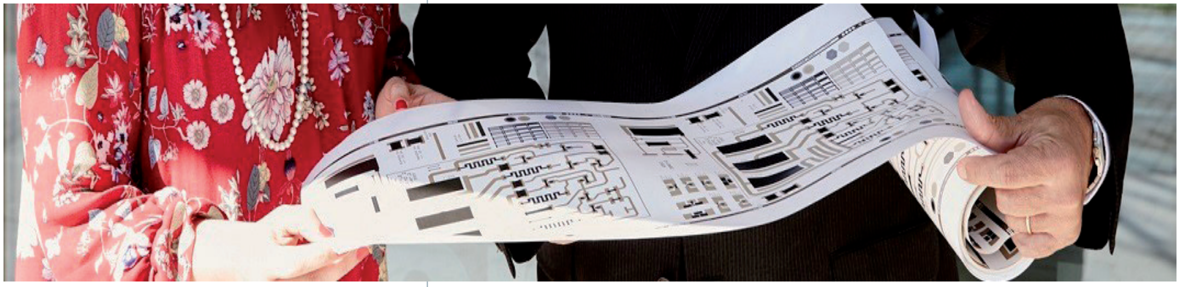
2014, £250,000 in March 2016, and £1m in July 2017, the last raise being at a post-new money valuation of £11m.

NTPE LDA

Frontier IP stake: 31.6 per cent

NTPE was the company's first spin-out in Portugal. It is developing Paper-E, a novel technology to print electronic circuits, sensors and semiconductors onto any cellulose-based paper. It does so by replacing the silicon used in electronics with eco-friendly metal oxides and cellulose. Applications include paper-based diagnostic kits, smart packaging, logistics, and for use with banknotes and passports.

The company was spun out of the NOVA University Lisbon, NOVA School of Science and Technology to commercialise the work of professors Elvira Fortunato and Rodrigo Martins, who lead a team of more than 65 researchers.



NTPE is developing novel technology called to print electronic circuits, sensors and semiconductors onto paper

PoreXpert

Frontier IP stake: 15 per cent

PoreXpert's software and consultancy services provide highly accurate information about the void spaces in porous materials and how gases and liquids behave within them. Customers include a major player in the nuclear industry and there is interest from companies in the oil and gas sector.

Image below: PoreXpert provides software and consultancy services to better understand porous materials and the way gases and liquids behave within them

Pulsiv Solar

Frontier IP stake: 18.9 per cent

Pulsiv Solar's technology improves the energy efficiency of photovoltaic cells and the power converters used by a host of everyday devices, such as laptops, televisions and mobile phones. The company enjoyed a year of solid progress, winning a £129,929 Innovate UK grant in July 2018 towards a £288,732 project to complete technological development of its solar micro-inverter. Pulsiv is now working with Bosch UK to optimise the design, cost and manufacturability of the product and plans to market the devices as "Engineered by Bosch" when it moves into commercial production. Frontier IP's management report "strong industry and government interest in the technology".

PulsiV Solar commercialises breakthrough research into the efficiency of photovoltaic solar panels and power converters

Tarsis Technology

Frontier IP stake: 18 per cent

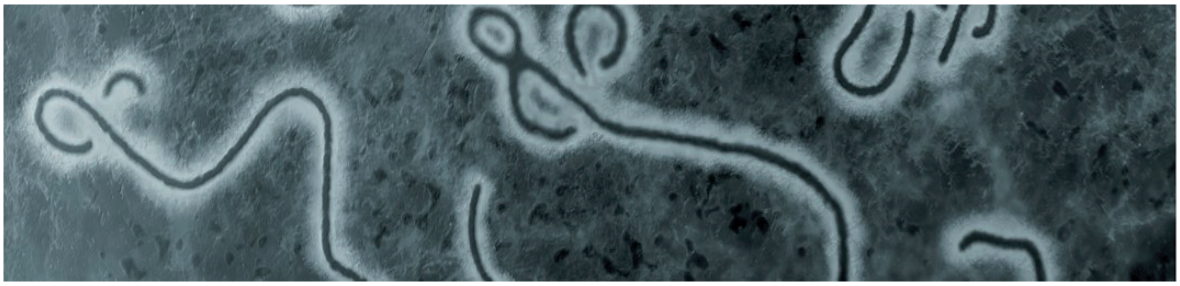
A spin-out from the University of Cambridge in 2016, Tarsis Technology entered a collaboration agreement with a world-leading manufacturer of crop protection products in July 2018. The collaboration is researching the use of the company's technology to deliver chemical pesticides and fungicides in a more precise and controlled way using metal-organic framework particles. To date the company has been self-funding.

Image below: Tarsis develops amorphous metal-organic frameworks for use in the delivery of active ingredients

The Vaccine Group

Frontier IP stake: 19.2 per cent

The Vaccine Group develops novel vaccine technologies to combat zoonotic diseases, which jump from species to species, including humans, and other diseases. The University of Plymouth spin-out has won major backing for its work, having been awarded grants from the US, UK and Chinese governments. This included its involvement as a key partner in a $9.7m project to protect the US military and homeland from Ebola, Lassa fever and other zoonotic diseases. Other grant-funded projects are under way, including work to tackle Streptococcus suis, an emerging antibiotic-resistant disease that can leap from pigs to humans. To date the company has been self-funding.



The Vaccine Group is developing technology to combat zoonotic viruses

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