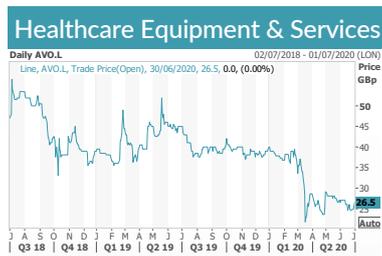




2 July 2020



Source: Refinitiv

**Market data**

EPIC/TKR	AVO
Price (p)	26.0
12m High (p)	52.0
12m Low (p)	21.8
Shares (m)	306.4
Mkt Cap (£m)	79.7
EV (£m)	122.9
Free Float*	68%
Market	AIM

\*As defined by AIM Rule 26

**Description**

Advanced Oncotherapy (AVO) is developing next-generation proton therapy systems for use in cancer radiotherapy (RT). Standard radiation procedures have evolved over many years. PT delivers radiation via a beam of proton particles, rather than via a beam of photons used in conventional radiotherapy (X-rays).

**Company information**

Exec. Chairman Dr Michael Sinclair  
CEO Nicolas Serandour

+44 203 617 8728

[www.avopl.com](http://www.avopl.com)**Key shareholders**

Liquid Harmony (Board)	14.7%
Other Board	7.7%
Nerano/Barrymore	9.9%
Celeste	6.5%
P.Glatz	5.1%
Lombard Odier	4.5%

**Diary**

29 Jul AGM

**Analyst**

Martin Hall 020 7194 7622  
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# ADVANCED ONCOTHERAPY

## Funded through to clinical events

AVO's goal is to deliver an affordable and novel proton therapy (PT) system, called LIGHT, based on state-of-the-art technology developed originally at the world-renowned CERN. Over the past two years, the project has been significantly de-risked through important technical milestones. AVO is working on the verification and validation phase, prior to LIGHT being used on the first patients to support CE certification. A recent equity issue, new loan facilities and some commercial announcements earlier in 2020 highlight the increasing confidence that is building in AVO's ability to achieve its goal to deliver LIGHT in the near future.

- **Strategy:** AVO is developing a compact and modular PT system, which is affordable for the payor, financially attractive to the operator, and generating superior patient outcomes. AVO benefits from technology know-how developed by ADAM (CERN spin-off), and relies on a world-class supplier base.
- **2019 results:** EBIT was in line with expectations, higher operating costs being offset by lower share-based payments. Introduction of IFRS 16 for lease liabilities does affect the net cash/(debt) calculation, but recent capital increases via an equity issue and new loan facilities have strengthened AVO's finances.
- **Commercial update:** AVO has seen significant commercial traction, with three collaborations announced in early 2020. Its flexible, customer-focused, business model can generate four potential revenue streams: sale of LIGHT systems, maintenance contracts, software licence fees and project management fees.
- **Risks:** The more complex technical challenges have been overcome, and progress towards assembling a fully functional accelerator is under way. The annual report highlights the upcoming challenges and how they are being mitigated, with new funding giving financial flexibility to reach the finishing line, despite COVID-19.
- **Investment summary:** The EV of £123m equates only to the amount invested into LIGHT to date, which reflects neither the enormous technical challenges that have been overcome, nor the market potential – our DCF valuation is 229p. The market will wake up to this opportunity, as assembly of the first LIGHT system reaches its conclusion and AVO applies for CE certification. Commercial deals indicate that buyers are comfortable about the timing of LIGHT delivery.

**Financial summary and valuation**

Year-end Dec (£m)	2017	2018	2019	2020E	2021E	2022E
Sales	0.0	0.0	0.0	11.2	57.1	105.8
Gross profit	0.0	-1.9	0.0	1.0	10.0	26.6
Administration costs	-12.9	-15.7	-19.0	-23.1	-23.9	-25.5
EBITDA	-14.1	-21.4	-18.6	-21.8	-16.4	-4.5
Underlying EBIT	-14.5	-21.8	-20.7	-25.0	-20.0	-8.2
Statutory EBIT	-14.5	-21.8	-20.7	-25.6	-19.3	-6.5
Underlying PBT	-16.5	-21.9	-21.8	-27.4	-24.7	-14.2
Statutory PBT	-16.5	-21.9	-21.9	-27.9	-24.0	-12.5
Underlying EPS (p)	-17.6	-14.0	-9.8	-8.9	-7.5	-4.0
Net cash/(debt)	-9.2	-2.0	-43.3	-65.2	-90.8	-86.8
Equity issues	8.1	21.1	25.4	15.1	0.0	25.0
EV/EBITDA (x)	-6.3	-3.8	-6.6	-6.6	-10.4	6.2

Source: Hardman &amp; Co Life Sciences Research

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## 2019 results

### Key features

#### Operational highlights

- ▶ **LIGHT:** All the key hardware components that make up the modules, which, when assembled together, will accelerate the proton beam to 230MeV, were manufactured, along with the patient positioning system.
- ▶ **Harley Street site:** Building work to accommodate a LIGHT system at this facility was completed at a cost of £10m, borne by the site's freeholder, the Howard de Walden Estate.

#### Commercial progress

- ▶ **The London Clinic (TLC):** Signed a memorandum of understanding with TLC to operate the first commercial LIGHT facility at the Harley Street site, which will include the addition of a second treatment room.
- ▶ **First sale:** Signed a purchase order for a LIGHT system with the Mediterranean Hospital of Limassol. AVO will receive up to €50m/£45m and a share of profits from clinical services.
- ▶ **Revenue streams:** Developed four potential revenues streams: sale of LIGHT systems, maintenance contracts, software licence fees and project management fees, bringing a diversified and sustainable source of cashflows.

#### Financial highlights

- ▶ **EBIT:** Operating losses were in line with forecasts, at -£20.7m. However, the underlying operating costs were higher than expected, rising 21%, offset by much lower-than-expected share-based payments.
- ▶ **Net cash/(debt):** At 31 December 2019, AVO had net debt of -£43.3m, which was considerably higher than expected. However, the difference was mainly the consequence of the introduction of IFRS 16, accounting for financial lease liabilities, which were £24.0m higher than forecast, at £32.6m. This was offset by a similar figure for the "right-of-use" assets included in the balance sheet.

2019 results – actual vs. expectations					
Year-end Dec (£m)	2018 actual	2019 actual	Change	2019 forecast	Delta Δ
Underlying operating costs	-15.7	-19.0	+21%	-16.0	-3.0
Share-based costs	-4.2	-1.7	-40%	-4.6	+2.9
<b>EBITDA</b>	<b>-21.4</b>	<b>-18.6</b>	<b>+13%</b>	<b>-19.0</b>	<b>+0.4</b>
Depreciation/amortisation	-0.4	-2.0	+393%	-1.7	-0.3
<b>Underlying EBIT</b>	<b>-21.8</b>	<b>-20.7</b>	<b>+5%</b>	<b>-20.6</b>	<b>-0.1</b>
Finance costs	-0.1	-1.2		-1.2	-
Underlying PBT	-21.9	-21.8		-21.7	-0.1
<b>Net cash/(debt)</b>	<b>-2.0</b>	<b>-43.3</b>		<b>-18.3</b>	<b>-25.0</b>

Figures may not add up exactly due to rounding  
Source: Hardman & Co Life Sciences Research

#### Post-balance sheet events

- ▶ **Subscription:** Issue of new shares to raise £15.1m gross new funds, including conversion of outstanding fees to certain directors and advisors into equity.
- ▶ **Loan facilities:** Agreements for a strategic funding partnership for €20m and a debt facility of up to \$30m with VDL Groep BV (VDL) and Nerano Pharma (Nerano), respectively, provide access to up to £42m of funding.
- ▶ Reduction in the size of the board from 12 to 8 members, with four NEDs not seeking re-election at the AGM, and more in line with corporate expectations.

## New funding has altered risk profile

During 2019, AVO raised £29.6m via equity subscriptions...

...with a further £15.1m raised in 2020

Financing a technically complex project is capital intensive and has been a challenge in difficult markets. However, given the significant technical progress and considerable de-risking of the LIGHT project, the end-goal is now very much in sight. Consequently, this has allowed AVO to strengthen its balance sheet and access capital resources to fund completion of the project. This has been achieved through a combination of equity and debt, culminating in two new loan facilities being announced, alongside the release of its 2019 results, to support the further development of LIGHT and advance the manufacturing of up to 30 LIGHT systems.

### Funding during 2019-20

Date	*Equity (£m)	Debt (£m)	Comment
January 2019	10.0	-	Subscription @40p per share
May 2019	2.4	10.0	Subscription @40p per share
August/September 2019	14.5	4.0	Same terms; includes conversion of prev. loan
November 2019	2.7	-	Subscription 6.83m shares @40p per share
May 2020	15.1	-	Subscription 60.4m shares @25p per share
June 2020	-	18.0	€20m loan facility from VDL Groep BV
June 2020	-	24.0	Up to \$30m convertible facility from Nerano
<b>Totals</b>	<b>44.7</b>	<b>56.0</b>	

\*Figures include payment of fees/salaries to directors/advisors in the form of shares  
Source: Company announcements

## Debt facilities

### 2019 facilities

During 2019, AVO took out a two-year secured debt facility with Credit Suisse AG for £10m, and a £4m loan with Nerano Pharma Ltd (Nerano), a company financing vehicle wholly-owned by a significant existing shareholder, Seamus Mulligan. The latter loan attracts interest at 12% p.a., paid annually. In the event that interest is accrued and repaid at Term, it will be at a rate of 15% p.a.

### VDL facility

Along with the results, AVO announced that it had entered into an unsecured debt facility agreement with existing supplier, VDL ETG Precision BV, a subsidiary of VDL Groep BV, for €20.0m/£18.0m (the "VDL Facility"). The loan carries an interest rate of 5% p.a., payable annually in cash.

AVO can issue drawdown requests during the six-year commitment period, the amount of which will be related to purchase orders placed by AVO with VDL, associated with the sale of LIGHT systems to customers. AVO must repay each loan in full on the third anniversary of the initial drawdown date, with the option to voluntarily repay part, or all, of the loan in advance.

VDL is a family-owned industrial group of companies, which manufactures precision parts, prototypes, sub-assemblies and modules used in the LIGHT system. In addition, AVO and VDL have the common intention to collaborate on a number of areas beyond the current activities.

This facility signals the commitment of partners who know AVO well and understand the huge potential of LIGHT. Also, very importantly, it indicates how the company intends to fund its fast growing pipeline – by having working capital financing deals in place (VDL) and with future LIGHT systems that can be used as security in

### Light development partners



Source: AVO

financing deals (as implied in the Nerano deal, see following). As such, AVO continues to differentiate itself from the crowd and fund its pipeline.

## New Nerano facility

Additionally, AVO has entered into a secured interest-bearing convertible facility with Nerano for up to \$30m. This loan has a maturity date of three years from the date of the agreement, upon which all amounts drawn down and interest owed will become repayable. The agreement also contains an option for AVO to repay voluntarily part, or all, of the loan prior to the maturity date. The Nerano facility is secured against the LIGHT system being built in Daresbury, and the prototype in Geneva and associated intellectual property. The loan will attract interest of 5% p.a., which will be paid in cash annually. In addition, Nerano will be entitled to an undisclosed share of any future profits generated by AVO at its PT facility in Harley Street.

Nerano may, at its sole discretion, convert any outstanding loan amounts and interest payable into new Ordinary shares in AVO at a price of 25p per share. However, conversion of the outstanding principal, together with any interest, can take place only at the maturity date of the Nerano facility in June 2023.

As part of the agreement, AVO has granted Nerano 5.0m warrants, exercisable for a period of five years at an exercise price of 50p. Additionally, AVO will pay Nerano a cash commitment fee of 2% of the total facility upon first drawdown or at maturity.

## Equity issues

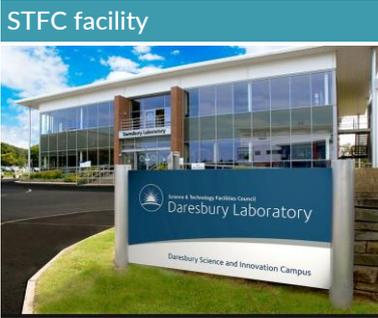
In May 2020, AVO raised gross new capital of £15.1m, including the conversion of some outstanding fees due to certain directors and advisors, via a Subscription of shares at 25p per share, for general working capital purposes, thereby strengthening its balance sheet. Over the past two years, each share issue has attracted new shareholders, resulting in a more diversified shareholder base.

## Financing conclusion

The equity issue in May, coupled with the two new loan facilities, has altered the risk profile of AVO. The Nerano and VDL financing deals are expected to provide strong impetus and give a final push towards completing the necessary documentation and assembly (see pages 6-7) in readiness for regulatory approval of LIGHT. Importantly, the Nerano financing facility i) allows AVO to align its operational and financing plans at the same pace, and ii) provides the company with more financing options, i.e. the facility and any potential equity raises are “interconnected”, in the sense that the company has the flexibility to raise equity and use less of the facility if the opportunity arises. This is a good position to be in now that the company can see the finishing line and with the uncertainty that has been caused by the coronavirus pandemic.

# LIGHT is nearing reality

## Validation



Source: STFC website

In May 2018, AVO signed a lease with the UK Government’s Science and Technology Facilities Council (STFC) to establish a UK testing and assembly site in Daresbury (Cheshire). The first completed LIGHT machine is being assembled, verified and validated on this site, prior to patient treatment.

At its 2019 AGM in July, management set out a schedule for the delivery of LIGHT components to Daresbury, which was updated at the time of the 2019 interim results announcement in September, and is now further updated.

All the key modules and hardware components that comprise LIGHT have been manufactured and delivered, or stored until required, to Daresbury, as shown in the table below.

Delivery and installation schedule in Daresbury assembly facility					
Component	Number	Manufactured	As of 25 July 2019	Current status	
Proton source	1	✓	By end of September 2019	✓ Delivered	
RFQ	1	✓	✓ Delivered	✓ Delivered	
SCDTL	4	✓	By end of September 2019	✓ All delivered	
CCL	13	✓	6 delivered, 7 during 4Q'19	✓ Delivered/stored	
Patient positioning	1	✓	By end of 2019	✓ Ready and in storage	
On-site validation		n/a	Throughout 2019 and 2020		In progress
First patient treatment		n/a	By end of 2020		2021

Source: AVO; Hardman & Co Life Sciences Research

Assembly of first complete LIGHT system under way

## Assembly for CE certification

Assembly of the first complete LIGHT system is under way, as can be seen in the photographs below. What is abundantly clear is the high manufacturing specification and quality of the individual hardware components.



Source: AVO annual report 2019

The coronavirus pandemic has come at an unfortunate time for AVO. During lockdown, all assembly staff at the Daresbury site had to be furloughed. However, those with administrative responsibility have been working remotely and concentrating on finalising the documentation and software development required for the LIGHT system to gain regulatory approval.

Following the recent easing of the lockdown, AVO is now in the process of restarting work at the Daresbury facility, with appropriate personal protection and social distancing being implemented.

## Regulatory status

### ISO 13485 certification

*High regulatory standards being followed*

As far as the International Organisation for Standards (ISO) is concerned, safety and quality are non-negotiable in the medical devices industry. Regulatory requirements are increasingly stringent throughout every step of a product’s life cycle, including service and delivery. Therefore, industry manufacturers are expected to demonstrate that their management processes are of the highest quality and in line with “best practice”. ISO 13485 certification is recognition that these high standards are being followed.

Compliance with ISO certification is a pre-requisite for obtaining CE certification and the authorisation to sell the LIGHT system in Europe. The assessment is undertaken by a third party that has independently examined the management processes and validated that the company has met the requirements of the standard. AVO received ISO 13485 certification from Lloyd’s Register, an independent compliance specialist, following an audit of its processes during 2019.

### CE certification

The next stage of AVO’s execution plan will be to complete the physical assembly of its first LIGHT system at Daresbury, verify that the machine is working to the specified standards and complete the validation process. Once these critical steps have been completed, the system will be used for the first patient treatment and for the purpose of obtaining regulatory approval. AVO has indicated that the treatment of a small cohort of patients will be needed for CE marking. As a consequence of the temporary closure of the assembly facility, due to the global lockdown, machine assembly has been delayed, with first patient treatments now expected in 2021.

## Risks

*Risk of different nature from drug development...*

*...with emphasis on carefully assembled documentation of development for user categories*

AVO has made enormous strides towards its goal of an affordable and flexible PT system, while at least maintaining the same highly successful outcomes for patients achieved with competitors’ offerings. Each step of the process has contributed to the de-risking of the project. All major projects, especially those for large technical medical devices, carry risk. However, the risk is of a different nature from drug development, since it places its emphasis on carefully assembled documentation of the development for each of the user categories. It is comforting to see the remaining risks clearly identified and discussed in the 2019 annual report, which is an extremely informative document and well worth reading. The remaining risks for the LIGHT project are summarised in the following chart.



Source: AVO annual report 2019

## Commercial opportunity

The 2019 annual report also details the advantages of PT over conventional radiation therapy, together with a comprehensive section on the advantages of AVO's LIGHT system over proton beams generated and accelerated by a cyclotron. AVO is clearly using this information to its benefit in its commercial pitches to potential customers. These advantages are summarised below.

*Main advantage: superior dose distribution*

### Advantages of PT

The principal advantage of PT is superior dose distribution, which allows physicians to precisely aim the highest dose of radiation at the tumour, while avoiding healthy tissues. Consequently, it shows many advantages over X-ray therapy. This has been further evidenced by a recent study from Stanford University, which shows that PT reduces the risk of a second cancer diagnosis by 69% versus other forms of radiation treatment<sup>1</sup>.

- ▶ Ultra-precise delivery.
- ▶ Fewer side effects.
- ▶ Lower risk of secondary tumours<sup>2</sup>.
- ▶ Faster treatment time, coupled with minimal recovery time.
- ▶ Accelerated hypofractionation, which will lower overall treatment cost.

*230 PT treatment rooms worldwide, vs. need greater than 10,000*

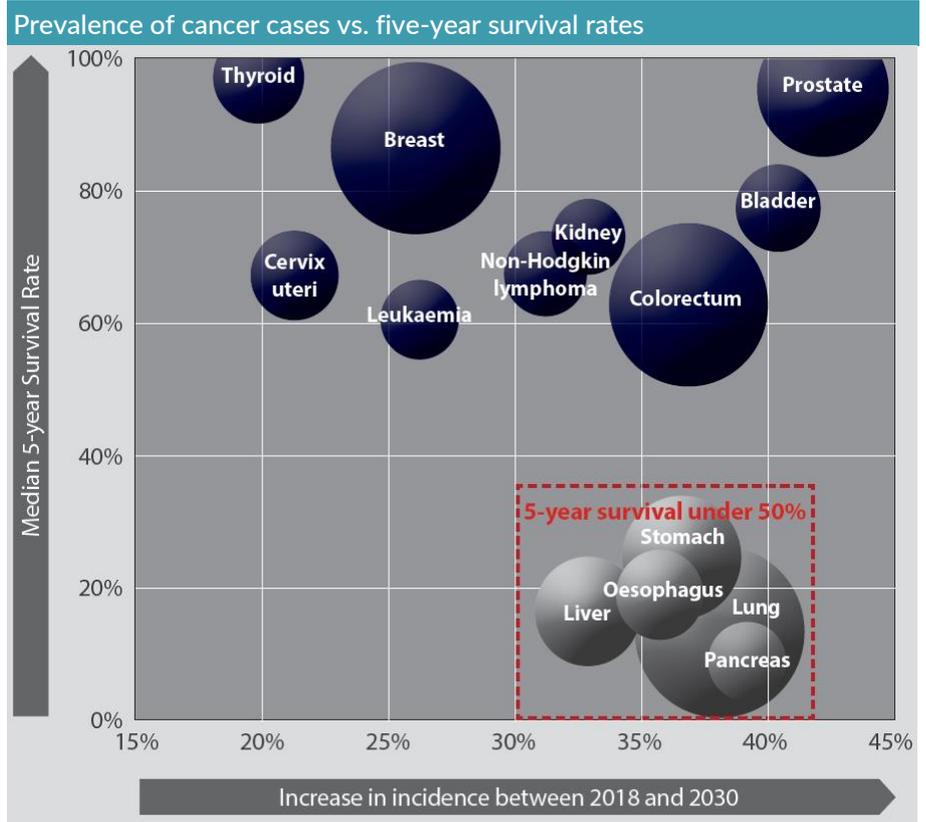
### Demand for PT

Today, PT is reserved for certain types of cancer, notably head and neck cancers, sarcomas (soft tissue cancers), ocular cancer and paediatric brain tumours. The reason for this is not that PT is ineffective in other types of cancer, but the high cost of treating patients resulting from the use of "old-based" technology. Lower treatment costs – a tangible reality with a new and linear proton accelerator – are expected to trigger a dramatic surge in the number of PT centres worldwide, given the significant unmet need: approximately 230 treatment rooms worldwide<sup>3</sup>, compared with a need in excess of 10,000, based on AVO's estimates. This is expected to be accomplished with a strong expansion in the number and types of cancer being treated.

<sup>1</sup> <https://okcproton.com/proton-therapy-safer-than-conventional-radiation-treatment-per-stanford>

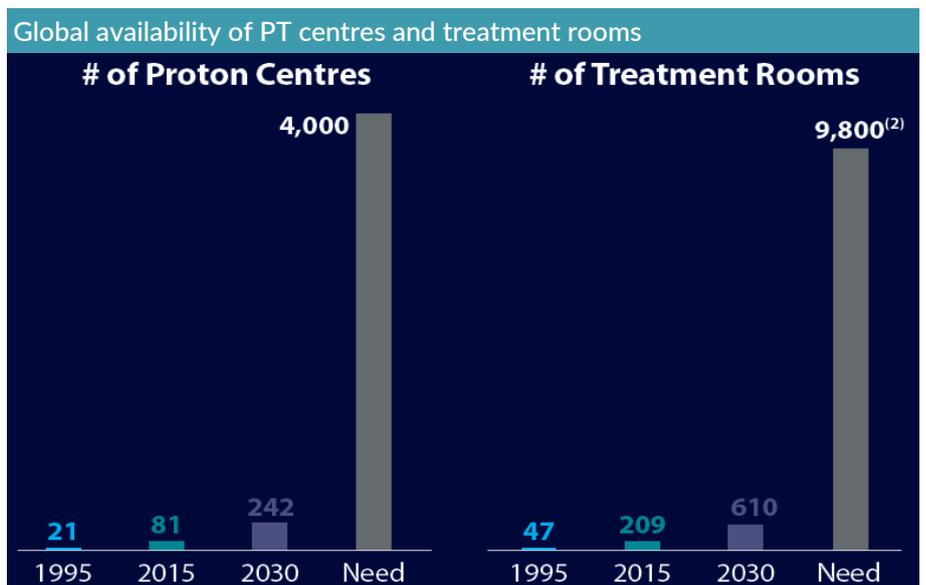
<sup>2</sup> <https://acsjournals.onlinelibrary.wiley.com/doi/abs/10.1002/cncr.32938>

<sup>3</sup> Particle Therapy Co-Operative Group (PTCOG)



Bubbles represent share of new cancer incidents in the US 2017  
 Source: Globocan 2018, WHO, Cancer Research UK

Although the number of PT centres has increased significantly over the past decade, the installed and operational base is still well below the market needs, and has the potential to treat only 70,000 patients p.a. – based on an average of 300 patient treatments p.a. per treatment room<sup>3</sup>. The following chart shows an estimate for the market needs over the next 20 years, and highlights the commercial opportunity for AVO with its disruptive technology.



Source: AVO annual report 2019

## Commercial progress

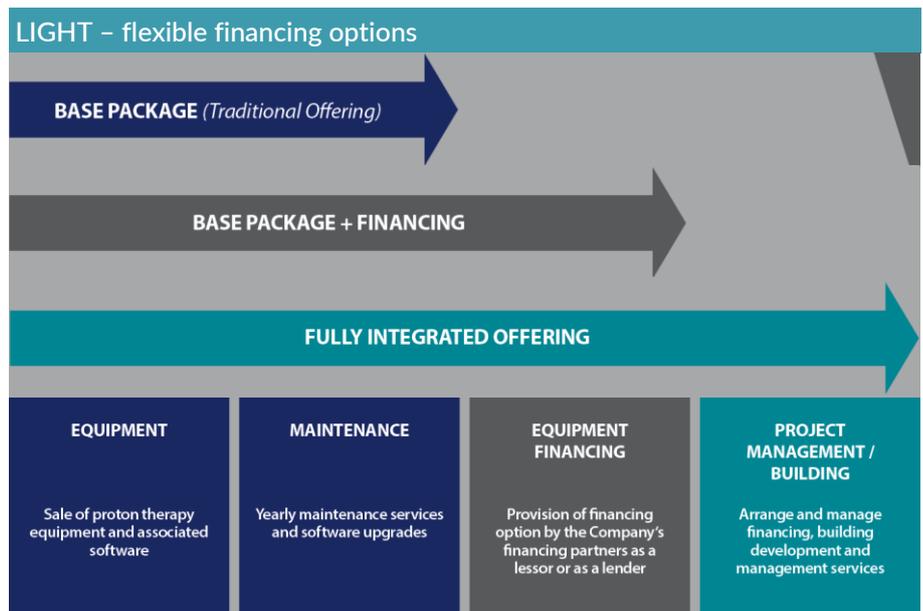
*Attention turning to commercialisation of LIGHT*

As the company approaches the final stages of this project, attention is turning to the commercialisation of LIGHT. Earlier in 2020, AVO announced a number of commercialisation projects, highlighting the increasing confidence that is building in AVO’s ability to deliver LIGHT in the near future.

- ▶ In February 2020, AVO announced an initial 10-year collaboration with TLC, one of the UK’s largest private hospitals, whereby AVO will supply the LIGHT proton accelerator and treatment room equipment for the Harley Street site, and TLC will manage the clinical operation of the facility – see our report dated 17 February 2020<sup>4</sup>.
- ▶ In a separate statement in February 2020, AVO announced the sale of a LIGHT system to the Mediterranean Hospital of Limassol (Mediterranean), one of the largest private hospitals in Cyprus, for a consideration of €50m/£45m. Although the financial terms were not disclosed, AVO will additionally receive a share of the profits generated by this new PT facility.
- ▶ Also in February 2020, AVO announced a strategic collaboration with University Hospitals Birmingham NHS Foundation Trust (UHB) for the construction and installation of a LIGHT system on the UHB campus. UHB is one of the largest teaching hospital trusts in England and one of the largest regional centres for non-surgical cancer treatment serving a regional, national and international population, treating more than 2.2m patients every year.

One of the reasons that AVO appears to have been successful with commercial partners is its flexible business model, allowing customers to adopt the most appropriate commercial arrangements to suit their own financial requirements.

The flexible financing options on offer to potential customers are highlighted in the following chart.



Source: AVO annual report 2019

<sup>4</sup> <https://www.hardmanandco.com/research/corporate-research/confidence-in-light-gaining-momentum/>

# Financial forecasts

## Profit & Loss

- ▶ **Sales:** First sales are expected in fiscal 2020 (Cyprus contract), although these are likely to be invoiced and paid in a tranching manner against construction milestones.
- ▶ **Administration costs:** Continued development of the organisation is expected to see a controlled increase in underlying administration costs, albeit there might be some offset as a result of staff being furloughed through the COVID-19 lockdown.
- ▶ **Profit share:** Details of profit share arrangements with some of AVO's commercial partners have not been disclosed. Consequently, they have not been included yet, suggesting that there is upside potential to our forecasts.
- ▶ **Interest charges:** Net financial costs are rising to reflect the drawdown of new loan facilities, although only some of these are cash payments; the remainder are accrued and will be repaid when loans mature.

Profit & Loss						
Year-end Dec (£m)	2017	2018	2019	2020E	2021E	2022E
GBP:USD	1.289	1.335	1.278	1.278	1.278	1.278
LIGHT systems sold	0	0	1	1	2	3
Cumulative systems	0	0	0	2	4	7
Cumulative rooms	0	0	0	1	5	11
Sales	0.0	0.0	0.0	11.2	57.1	105.8
COGS	0.0	-1.9	0.0	-10.3	-47.1	-79.1
Gross profit	0.0	-1.9	0.0	1.0	10.0	26.6
Marketing costs	0.0	0.0	0.0	-0.5	-2.7	-4.8
Administration costs	-12.9	-15.7	-19.0	-23.1	-23.9	-25.5
Share-based costs	-1.5	-4.2	-1.7	-1.8	-2.0	-2.3
R&D	0.0	0.0	0.0	-0.5	-1.3	-2.2
Other income	0.0	0.0	0.0	0.0	0.0	0.0
<b>Underlying EBITDA</b>	<b>-14.1</b>	<b>-21.4</b>	<b>-18.6</b>	<b>-21.8</b>	<b>-16.4</b>	<b>-4.5</b>
Depreciation	-0.4	-0.4	-0.7	-0.7	-0.8	-0.8
Amortisation	0.0	0.0	-1.3	-2.5	-2.8	-2.9
<b>Underlying EBIT</b>	<b>-14.5</b>	<b>-21.8</b>	<b>-20.7</b>	<b>-25.0</b>	<b>-20.0</b>	<b>-8.2</b>
Share of JV profit/(loss)	0.0	0.0	0.0	-0.6	0.7	1.7
Exceptional items	0.0	0.0	0.0	0.0	0.0	0.0
Statutory EBIT	-14.5	-21.8	-20.7	-25.6	-19.3	-6.5
Net interest	-2.0	-0.1	-1.2	-2.4	-4.7	-6.0
<b>Underlying PBT</b>	<b>-16.5</b>	<b>-21.9</b>	<b>-21.8</b>	<b>-27.4</b>	<b>-24.7</b>	<b>-14.2</b>
Other financials	0.0	0.0	0.0	0.0	0.0	0.0
Extraordinary items	0.0	0.0	0.0	0.0	0.0	0.0
Statutory PBT	-16.5	-21.9	-21.9	-27.9	-24.0	-12.5
Tax payable/credit	2.8	0.8	1.1	2.0	1.5	1.1
<b>Underlying net income</b>	<b>-13.7</b>	<b>-21.1</b>	<b>-20.7</b>	<b>-25.4</b>	<b>-23.2</b>	<b>-13.1</b>
Forex	-1.1	1.0	0.0	0.0	0.0	0.0
Statutory net income	-14.7	-20.2	-20.8	-25.9	-22.5	-11.4
<b>Ordinary 25p shares:</b>						
Period-end (m)	72.5	169.6	255.5	306.4	313.4	337.0
Weighted average (m)	77.8	150.5	211.5	285.2	309.9	325.2
Fully-diluted (m)	91.4	188.2	257.9	324.6	342.3	350.7
<b>Underlying basic EPS (p)</b>	<b>-17.6</b>	<b>-14.0</b>	<b>-9.8</b>	<b>-8.9</b>	<b>-7.5</b>	<b>-4.0</b>
Statutory basic EPS (p)	-18.9	-13.4	-9.8	-9.1	-7.2	-3.5
U/I fully-diluted EPS (p)	-14.9	-11.2	-8.0	-7.8	-6.8	-3.7
Stat. fully-diluted EPS (p)	-16.1	-10.7	-8.1	-8.0	-6.6	-3.3
DPS (p)	0.0	0.0	0.0	0.0	0.0	0.0

Source: Hardman & Co Life Sciences Research

## Balance sheet

- ▶ **Leases:** As highlighted earlier, the introduction of IFRS 16 for financial leases from 1 January 2019 had a significant effect on the net cash/(debt) calculation. However, this was offset by an equivalent increase in “right-of-use” assets.
- ▶ **Net cash/(debt):** This position will continue to develop, and will become clearer as AVO enters into more commercial arrangements and increases the number of LIGHT machines sold through its flexible business model.

Balance sheet						
@31 Dec (£m)	2017	2018	2019	2020E	2021E	2022E
Shareholders' funds	28.7	34.0	42.9	32.1	9.6	23.2
Cumulated goodwill	0.0	0.0	0.0	0.0	0.0	0.0
Total equity	28.7	34.0	42.9	32.1	9.6	23.2
Share capital	20.2	42.4	61.1	76.6	78.3	84.3
Reserves	8.4	-8.4	-18.2	-44.5	-68.7	-61.0
Provisions/liabilities	0.0	16.5	16.5	16.5	16.5	16.5
Deferred tax	0.0	0.0	0.0	0.0	0.0	0.0
<i>Long-term leases</i>	0.0	0.0	31.0	29.5	27.9	26.3
<i>Short-term leases</i>	0.0	0.0	1.6	1.6	1.6	1.6
Lease liabilities	0.0	0.0	32.6	31.0	29.5	27.9
Long-term loans	0.0	0.0	13.9	37.9	64.9	66.9
Short-term debt	9.2	3.0	0.0	0.0	0.0	0.0
less: Cash	0.1	1.0	3.2	3.7	3.5	7.9
<b>Invested capital</b>	<b>37.9</b>	<b>52.5</b>	<b>102.7</b>	<b>113.8</b>	<b>117.0</b>	<b>126.5</b>
Fixed assets	1.2	4.1	6.0	5.9	5.9	5.9
Intangible assets	30.6	40.2	49.2	56.7	58.9	55.9
Right-of-use assets	0.0	0.0	32.5	32.5	32.5	32.5
Investments	0.3	0.3	0.0	0.0	0.0	0.0
JV investment	0.0	0.0	0.0	3.0	3.0	3.0
Inventories	7.6	10.0	15.0	19.0	19.5	28.3
<i>Trade debtors</i>	0.0	0.0	0.0	1.4	6.9	12.2
<i>Other debtors</i>	2.8	3.2	3.1	3.1	3.1	3.1
<i>Tax liability/credit</i>	2.9	0.7	1.8	2.0	1.5	1.1
<i>Trade creditors</i>	-4.0	-2.8	-1.9	-3.5	-5.1	-5.4
<i>Other creditors</i>	-3.5	-3.2	-3.0	-6.3	-9.2	-10.2
Debtors less creditors	-1.8	-2.1	-0.1	-3.4	-2.9	0.8
<b>Invested capital</b>	<b>37.9</b>	<b>52.5</b>	<b>102.7</b>	<b>113.8</b>	<b>117.0</b>	<b>126.5</b>
<b>Net cash/(debt)</b>	<b>-9.2</b>	<b>-2.0</b>	<b>-43.3</b>	<b>-65.2</b>	<b>-90.8</b>	<b>-86.8</b>

Source: Hardman & Co Life Sciences Research

## Cashflow

- ▶ **Working capital:** The strategy to facilitate vendor financing arrangements with purchasers is aimed at securing working capital. However, there will still be a working capital requirement during the ramp-up phase.
- ▶ **Harley Street:** As part of the JV arrangement with TLC, AVO is committed to an investment of £3.0m in fiscal 2020.
- ▶ **Capitalised spend:** Intangible expenditure of £9.3m was incurred during fiscal 2019, which includes, in part, further investment at the Daresbury site. This is expected to reduce significantly in 2021.
- ▶ **Loans/capital increases:** To date in 2020, AVO has raised a total of up to ca.£57.1m new capital through a mixture of equity (ca.£15.1m gross, including fees) and loan facilities (ca.£42.0m). An assumption has been made that future loans will be taken against contracted orders for LIGHT.
- ▶ **Capital increases/warrants:** At the end of 2019, AVO had 34.2m warrants outstanding, which are exercisable over the coming years, with the potential to raise ca.£8.0m of new capital. This is reflected over the forecast period.
- ▶ **Cashflow breakeven:** Based on our central-case LIGHT forecasts, we believe that AVO will reach operational cashflow breakeven at the end of fiscal 2023.

Cashflow						
Year-end Dec (£m)	2017	2018	2019	2020E	2021E	2022E
Underlying EBIT	-14.5	-21.8	-20.7	-25.0	-20.0	-8.2
Depreciation	0.4	0.4	0.7	0.7	0.8	0.8
Amortisation	0.0	0.0	1.3	2.5	2.8	2.9
Share-based payments	1.5	4.2	1.7	1.8	2.0	2.3
Inventories	-0.2	-4.3	-5.0	-3.9	-0.6	-8.8
Receivables	-2.1	0.0	-1.1	-1.4	-5.5	-5.3
Payables	4.3	-1.4	0.4	1.7	1.6	0.3
Change in working capital	2.0	-5.7	-5.7	-3.6	-4.5	-13.9
Exceptionals/provisions	-0.8	18.0	0.0	0.0	0.0	0.0
Other	0.0	0.8	-0.1	0.0	0.0	0.0
<b>Cashflow from operations</b>	<b>-11.4</b>	<b>-4.0</b>	<b>-22.8</b>	<b>-23.6</b>	<b>-18.9</b>	<b>-16.0</b>
Net interest	-0.6	-0.1	-0.1	-2.4	-4.7	-6.0
Lease payments	0.0	0.0	-1.4	-1.6	-1.6	-1.6
Tax paid/received	3.1	2.9	0.0	1.8	2.0	1.5
<b>Operational cashflow</b>	<b>-8.9</b>	<b>-1.2</b>	<b>-24.3</b>	<b>-25.8</b>	<b>-23.1</b>	<b>-22.1</b>
Capital expenditure	-0.1	-3.3	2.7	-0.7	-0.7	-0.8
Capitalised intangibles	-8.4	-8.8	-9.3	-10.0	-5.0	0.0
Sale of fixed assets	0.0	0.0	0.0	0.0	0.0	0.0
<b>Free cashflow</b>	<b>-17.4</b>	<b>-13.2</b>	<b>-31.0</b>	<b>-36.4</b>	<b>-28.9</b>	<b>-22.9</b>
Acquisitions	0.0	0.0	0.0	0.0	0.0	0.0
Disposals	0.0	0.0	0.3	0.0	0.0	0.0
Dividends	0.0	0.0	0.0	0.0	0.0	0.0
Investment in JVs	0.0	0.0	0.0	-3.0	0.0	0.0
Other investments	0.0	0.0	0.0	0.0	0.0	0.0
<b>Cashflow after investments</b>	<b>-17.4</b>	<b>-13.2</b>	<b>-30.7</b>	<b>-39.4</b>	<b>-28.9</b>	<b>-22.9</b>
Exercise of warrants	0.0	0.0	0.0	3.2	3.2	3.2
Equity issues	8.1	21.1	25.4	15.1	0.0	25.0
Costs of fundraising	-0.7	-0.7	-1.2	-0.8	0.0	-1.3
Currency effect	0.0	0.0	0.0	0.0	0.0	0.0
Cash/(debt) acquired	0.0	0.0	-34.8	0.0	0.0	0.0
<b>Change in net debt</b>	<b>-10.1</b>	<b>7.2</b>	<b>-41.3</b>	<b>-21.9</b>	<b>-25.7</b>	<b>4.0</b>
OCFPS (p)	-11.4	-0.8	-11.5	-9.0	-7.5	-6.8
Opening net cash/(debt)	0.9	-9.2	-2.0	-43.3	-65.2	-90.8
<b>Closing net cash/(debt)</b>	<b>-9.2</b>	<b>-2.0</b>	<b>-43.3</b>	<b>-65.2</b>	<b>-90.8</b>	<b>-86.8</b>

Source: Hardman & Co Life Sciences Research

## Company matters

### Registration

Incorporated in the UK with company registration number 05564418

Registered office: Third floor, 4 Tenterden Street, London, W1S 1TE

### Board of Directors

Board of Directors	
Name	Position
Dr Michael Sinclair	Executive Chairman
Nicolas Serandour	Chief Executive Officer
Prof. Steve Myers	Executive Director, ADAM executive Chairman
Michael Bradfield	Non-executive Director
Hans von Celsing	Non-executive Director
Dr Nick Plowman	Non-executive Director, Chairman Medical Advisory
Dr Enrico Vanni	Non-executive Director
RenHua Zhang	Non-executive Director

Source: Company reports

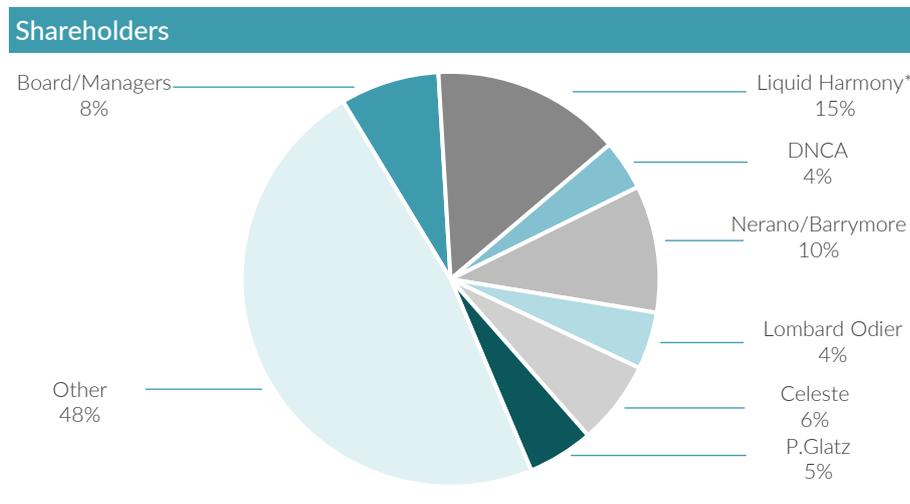
### Medical Advisory Board

Medical Advisory Board (post-AGM)	
Name	Affiliation
Prof. Ugo Amaldi	Founder and President of the TERA Foundation
Dr Jay S Loeffler	Professor of Radiation Oncology at Harvard Medical School and Chair of Radiation Oncology at Massachusetts General Hospital
Prof. Chris Nutting	Clinical oncologist and Chair at The Royal Marsden and ICR London
Dr Margaret Spittle OBE	Clinical oncologist at University College Hospital London
Dr Euan Thomson	Operating partner at Khosla Ventures, CEO of AliveCor and Director of the Hospice of the Valley

Source: Company reports

### Share capital

There are 306,371,241 Ordinary shares of 25p in issue. In addition, there are currently 7.3m options and 39.2m warrants outstanding.



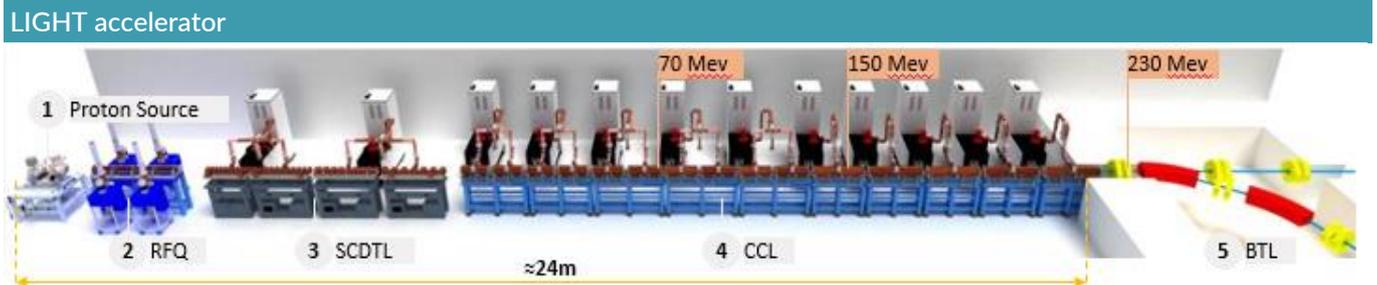
\*Also a board member

Source: Company announcements, Hardman & Co Life Sciences Research

## Appendix

### The LIGHT accelerator

The LIGHT proton beam accelerator unit is composed of four main structures, which are integrated with delivery and patient positioning systems.



Source: AVO investor presentation

- ▶ **Proton source:** The proton source generates a very high rate of up to 200 pulses of protons per second (a rate higher than that of any competitor) from a source of hydrogen gas. The protons are accelerated to an energy level of 40keV.
- ▶ **Radio Frequency Quadruple (RFQ):** This focuses the beam and accelerates the protons from 40keV to 5MeV. The RFQ structure is composed of four units, each designed to match the proton velocity. The RFQ unit has been designed by CERN. It operates at the highest frequency in the world, at 750MHz (compared with the closest RFQ at 400MHz), which allows the wavelength to be much shorter; this, in turn, allows the RFQ component to be shorter and more affordable.

#### Installation and commissioning of the RFQ in Daresbury



Source: AVO annual report 2020

- ▶ **Side Coupled Drift Tube Linac (SCDTL):** Manufactured by TSC and VDL, the SCDTLs, each with their own power unit, sit between the RFQ and the CCL components. The four low-speed accelerating units aim to accelerate the protons from 5MeV to 37.5MeV. Again, each unit is different, so that it matches the increasing velocity of the protons.
- ▶ **Coupled Cavity Linac (CCL):** This structure of high accelerating units is composed of up to 15 separate units to accelerate the proton beam from 37.5MeV to the clinically relevant energy of up to 230MeV (0.6x the speed of light).

- ▶ **Dose Delivery System (DDS, or “nozzle”):** Once fully accelerated, the high-energy beam passes into the DDS, which ensures that the proton beam is both measured and targeted to maximise its effectiveness in cancer treatment.
- ▶ **Patient Positioning System (PPS):** This represents the end-part of the system and comprises several components that allow the optimal positioning of the patient for both imaging and therapy.

## Glossary

CCL	Coupled Cavity Linac – accelerate the proton beam to the clinically relevant energy
CERN	Conseil Européen pour la Recherche Nucléaire
DDS	Dose Delivery System
Hypofractionation	Delivery of higher doses of radiation in fewer fractions than are used in conventional radiation therapy.
ISO	International Organisation for Standards
Linac	Linear accelerator
MeV	Mega-electron Volts
PPS	Patient positioning system
PT	Proton therapy
PTCOG	Particle Therapy Co-Operative Group
RFQ	Radio Frequency Quadruple – focuses the proton beam and accelerates the protons up to 5MeV
RT	Radiotherapy
SCDTL	Side Coupled Drift Tube Linac – low-speed accelerating units that accelerate the protons from 5MeV to 37.5MeV
STFC	Science and Technology Facilities Council
TLC	The London Clinic
UHB	University Hospitals Birmingham NHS Foundation Trust

# Notes

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