BEAUFORT

# Advanced Oncotherapy Plc

25 February 2016

## Rocket Science – All Set for Take-off

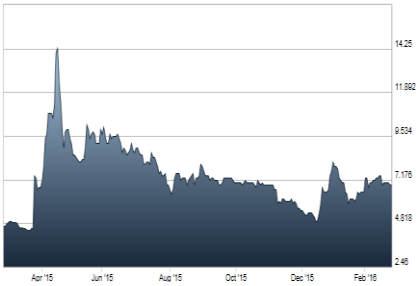
### Speculative Buy

**Price:** 6.88p

**Sector:** Medical Equipment

**A small, young company with limited financial resources, trying to take on giant, established international peers with exceptionally deep pockets, in a product area that both tests the limits of scientific understanding whilst also facing the scrutiny of the world's most exhaustive regulators? Sounds like a recipe for disaster! Yet Advanced Oncotherapy plc ('AVO') is confident that it will demonstrate a full-scale Linac Image Guided Hadron Technology (or 'LIGHT' system) prototype during the course of 2016, before commencing commercial production the following year. Moreover, this wholly-owned technology appears to enjoy quite rigorous global IP protection, while its low-cost, second-generation proton beam therapy device possesses USPs, in terms of price, size and safety features, sufficient to effectively relegate predecessor devices to obsolescence. Given such an outcome, of course, major international competitors wishing to 'remain in the game' will almost certainly be willing to pay a very handsome price, one way or another, to get their hands on its proprietary technologies.**

### Share Price Performance




*Source: London Stock Exchange*

*Key Data*

| | |
|---|---|
| Market: | London (AIM) |
| TIDM: | AVO.L |
| 1 Year Hi/Lo: | 16.9p – 4.35p |
| Existing Shares: | 1,418m |
| Market Cap: | £97.51m |
| ISIN: | GB00B16JQ761 |
| SEDOL: | B16JQ76 |
| Co. Website: | www.avoplc.com |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- It is now widely accepted that the physical properties of protons, for precise local treatment of cancerous tumours, offer an intrinsic advantage over traditional high-energy X-rays as a source of therapeutic radiation. Yet there are presently only 54 operational proton therapy devices in the whole world.
- There are good reasons for this, including price (US$160m to US$220m excluding building cost for a 'first generation' 3-bay system); size and weight (a four story football pitch and as much as 300 tonnes) and; safety (Cyclotron technology is very hazardous and requires extensive bunkering). AVO's LIGHT system, by comparison, is compact enough to fit into a single-story penalty area, will cost around one-fifth of the price of the typical price of a three-bay first generation system, will be safe enough to operate in city-centre locations, while requiring much less power to operate, short power-up times, as well as offering a more precise direct and dynamic scanning beam; maintenance and operating costs will also be a fraction of that demanded by existing devices.
- AVO's CERN-developed and protected linear accelerator technology has been validated through the successful testing of LIBO (its Linac Booster) which is expected to achieve a 230MeV. This is expected to lead to construction of the first full-sized prototype LIGHT during H2'2016, before moving to first commercialisation in 2017, for which the highly prestigious French multinational, Thales Group, has already started the optimisation studies required for mass production.
- AVO's management appears to have significantly reduced the technical, commercial and financing risks that such leading-edge technical developments usually present. It appears set to rapidly capture the larger chunk of an existing 'big-ticket' US$2.5bn market that is forecast to nearly triple in size by 2018. Yet, in fact, the true global opportunity for LIGHT is potentially a multiple of this, given that it must also be considered the obvious replacement/upgrade for operators of the giant installed base of aging and, in medical terms at least, relatively antiquated X-ray radiotherapy systems.
- Tackling the presently significant unmet medical need, given growing incidence of cancer supported by aging populations and lifestyle, for which a global economic cost in 2009 was put at US$286bn, suggests the number of treatment rooms should rise from 121 today to upwards of 13,000. So the reality is that if AVO delivers exactly 'what it says on the tin', the operational and cost advantages LIGHT offers will effectively render first generation devices all but obsolete, while also placing the obvious superiority of proton beam technology within reach of the global medical fraternity for the first time. AVO's principal limitation would then become simply its capacity to deliver, a challenge which is being addressed through the AVO/Thales partnership.

**Protons – Superior Physical Properties**

*Source: Advanced Oncotherapy*

It is now widely accepted that the physical properties of protons, for precise local treatment of cancerous tumours, offer an intrinsic advantage over traditional high-energy X-rays as a source of therapeutic radiation.

Facing a dramatic rise in cancer across the developed world, governments, university hospitals and specialist providers now understand the urgent need, as was most dramatically demonstrated in 2015 by little Ashya King's parents determination to escape the 'clutches' of the NHS, for a major global expansion in the number of proton radiation treatment rooms to ensure facilities are available locally and at short notice for patients with advanced symptoms.

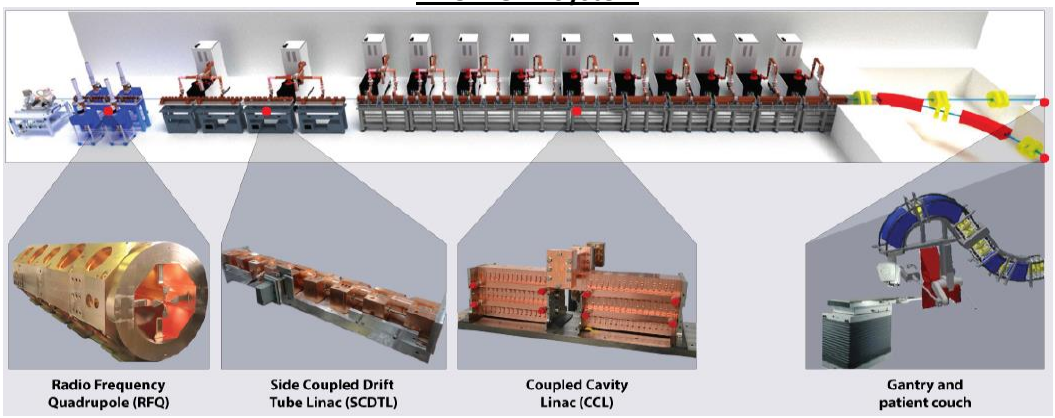
**So what is the problem?**

It is that first generation proton beam therapy facilities are exceptionally expensive to build (range US$120m-US$200m plus infrastructure) and operate (as well as being potentially hazardous), relative to more economical and proven traditional X-ray radiation devices of comparable capacity. Such units became commercially available from 1990, since when their market has become dominated by a small handful of industry players (IBA, Hitachi, Mitsubishi, Varian Medical Systems, Sumitomo), who have been largely responsible for commissioning the 54 operational facilities that offer 121 treatment rooms worldwide (August 2014). Presently, this represents less than 1% of the 21,000 or so conventional X-ray radiotherapy rooms in use around the globe. The latter being available since the 1950s, with commissioning and operation more elementary while unit cost is around just one-fifth of presently available proton facilities.

So the reality is that a dramatic improvement in the underlying economics of proton therapy needs to be found if MEDraysintell's growth projections of a tripling of the global market for proton therapy systems by end-2018 are to be delivered. It calls for a second generation of devices. One that provides equivalent therapeutic excellence, without such commissioning and operational complexities, all of which come at a price much closer to that of a conventional radiotherapy unit. This is AVO's promise. And quite clearly, it would never have been able to assemble such a prestigious line up of Board members, NEDs and advisors, along with a long list of 'highbrow' academics and industrial collaborators, unless its concept also came with significant scientific credibility.

Moreover, AVO has scientific USPs buried deep within its 100%-owned subsidiary, ADAM (Application of Detectors and Accelerators to Medicine). Being a medical spin-off enterprise from CERN (the European Organisation for Nuclear Research, the world's largest particle physics laboratory), it brings the necessary tech-credentials to develop a 'game changer' in the radiotherapy world. Following investment of some €14m in development of the core technology, AVO exchanged 29.9% of its enlarged capital for 100% of LIGHT in September 2013. Since then, the Group has taken a series of major strides forward. It has pieced together the necessary industrial collaborators to oversee the commissioning of a full-scale prototype. It has also secured financing to cover all remaining anticipated capital expenditure, prototyping, fitting-out and regulatory submissions. Recognising the ground-breaking potential for this technology, AVO has already received two firm orders from a Chinese hospital along with four framework agreements and many other formal 'Letters of Intent' from, amongst others, BMI and Spire Healthcare, which suggests that neither credibility for the project nor interest in the final product can be in any doubt.

**AVO LIGHT System**



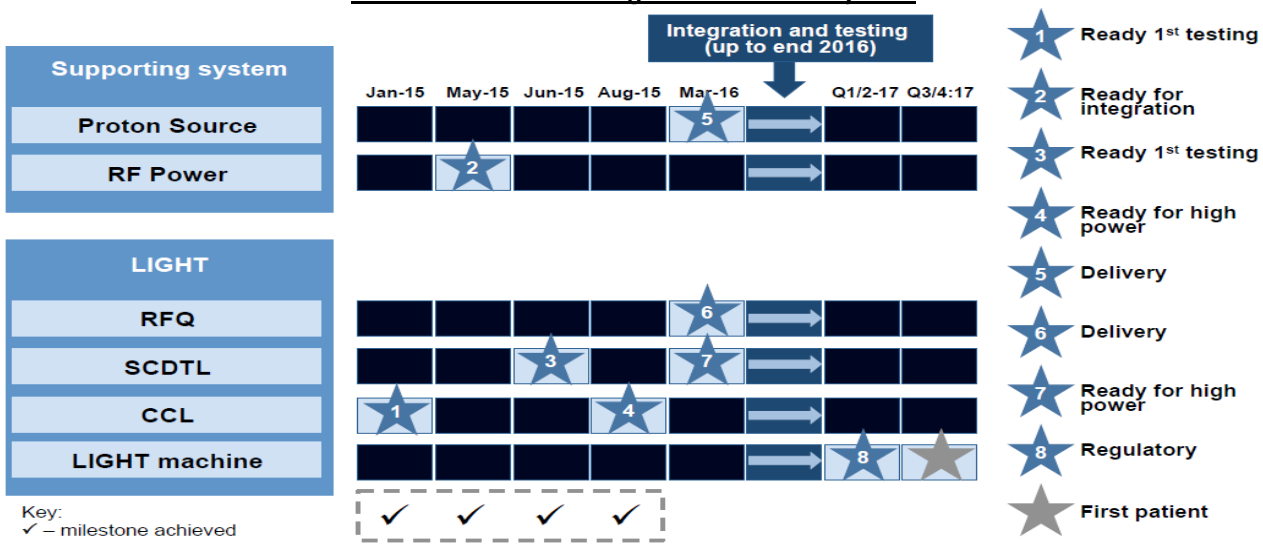

*Source: Advanced Oncotherapy*

**So what next?**

AVO has provided its shareholders with a stream of technological updates and other news over the past year. To date, each highly sophisticated step has confirmed that the Group is moving closer to its stated ambition of demonstrating a first full-scale working prototype before end-2016. At the end of August it announced that the two Coupled Cavity Linac ('CCL') modules that form part of its proprietary proton accelerator are now ready for high-power testing at the Group's facility in Geneva. Results from this work might be expected shortly, before moving onto running 12 or so as a banked series of accelerators in order to achieve the 230MeV output required to meet clinical requirements.

Once demonstrated, the most significant technological hurdle will have been successfully negotiated, leaving only a number of less challenging tasks ahead. While Beaufort itself considers that the over-rigorous diligence routinely demanded for FDA approval could potentially hinder product approval for somewhat longer than is presently being suggested, the extent of interest from other non-dependent international territories (in particular that presently being shown from China) suggests the Group will find itself overwhelmed by demand for LIGHT as soon as units become commercially available. Given such an outcome, of course, major international competitors wishing to remain in the game will almost certainly be willing to pay a very handsome price, one way or another, to get their hands on AVO's proprietary technologies.

**Clear Path for Delivering the First LIGHT System**




*Source: Advanced Oncotherapy*

## *Strengths and Weaknesses*

***Strengths***

- ✓ *CERN-developed and patented technology*
- ✓ *Support of leading scientists/academics and industrial collaborators*
- ✓ *Expanding market opportunity in need of lower cost, clinically superior solution*
- ✓ *Route to low-cost manufacture and significant licensing partnerships*
- ✓ *Highly experienced management team and Board of Directors*

***Weaknesses***

- – *Development and Technology Risk*
- – *Lack of market adoption/Failure to convert Letters of Intent*
- – *Patent violation/legal challenge*
- – *Higher than expected costs/Access to finance*
- – *New treatment, therapy or earlier/simpler detection could reduce the incidence or advancement of human cancer*

*Beaufort Securities acts as corporate broker to Advanced Oncotherapy Plc*

*Sources: Company website, Company RNS, Bloomberg, ProQuote, London Stock Exchange, Investee Companies' web sites*

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During the three months to end-January 2016, the number of stocks on which Beaufort Securities has published recommendations was 310, and the recommendations were as follows: Buy – 103, Speculative Buy - 194; Hold - 13; Sell - 0.

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| Company Name | Disclosure |
|---|---|
| Advanced Oncotherapy Plc | 7 |

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