

05 January 2021

## **PRESS INFORMATION**

### **TMD provides innovative accelerator structures for CERN Compact Linear Collider Collaboration (CLIC)**

TMD Technologies Limited, (TMD) world-class, West London based manufacturer of hi-tech microwave and RF products, has won a contract to produce the latest CERN prototype CLIC accelerating structure.

TMD has long been associated with the supply of RF components to CERN, and this latest, prestigious order is the result this successful relationship.

#### **Engineering to the ‘width of a human hair’...**

The Compact Linear Collider (CLIC) Collaboration involves the development of a next generation electron-positron collider that could serve as a ‘factory’ for mass-producing Higgs Bosons. The key elements of the CLIC design are the accelerating structures, which need to produce an electric-field gradient of up to 100 million volts per meter to accelerate the electrons and positrons (antielectrons) to high energies within the shortest distance possible - in this case about 7 km for a collision energy of 380 GeV.

Each accelerating structure is made from high-precision copper disks stacked and high-temperature bonded to form a monolithic block to which additional components (couplers, cooling channels and flanges) are subsequently brazed.

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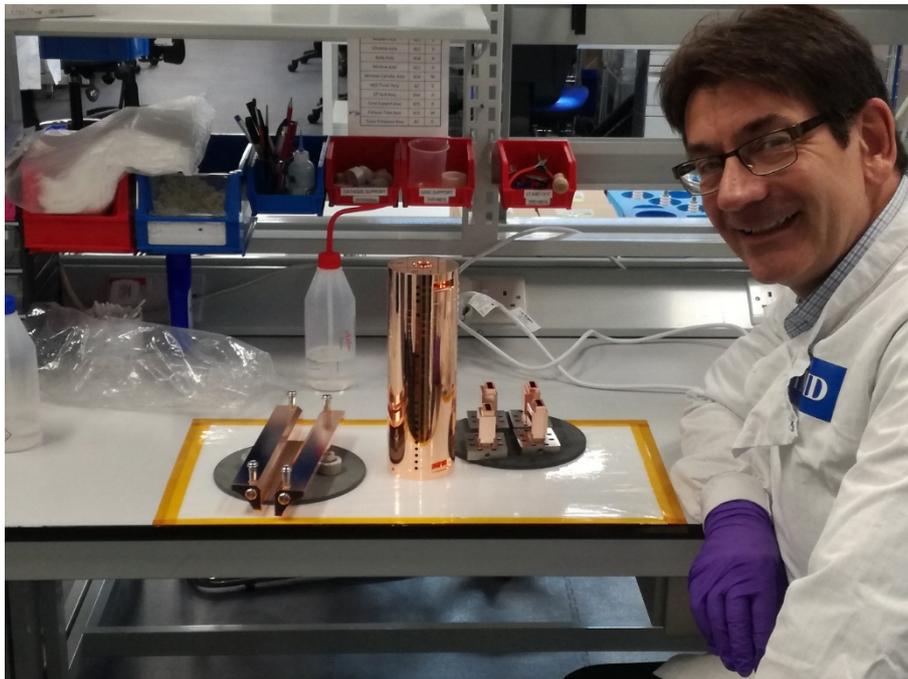


One particularly tricky aspect of the complex procedure is to maintain the alignment of the disk-stack to much better than 100 microns (approximately the width of a human hair) across its 26 cm length during the assembly and brazing processes.

### **Critical assembly at TMD...**

In close collaboration with CERN, the structure was carefully assembled at TMD's advanced manufacturing facility in West London, and bonded and brazed in one of its high-temperature furnaces. The final product was then dispatched to CERN to be characterized and tested in the CLIC high-gradient test stand.

High-gradient structures like these have potential applications in compact particle-beam therapy systems for cancer treatment as well as compact free-electron laser light sources.



*TMD's first assembled CLIC prototype structure.*

*(Right: Prof. Philip Burrows, CLIC Collaboration Spokesperson, with the prototype at TMD.)*

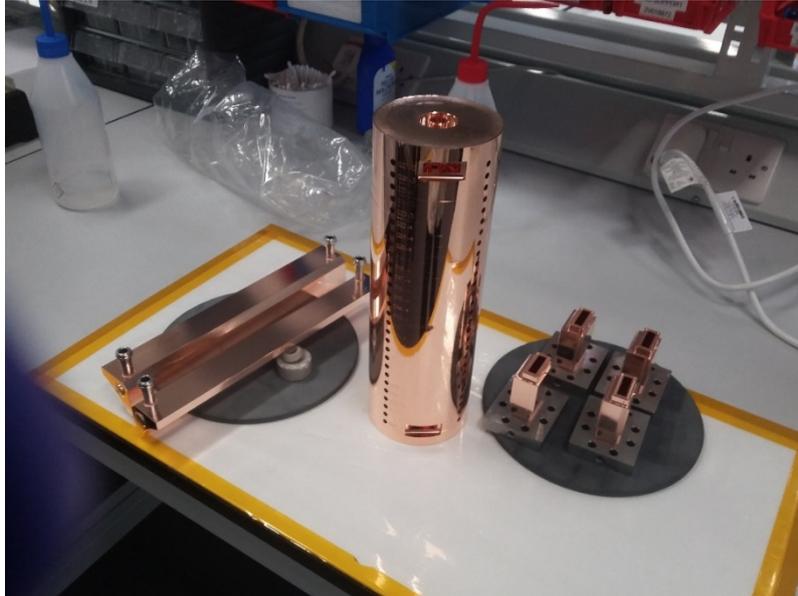
## TMD - taking a lead...

Said Prof. Philip Burrows, CLIC Collaboration Leader and Director of the John Adams Institute\*: “It is wonderful to have a UK SME like TMD taking a lead in developing advanced technology for particle accelerator systems. The technologies that TMD is helping to perfect for CLIC have potential applications for many other accelerator-based solutions to societal challenges, not least in beam therapy systems for cancer treatment. TMD has also recently completed a manufacturing study for the CLIC team - assessing how a substantial volume of structures could be assembled and delivered to enable the build of CLIC.”

Richard Patrick, TMD’s Head of Business Development commented: “We have been tracking this exciting opportunity for some time and are now looking forward to the project being funded - since the challenging nature of the work fits well with TMD’s other manufacturing activities in high vacuum and precision engineering.”

*\*The John Adams Institute is the centre of excellence in the UK for advanced and novel accelerator technology.*





*Close-up of the CLIC prototype: main stack, couplers and cooling channels.*



*TMD Development Engineer Paul Osborn (left) and Line Engineer Graham Adams*

**ENDS**

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## **TMD Technologies Limited – the leaders in scientific and technical microwave and RF innovation**



*TMD's headquarters design and manufacturing facility in West London, UK.*

With a heritage dating back to the 1940s, TMD Technologies Limited (TMD) is a world-class designer and manufacturer of professional microwave and RF products. At the company headquarters in Hayes, West London it produces specialised transmitters, amplifiers, microwave power modules (MPMs), high voltage power supplies, microwave tubes and transponders for radar, EW and communications applications. A previous twice Queen's Award winner, it also produces a range of advanced instrumentation microwave amplifiers for EMC testing, scientific and medical applications.

TMD is also making on-going and substantial investment in the development of quantum-enabled technology under the UK National Quantum Technologies Programme (UK-NQTP).

### **TMD Technologies, LLC, USA**

TMD Technologies, LLC is the US subsidiary of TMD Technologies Limited. Based in Baltimore, Maryland, it provides complete technical and commercial support to TMD's customers in the USA and offers a comprehensive product repair centre.

The Sales and Business Development team is engaged with promoting the whole range of TMD's products, as well as identifying new business development opportunities in the United States.

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