

Case Study

Collaborative Machine Tool Design with Wayland Additive

Industry/Sector: Electron Beam Additive Manufacturing, New Product Development, Bespoke Machine Tool Design

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Introduction

In late 2020 Wayland Additive, a start up company in the electron beam additive manufacturing space, approached MTT to collaborate on the development and industrialization of their state of the art additive manufacturing concept

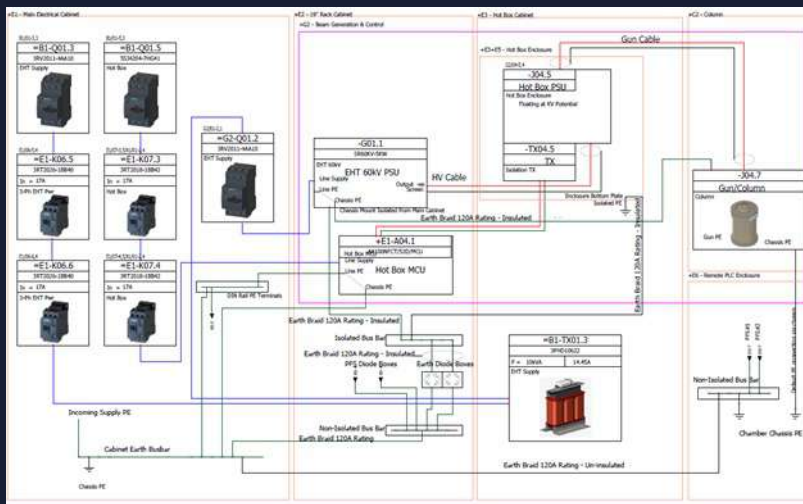


Challenge / Opportunity

Prior to engaging MTT, Wayland Additive had developed a novel approach to electron beam additive manufacturing. One of the new technologies developed by Wayland - "NeuBeam"™ - allows, amongst other advantages, the sintering of materials at much higher temperatures than conventional electron beam technology, opening up a host of new applications to the market.

Wayland's in house engineering team had produced an MVP machine design utilizing an Allen Bradley system to control the machine safety and functionality. Wayland approached MTT to engage in a long term collaborative relationship with the objective of refining their MVP into an industrialized product which would satisfy customers operational, maintenance, safety and conformity requirements.

The primary challenge was to develop a design which was robust and maintainable, whilst also satisfying a suite of regulatory obligations not typically associated with traditional machine tools. Special considerations included the need for High Voltage power supplies, potential X-Ray emissions and explosive risks inherent in the raw materials necessary for powder bed fusion processes. MTT were tasked with conceptualizing the design in accordance with these requirements in conjunction with traditional machine tool requirements (Machinery Directive, EMC, CE / UK CA and UL conformity).



Results and Impact

MTT's team were tasked in particular with a complete re-design of the control system hardware and software (Utilising a Siemens S7-1200 PLC), to take advantage of improved safety, features and support available on the Siemens platform. The design was developed such that it also conformed with North American (UL) regulations, whilst integrating with Waylands proprietary beam control software.

MTT's specialists advised comprehensively on matters of conformity and production of the machine TCF (Technical Construction File), required for achieving CE / UKCA marking. MTT's activities included the production of explosion risk assessments, functional design specifications, inspection and commissioning procedures / checklists and design risk assessments. MTT provided guidance & consultancy services to Wayland's team on conformity requirements and provided best practice methods, templates and workshops as necessary for Wayland to achieve conformance.

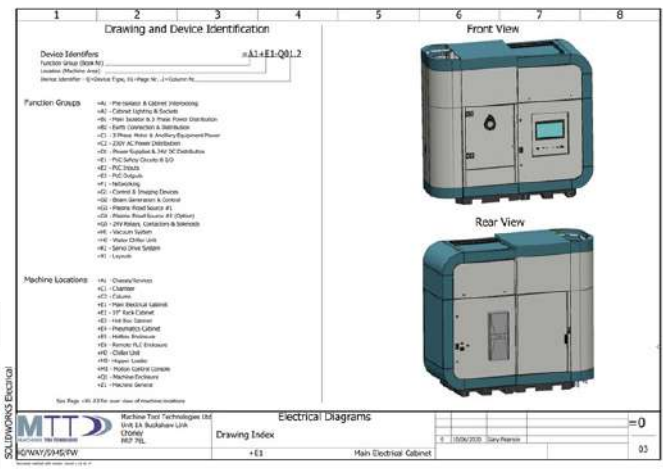
Following a collaborative, iterative design and review process, Wayland put the final machine design into manufacture, bringing a UK innovation to the global market.

Since finalizing the design, MTT have become an essential partner of Wayland Additive's, supplying bespoke manufactured control panels into Wayland's assembly line in Huddersfield UK. To date, MTT have manufactured thirteen electrical panels which have been incorporated into Calibur3 machines for numerous industry applications across the UK, US, and Canada.

Services or Tools Used in this Project?

MTT's specialism in the design of CNC machines was essential in meeting the functionality and operational requirements of the final machine design, and MTT's expert consultancy on the designs intricacies and industry regulations were imperative in delivering the finalized design.

The success of this project required a strong, collaborative effort across MTT and Wayland's design, procurement, quality assurance, and production departments to ensure a finished result that met the prestigious standards required to operate in some of the industry's most demanding sectors.





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