

PipeHawk plc
Underground Intelligence



QM Systems & Thomson Engineering Design
AGM 21st December 2023

Agenda:

- QM Systems
 - Caudwell Marine
 - Ventive
 - Fast MDx
- Thomson Engineering Design (TED)
 - UR Partnership
 - High Output Machines



Innovation in Automation

Current Projects

- Largest orderbook ever
- Healthy pipeline
- Company currently trading purely on project business

- But that is about to change.....





A RELIABLE
DIESEL OUTBOARD IS COMING

Caudwell Marine – Innovative Diesel Outboard

A Revolutionary 300 BHP Diesel Outboard Power Unit



Caudwell Diesel Outboard

The Caudwell Marine diesel outboard brings a number of new features to the large outboard diesel market which will deliver an exceptional end user experience:

Axis Drive

- Steering from the lower leg only drives incredible steering performance, greater stability & allows engines to be mounted closely together

Duo Prop

- Improved manoeuvring and power delivery

Twin Clutch

- Provides improved power deliver, more efficient and smooth gear change

Cowling Design

- Unique design enabling access to more parts of the motor whilst in the water.

Closed Loop Cooling

- Protects key engine components; supports hot environment performance



Images of Caudwell Production Facility During VB Build



Caudwell Marine Timeline

- **VB**
 - Production of c30 units for final design validation
 - Completed April – September 2023
- **QP**
 - Validation of manufacturing process and assembly line
 - c60 units
 - Every unit tested on in house 'Hot Engine Test' facility
 - February 2024 – June 24
 - Saleable units
- **SOP**
 - Mid 2024 onwards





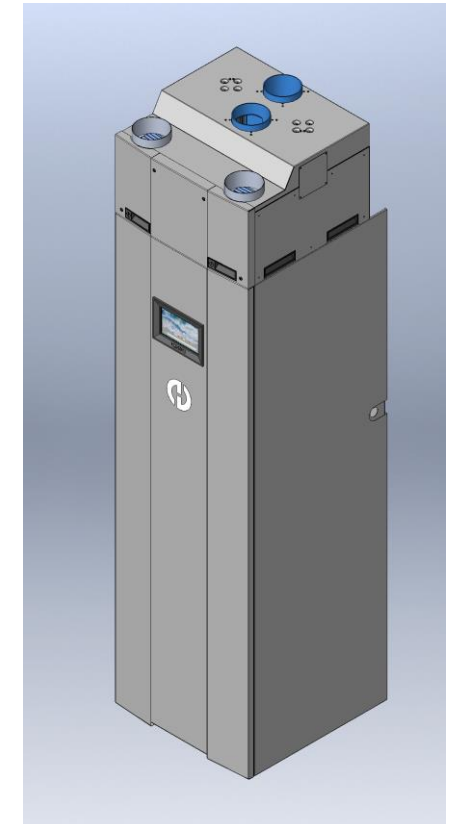
Ventive Home

An intelligent whole house ventilation, heating, cooling and hot water for domestic homes.



Ventive Home – Smart Whole House Ventilation, Heating and Hot Water System

- Based on Ventive's patented intelligent ventilation system – offering zero carbon heating via a heat pump, ventilation for healthier living, passive cooling, hot water, electrical battery, thermal heat storage, metering, monitoring and intelligent control – all in one box.



The Ventive Home System brings a number of new features to domestic ventilation, heating and hot water market, all combined into one neat, compact unit:

Heat Pump Technology

- Utilises a HP to provide efficient direct or indirect heating and hot water

Thermal Battery

- Upto 12kw storage of thermal energy in a 'Thermal Battery'

Instant Hot Water

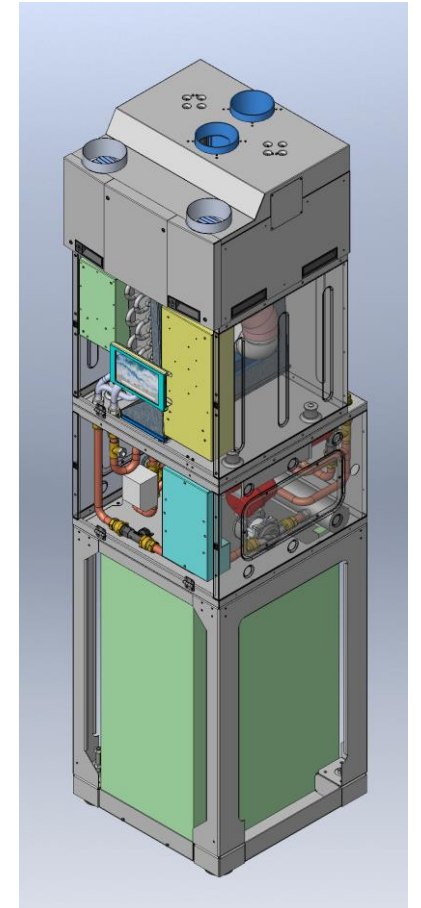
- Provided through thermal battery, inline heater, HP or combination of these.

Intelligent Control

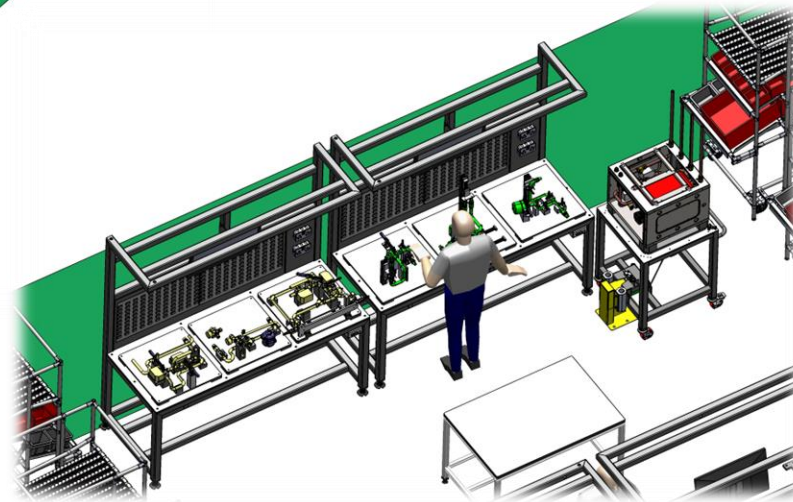
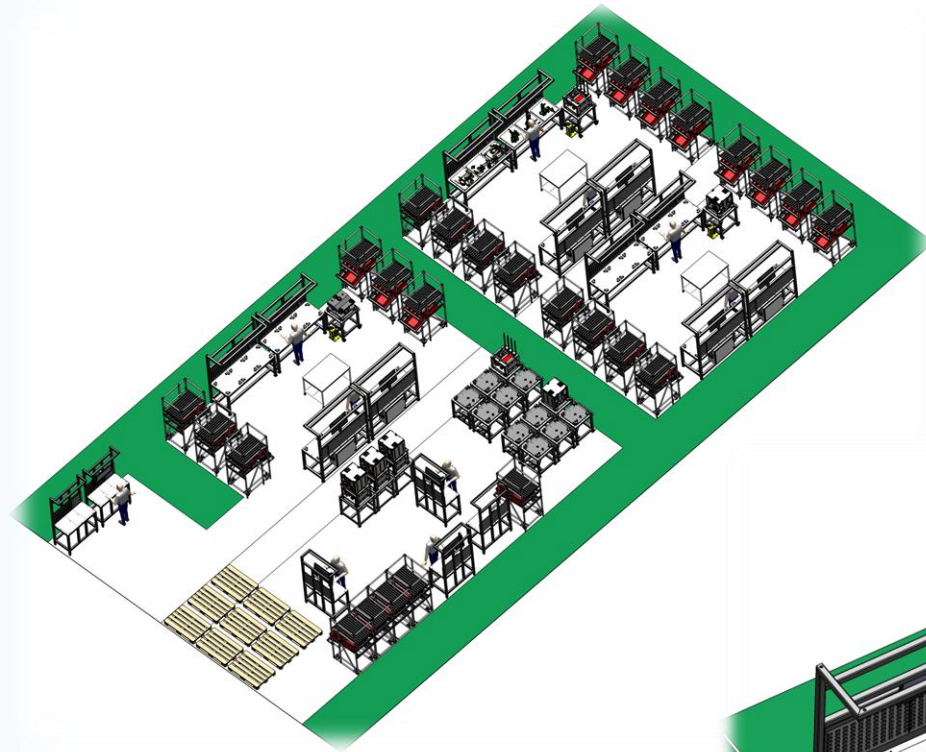
- Efficient control that measures temperature and humidity of incoming air and can switch heating and cooling modes to provide most cost effective heating source. Can boost extraction of humid air to clear rooms quickly (shower room, utility etc).
- Wifi enabled for remote monitoring of data and operational performance

Free Air Cooling

- Utilising integrated mechanical heat exchanger, cooling of recycled air can be provided almost free of charge



Images of Ventive Home System Production Facility

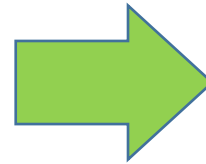
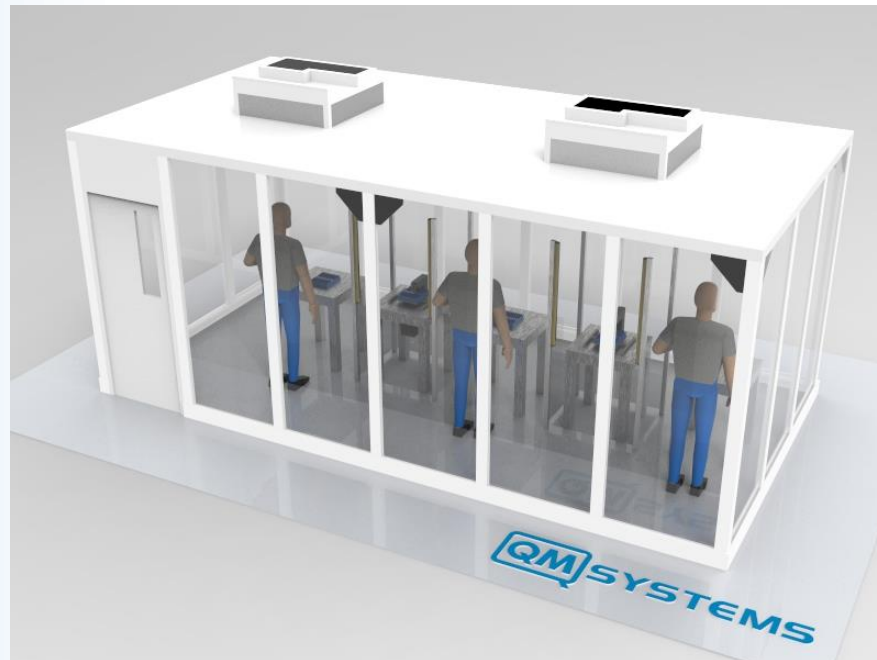


Ventive Home Timeline

- **VB**
 - Production of c15 units for final design validation
 - Currently underway, due for completion January 2024
- **PV**
 - Validation of manufacturing process and assembly line
 - c60 units
 - Every unit tested on in house EOL test system
 - April 2024 – July 24
 - Saleable units
- **SOP**
 - End 2024 onwards

Fast MDx Medical Vial Filling

- Our medical vial filling cell is up and running
- First filling machine built and tested within our newly installed clean room
- First quantities shipped to our customer November 2023
- Initial pilot volumes due to be shipped through until mid 2024
- SOP mid 2024 with steady ramp up of volume as our customer starts to ship test platforms to clients





Unipart Rail Partnership

- What we said last time around....
 - Contract already in place with Unipart Rail for global export supply of TED rail equipment
 - Access to the distribution network of a £200 Million turnover company (part of a c£1Bn turnover group)
 - Sales and technical presence globally
 - Established rail brand supplying rolling stock, rolling stock spares, signalling and safety equipment
 - Unipart Rail focus core target growth in rail plant and infrastructure
 - TED provide ready made products to compliment this strategy
 - Full access to TED's product catalogue
 - Access to Unipart's marketing machine
 - A focused marketing strategy and campaign on signing the distribution agreement
 - Development of existing partnerships to sell our products as turn key packages with machine suppliers.
 - Access to all the key trade shows globally – Innotrans, AusRail, Arema Rail, Rail Live etc...

Unipart Rail Partnership

- TED and Unipart Rail (UR) are excited to announce a further partnership to develop and manufacture a range of high output machines
 - Together TED and UR will develop new and exciting products
 - UR will complete the final assembly of machines
 - Providing TED with access to UR's buying power, facilities and exceptional experience in larger machine assembly
 - UR will market the machines on a global stage.
 - Providing clients with unparalleled access to service and support anywhere in the world
 - TED will retain IP of machines developed
 - Contract provides UR with exclusive agreement to market and manufacture products internationally
- New products will compliment existing high output machines e.g gantry cranes, de-clippers, sleeper handlers and spreaders.

High Output Machines

- TED have developed a range of products called 'High Output Machines'
- Disruptive approach to railway track installation and renewal
 - High output normally reserved for few Tier 1 suppliers
 - Opens market to Tier 2 and 3 suppliers
- Concept provides a suite of low cost, high output machines breaking down the functionality of multi-million pound track replacement trains into discrete elements each carried out by small road-portable machines costing less than £1/2 million – most of them much less.
- The specification of each machine has been developed in association with construction and plant-hire clients and in consultation with industry and safety authorities.
- All machines are equipped with an interchangeable Diesel power module that can, at a later date be switched out for an electric battery power module.
- Considerable market research undertaken, with a strongly positive outcome.



SL21-04 Sleeper Laying Machine

- Current methods lay upto 200 sleepers per hour.
- Sleeper laying is the main bottleneck in the track laying process.
- Will revolutionise the whole process, offering precision placing of sleepers at rates of 500 to 1000 sleepers per hour.
- Operates semi-autonomously, even steering itself using GPS technology.



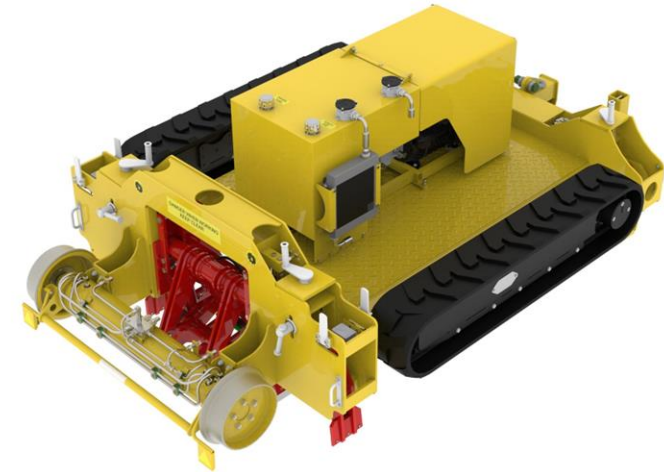
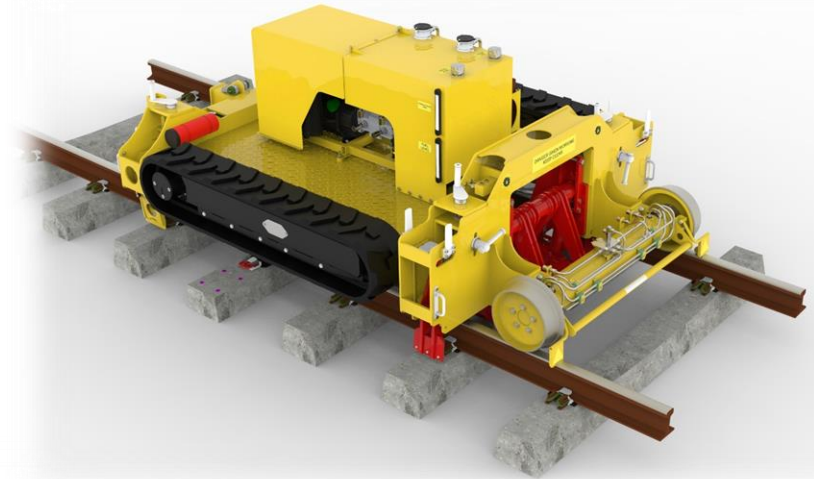
Powered Rail Threaders

- Next stage is to install the rails.
- Wide variety of different track assembly methods employed around the world
- Two machines developed,
 - RT21-01 which has already been proposed for use on HS2:
 - RT23-04 multi-purpose machine, not only used for installing rails but also for a variety of maintenance tasks through the track life-cycle.



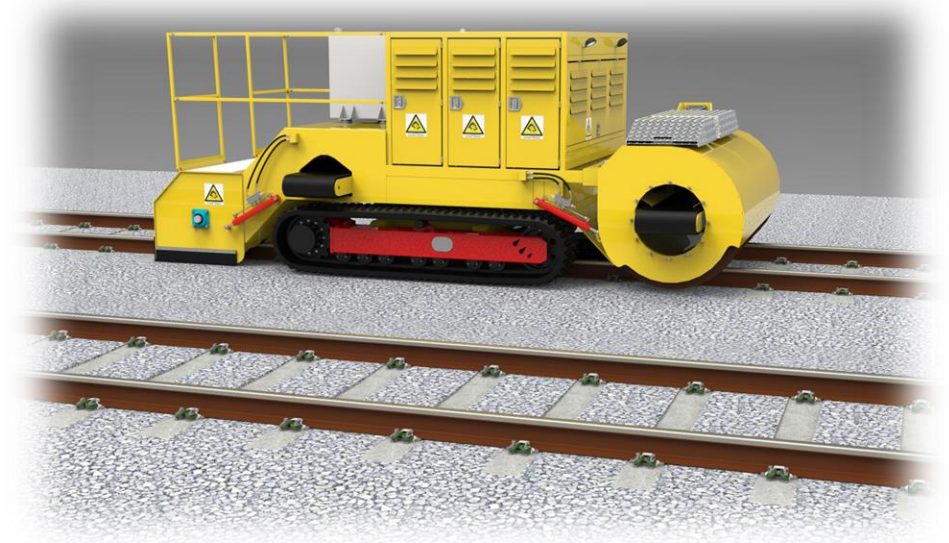
FC 23-04 High Speed Clipping Machine

- Next stage is connecting rails to sleepers
- Semi-autonomous machine follows the rail threaders
- Fastens rails at a rate to match the sleeper layer
- Removes the need for a gang of 30 workers who would normally be employed to complete this task manually.
- TED has been making attachments of this type for over 20 years
- New machine uses computerised control and monitoring systems never seen before which increase speed and accuracy
- Significantly improves ease of use whilst reducing the skill required of the operator.



Ballast Handling

- Ballast is applied next
- Trains are used to apply ballast which cannot easily be replaced however excess ballast needs tidying and removal
- Two products developed by TED for this part of the process.
 - BBR23-02 excavator attachment is the first of its type to incorporate dust suppression systems designed to significantly reduce the respirable silicate particles which are a known serious hazard to rail staff.
 - BBR23-03 is autonomous radio controlled machine with dust suppression and much greater power than existing ballast clearing machines, offering higher output rates.
- Respirable silicates are a known cause of lung disease and cancers
 - Major Health risk but no solutions yet available.



Thanks for your time

