

# X-by-wire: Experience the Control



Cervis, North American Partner of TTControl

TTTech Off-Highway **TTControl**

TTControl's general purpose control unit, TTC 200, as well as its I/O-reduced variant TTC 100 are predestined for their use in by-wire controls. Both feature a powerful **32bit MPC555** microprocessor with integrated floating point unit (FPU), providing enough computational power for sophisticated closed loop controls used for implementing drive-, steer- and work-by-wire circuits. The TTC 200 is certified according to **IEC 61508**, the international standard for functional safety of programmable electronic systems, thus allowing the creation of safe and reliable applications satisfying safety demands up to **Safety Integrity Level (SIL) 3**.

## Prinoth Snow Groomers Full X-by-wire with TT Control

Prinoth snow groomers utilize TTControl electronic control units (ECUs) for full x-by-wire vehicles. TTC 200 units as well as several electronically controlled pumps on the tracked vehicles are used for realizing the hydrostatic transmission, including a power limiting controller, as well as advanced work-by-wire circuits for tiller, blade and cable winch.

The snow groomer's winch, for example, features an automatic work mode, where the tensile force acting on the cable is automatically adjusted depending on pressure sensors integrated in the propulsion circuit, thus guaranteeing that the cable is under constant tension. **CAN bus** communication is used to exchange data between the control units and to gather data from the engine controller. The independent **watchdog CPU** integrated on each TTC 200 continuously monitors activities, detects failures and shifts the vehicle in a safe state, in case a critical failure is detected.



To support the configuration and supervision of the available by-wire systems an intuitive **HMI** was developed based on TTControl's full-graphical Vision product family. By using a large color LCD the user has access to configuration parameters, engine data and diagnostic information.



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## CoDeSys Programming Available on TTControl ECUs

**CoDeSys**, the available **PLC** programming language, is the development environment used for realizing the by-wire-controls on the TTC 200 units and for creating the graphical user interface on the Vision controller. **CoDeSys**, developed by the German company **3S**, allows the application developer to program the control units using easy-to-use graphical or text-based programming languages as defined in **IEC 61131-3** and includes all tools needed for efficient application development like debugging, monitoring and commissioning features. Please contact Cervis, Inc for more information regarding TTControl products in North America

