

PRESS RELEASE

Pfronstetten-Aichelau | 26.01.2024



Arnold NextG revolutionizes fieldwork

Modern agriculture is inconceivable without an efficiently operated fleet of machinery. Considering the shortage of skilled personnel or drivers and the continuously rising costs, automation plays a crucial role in this environment. With its central control unit NX NextMotion, Arnold NextG provides the perfect foundation to make as much as all agricultural machinery suitable for automated processes and autonomous applications – also as an efficient and secure retrofit solution!



This tractor has been equipped with a redundant electronic steering and driving system from Arnold NextG and can therefore be teleoperated or driven remotely - even from a helicopter.

Source: Arnold NextG |

Kevin Arnold, CEO and founder of Arnold NextG, aims to revolutionize the automotive industry with nothing less than a self-developed multi-redundant drive-by-wire central control unit, redundant actuation and corresponding input devices. In a drive-by-wire vehicle, there is no need for any mechanical connection between the steering wheel and the steering gear – this technology not only forms the basis for next-generation driving and assistance systems but also enables secure autonomous driving.

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Arnold NextG is at the forefront of agricultural innovation, demonstrating its state-of-the-art system with the tractor. This All-wheel drive machine, a powerhouse of 409 horsepower with all-wheel drive, is a glimpse into the future of farming. Equipped for teleoperation, semi-autonomous or fully automated functions, it showcases versatility in agricultural applications.

The agricultural machine, weighing nearly 12 tons, is enhanced with Arnold NextG's multi-redundant driving and steering system. This advanced system allows control beyond the traditional steering wheel or joystick; it includes remote control options for direct line-of-sight operation or desk-based teleoperation. Its sophisticated design incorporates multiple redundancies and a fail-operational safety concept, ensuring reliability even when external systems, like AD-Stacks, encounter errors.

Car-like Steering Feel in a Tractor

Arnold NextG introduces a revolutionary concept to tractors: a car-like steering feel. By digitizing key vehicle functions such as steering, throttle, and brake, they have reimagined the tractor's steering wheel. The patented Virtual-Shaft Technology synchronizes the steering wheel position with the wheel steering angle, effectively creating a virtual steering column. This technology ensures the front axle's alignment with the steering wheel, mirroring the functionality found in trucks and cars, including the steering wheel's automatic return to the 12 o'clock position.

The addition of Arnold NextG's Force-Feedback Technology further transforms the driving experience. This technology provides the driver with real-time feedback about varying road and terrain conditions, axle load, and the lateral force from attached implements. This adaptive steering response not only enhances operational safety but also significantly elevates driver comfort.

Adaptive Steering as a Safety Feature

The integration of speed-dependent steering force allocation and variable steering ratios in Arnold NextG's system simplifies and enhances the driving experience. These features, coupled with the multi-redundant steering system, make driving both more intuitive and comfortable.

Joystick with Road Approval

Arnold NextG's NX NextMotion, adhering to all relevant safety standards, paves the way for a new era in tractor operation. With its compliance, the traditional steering column becomes redundant, allowing for joystick-only operation, even on public roads. This opens exciting possibilities for reimagining the tractor's cabin design, from a swiveling driver's seat to a customizable control unit that combines seating and controls.



Maneuvering, positioning, and coupling via remote control

NX NextMotion integration revolutionizes the remote control of attachments, enabling precise maneuvering, positioning, and coupling. This system not only allows for millimeter-accurate control but also incorporates an advanced braking system that is speed-sensitive and actively engaged, ensuring consistent operational safety.

Digital Transformation of Driver Tasks

Kevin Arnold (CEO Arnold NextG) highlights the transformative potential of our electronic steering and braking system: "Equipped with interfaces essential for autonomous driving systems, our technology paves the way for transferring human driver responsibilities to digital platforms. This innovation supports various operational modes, ranging from fully automated to semi-autonomous, teleoperated, or remote-controlled vehicles."

Upgrading Existing Fleets with Fail-Operational Solutions

In the dynamic sectors of agriculture, construction, and forestry, automating machinery is key, driven by cost and efficiency. Introducing vehicles that minimize the need for human operation reduces risks like downtime and optimizes operational costs. Arnold NextG's drive-by-wire technology aims to not only automate new agricultural machinery but also upgrade existing fleets. This technology supports a range of operations from joystick control to full autonomy, adhering to all safety standards and, where applicable, road regulations.

Centralized Automation Interface

NX NextMotion seamlessly integrates into the vehicle system, controlling primary functions (steering, throttle, brake) and secondary features (gear selection, signals, horn, wipers) via diverse interfaces including touch displays and voice control, or directly through autonomous driving systems. This integration networks all vehicle systems in real-time, creating a central hub for automating technical processes and enhancing operational safety.

Arnold NextG's advanced steering and braking system continuously gathers and analyzes road-to-wheel friction data. This vital information is shared with autonomous driving system providers and sensor manufacturers (camera, radar, LiDAR), ensuring that vehicles can always return to a safe state, even in case of autonomous system errors.

Accelerating Development and Efficiency

NX NextMotion's system architecture enables the consolidation of various safety-critical functions previously scattered across multiple control units. This integration fosters rapid development and heightened efficiency in vehicle manufacturing, as Kevin Arnold emphasizes.

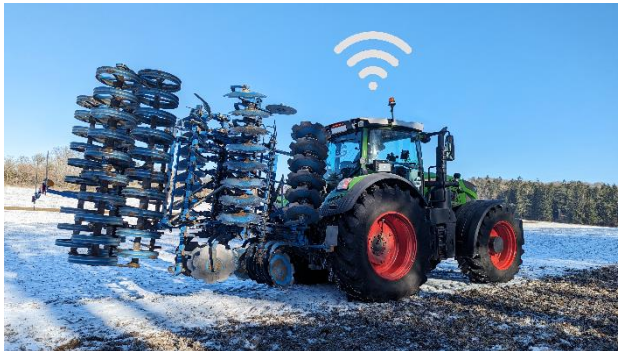
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The digitalization of previously manual or hydraulic vehicle functions makes it possible to operate agricultural machines by remote control - without a human driver in the cab.

Source: Arnold NextG I




Even the control of the rear hydraulics for coupling implements (here a disc harrow) can be controlled remotely using Arnold NextG technology.

Quelle: Arnold NextG I



NX NextMotion
SKALIERBARES ZENTRALSTEUERGERÄT



Ansteuerung von Primär- und Sekundärfunktionen	Ausfallsicher - fully 50. operation
Einheit, Typenzulassung bis zur nominaleinstufigen Größe	ISO 25113-2:2016, ISO 15017-1:2016, EN 1179:2020
Systemanforderung nach ISO 26262:2018 (ASIL-B)	Cybersecurity nach ISO 21448 und SAE J3061:2019
Funkstandard (optional nach ISO 18133 (IEEE 802.11))	LoRaWAN 7, LoRaWAN 2019, LoRaWAN 2016, LoRaWAN 2012, LoRaWAN 2012, 4G, 4G LTE Cat. M1
12V und CAN-Netzwerksteuerung	RS-485, CAN, CAN FD, CAN, LIN, CAN X, CAN XL
Netzwerk mit geringem, skalierbarem Force Feedback Technologie	12 Schrittmotoren (CAN, CAN FD, CAN, LIN, CAN X, CAN XL)
23 analoge Eingänge	2 redundante 3-Phasen-Motoren oder
23 digitale Eingänge	4 nicht-redundante 3-Phasen-Motoren (PMSM, BLDC), 5 redundante DC-Motoren
Strom pro Phase 40A	

The performance data of the multi-redundant NX NextMotion central control unit at a glance.

Source: Arnold NextG I

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Until 2018, Kevin Arnold was still active in motor racing. Today, the 24-year-old is working on the mobility of the future with his company Arnold NextG.

Source: Arnold NextG |

Contact

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About Arnold NextG GmbH

Arnold NextG implements the safety-by-wire® technology of tomorrow - whether on land, in the water or in the air. We offer the globally unique and multi-redundant central control unit NX NextMotion, which enables fail-safe and individual implementation. As an independent advance developer, incubator and system supplier, Arnold NextG takes care of planning and implementation - from vision to road approval. www.arnoldnextg.com/