



Nidec Motor Corporation

Cybersecurity in Motors and IIoT

Nidec Overview

Nidec Corporation

Nidec
→All for dreams

A Leading Global Manufacturer of Electric Motors and Controls



Founded in
1973



HQ: Kyoto



\$14.8B
2017 GROUP
TURNOVER



\$46.7B
Market Capitalization
(as of 4/1/2018)

**Competing in
"Everything that
spins and
moves"**



INFORMATION TECHNOLOGY

- PCs / Servers
- Data Center Cloud
- Smartphones
- Haptics / HMI
- Office Automation
- Consumer Electronics
- Digital Recorders / Cameras...



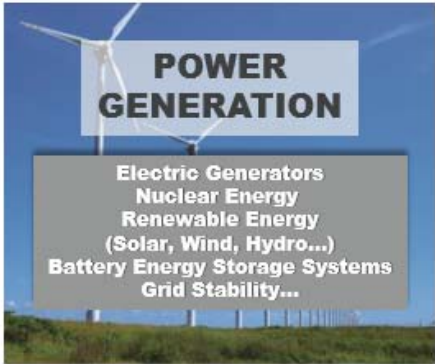
VEHICLES

- EV Traction Drives
(LSEV, Golf Carts, Utility, Passenger, Material Handling, Bus, Off Road Heavy...)
- Passenger Car Peripherals
(Power Steering, Braking, Oil/Water Pump, Sunroof, Windows, Seats, HVAC...)
- Passenger Car Electronics



ROBOTICS

- Factory Automation
- Automated Guided Vehicles
- Power Assist Suits
- Personal Mobility
- Telepresence Robot
- Drones...



POWER GENERATION

- Electric Generators
- Nuclear Energy
- Renewable Energy
(Solar, Wind, Hydro...)
- Battery Energy Storage Systems
- Grid Stability...



APPLIANCES

- Washers
- Dryers
- Dishwashers
- Refrigerators
- Cookers
- Fans
- Air Conditioners...



INDUSTRY

- Automation Systems
- Conveyors
- Compressors
- Fans
- Pumps...

**Common
Principles
For All
Products**

- Detailed Design Process
 - 5-stage Gate process
 - Detailed business and technical feasibility study
 - Product safety and reliability plan
 - Supply chain plan
 - Manufacturing process flow chart
 - Rigorous design / code / safety reviews
 - Failure Mode Effect and Analysis (Design and Production)
 - Prototypes and pilot run

Common Principles For All Products

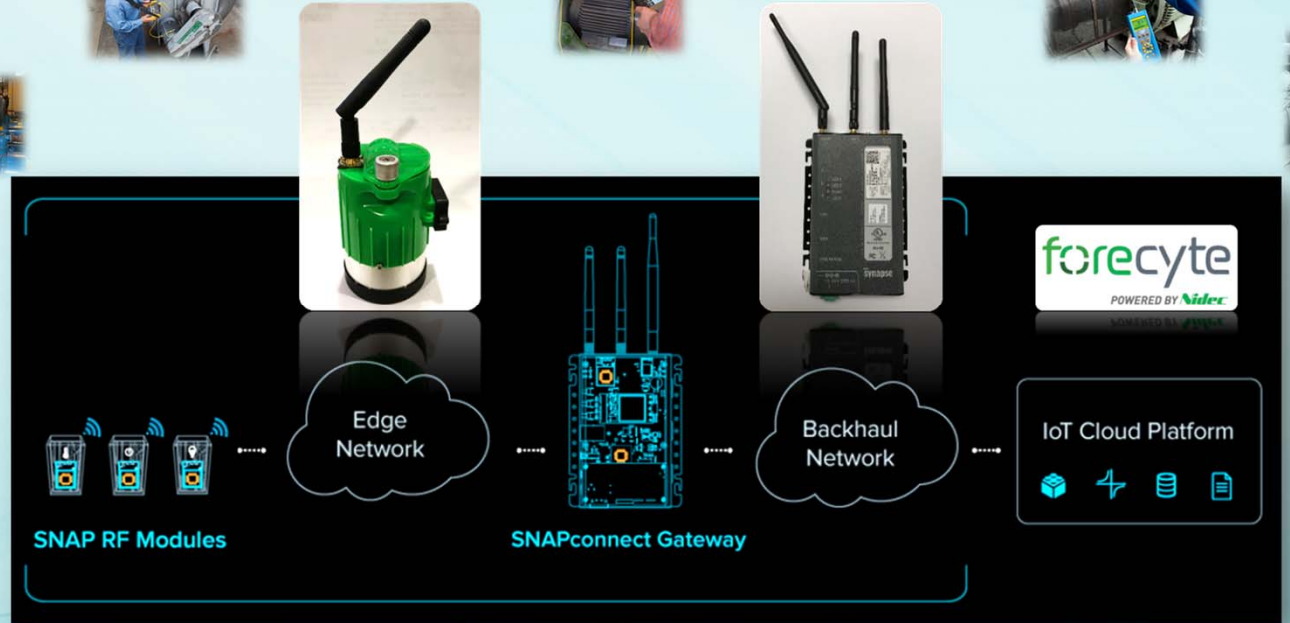
- Agency Approvals
- Quality Control Plan
- Cybersecurity review (where applicable)
- Software and hardware configuration management
- Externally accessible non-volatile data storage is encrypted (where applicable)
- Electronic component purchase only from authorized sources
- Rigorous vetting process in place for parts qualification and new supplier onboarding



Electronically Controlled Motors

- Provided as subsystem to downstream entities
- Modbus protocol used for local control – no internet access
- Bluetooth based smart phone app available
- Comprehensive security including time-limited access and multiple passwords for programming

FORECYTE™ Remote Asset Condition Monitoring (IIoT)



**FORECYTE™
Remote Asset
Condition
Monitoring
(IIoT)**

- System consists of sensors, gateway and cloud platform
- Sensor to gateway communications – IEEE 802.15.4 based protocol, AES-128 encryption
- Gateway to cloud communication – encrypted with TLS, using MQTT and HTTPS
- Cloud platform hosted on Microsoft Azure
- Data Privacy considerations
 - GDPR – ongoing compliance evaluation and assurance
 - CA Senate Bill 327 – effective 1/1/2020



Thank You

Pranesh Rao (pranesh.rao@nidec-motor.com)