Tomorrow's Autonomous Controls Today

Xtensor Systems Inc.

John Lenko, CEO/President
Cell – (805) 551-7719
Email – john.lenko@xtensor.com

Xtensor

Autonomous Systems Trend

- Combination of control, sensing, and AI technology
- Rapidly advancing technology
  - military land/sea/undersea/air vehicles
  - commercial vertical solutions (car, robotics, etc.)
- Problems with current implementations
  - high-cost proprietary vertical solutions
  - complex development and integration
  - static AI scalability (centralized processing intensive)
  - limited real-time distributed functionality
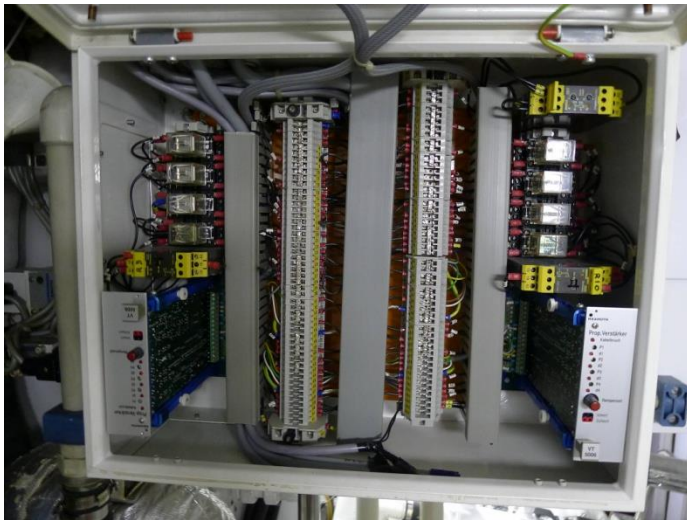 - massive cyber security vulnerability

Xtensor's Autonomous AI Control

- Cost effective and Easy to develop and use

- Integrated SW/HW platform providing

  1. Dynamic AI (XDAI™) smart software

     A. Built-in AI and control

     B. Built-in end-to-end security

  2. XactV4™ miniaturized smart hardware

     A. Distributed real-time platform

     B. Commercial-off-the-shelf (COTS) hardware

- Rapid user solutions (weeks not years)

Xtensor's Innovations

- **First-to-market DynamicAI™ software engine**
  - ☐ US Patent App. 202117316337 (2021-05-10)
  - ☐ Based on US Patent App. 202017128070 (2020-12-19)
- **Easy-to-use simplified interface**
- **High-performance remote controllers**
- **Dynamically modifies parameters/fixes problems**
- **Self-contained (no Cloud required)**
- **SW configurable ports (as inputs or outputs)**
- **Customization with much less programming**
- **Replicates expertise to multiple locations**

From this…

To this……32-port XactMax™

Specifications

✓ Cell phone size
  ✓ 80 X 120 X 20 mm
✓ 32 Smart Ports
✓ Weight 100 Grams
✓ Power 12-32 Vdc
✓ All ports software configurable as inputs or outputs
✓ All ports support OneWire®
✓ USB, LoRaWan®, and Ethernet ports

P1 P2 P3 P4 P5 P6 P7 P8
P9 P10 P11 P12 P13 P14 P15 P16

POWER

XactMax™
ID 007732
PN AA13756 Rev 2A
SN 990934

Xtensor System CAGE 4E6D6

P17 P18 P19 P20 P21 P22 P23 P24
P25 P26 P27 P28 P29 P30 P31 P32

Next-Gen Autonomous Applications Projects

- Autonomous flight mgmt. (NASA/FAA)
- Autonomous crypto mgmt. (SDA/NSA)
- Equipment mgmt. and control (IT/OT)
- AI-enabled control (IoT/IIoT)
- Deep space flight mgmt. (NASA/JPL)
- Unmanned air/ground/sea vehicles (DoD)
- Auto equipment maintenance (Navy/Army)
- Autonomous robotics (DoD/Industrial)

XactMax™ Value

Device Manager	Device mgmt.	$4K
SCADA I/O System	Distributed control	$5K
Industrial Control System	Industrial automation	$7K
Full Unix System	Applications	$4K
Integration Cost	Single instance est.	$30K
Integrated System	**COST**	**$50K**

✓ Integrated system
✓ 32 Virtual PLC control
✓ Real-time response
✓ Secure system
✓ Localized screen
✓ 80% less programming
✓ Slave unit control (50)
✓ Onboard database
✓ 90 days data storage
✓ High scalability

XactMax™ OT Controller	**$2K**

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XactMax™ Payback

Onsite Person vs. **XactMax™**

Comparison	Onsite Person	XactMax™	*Advantage*	*Payback*
Cost	**$125K**	**$2K**	*Invest 1 time vs. ongoing burden*	*2% cost of adding a person*
Support	**Onsite**	**Automated**	*30% to 70% effect of live onsite person*	*7x to 21x*
Coverage	**8/5 (1 shift)**	**24/7**	*3x coverage at no added cost*	*Cost effective 24/7 support*
Reach	**One location**	**Distributed**	*Multiplier effect = Expertise x Locations x Incidents*	*Multi-location simultaneous problem resolution*
Response	**Reactive**	**Proactive**	*Actively present during incidents*	*Resolve problems before they happen*
Expertise	**Live**	**Autonomous**	*Automate best practices*	*Leverage in-house expertise*

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Autonomous Control Opportunity

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SIEMENS
MITSUBISHI ELECTRIC
Rockwell Automation
Schneider Electric

Automation Market	$85B
Siemens	$21B (25%)
Emerson	$12B (14%)
Mitsubishi	$11B (13%)
Honeywell	$10B (12%)
ABB	$8B (10%)

GE Honeywell YOKOGAWA ABB

OMRON BECKHOFF

What's Missing?

- End-to-end security
- Distributed solutions
- Flexibility
- Scalability
- Cost effectiveness
- Predictive abilities
- Simple API
- Easy programming
- Easy localization

Autonomous Control
Target Markets

- *$4B/yr. Automation retrofit*
- *New $2B IT/OT*
- *New $1B Auto Navigation*
- *New $500M IoT/IIoT*
- *New $500M Mil/Space*

Technology Roadmap

- **Autonomous Industrial Control/Enterprise IT**
  - ☐ Core DynamicAI™ software
  - ☐ Core XactV4™ products (from 4 to 32 ports)

- **Autonomous Flight/Navigation**
  - ☐ Core AutoNav DynamicAI™ software air, sea, land
  - ☐ Core XactMax™ navigation controllers

- **Autonomous Robotics**
  - ☐ Core AutoRobo software DynamicAI™
  - ☐ Core XactMax™ robotic controllers
  - ☐ GangN™ Ganglion Node processor
    - A high-performance secure networked "nervous system"

Summary

- Integrated first-to-market solution
  - "Microsoft/Cisco" for NextGen Autonomous AI
- Cheap and Easy next-gen solutions
  - PC vs. Mainframe analogy
- High productivity gains (3X to 21X)
- Complementary AI control technology
- Multiple new large markets
- Scalable global solutions