Intersection of Safety & Technology

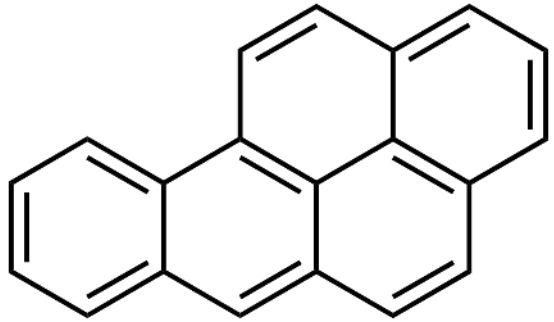
Iowa-Illinois Safety Council

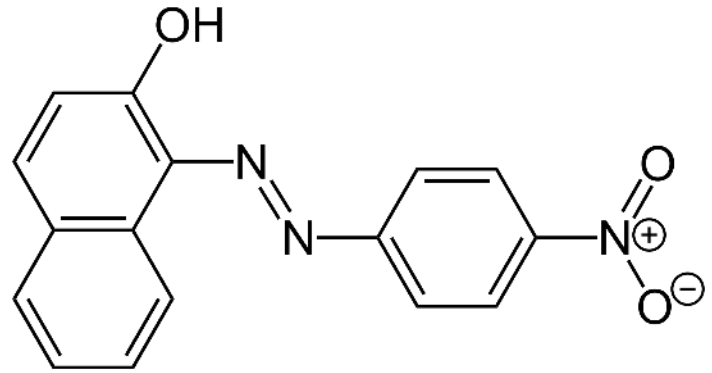
March 2022

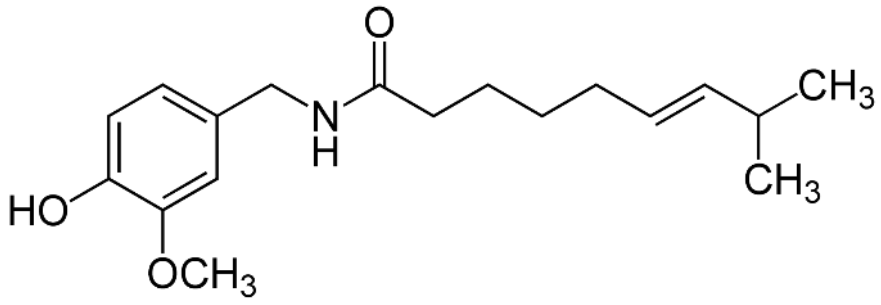
LEVEL UP

Steven Shaffer

- Grinnell College, Chemistry, 1991
- Analytical Chemist
- Drake University, Inorganic and Organic Laboratories, EHS Department
- EMC Insurance, 2005;
  - Rehab the Lab
  - Emerging Issues Chair
  - RI Innovations Team







RI Innovation Team

Chad Veach

Steven Shaffer

Nathan Smith

Jake Thoren

Chris Murphy

count on EMC INSURANCE

March 2002

Nationwide®

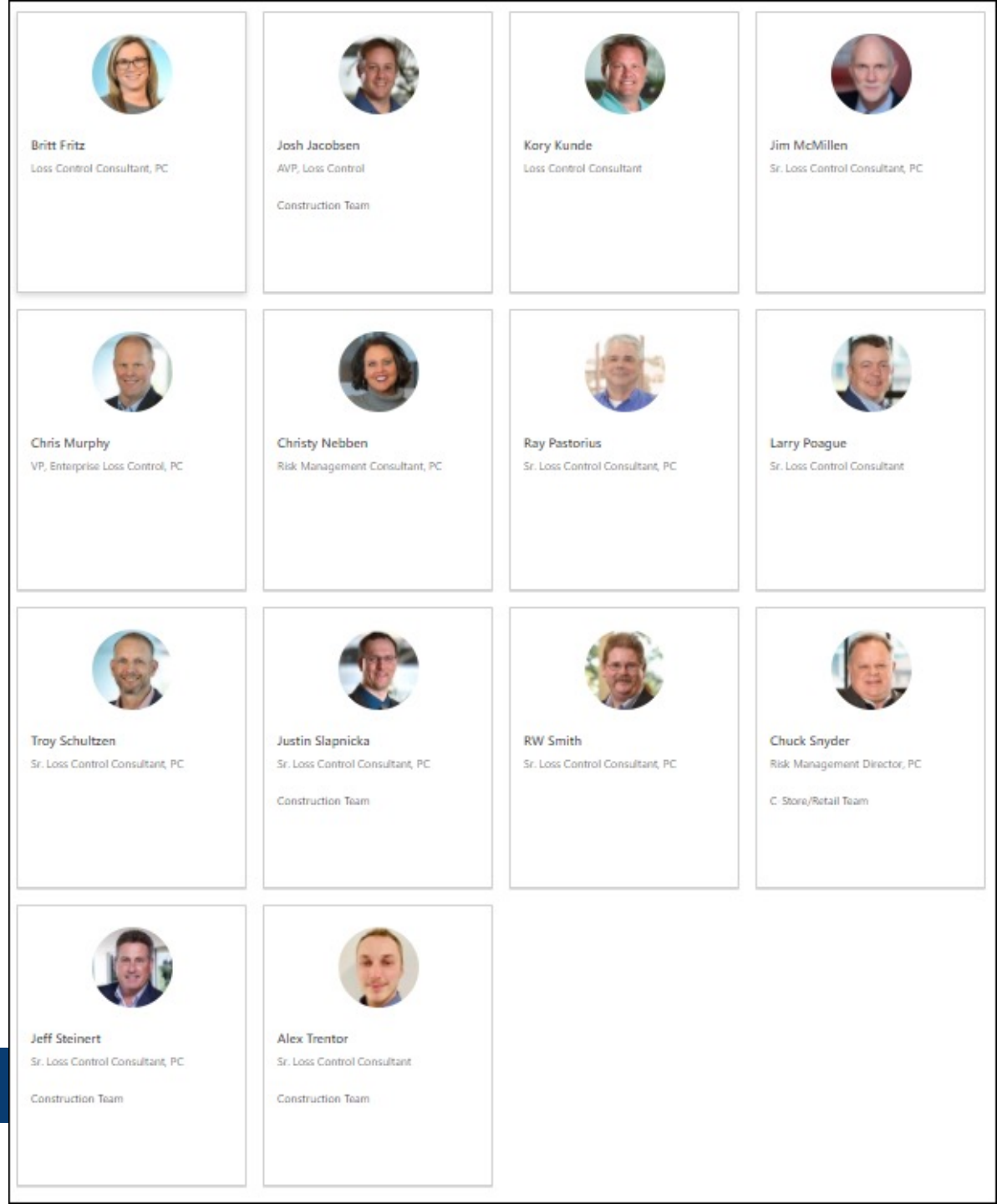
January 2017

HOLMES MURPHY

October 2020

VP, LOSS CONTROL

LEVEL UP



#1 Rule of Technology

Start with the problem

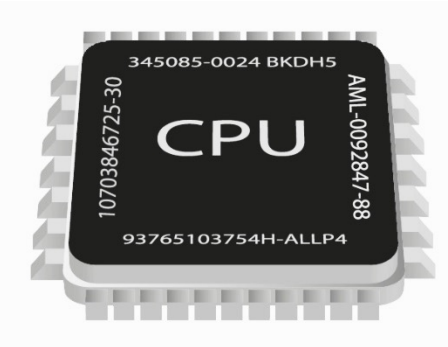
The best way to use technology, as summarized by Jim Collins in his book, *Good to Great*, is as "an accelerator of momentum rather than a creator of it." Having studied companies over a five-year period, Collins came to the conclusion that not only do successful organizations think differently about technology than mediocre companies, but they tend to **become pioneers in the application of carefully-selected technologies**.

RI Innovation – Technology & Data

Aerial Intelligence

Wearable IoT

Building/Equip IoT



Machine Vision

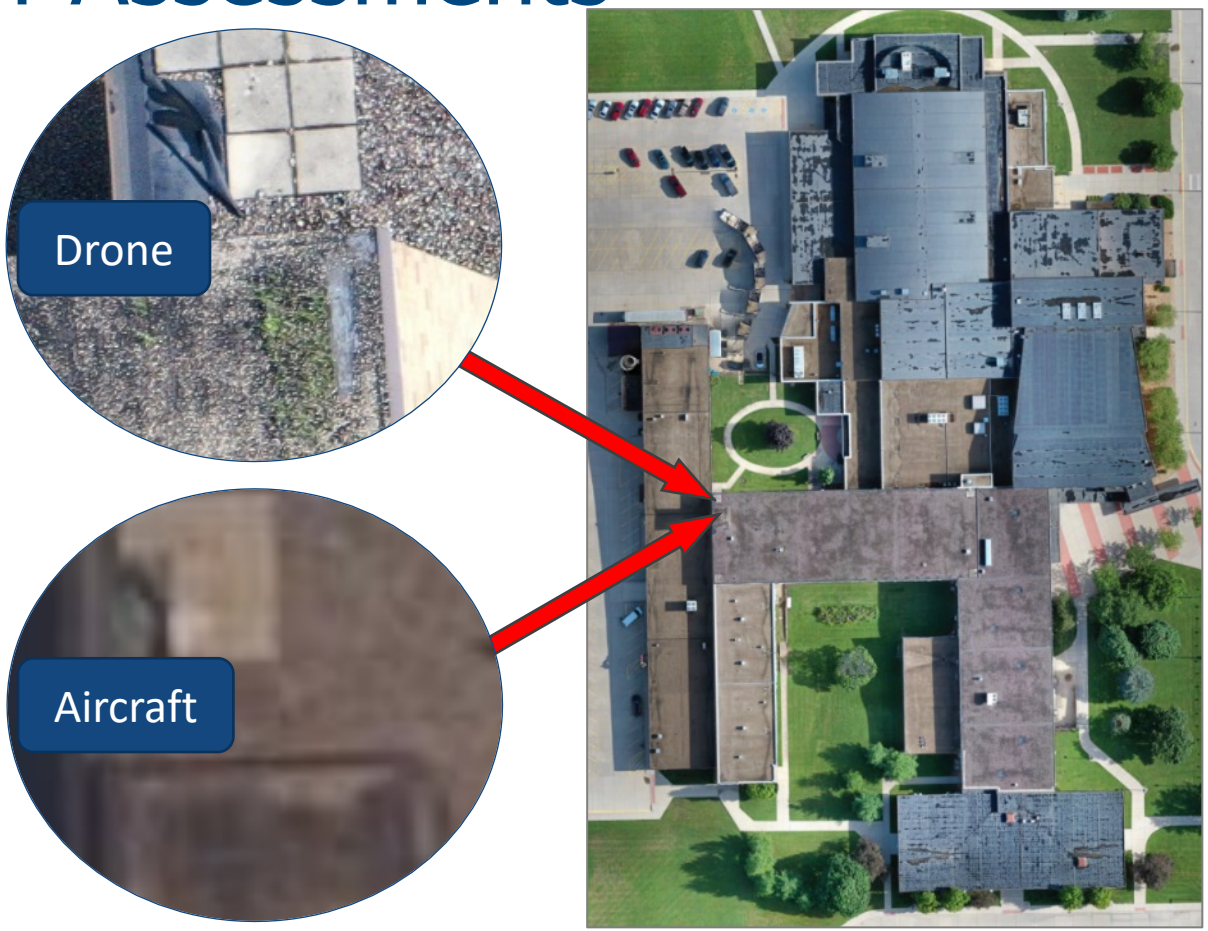
Drones / Aerial Intelligence

VERIFIED Data Analytics

EMC INSURANCE

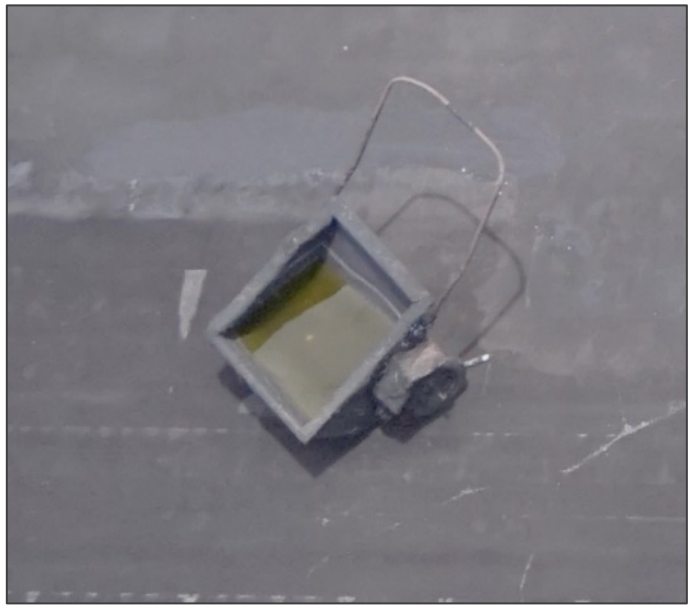
Drone Roof Assessments

- Roof Assessment Service Reports for policyholders
- Report generator with Computer Vision built in-house
- Roof Score for underwriting generated based on detections from HD imagery



LEVEL UP

Why Roof Assessment?



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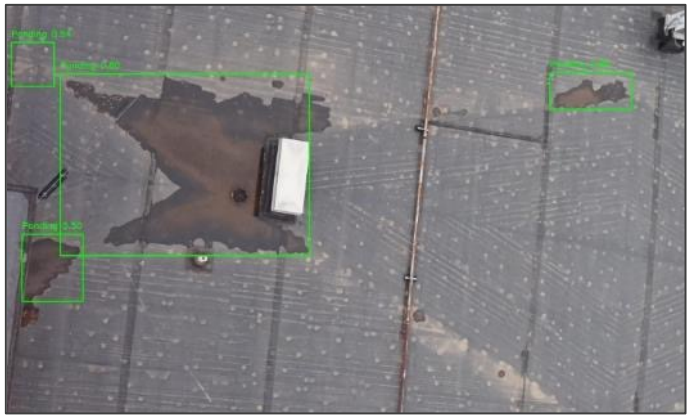
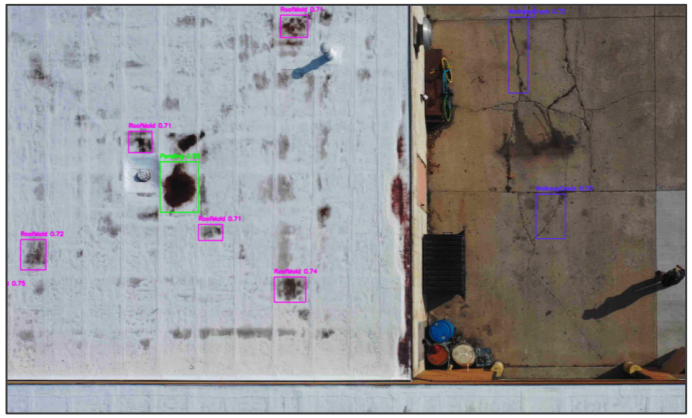
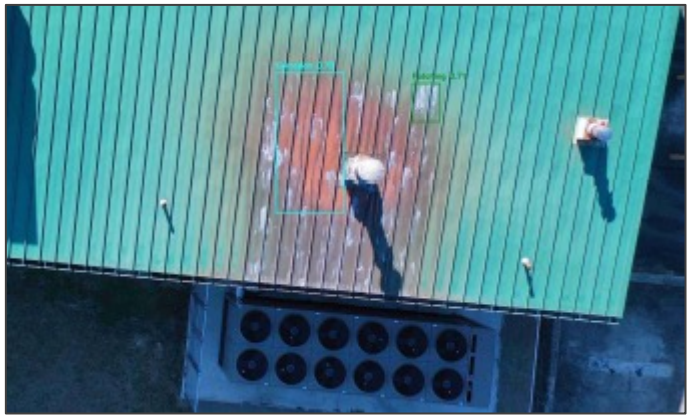
LEVEL UP

INFRALYTIKS Machine Vision







Current Models Used

- Ponding
- Displaced Ballast
- Staining/Mold
- Corrosion/Rust
- Wrinkled Membrane

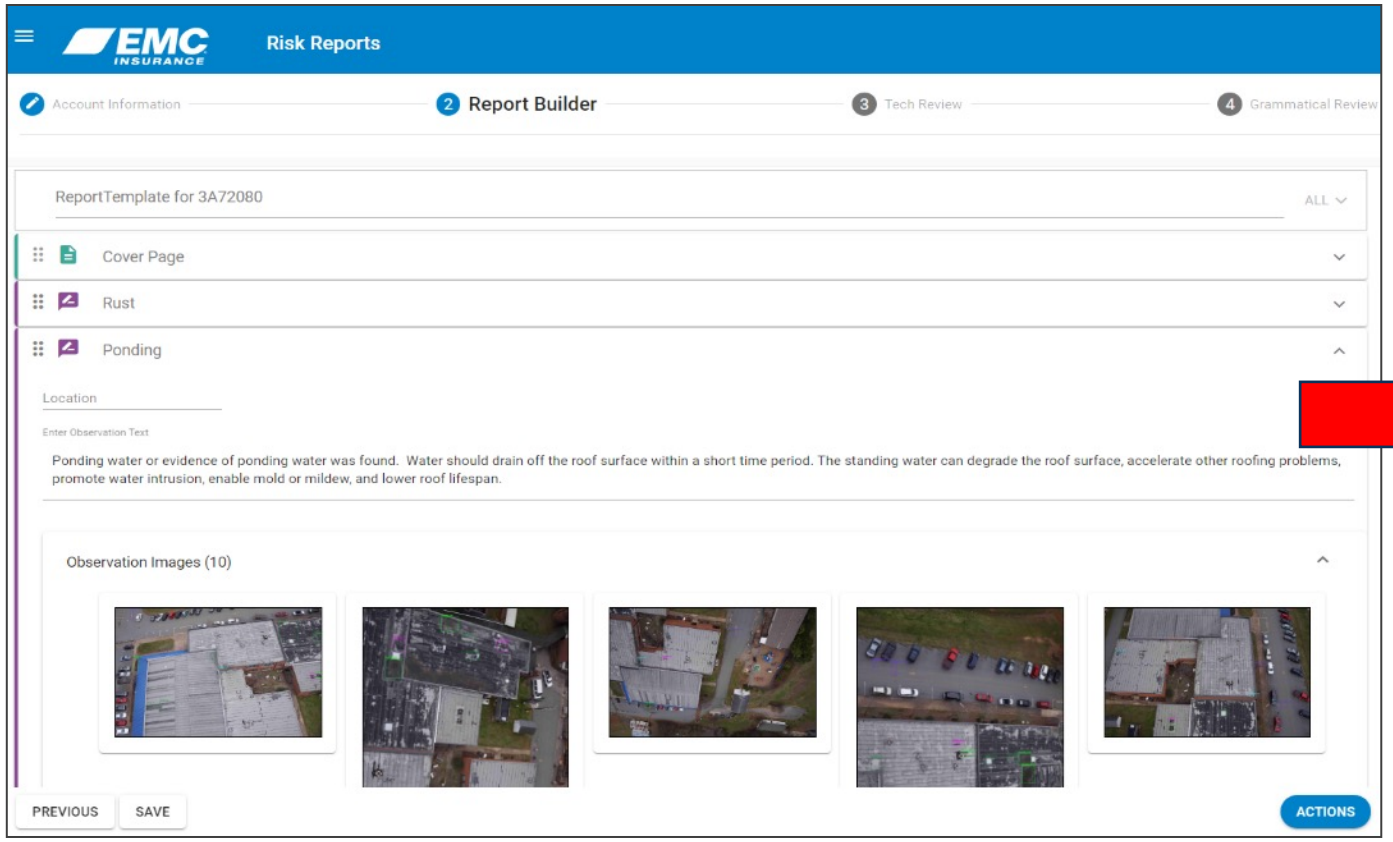
Models Not Used

- Walkway Crack
- Patching

Future Models

- Overhanging Tree
- Debris
- ???

Roof Assessment Service Reports



Roof Assessment Report

Account Name	CARDINAL COMMUNITY SCHOOL DISTRICT
Policy No.	8A71607
Building Occupancy	High School
Building Street Address	4045 ASHLAND RD ELDON IA 52554-8037
Drone Flight Date	05/05/2021

EMC provides this Roof Assessment Report to your organization as a value-added service on top of the policy coverage promise. Our aim is to assist you in identifying controllable property risk and possible solutions to increase the lifespan and performance of the roof system, reduce the risk of a roof related claim and the associated disruption to your daily operations.

This report was created using imagery from an Unmanned Aircraft System, commonly called a drone. The drone pilot is an EMC team member, FAA licensed and trained to inspect facilities with the specific drone that was used. This service involves the combined use of HD photogrammetry, orthomosaic scans and computer vision technology to automatically identify risks to the roof system. Finally, individual comments are made on various defects to communicate what was found and possible control measures.

We believe strongly in the value that risk improvement techniques have for our mutual success. We are pleased to be able to provide this service and hope you will find it valuable for your organization. If you have any questions or feedback, please feel free to contact your EMC representative. Thank you for taking the time to review this report.

Joel Frank
Joel.A.Frank@EMCIns.com
5153452490

Wearable IoT

NCCI – Wearables Paper

- **Is wearable technology a game changer for workers compensation?**

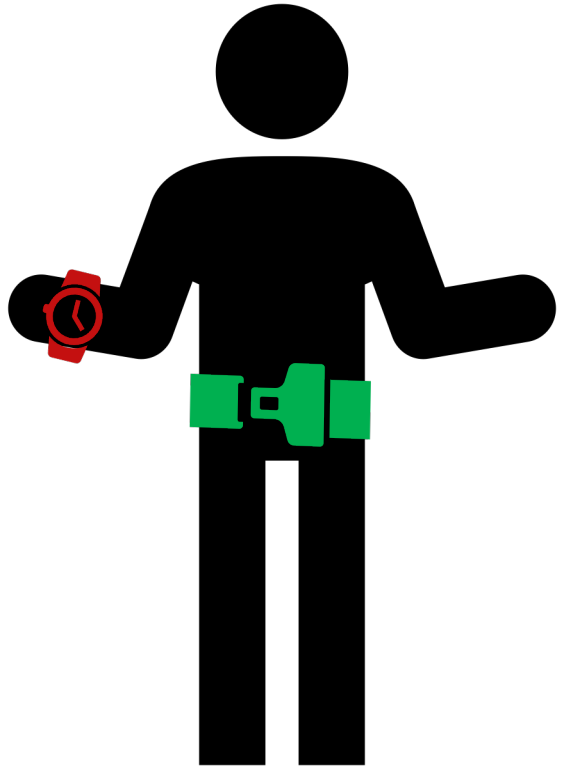
"As wearable technology advances, the interviewed stakeholders agree that ***wearables are well positioned to become an integral part of the future workplace*** *and the workers compensation system. Notably,* ***with more widespread use, wearables could provide data and information that could lead to safer workplaces and may help reduce recovery times, facilitate return-to-work, and reduce the overall costs of workers compensation claims****.*

One of the most important goals in workers compensation is to prevent an injury before it occurs. If wearables can ***identify and mitigate risks in real time—before a worker is injured—it could transform the world of loss control and, most importantly, transform the lives of workers****. As one of our stakeholders noted, "By preventing injuries, everybody wins: the employee, employer, agent, and the insurance company."*

https://www.ncci.com/Articles/Pages/II_Insights_Wearables.aspx

Two Directions of Wearables

Inward:
Sensors that measure things inside the worker: oxygen concentration, pulse, number of steps, etc.



Some wearables do both

Outward:
Sensors that measure things around the worker, actions taken by worker, or communicate with the worker

GoXLabs

Boost is the only all-in-one solution on a third party Samsung or Apple smartwatch.

Injury Prevention
Back and shoulder injury risk prediction and prevention

Illness Detection
Influenza like illness detection prior to onset of symptoms and social distance detection

Fatigue Assessment
Fatigue assessment using real-time measurement of VO2 from a watch

Dehydration Detection
Dehydration and thermal stress detection and prevention prior to onset of symptoms

Lone Worker Safety
Lone worker safety includes GPS location, health status, and communication on a watch

Noise Detection
Noise detection and warning (Coming December 2020)

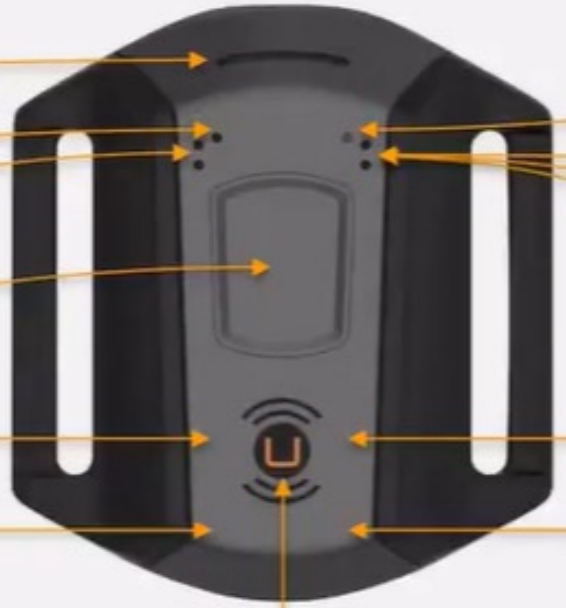
CO2 Detection
CO2 detection and warning (Coming December 2020)

Learn More >

https://www.goxlabs.com/

Wearable Anatomy

MAKUSAFE



LED

Microphone

TVOC and CO_2

Manual Submit

WiFi

Bluetooth

Visible Light & Infrared Light

Temp

Humidity

Air Pressure

Accelerometers

Battery

ARM Cortex M4F CPU

Environmental Conditions

Forceful Motion

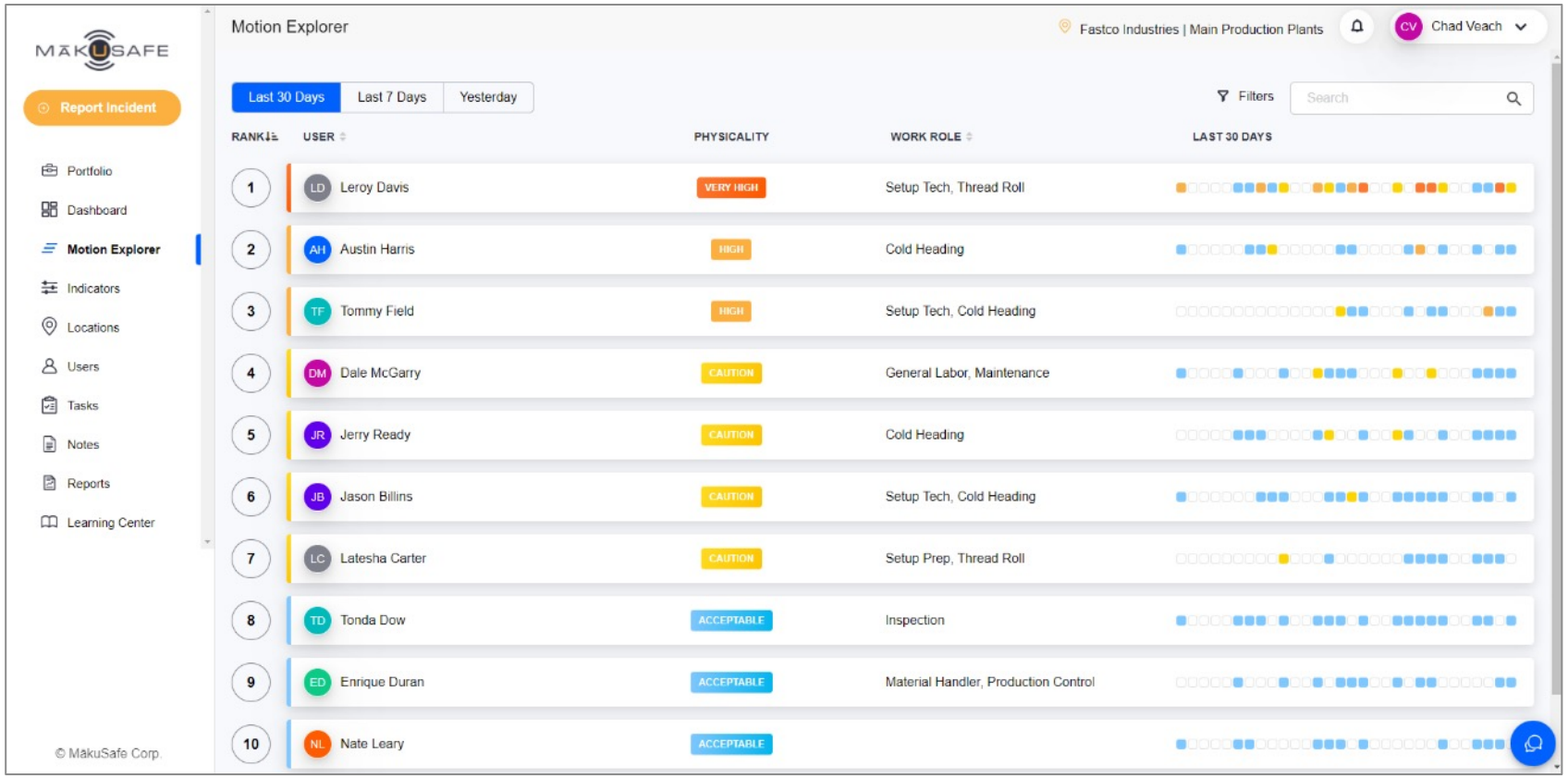
Location

Voice Memos/Near Misses

Wearable Safety Tech

- Two Pilots completed in 2019
  - > 3 months & 40 devices
- Beta phase with 1,200 devices and 12-month no-cost trial for WC policyholders

MākuSmart Platform



Wearables – Doing Their Part!

GENERAL INDUSTRIES | CLIENT RESOURCE

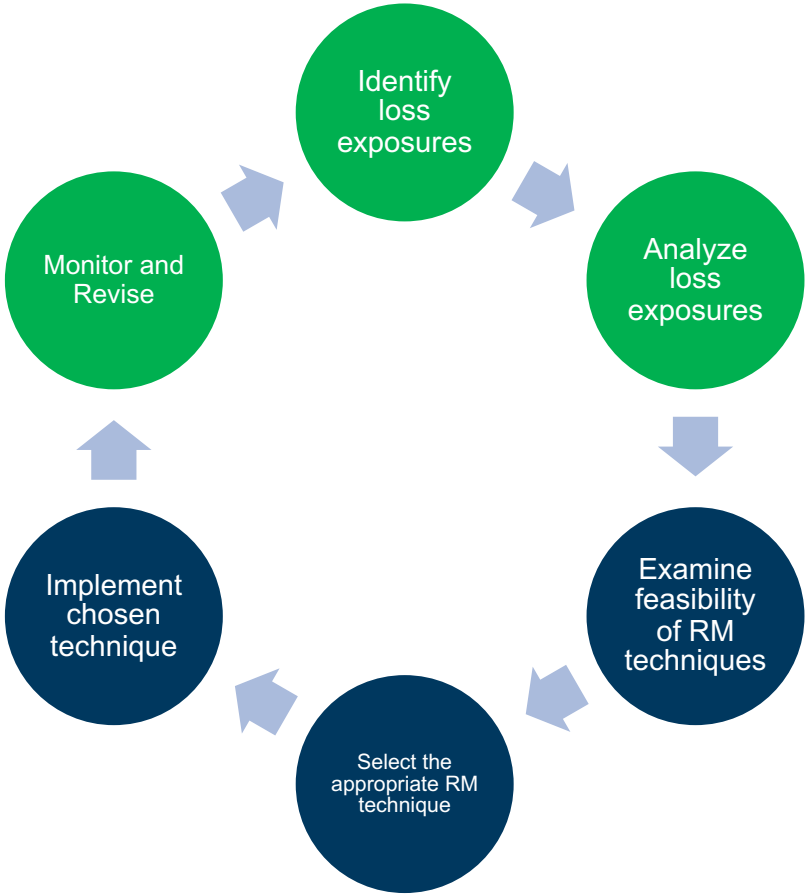
How wearable devices are changing the future of workplace safety

A look at this emerging technology's uses and benefits

BY CHRIS MURPHY

Considerations to keep in mind

While wearables can help identify and analyze workplace safety issues, **they shouldn't be viewed as a cure-all. They often don't solve underlying safety issues on their own, and should be used as a component of larger risk management strategies that combine traditional risk mitigation techniques to correct issues.**



https://agentblog.nationwide.com/commercial-insights/general-industries/wearable-devices-are-changing-workplace-safety/

Building / Equipment IoT

Are building sensors game changers?

HBJ PHOTO | STEVE LASCHEVER

Gordon Hui, a vice president at Hartford Steam Boiler, says sensor technology could change the insurance industry's focus from paying claims to predicting and preventing loss

2020 article: *Further, he thinks the ability to prevent accidents that lead to property damage could turn the insurance industry on its head within the next five or so years.*

"It's going to be about predicting and preventing loss, and not just about paying out for losses," *Hui said. "I think that is going to be a huge sea change for the industry."*

https://www.hartfordbusiness.com/article/ct-companies-see-sensors-as-game-changing-technology/

Sensors have been around for awhile…

In 1830, Andrew Ure a Scotsman, invented what today we refer to as a thermostat with a view to keeping steam boilers warm.

A few decades later, in 1880, a Professor from Wisconsin named Warren Johnson became truly obsessed with regulating the temperature of the classrooms in which he taught. **His obsession led him to create the electrical thermostat, a device to control the room temperature inside buildings.**

Other "Sensors"

Fire sprinkler head

Smoke

Motion

HSB Building / Equipment Monitoring

- Sensor Solutions by HSB available for EMC schools
- Monitoring for Water, Spoilage, Freeze, & Mold

Beta Phase

24 months	54 locations

33 spoilage events prevented 2 HVAC & chiller issues detected 3 water damage events prevented	~$165,000 + ~$25,000 + ~$50,000

Remote Monitoring & Reporting	Predictive Maintenance	Disruption Prevention

School's annual cost is less than 1 property deductible: $692 first year, then $612/year

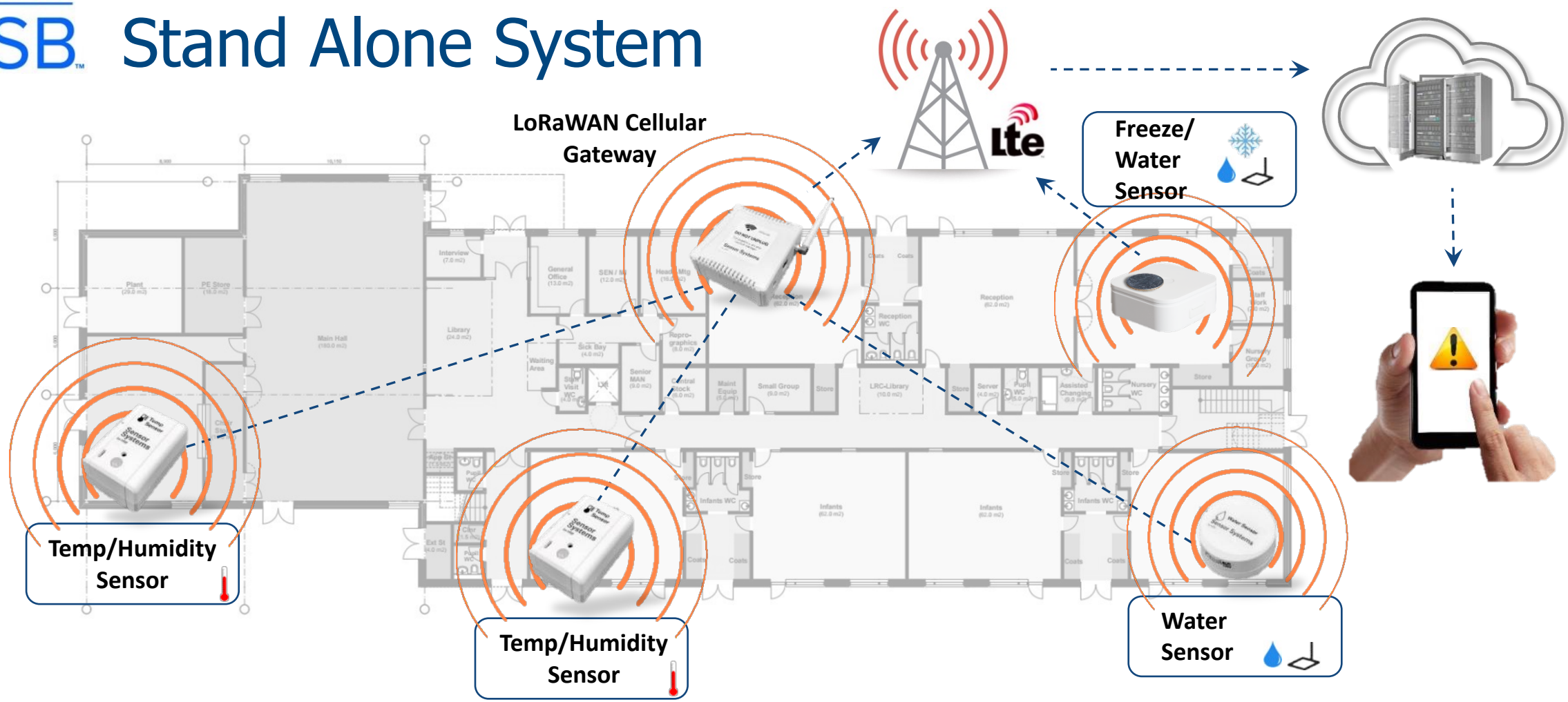
HSB Building / Equipment Monitoring

Sensor Solutions by HSB

Freeze Prevention Kit

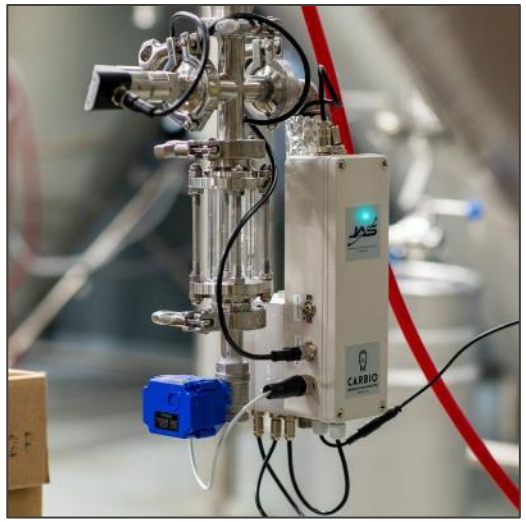
Policyholder's annual cost is less than 1 property deductible:
$192 per year

Stand Alone System

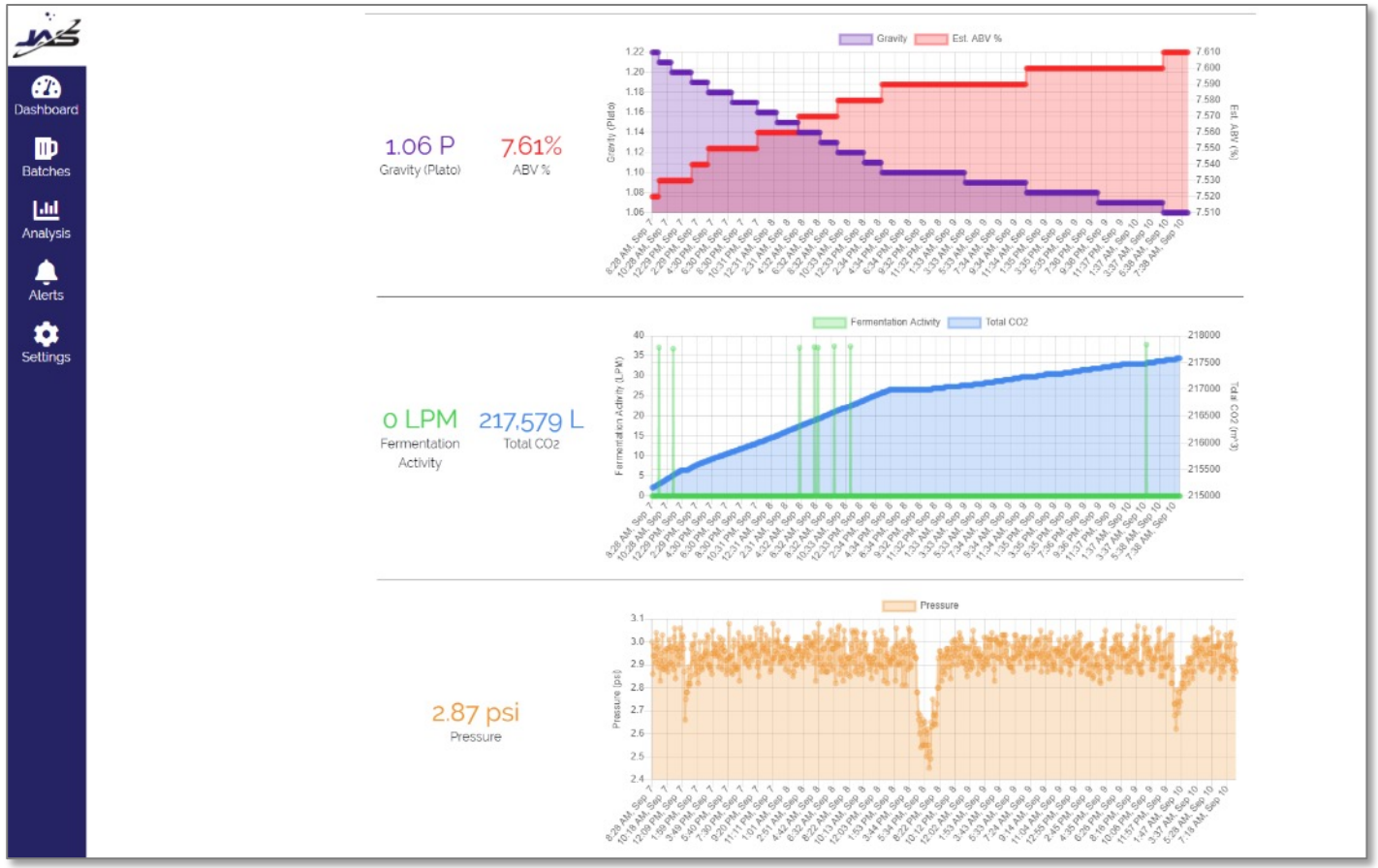


Brewery Sensor Solutions

- CO_2 sensor for fermentation
- pH sensor for sour beer
- Pressure & temp carbonation
- Temp/humidity refrigeration
- Ambient CO_2 for worker safety
- Water leak or intrusion



Mission Control – Data & Alerts



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Computer Vision / AI

LEVEL UP

Advanced Driver Assist

14.9% Discount

Pedestrian & Cyclist Collision Warning

Speed Limit Indicator

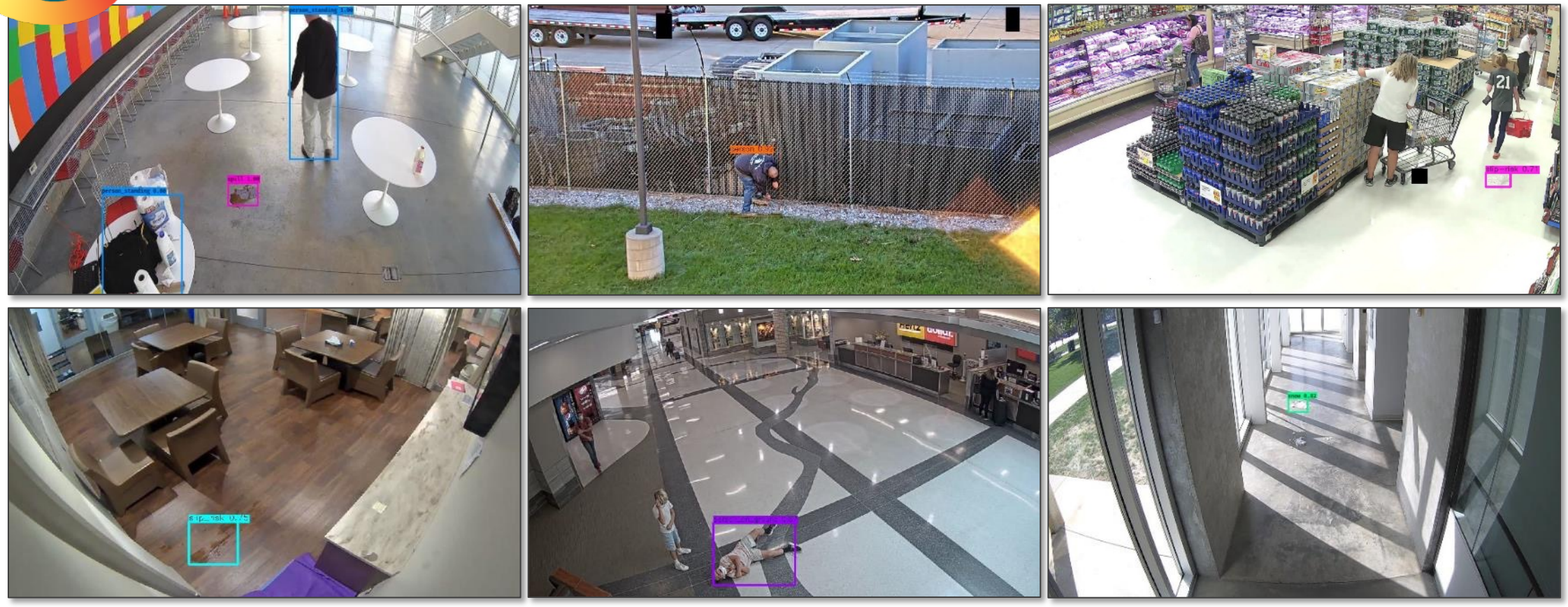
Lane Departure Warning

Forward Collision Warning

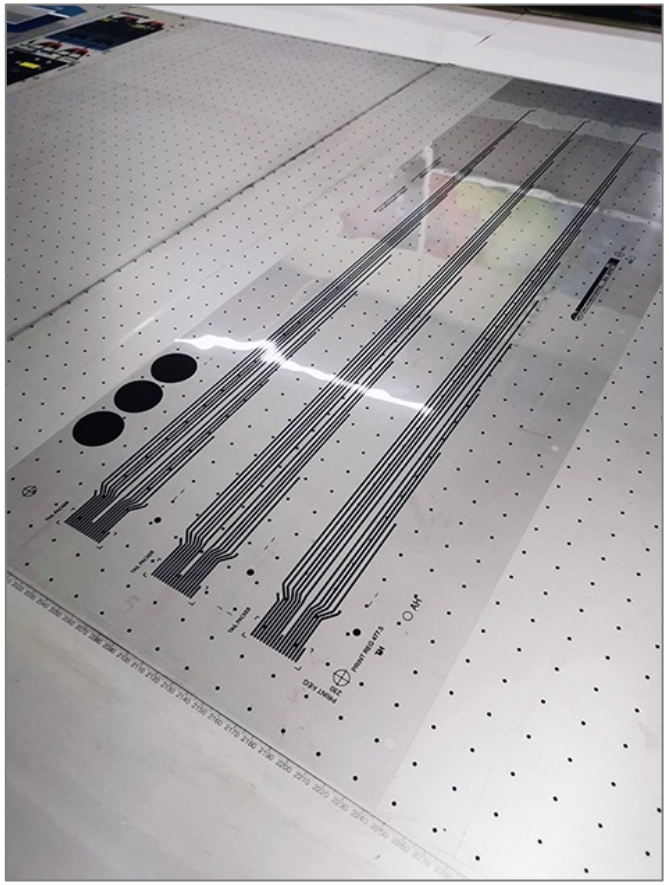
Headway Monitoring & Warning

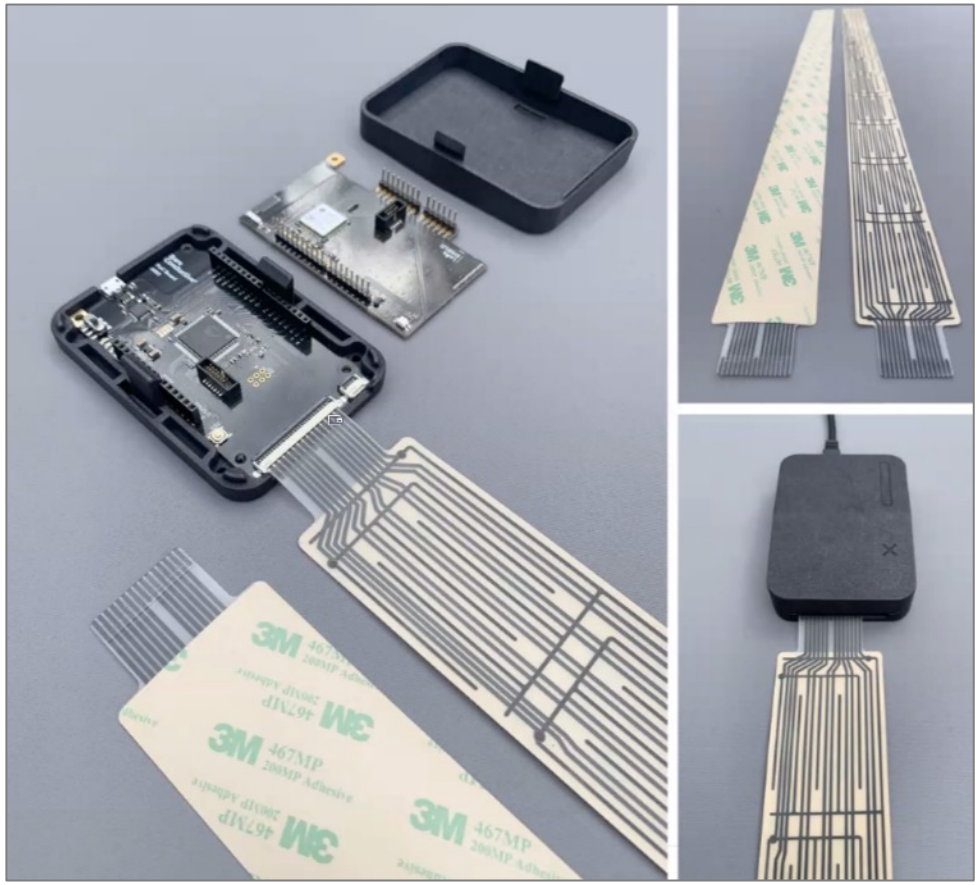
IntelliSee
Smarter surveillance for a safer world

Machine Vision on Video

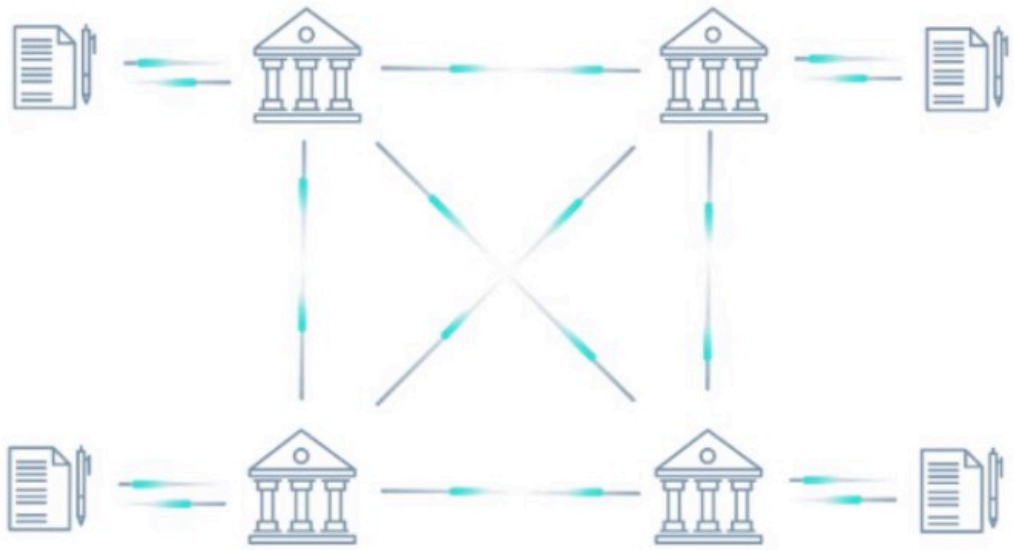


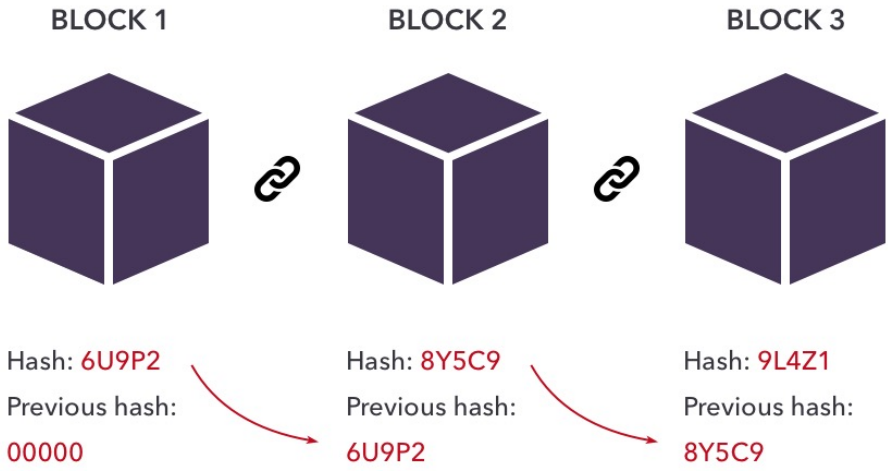
Prototype Water Sensors





The Institutes RiskStream Collaborative

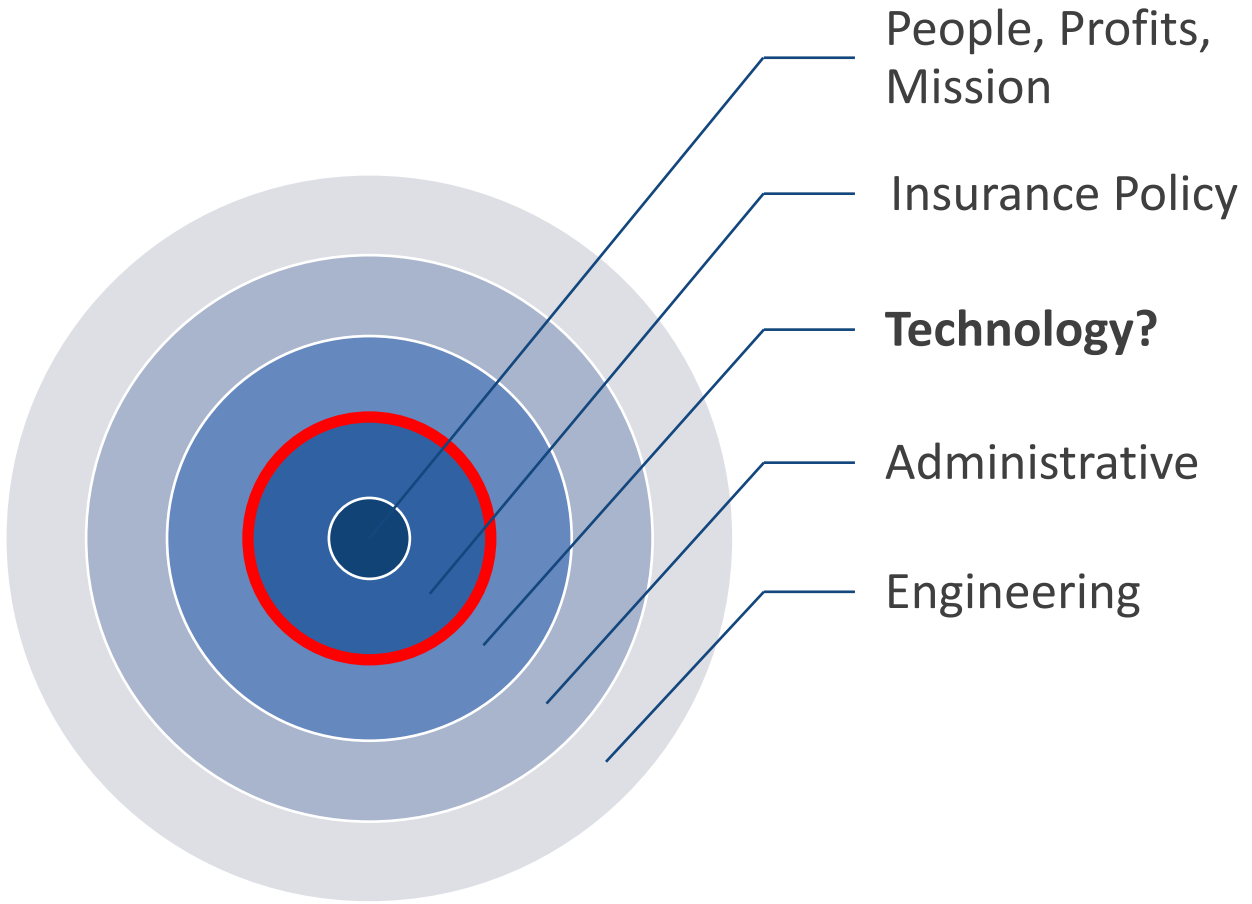




- Certificates of Insurance
- Surety Bonds – Power of Attorney
- Work Comp – Data Source Sharing
- Reinsurance Bordereaux Reporting

Key Takeaways

- Technology can accelerate business by assisting in risk management – **start with the problem**
- Insurers and brokers will continue to test and learn
- Solutions get better every day



Intersection of Safety & Technology

Questions?