



# Technology in Risk and Safety

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M-L2

Monday 2/26/2024 1-2 PM

26th California Unified Program  
Annual Training Conference  
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# Poll #1 How do you see yourself?



- Innovator
- Early Adopter
- Early Majority
- Late Majority
- Laggard
- Luddite\*



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# Poll #1 Results



- % Innovator**
- % Early Adopter**
- % Early Majority**
- % Late Majority**
- % Laggard**
- % Luddite\***

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# Early Risk & Safety Technology



- 2.6- 1.6 million years ago, Stone tools
- 80,000-40,000 years ago, Stone cutting blades
- 17,000-11,000 years ago, Bone microblades
- 12,000 years ago, Jade axes, chisels



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# Ages of Metal Use

- 9000 BC Native copper
- 5000 - 3000 BC melting & shaping copper
- 2500 BC gold and silver
- 2000 BC Bronze
- 1500 BC Wrought Iron
- 600 BC Cast Iron
- 200-300 AD Mercury amalgam
- 1600's Sand casting
- 1709 Cast iron made with coke
- 1740 Cast steel
- 1838 Electroplating of Copper
- 1884 Refining of Aluminum

# Safety Technology & PPE



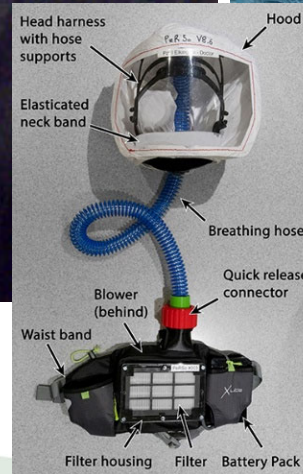
- **War**
  - Body armor, boots and gloves focused on physical injury
- **Pestilence**
  - Plague doctors wore protective uniforms consisting of a full-length gown, helmet, glass eye coverings, gloves and boots with a beak-like mask was filled with pleasant-smelling flowers, herbs and spices
  - Cloth facemasks in the 1910–11 Manchurian pneumonic plague outbreak
- **Work**
  - Bee keeping, Fire fighting, Hospitals, Labs and more

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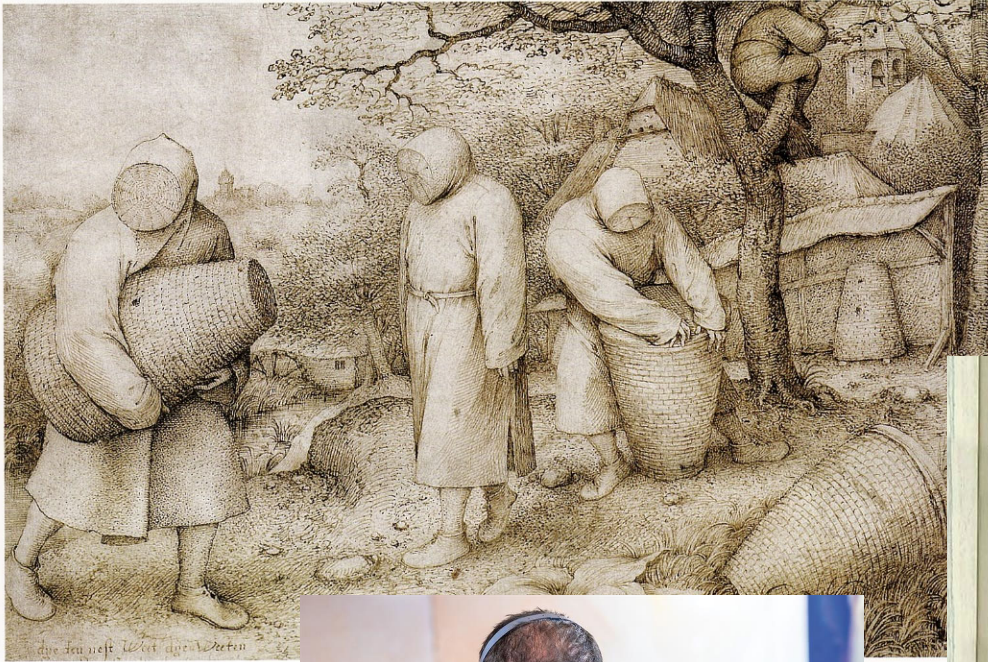
# Pestilence - PPE



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# Work – PPE +



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# Extreme Risks...



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# Poll #2

**Please complete the poll with one or two words**

**Fill in the Blank:**

**When you think of 'Safety & Risk technology, what comes to mind**

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***Create word cloud***

# Poll #2 Word Cloud



## *Discussion*



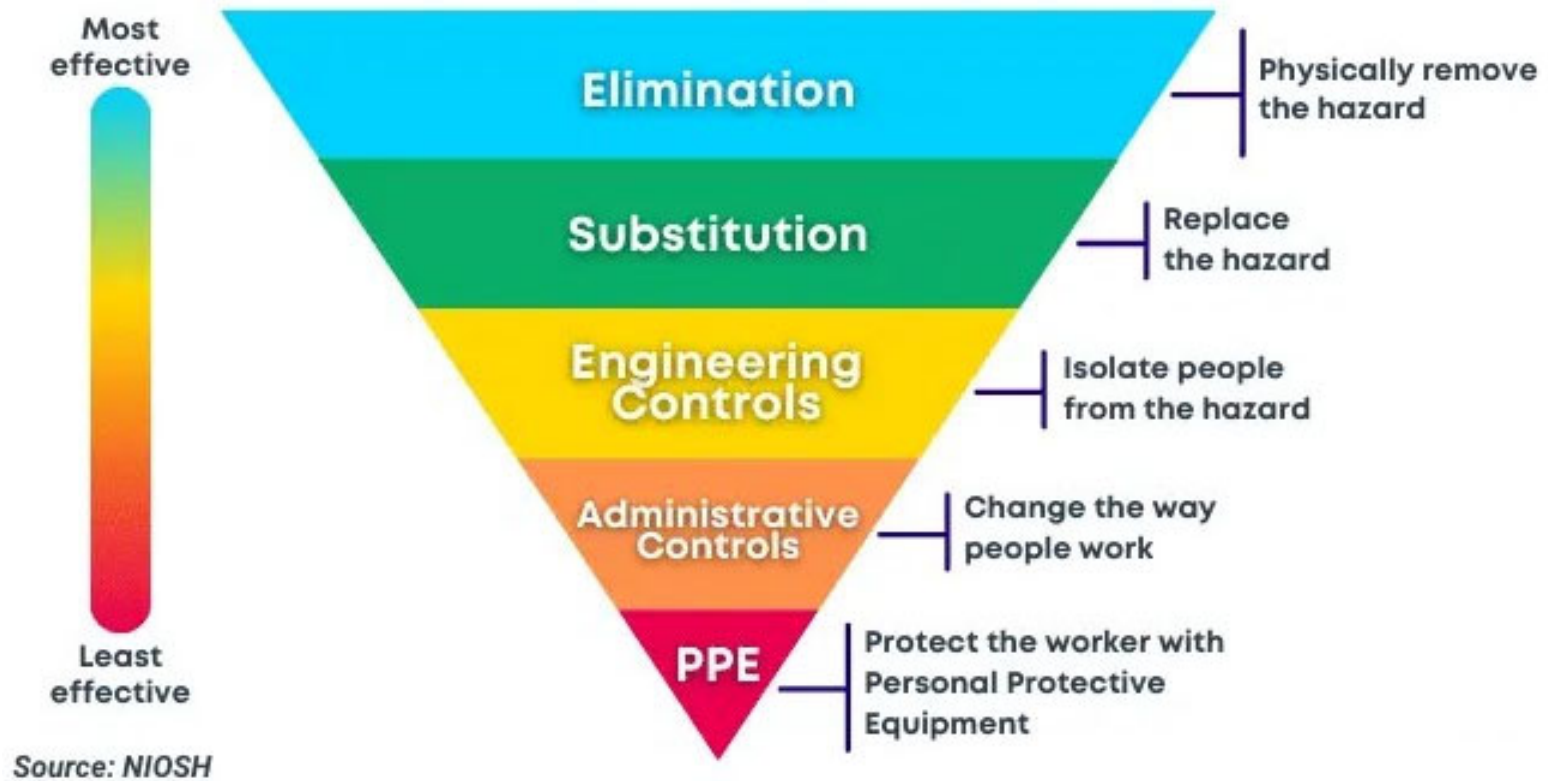
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# Hierarchy of Controls

- History
  - prior to 1940 – trial & error “fly-fix-fly”
  - National Safety Council – Explored fatal accident causes
  - In 1950 NSC introduced the Hierarchy of controls:
  - 2018 NFPA 70E

# Hierarchy of Controls



<https://www.cdc.gov/niosh/topics/hierarchy/default.html>

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# Exiting Technology

- Flame Resistant & Chemical Protective lab coats
- Additive Manufacture (3d printing)
- VR, AR, Computer Learning, sensors, wearables
- AI, generative AI, ChatGPT



# Risk and Safety Tech Uses

- PPE upgrades
  - Admin controls (smart glasses, audio devices, fit bits, smart watches and other wearables)
  - Engineering controls (glove boxes, fume hood, etc.)
  - Substitution (EPA safer choices(<https://www.epa.gov/saferchoice/safer-ingredients>))
- (Health care PPE improvements video (<https://www.youtube.com/watch?v=-Ui-wXeNbE&t=54s>))



# Smart Glasses Types

- **Head Up Display** – *Assisted Reality*: maps, calendar reminders, etc.
- **Camera**: live streaming, video conferencing
- **Audio**: no display – like ear buds with AI
- **Mixed Reality** – *Augmented Reality* : plug in cable to phone – layered images relative to your environment
- **Fitness/Sports**: tracks your vitals and performance
- **Open Source**: teach you how to use & code
- **Productivity**: use as a workstation – replacement for monitors
- **Sensor**: captures video, audio, physiological information like eye movement

<https://youtu.be/DimjjO9pZ1Y?feature=shared>

# Sensors

- Vision
- Accelerometer
- Gyroscope
- Time of Flight
- Currents
- Microphone
- Thermal
- Gas



[https://www.st.com/content/st\\_com/en/search.html#q=sensors-t=products-page=1](https://www.st.com/content/st_com/en/search.html#q=sensors-t=products-page=1)



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# Poll #3

**Please complete the poll with one or two words**

**Fill in the Blank:**

**Considering the available sensors, what use can you imagine**

***Create word cloud***

# Poll #3 Word Cloud



## *Discussion*



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# Risk & Safety Tech Uses

## Vision Sensors

- Traffic signs, food contaminants, handwriting, disease identification, plant recognition, digital readers, counting people, face recognition, occupancy, fire detection, food

<https://stm32ai.st.com/use-cases/sensors-vision/>



# STMicroelectronics AI uses

- Accelerometer - <https://stm32ai.st.com/use-cases/sensors-accelerometer/>
- Gyroscope - <https://stm32ai.st.com/use-cases/sensors-gyroscope/>
- Time of Flight - <https://stm32ai.st.com/use-cases/sensors-time-of-flight/>
- eCurrents - <https://stm32ai.st.com/use-cases/sensors-current-sensor/>
- Microphone - <https://stm32ai.st.com/use-cases/sensors-microphone/>
- Thermal - <https://stm32ai.st.com/use-cases/sensors-thermal-sensor/>
- Gas - <https://stm32ai.st.com/use-cases/sensors-gas-sensor/>

# Data Acquisition, Interpretation & Management

- Healthcare - <https://riskandsafety.com/solutions/healthcare>
- Higher Education - <https://riskandsafety.com/solutions/academia>
- Industry & Government -  
<https://riskandsafety.com/solutions/industry>
- Infection Prevention Control -  
<https://riskandsafety.com/solutions/infection-prevention>

# Types of Solutions



- Inspections
- Injury and Illness Reporting
- Computer Ergonomics
- Hazard/Risk Assessments
- Radioactive Material Use
- Lockout/Tagout
- Patient Rounding
- Chemical Inventory Management
- SDS Management
- Hazardous Waste Disposal and Tracking
- Drones (UAS)
- Safe Patient Handling
- Workplace Violence Prevention
- Biological Use Authorizations
- Field Safety Plans
- Industrial Hygiene Monitoring
- Pesticide Application Plans
- Standard Operating Procedures
- Respirator Medical Evaluation
- Dashboards and Reporting



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**RISK & SAFETY**  
SOLUTIONS



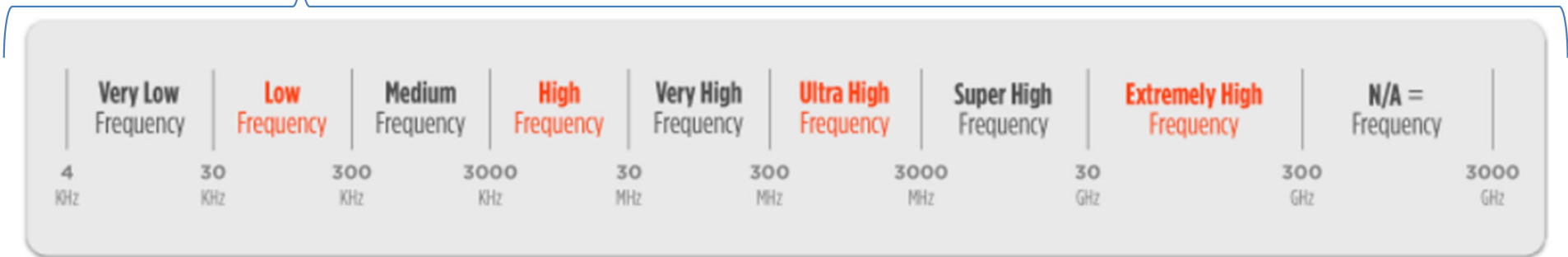


# IoT Communication



Electromagnetic Spectrum

<https://www.youtube.com/@atlasrfidstore>



**LF**  
10 cm

**HF**  
30 cm

**UHF**  
Active:  
30 – 100+ m  
Passive  
Near contact to 25 m

Read Range

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# IoT Safety Applications



Technology	Risk and Safety Uses
Radio Frequency Identification (RFID)	Proximity and warning devices; Collision avoidance; Real-time locating system; Possible warning system; Asset management
Ultra-Wideband (UWB)	Real-time locating system; Virtual fences for dangerous zones; Warning system; Crane operator support
Geographic Information System (GIS)	Construction Safety; Environmental impacts planning; Hazard location mapping; SPCC plans
Global Positioning Satellite (GPS)	Vehicle Tracking; Collision avoidance; Warning system; Proximity data between workers, equipment and hazardous areas
Bluetooth 	Short range (30 m) UHF Radio for data transfers, Communication
WiFi 	Communication, data transfer



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# Near Future Uses



- RFID sensors deliver item/hazard location with RFID tags to augmented reality glasses
- Assisted Reality Glasses display hazard maps
- Speakers providing proximity awareness for very quiet vehicles and equipment
- Identification of emergency evacuees



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# Safety & Compliance Intelligent Software



Booth #26

| [RiskandSafety.com](http://RiskandSafety.com)



Risk Assessments



Inspections & Audits



Injury & Illness Reporting



Chemical Inventory Management



Computer Ergonomics



Respirator Fit



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# HEADSHOTS



Swing by booth #26 and let Risk and Safety Solutions snap your perfect headshot!

Available during the Welcome Reception and all day on Tuesday, February 27th

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# Any Questions?

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<https://riskandsafety.com>

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