The Life Saving Force

. . . for a safer Singapore

FSM Seminar 2024 -
The Internet of Things Roadmap

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SCOPE

1. What is the Internet of Things (IoT)?

2. IoT Applications in Fire Safety Management

- Common Smart Sensors and Devices
- Other Smart Sensors and Devices Being Trialed
- IoT Ecosystem

3. Case Study

- Case Study 1 – SCDF HQ Building
- Case Study 2 - Commercial Building (Events and Exhibitions)
- Case Study 3 - Industrial Building (Critical Infrastructure and Protected Installations)

4. Challenges and Considerations

5. IoT RoadMap

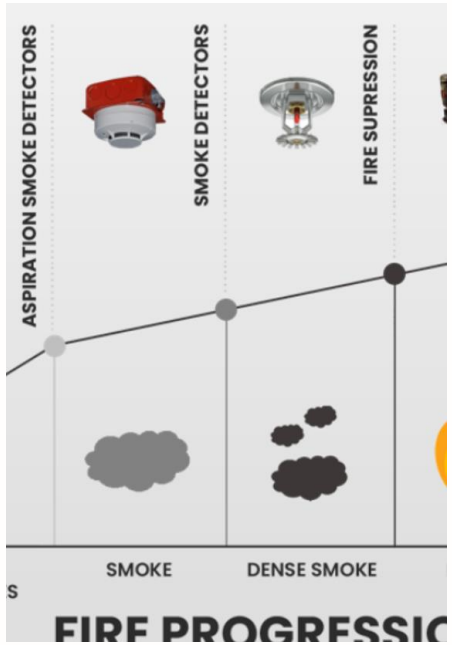
- Background
- IoT Roadmap for Fire Safety

WHAT IS THE INTERNET OF THINGS (IOT)?

RELIABILITY
TEMPERATURE PREVENTION CONNECTIVITY
EFFICIENCY CONTROL EXTINGUISHER ANALYTICS
VIDEO SCALABILITY
STANDARD HEAT EXIT MONITORING FIRE LOCATION
GATEWAY RISK MESH INTERNET COST DATA EMERGENCY
MANAGEMENT SAFETY PREDICTIVE MOBILE
HUMIDITY LIGHT BACNET SENSOR IOT MODBUS SMOKE
APPLICATION SYSTEM CLOUD
ENERGY DETECTION IOT REMOTE SIGN GAS
DEVICE IMAGE
FLAME ALERT MAINTENANCE BLUETOOTH PROTOCOL
NETWORK INTEGRATION INFRASTRUCTURE
NOTIFICATION RESPONSE AUTOMATION
PRESSURE EVACUATION DASHBOARD
MAINTENANCE

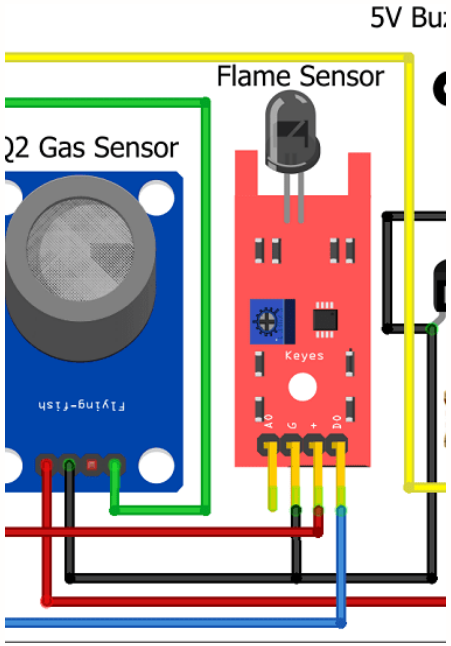
IOT APPLICATIONS IN FIRE SAFETY MANAGEMENT

COMMON SMART SENSORS AND DEVICES



Smoke Detectors

Heat Sensors



Gas Detectors

Sprinkler Systems

Occupancy Sensors

OTHER SMART SENSORS AND DEVICES INSTALLED

Fire Extinguisher

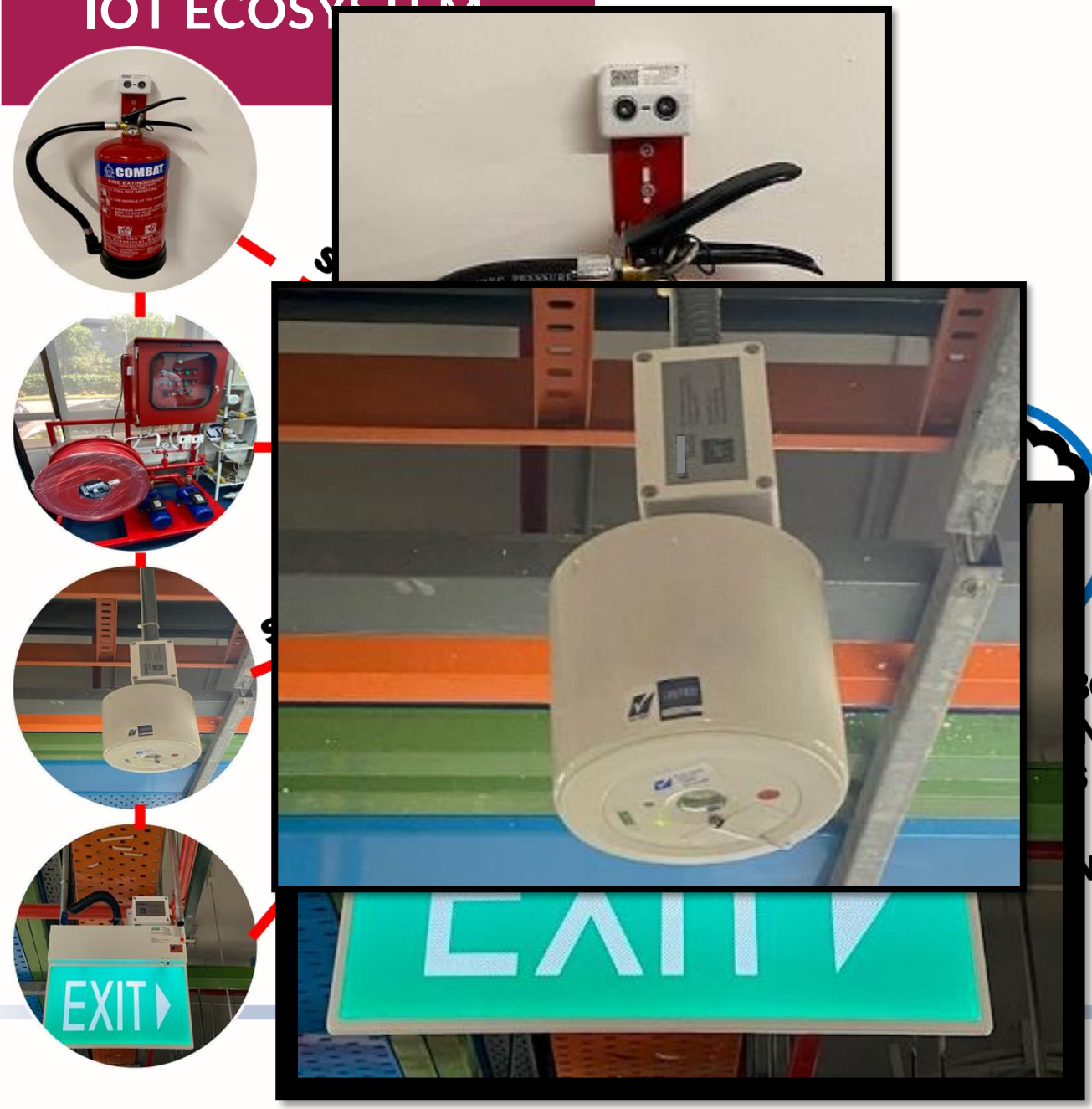
Exit Sign

Emergency Light

Fire Pump System

Fully Integrated Cloud-Based IoT Fire Safety System

IOT ECOSYSTEM



“THE KEY TO FIRE SAFETY IS PREVENTION, AND IOT IS THE TOOL THAT CAN MAKE IT A REALITY.”

CASE STUDY 1 – SCDF HQ BUILDING

Leading digital transformation efforts and foster a workforce that is both digitally prepared and innovation-oriented.

CASE STUDY 2 - COMMERCIAL BUILDING (EVENTS AND EXIBITIONS)

In the commercial space, several buildings have conducted trials to study how IoT sensor technology helps with achieving operational efficiency for their facilities management team.

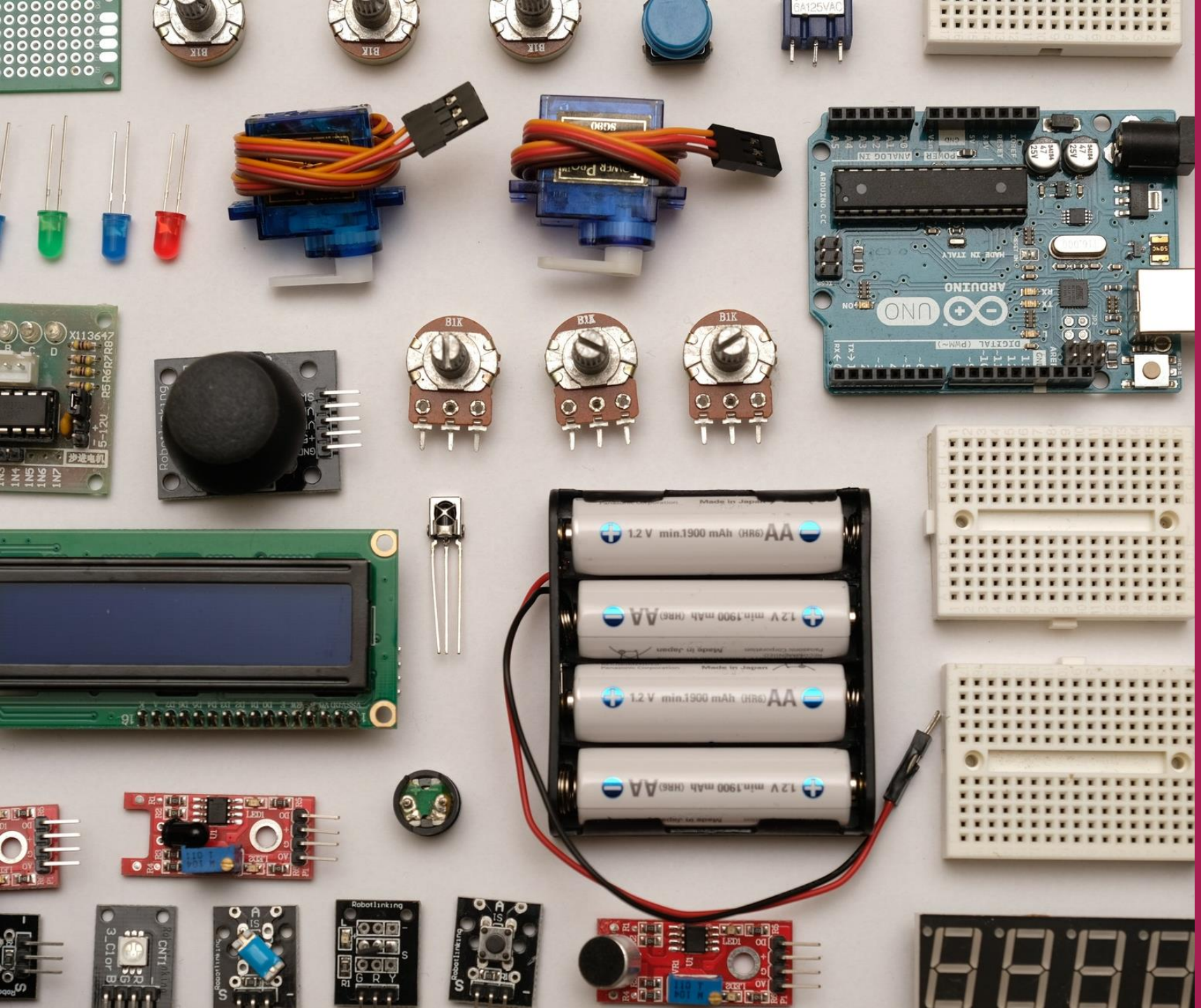
CASE STUDY 3 - INDUSTRIAL BUILDING (CRITICAL INFRASTRUCTURE AND PROTECTED INSTALLATIONS)

A number of industrial buildings are leveraging IoT sensors as enablers to enhance fire safety management by providing real-time monitoring of fire protection equipment, early detection of fire hazards, and automated responses.

CHALLENGES AND CONSIDERATIONS

- Data Security and Privacy Concerns
- Integration Challenges
- Interoperability Issues
- Cost Considerations
- Regulatory Compliance

DATA SECURITY AND PRIVACY CONCERNS



INTEGRATION CHALLENGES

- Technological Solutions
- Data Integration and Management
- Security and Compliance

INTEROPERABILITY ISSUES

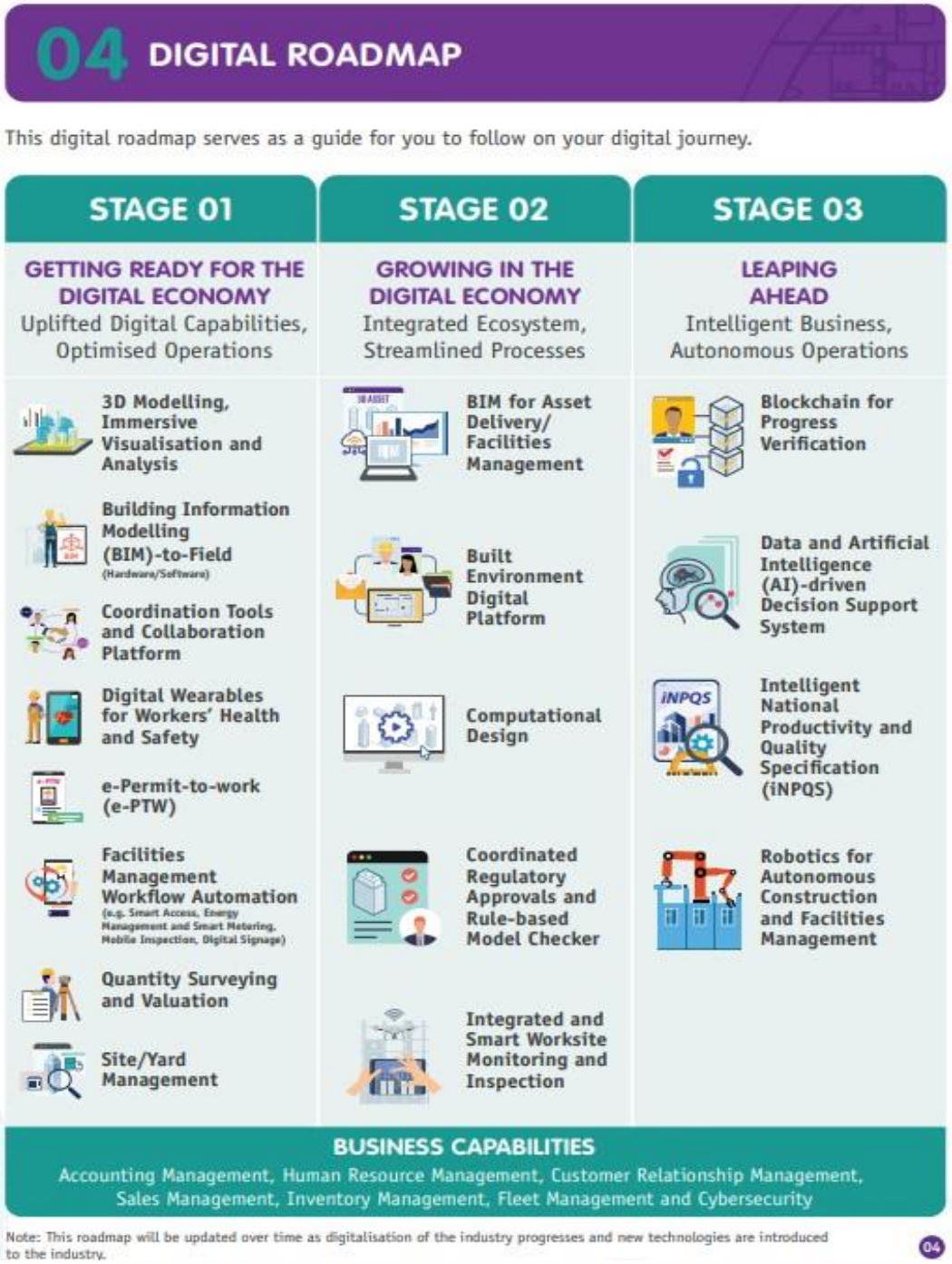
- Standardization and Interoperability
- Middleware Solutions
- Security and Privacy

COST CONSIDERATIONS

- Government Grants and Subsidies
  1. Productivity Solutions Grant (PSG) for the Built Environment by IMDA and ESG
  2. SMEs Go Digital programme by IMDA
- Incentivising Fire Certification Renewal (In progress)

REGULATORY COMPLIANCE

IOT ROADMAP



INDUSTRY TRANSFORMATION MAP

The Construction and Facilities Management Sector is crucial to Singapore's economy, creating safe, sustainable, and modern environments for living, working, and leisure, thereby enhancing the quality of life for Singaporeans

Source: Construction Industry Transformation Map (ITM)

Infocomm Development Media Authority, Building and Construction Authority (BCA), Singapore Department of Statistics 2018

IOT ROADMAP FOR FIRE PROTECTION / SAFETY MANAGEMENT

Near-Term (1 – 2 years)

- Mostly localised sensing and capture of individual fire safety systems via main fire alarm panel
- Fragmented distribution of critical information and alerts are primitive and localized
- Non-scalable, proprietary IoT solutions (lack of interoperability)

Mid-Term (3 – 5 years)

- Centralised platform that can retrieve sensing and data from fire alarm panel
- Trigger automated alerts to all stakeholders for relevant follow up
- Plug & play scalable IoT solutions requiring little to no hard wiring
- E.g. IoT sensor for FE, exit signs, fire pumps, engineered smoke control system etc.

Long- Term (6 to 8 years)

- Predictive maintenance & Intelligent Trend Analysis
- Performance and portfolio benchmarking and comparison
- Remote inspection for licensing and fire certification

THE DESIRED FUTURE OF IOT IN FIRE SAFETY

Predictive Maintenance of Fire Alarm and Detection Systems
e.g. pump operational health indicating decrease in pump performance

Remote inspections, intelligent data analysis and submission for regulatory certifications
e.g. system linked to SCDF and future inspections can be conducted remotely and certificate applications can be automated.

Enhanced Emergency Response Coordination and Smart Evacuation
e.g. smart exit signs; real-time occupant geo-location etc.

TIMELINE FOR IOT DEVELOPMENT IN FIRE SAFETY

2022

- Amendment of SS578 to include inspection by means of electronic monitoring of fire extinguisher

2023

- Proof-of-concept (PoC) for integration of IoT sensors with fire extinguishers, exit signs and emergency lights
- FSM Seminar: Utilising IoT to complement FSM Duties

2024

- Review of SS563 to include electronic monitoring for emergency lighting and power supply
- FSM Seminar: IoT Roadmap for Fire Safety
- Expand PoC for IoT -based integration to other public buildings

2025 to 2026

- Joint development and PoC with various stakeholders such as SCDF, HTX, HDB and relevant vendors of IoT-based remote monitoring systems for rising mains, engineered smoke control systems with remote activation and real-time status monitoring including non-proprietary, SS 695 compliant cloud platform to aggregate all sensor data

2027

Review of relevant SS (i.e. SS575) to include electronic monitoring for hydrants and rising mains

Thank You