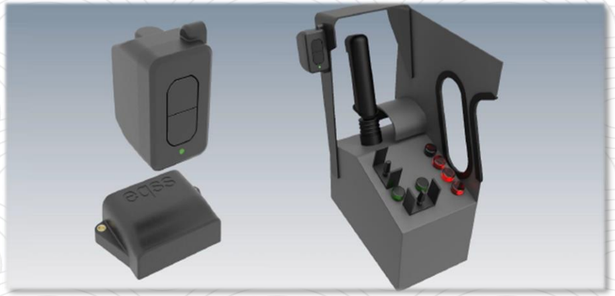
ZHENG KENG

Embracing Smart WSH Technologies & Effective Surveillance System in Construction



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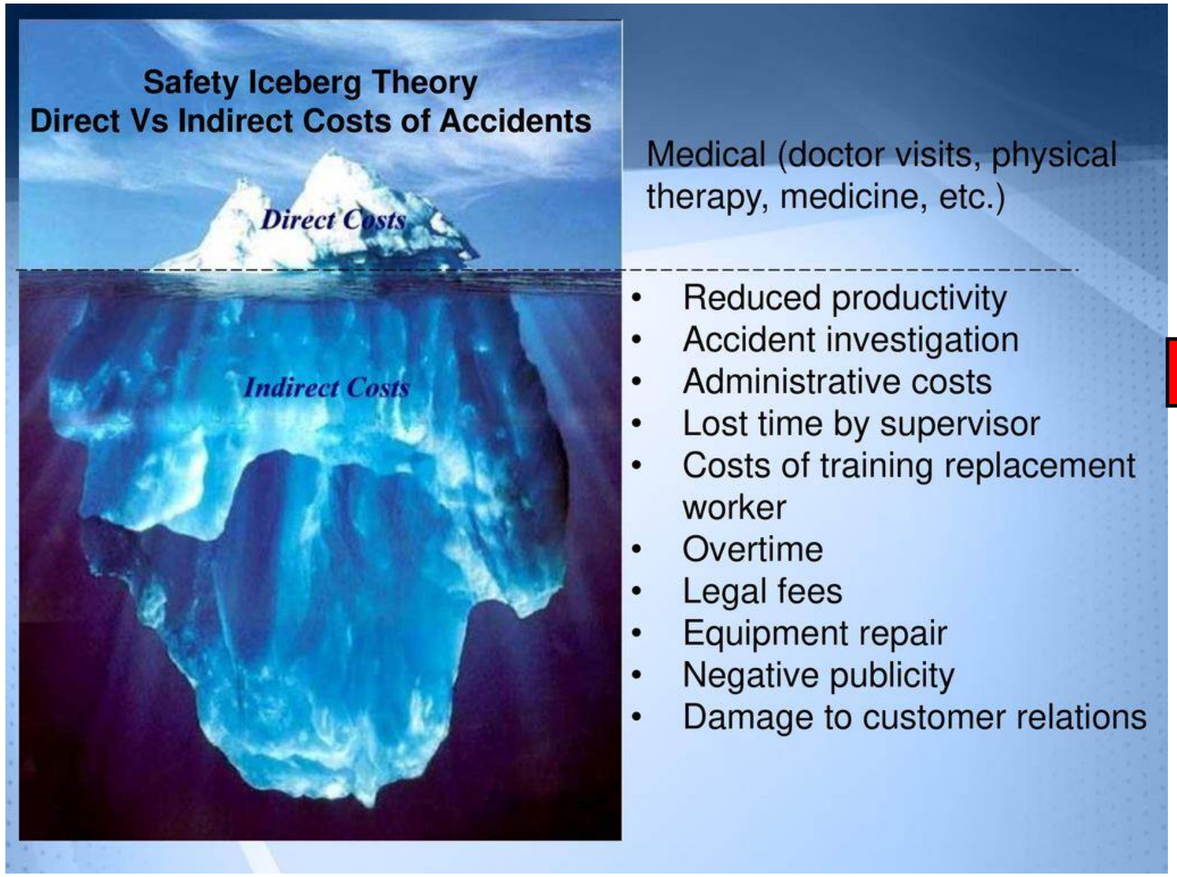
1. Why WSH Technologies?

ACCIDENTS ARE VERY EXPENSIVE!



Why embrace WSH Technologies?

- Enhanced safety controls of various work activities and prevent accident
- Raised WSH standard and capabilities
- Improved productivity and efficiency
- Raised workforce confidence
- Benefits WSH environment by constant sharing, learning and improving

2. Video Surveillance System

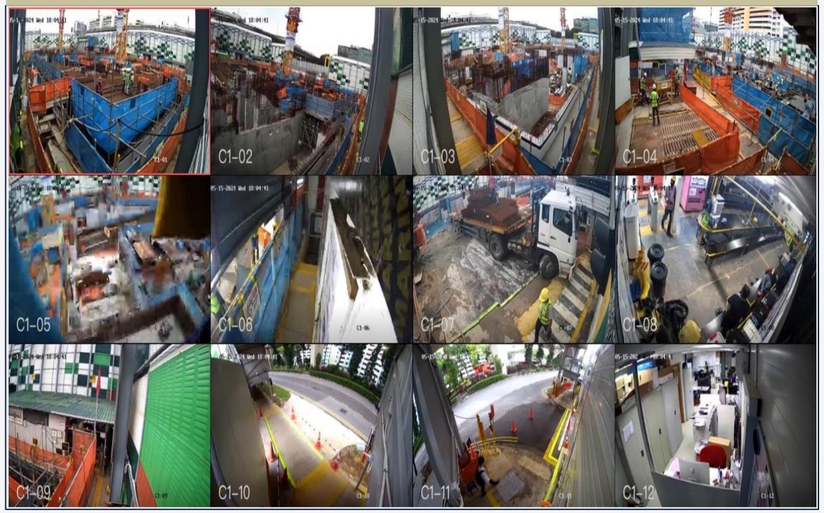
- **Monitor proper and safe execution of works concurrently at the CCTV command center**
- **Real-time monitoring from other locations using mobile phones.**
- **Monitoring of worker's WSH behavior and high risk activities**

Specifications of CCTV

-- Minimum resolution 1920x 1080 Pixel
- Stable and colour accurate
- Image free of noise & interference
- Can take photo under lighting level of 0.1 Lux
- Record up to 30 days
- Record images of 12 frames per sec
- Storage with extra 10% capacity

CCTV Command Center

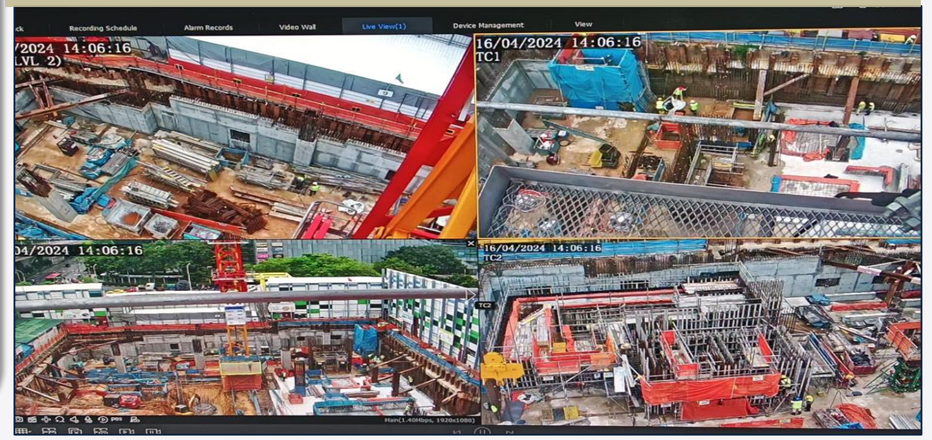
Overall View of all CCTVs



2. Video Analytics in Video Surveillance System

- Using video analytics to detect unsafe act and safety non-compliance
- Detect hazards and WSH / key personnel receive alerts in real time.
- Alerts and reports viewable through mobile devices.

Work Areas Well Covered by CCTVs



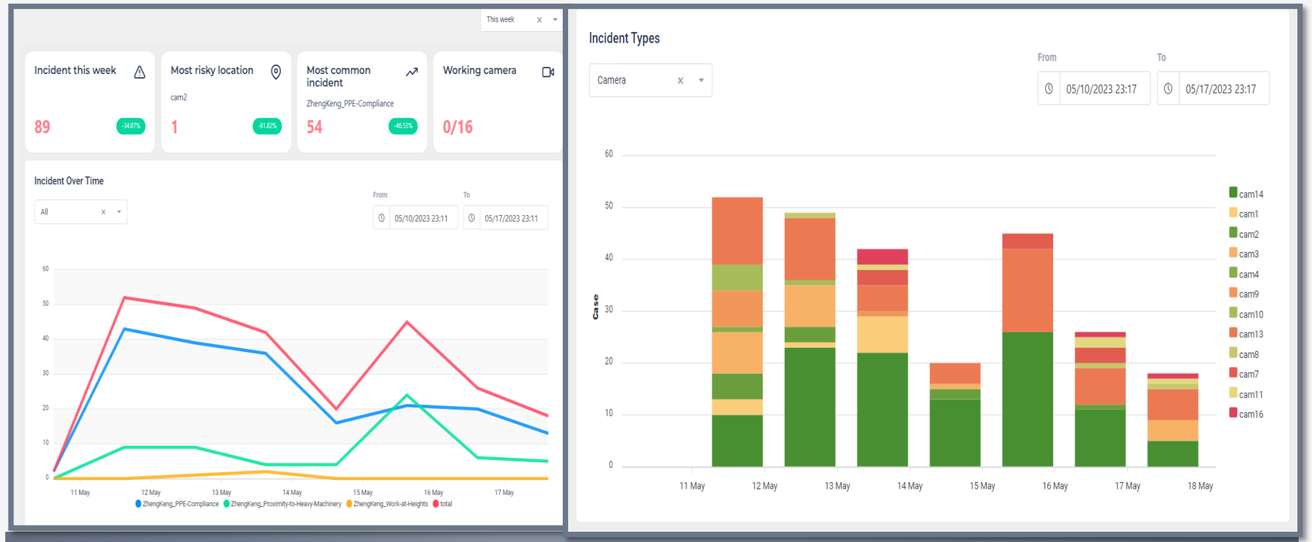
The video analytics are programmed to detect the following hazards through A.I-enabled CCTVs including;

1. Absence of PPEs
2. Close proximity to machineries
3. Entry into intrusion zone (Excavation, vehicle access etc)
4. Missing guardrails

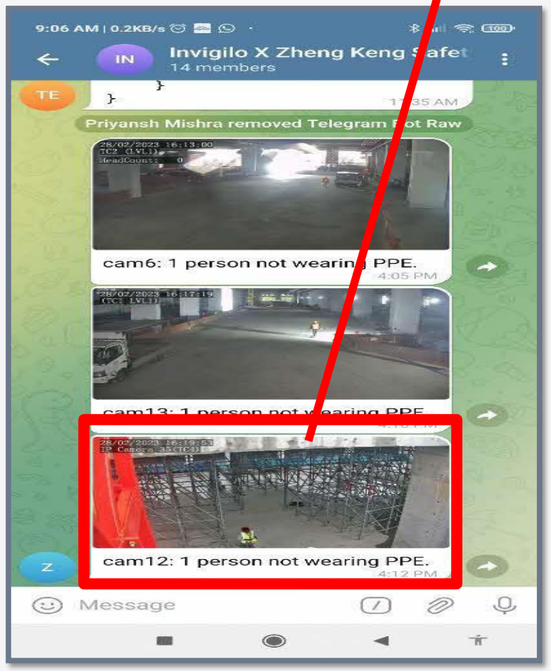
Detection of Hazards through A.I

2. Video Analytics in Video Surveillance System

- Immediate alerts sent to Telegram groupchat allow immediate actions to be taken.
- Improves productivity and efficiency in WSH supervision and intervention
- Incident trends can be generated for further follow up actions



CLOUD DASHBOARDS VIEWABLE THROUGH PC



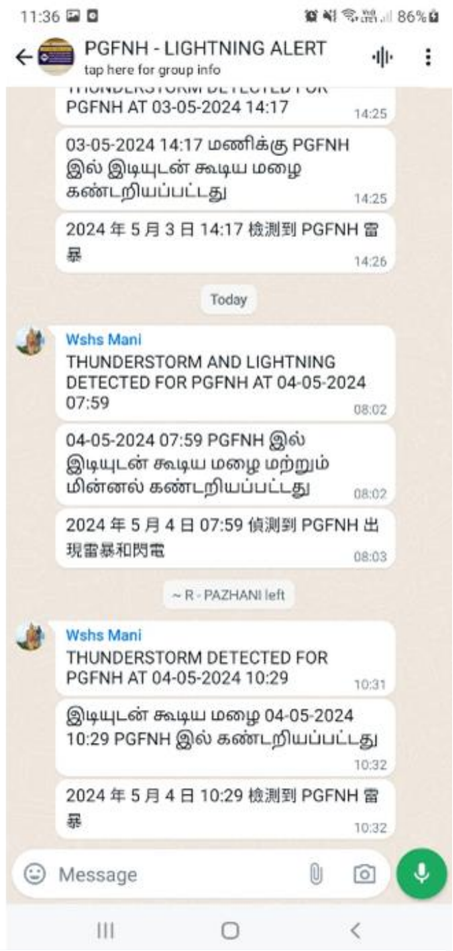
3. Automated Lightning Alert Warning System

- Annually, on average, there are 175 days when lightning is detected
- Reduce human error or manpower in manning manual Lightning Warning System.
- Low cost of in-system maintenance as compared to standalone Localized Probe System.
- Connects with NEA-MSS Lightning Alert - Meteorological Service Singapore, and it can detect lightning within 5km radius.
- Immediate lightning alert SMS send to mobile phone

Control Panel

Lightning Alert with Audio and Visual Warning

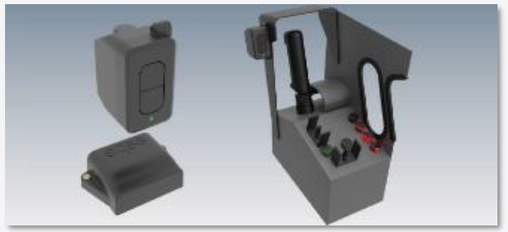
Immediate SMS Alert



Communication of alert through Whatsapp groupchat with sub-contractors

4. EQSS Overwatch on Scissor Lift

- Prevent entrapment risk on scissor lifts
- Usage of Light Detection and Ranging (LiDAR) scanning technology to track operator's movement and positioning.
- The overwatch will cut off the scissors lift operation if the operator is out of the calibrated position.
- High precision sensors to monitor the operator's movements in real time.

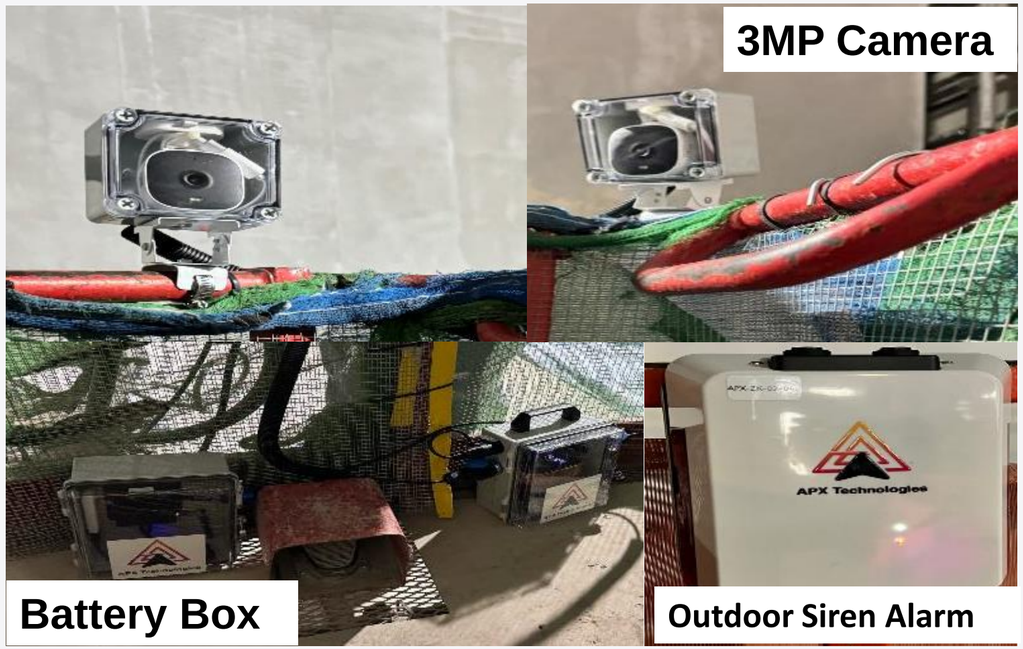


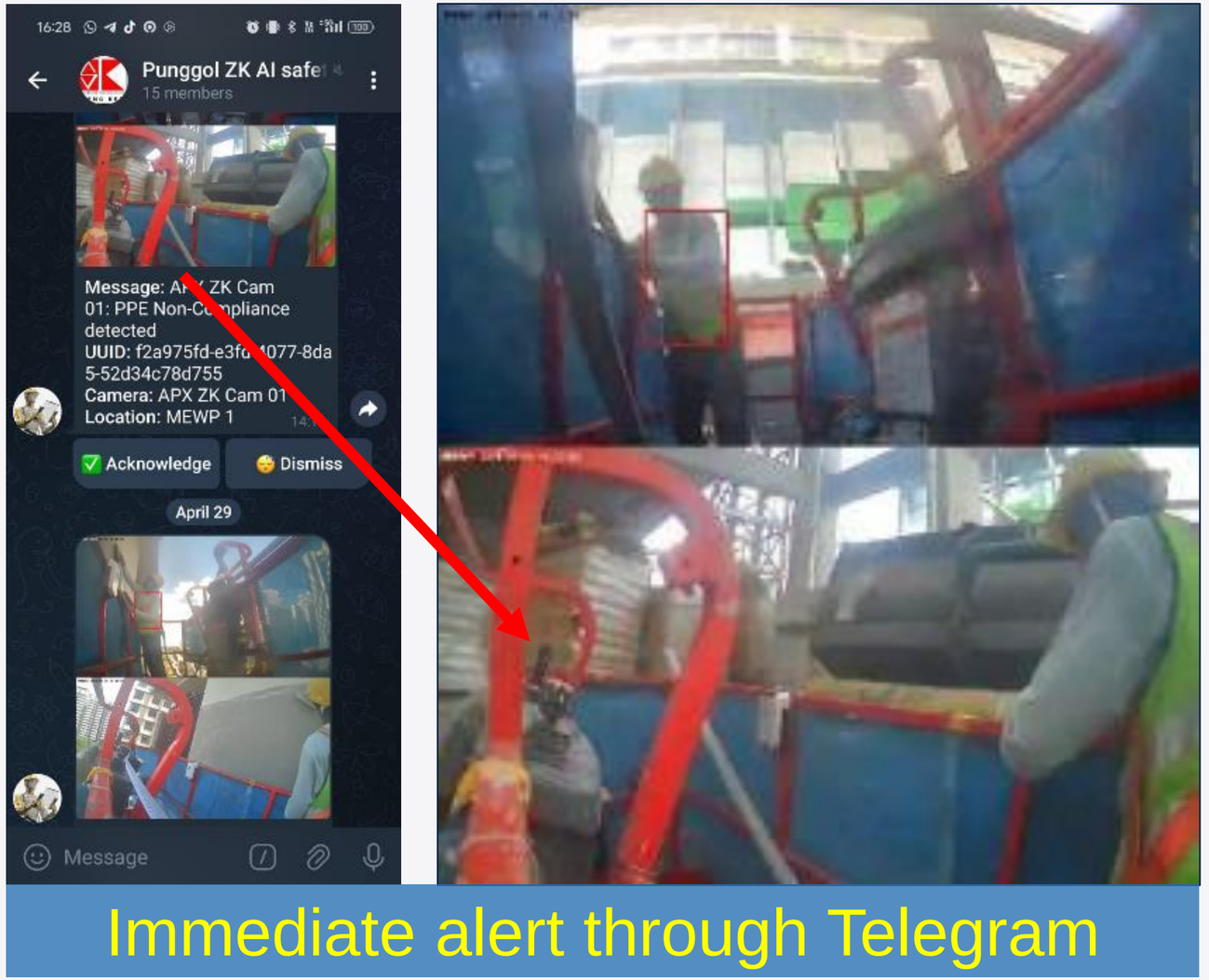
Positions that allows machine function

Positions that does not allow machine function

5. MEWP Safety Surveillance on Boom Lift (VIDSAFE MSS)

- Detect and deter unsafe acts on boom lift through A.I enabled camera for video analytics
- Detection of unsafe behaviours such as failure to anchor safety harness, standing on rail and exiting at height
- Detect overhead structures that can cause entrapment, and gives audio warning
- Send immediate alerts to Telegram





Immediate alert through Telegram

6. Artificial Intelligence Proximity Camera on Telescopic Handlers

- Prevent man-machine interaction , thus prevent traffic accident
- Reduce false alarms by differentiating human and physical object detection.
- Assists the operator to avoid a collision by detecting human in the blind spot areas
- Enhance awareness to operator and workers upon alert trigger
- Alert any humans nearby that is within its proximity through the external visual-audible buzzer

5 Blind spot detection A.I. cameras

In-cabin monitor screen provided for operator

External visual-audible buzzer

In-cabin camera

7. SMART Traffic Light A.I System

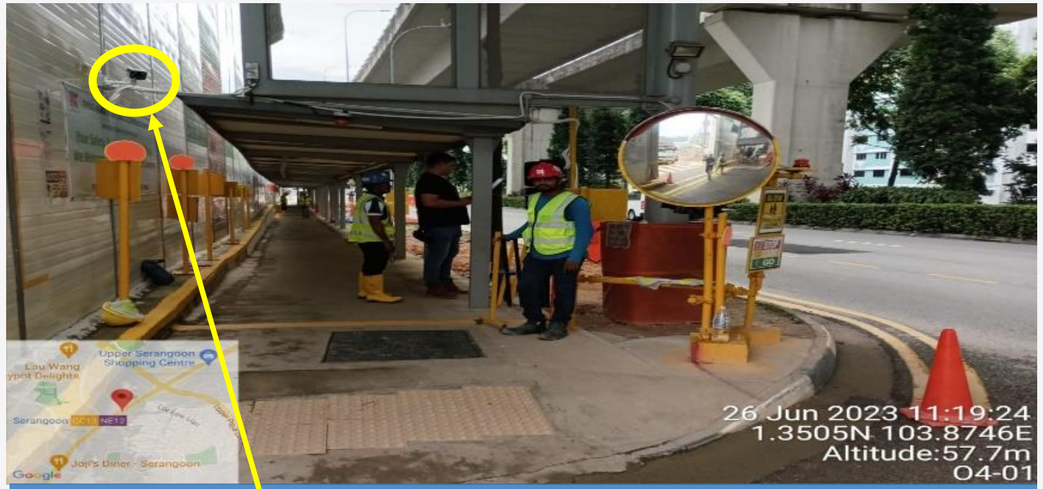
- Enhance traffic control for pedestrian safety at vehicular entrance
- Traffic light system for pedestrian and vehicles

How It Works?

1. Right of way given to pedestrian at all times.
2. Detection of pedestrian by the A.I camera will change the traffic light to **RED**, and warn vehicle exiting the site to **STOP**
3. Verbal warning through an external speaker to the traffic light to warn the pedestrians
4. Once no pedestrian detected , the traffic light will change to “Green” to allow vehicle to exit.

Internal AI Camera to detect vehicle & traffic light

Verbal warning through an external speaker



A.I. Cameras to detect pedestrian along the walkway

8. Challenges and Limitations of Implementation

Challenges and Limitations	How we overcome them?
Cost including setup, implementation, maintenance, monthly recurring cost etc	1. Tapping into grants for WSH Technologies 2. Factoring into WSH Budget 3. Reducing incremental cost by re-using in other projects
Human intervention is still required after implementation of WSH Technologies	1. Lesser manpower required compared to before implementation
Takes time for A.I in video analytics to learn, thus resulting in many false alarm	1. Manual dismissal of false alarm improved accuracy over time

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THANK YOU