



**SCDF**  
The Life Saving Force

# Transforming Fire and Rescue Response Through Innovation

**Eric Yap**

Commissioner

Singapore Civil Defence Force

AFAC18 powered by INTERSCHUTZ - 5 to 8 September 2018

UNCLASSIFIED



# Scope

Singapore's Profile

SCDF Structure and Operational Statistics

Strategic Challenges and Driving Forces

Transformation Vision and Framework

Transforming Fire and Rescue Response

- *Leveraging Technology and Innovation*
- *Robust Fire Safety Regime*
- *Enabled and Empowered Community*



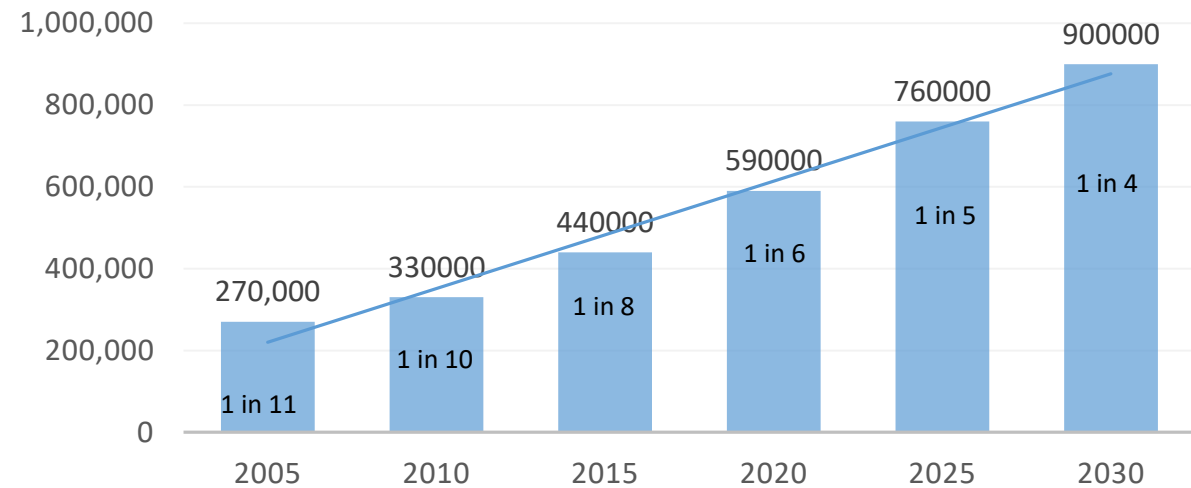
# Singapore's Profile



## Densely Populated

- 719.9 km<sup>2</sup>
- 5.6 million population

## Number of Singaporeans aged 65 and above



Source: Department of Statistics. Projections assume TFR of 1.2 and current immigration rates.

## Ageing Population

- 1 : 8 Today
- 1 : 4 2030



# Singapore's Profile

High Rise Residential Buildings



Land Checkpoints



Singapore Changi Airport



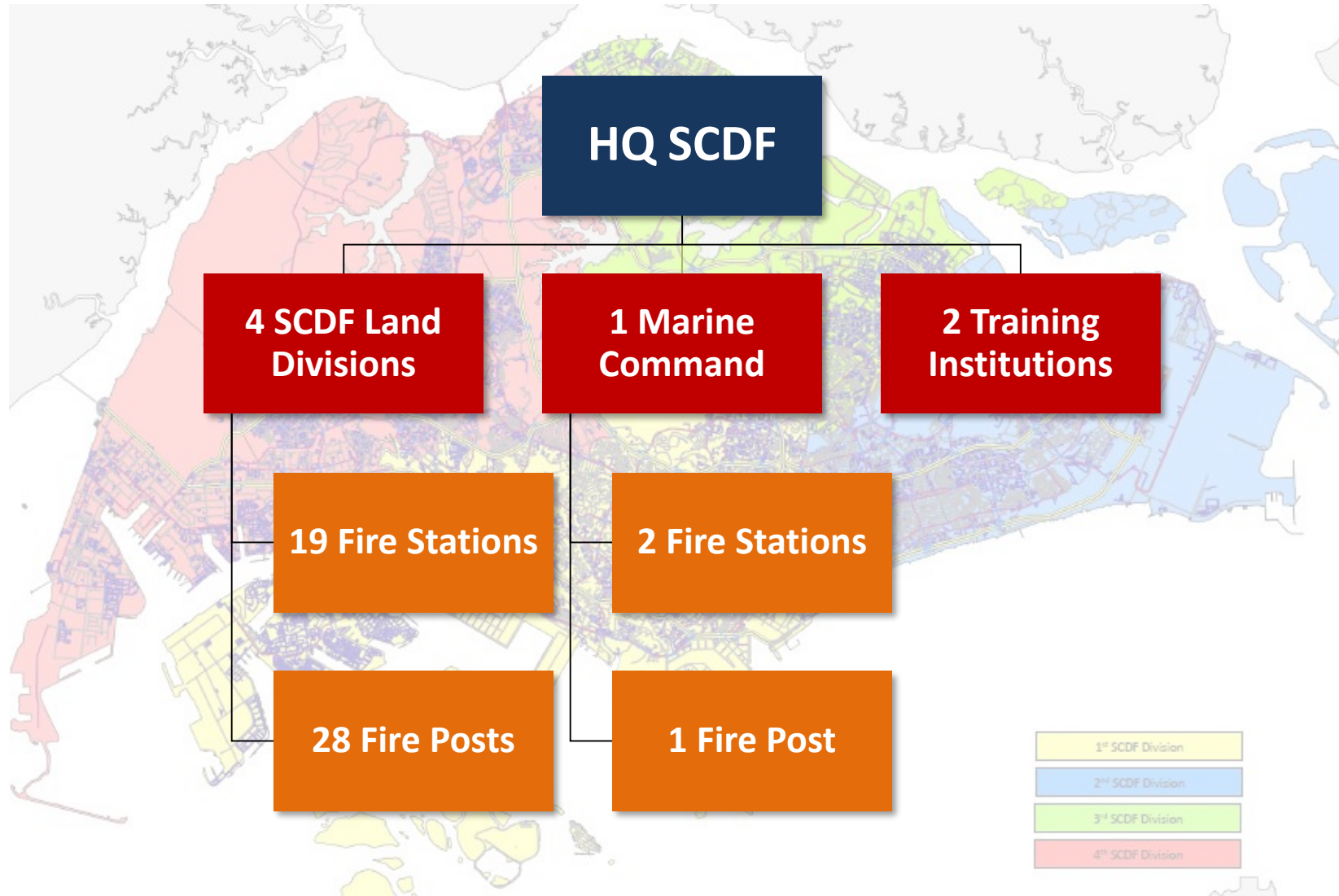
Industrial and Petroleum Industries



Central Business District



# Singapore Civil Defence Force



» **2,500**  
Uniformed Officer

» **280**  
Civilian Staff

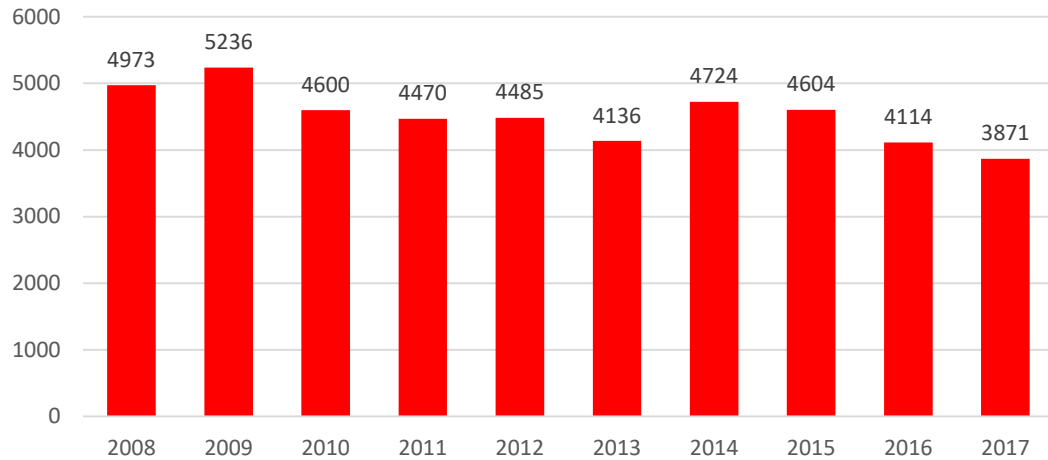
» **3,100**  
NS Full-time

» **16,700**  
Active ORNSmen

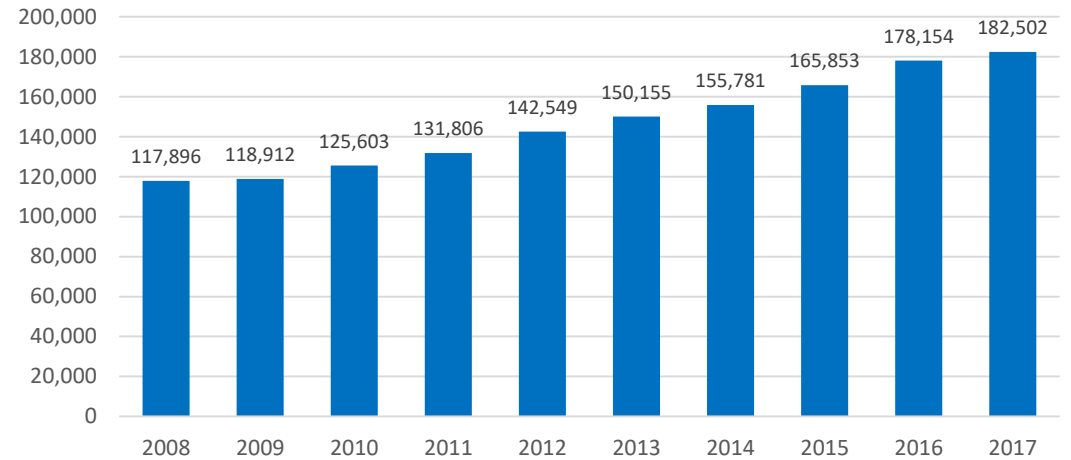


# Operations Statistics

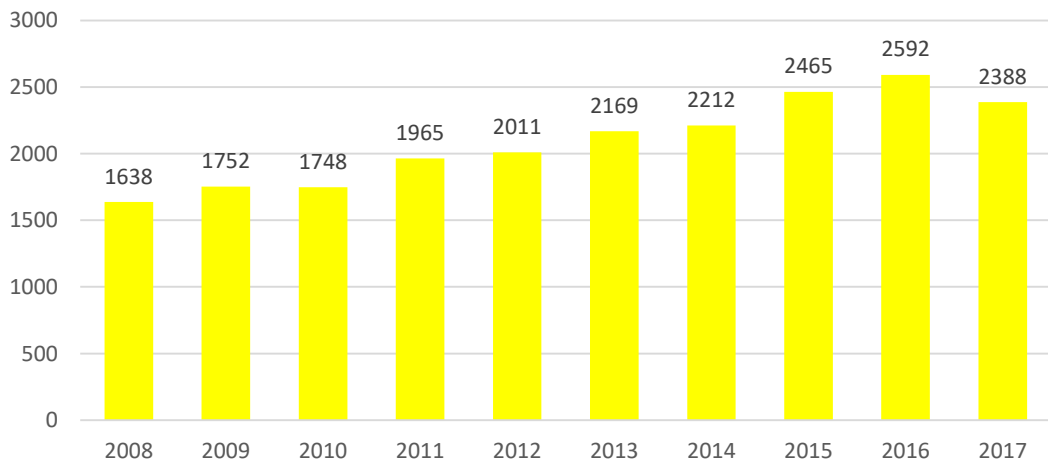
## Fire



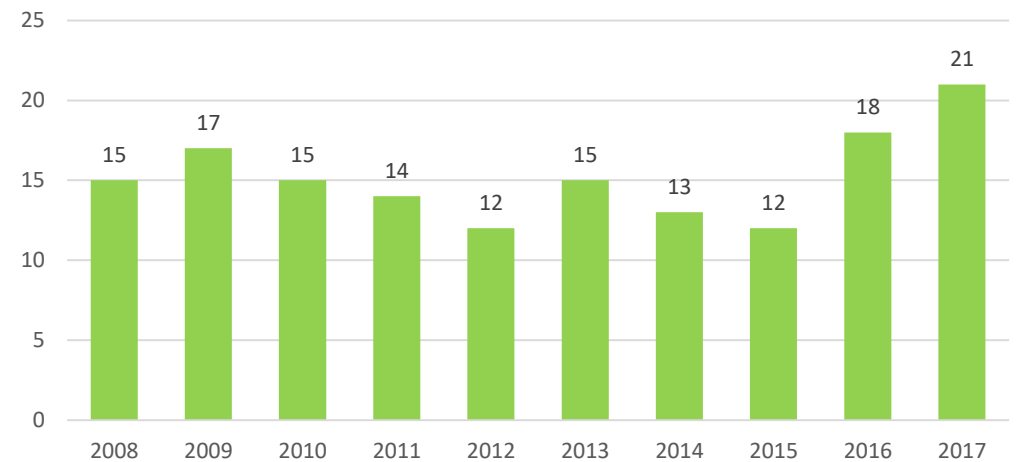
## EMS



## Rescue



## HazMat



# SCDF's Strategic Challenges

## Volatility

Myriad of response scenarios

## Uncertainty

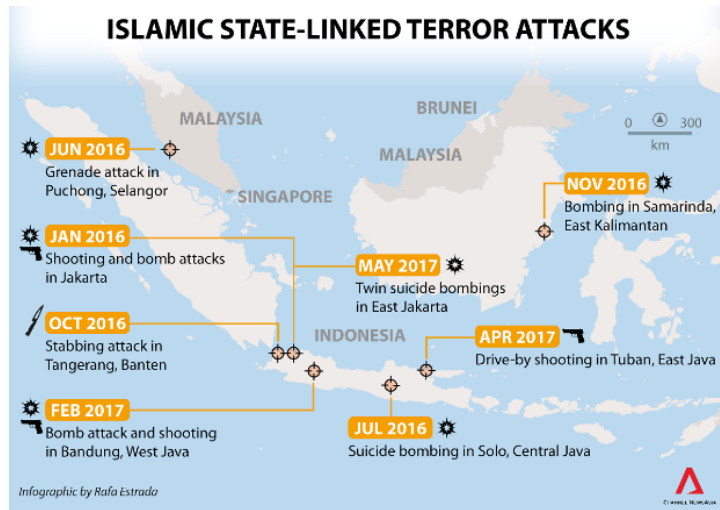
Evolving Operating Environment  
(Threat of terrorism)

## Complex

Pace of technological Advancements

## Ambiguous

High Potential for mis-reading conditions



**THE STRAITS TIMES**

ASIA > East Asia SE Asia South Asia Aus

Panasonic cubie All in One Oven

### Suspected Batam launch site of foiled rocket attack was 18km away from Marina Bay

Suspects involved in the foiled plot to fire a rocket at

### Counter-Terrorism Exercise

The Home Team and the SAF conducted an island-wide joint exercise to validate their operational response in the event of a large-scale terror attack or when there is a heightened security threat to Singapore. Here's a rundown of the action.

**PHASE 1**

- Day 1.1 (08:00am)**: A major terrorist attack among neighbouring countries triggered out numerous bomb alerts in the region outside of Singapore. The threat level is raised and authorities across the region are alerted.
- Day 1.2 (10:00am)**: A major terrorist attack in Singapore is confirmed. The threat level is raised and authorities across the region are alerted.
- Day 1.3 (10:00am)**: A major terrorist attack in Singapore is confirmed. The threat level is raised and authorities across the region are alerted.
- Day 2.1 (11:30am)**: A major terrorist attack in Singapore is confirmed. The threat level is raised and authorities across the region are alerted.

**PHASE 2**

- Day 2.2**: A major terrorist attack in Singapore is confirmed. The threat level is raised and authorities across the region are alerted.
- Day 2.3**: A major terrorist attack in Singapore is confirmed. The threat level is raised and authorities across the region are alerted.
- Day 2.4**: A major terrorist attack in Singapore is confirmed. The threat level is raised and authorities across the region are alerted.
- Day 2.5**: A major terrorist attack in Singapore is confirmed. The threat level is raised and authorities across the region are alerted.
- Day 2.6**: A major terrorist attack in Singapore is confirmed. The threat level is raised and authorities across the region are alerted.
- Day 2.7**: A major terrorist attack in Singapore is confirmed. The threat level is raised and authorities across the region are alerted.

# SCDF's Driving Forces

## 1 Increasing Workload

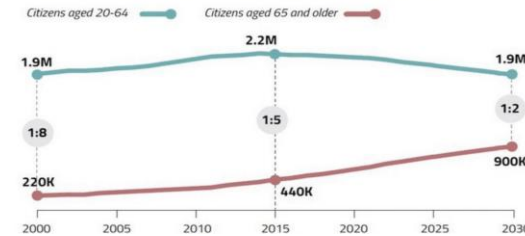


Traveler Volume  
Ambulance Load



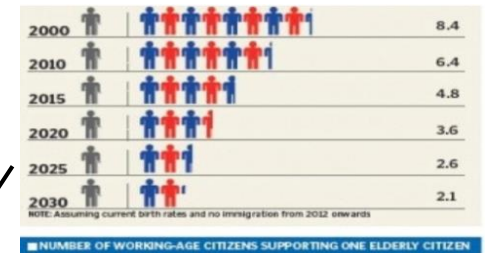
## 2 Manpower Constraints

Number of working-age citizens has peaked



## 3 Higher Public Expectations

## 4 Ageing Population





# SCDF Transformation Vision 2025

# 2025 A NATION OF LIFESAVERS

## Vision 2025 - 'A Nation Of Lifesavers'

'A Nation of Lifesavers' is a belief that all Singaporeans will possess the skills, knowledge, and attitude to respond to emergencies. The Vision 2025 illustrates the types of operational response that SCDF will be able to field at the conclusion of the Force's current transformation efforts in 2025.

The services will see the different communities (residential, commercial and industrial) being greater and sustainable connectivity over their spheres of influence and responding to ensure the safety of their neighbourhood. Underpinning this vision is the premise that whilst SCDF continues to provide the highest standard in our response, the community to be prepared to respond appropriately to an incident, particularly if the person is unavailable to be assisted. This bridge is critical between incident occurrence and SCDF's critical response.

## Building A Strong SCDF Through Training Transformation

SCDF will establish new training regime to ensure that staff are equipped with the competencies and capabilities that are needed to succeed in the existing operating landscape. This will be done through various means that include new training programmes, leveraging the latest technology, and partnering with industry of higher learning.

- Advanced Risk Building Ability**  
Advanced fire and rescue training for high-rise buildings.
- Advanced Fire Fighting Unit**  
Specialised fire fighting units for high-rise buildings.
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## A Joint Community - SCDF Response Model For Increased Survival Outcomes

A team that draw different responses leads to a community in the community. Various fire response services will be shared and operated together to provide a more effective and efficient pre-response model.

- Response for Fire**  
Fire response services.
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Fire response services.

## Enhanced HazMat Capabilities

Response to an on regional industrial facilities that it remains operational, capable and ready to deal with any CBRN-related threats. As a result, the Force has also enhanced its capabilities to effectively manage regional incidents.

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## Technology As A Force-Multiplier For Higher Operational Effectiveness

The use of Wireless Fire and how the Force will leverage capabilities to have in order to make and thereby enhance the standard of our operations. SCDF's continued drive to leverage on new technologies to enhance its operational readiness when dealing with incidents.

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## Robust Marine Response

Response to a leading marine port which handles one of the world's largest ports. With SCDF equipped on the incident coverage of all CBRN threats, the Force will continue to enhance its marine capabilities.

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**LEGEND**

- Enhancing Competencies
- Enhancing Capabilities

# Transformation Framework



Vision



Strategic  
Outcomes



Enablers





***Leveraging Technology and Innovation***



***Robust Fire Safety Regime***



***Enabled and Empowered Community***

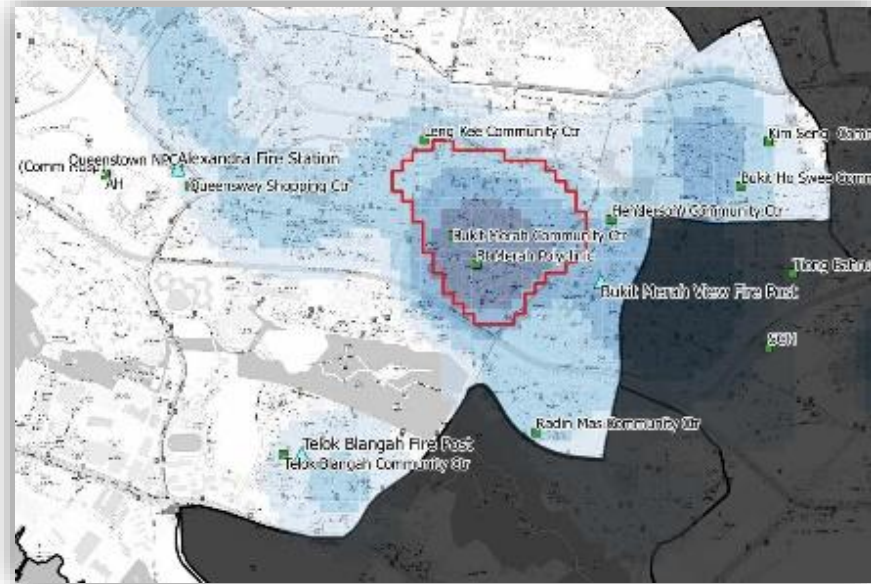
# Transforming Fire and Rescue Response



# Leveraging Technology and Innovation

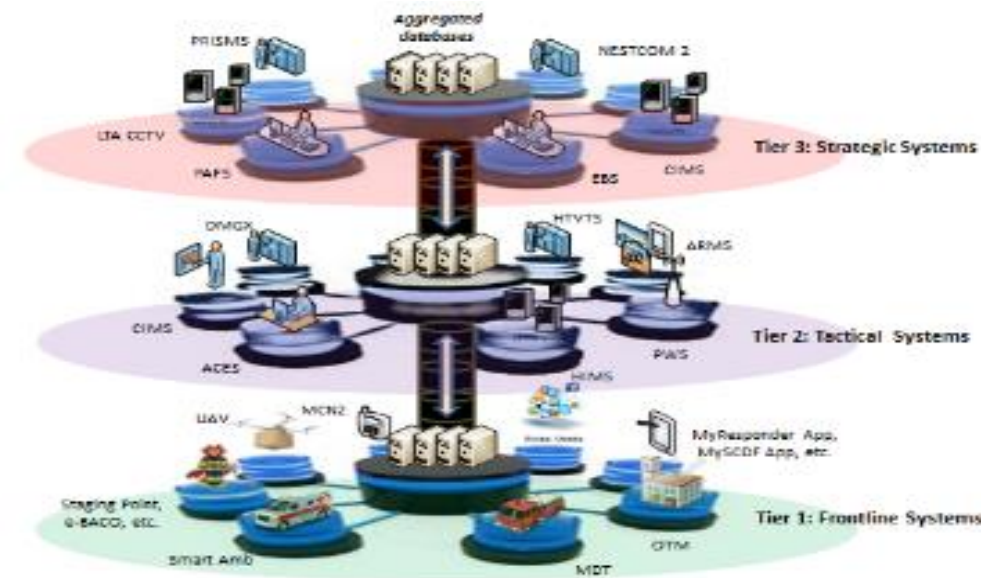
## 1 Data Analytics

- Dynamic Resource Optimisation (DRO)
- SCDF Business Intelligence Tool (S-Bit)



## 2 IT Systems / Infrastructure

- Integrated Management, Communications, Command & Control (IM3C) System
- Advanced Medical Protocol System (AMPS)



# Leveraging Technology and Innovation

## 3 New Concept of Operations

- Tiered EMS Response
- Enhanced Triaging
- Enhanced Marine Response
- Enhanced HazMat Response



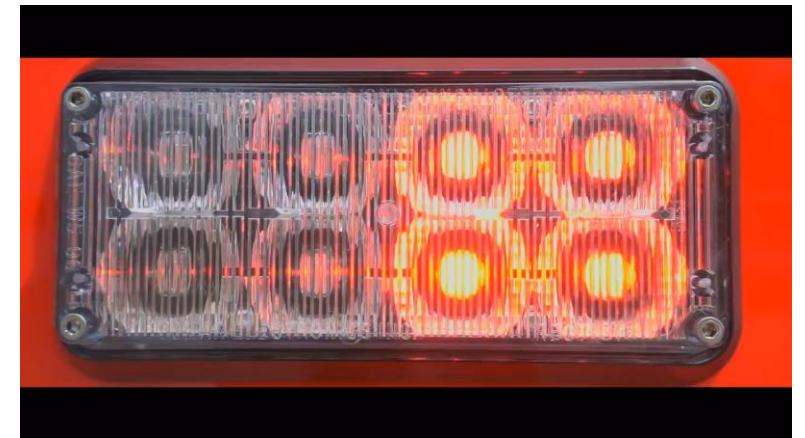
CATEGORY OF CASES	EXAMPLES	RESPONSE
LIFE-THREATENING EMERGENCIES	Cardiac arrest, unconsciousness, breathlessness, active seizure, major trauma and stroke.	Highest priority Fastest response Extra resources deployed
EMERGENCIES	Severe allergy, emergency labour, head injury, bone fracture, asthma, elderly with chronic medical conditions and sick children.	High priority Fast response
MINOR EMERGENCIES	Cut with bleeding, accident with bruising, swelling, mild injury and persistent fever.	Lower priority Slower response
NON-EMERGENCIES	Constipation, chronic cough, diarrhoea and skin rash.	Emergency medical assistance not required Seek treatment at clinics or call 1777 for non-emergency ambulances



# Leveraging Technology and Innovation

## 4 Hardware / Equipment

- FROST
- Fire and Medical Vehicle (FMV)
- HazMat Control Vehicle (HCV)
- SkyCam



# Leveraging Technology and Innovation

## 4 Hardware / Equipment

- LF6G & Red Rhino Robot (3R)
- DART Rescue Vehicle (DRV)
- Exoskeleton
- Life Detection Robot



### SCDF's new technological innovations

The Singapore Civil Defence Force (SCDF) has unveiled several new innovations at the SCDF Workplan Seminar 2018 that aim to improve firefighting capabilities as well as responder performance. All of the innovations are currently in the proof-of-concept stage and will be undergoing operational trials.

#### Red Rhino Robot (3R)

- Portable emergency responder robot used to tackle residential unit fires by performing the initial extinguishing of fires.
- Uses both compressed air foam and water.
- Will be fitted into the new 6th Generation Light Fire Attack Vehicle.
- Remotely controlled but capable of detecting and fighting fires autonomously, lowering the safety risk.
- Weighs about 80kg.
- Can withstand heat of up to 250 deg C and is water-resistant.



#### Exoskeleton

- Reduces muscle stress by allowing responders to carry heavy firefighting equipment with greater ease.
- Over 60kg of load-bearing will be transferred from the wearer to the exoskeleton, while pneumatic pistons assist in movement.
- Pneumatic pistons push responders up when climbing stairs.
- Enhances responder's performance in firefighting and rescue operations.
- Wearers can jettison the exoskeleton quickly via a quick release catch during emergencies.

#### Life detection robot

- Used to locate human life during urban search and rescue operations.
- Combines visual imaging, acoustic, scoping and heat and chemical (carbon dioxide and ammonia) sensors.
- Robot triangulates likely locations of casualties and provides a 3D map of the area of operations.



Source: SINGAPORE CIVIL DEFENCE FORCE. ST PHOTOS: LEE JIA NEN. STRAITS TIMES GRAPHICS

Source: The Straits Times, 18 April 2018

# Leveraging Technology and Innovation

## 5 Training Facilities and Simulations

- New Field Training Area (FTA)



Mixed Use (Transport Hub, Commercial & Residential)



Enterprise

EMS





# Leveraging Technology and Innovation

## 5 Training Facilities and Simulations

- Fire Research Centre
- EXCEL @ Civil Defence Academy



Tunnel  
Fire Research  
Compartment Fire Behaviour Training (CFBT)



EXCEL – Emergency Responders  
Fitness Conditioning &  
Enhancement Lab



# Leveraging Technology and Innovation

## 6 Streamline Processes with IoT

- FISSION (Fire Safety & Shelter Information Online)
- Fully-automated checks on the submitted building plans
- Traffic Priority System
- Community First Response

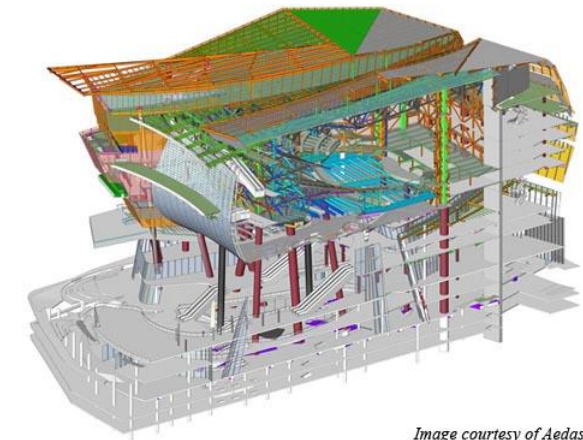


Image courtesy of Aedas



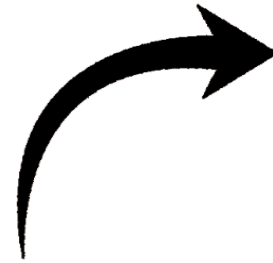
# Robust Fire Safety Regime



- Evidence based approach
- Review regularly
- Collaborate with building industry, stakeholders and regulatory bodies



## 2018 Fire Code



### Digitising Fire Code



Easily accessible



Interactive  
Easy to cross reference

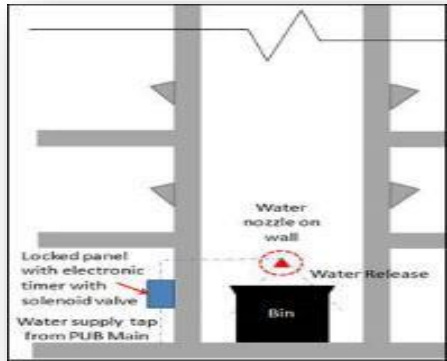
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### Incorporating New Tech and Regulations

1. Video Image Fire Detection System (VIFDS)
2. Home Fire Alarm Device (HFAD)
3. Adoption of New and Green Tech



# Robust Fire Safety Regime



Timer- based Water Release System



Fire Modelling Simulation Studies (Analytics)



Home Fire Alarm Device (HFAD)



Adoption of New and Green Tech Building Materials



Community-based enforcement approach to safeguard fire safety standards



CERT Standards Extended to Public & Industrial Buildings



Enhanced Hazardous Transport Vehicle Tracking System



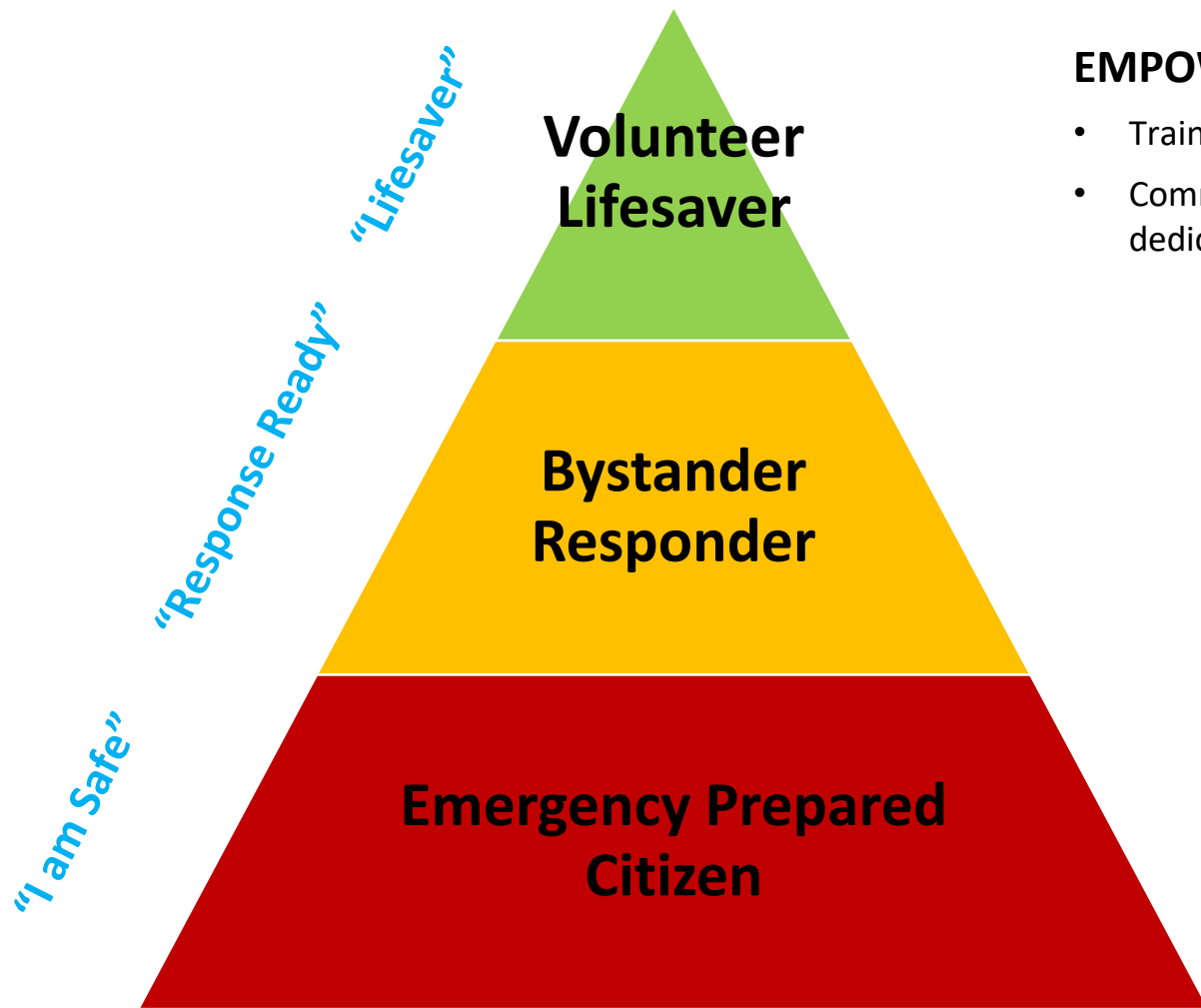
Video Image Fire Detection System (VIFDS)



Integration with Smart Nation Framework



# Enabling and Empowering the Community To Be Community First Responders



## EMPOWER THE ACTIVE RESPONDER

- Trained in Life Saving Skills
- Commits volunteer hours and serve Community as a dedicated responder

## ENABLE THE BYSTANDER RESPONDER

- Trained in Life Saving Skills
- Involves in the chain of saving lives but does not commit volunteer hours
- Examples: Calls 995 & retrieve AED

## ENGAGE THE CONCERNED CITIZEN

- Basic EP Knowledge awareness
- Knows how to help and get out of harm's way in times of emergency
- Examples: Self evacuation & use mySCDF app to take snap shots



# Enabling and Empowering the Community To Be Community First Responders



**Junior CD Lionhearters**



**National CD Cadet Corps**



**CD Lionhearters**



**CD Auxiliary Unit**

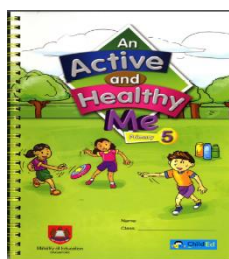
## Future-Ready



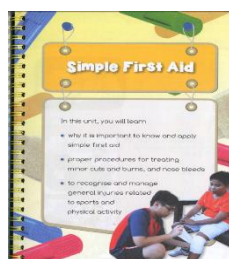
**Future 7-Storey EP Centre**



**Preschool Resource Kit**



**Primary School Curriculum**



## Public Education Programs



I. What do you do when a fire breaks out?

**When you discover a fire:**

- Do not panic.
- Alert others to the fire by shouting.
- Evacuate the room/area and get everyone out of the premises without endangering yourself.
- If possible, close the door of the affected room to contain the fire.
- Dial 995 for the SCDF.
- Turn off the gas mains if you can reach them.
- Activate the fire alarm at the nearest manual call point.
- Evacuate the building in an orderly manner via the stairs; do not use the lift.
- Do not return to the building until the authorities announce that it is safe to do so.

## Community Emergency Preparedness Programme (CEPP) – Training + Online



Previous Next

TOGETHER A NATION OF LIVESAVERS | Am Safe



**Emergency Preparedness (EP) Days**



# Community First Responders

## Save-A-Life Initiative



### » Hardware

- Enhance Community First Response
- Install AEDs in residential estates
- AEDs on wheels
  - Placed in taxis
  - 1<sup>st</sup> in Southeast Asia



### » Heart-ware

- Basic Training
  - Triangle of Life Training
- Dispatcher-Assisted First Responder (DARE) Program



### » Software

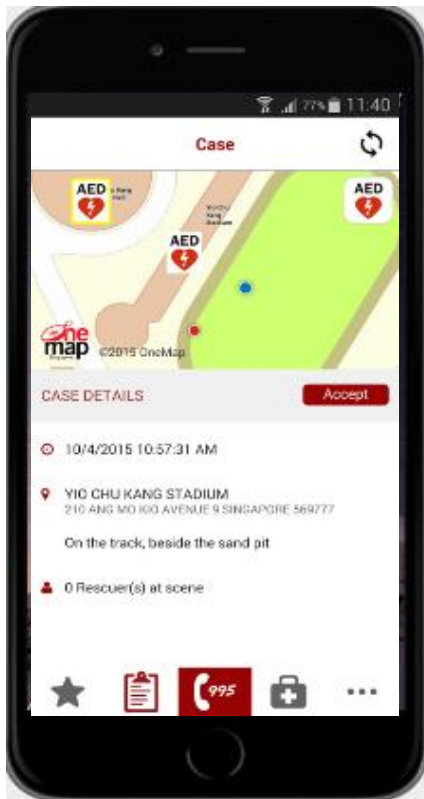
- Geo-location Technology
- Alerts volunteers to nearby cardiac arrest cases & nearest available AED



Enabling and Empowering the Community To Be  
**Community First Responders**



# MyResponder App

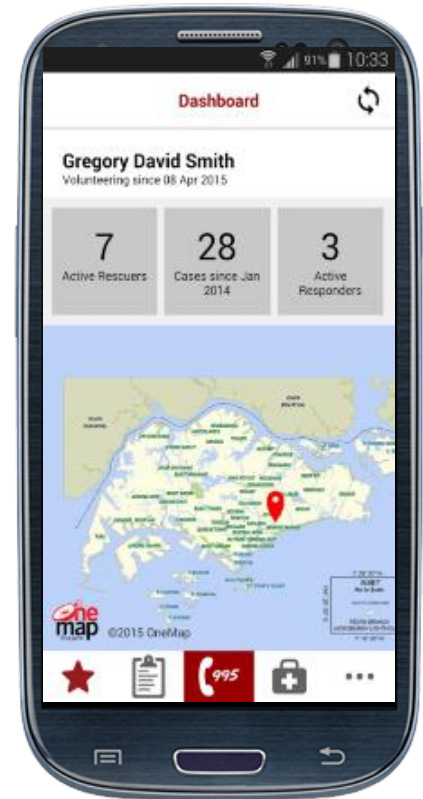


**92,327**  
Downloads

**30,893**  
Active  
Responders

**15,615**  
Activations

\*As at 31 July 2018





# Enabling and Empowering the Community To Be Community First Responders

## Expanding myResponder App usage

- Enable Community First Responders (CFRs) to attend to rubbish chute and bin fires

## Encouraging Stats

- MOPs willing to assist in more than 30% of the cases
- Successfully extinguished 85% of the cases they accepted
- Accounted for 25% of all rubbish chute and bin fires.



PHOTO:  
ITUNES/SCDF

## Help fight fires with SCDF app alert

**Kimberley Chia**

Individuals can now play a part in fighting small fires in their vicinity, such as rubbish chute or bin fires.

A new function in the Singapore Civil Defence Force's (SCDF's) myResponder mobile app will alert registered users to cases of minor fires within a 400m radius.

Such fires are usually small, with no risk of spreading, and can be swiftly put out, noted SCDF.

As such, the risk to responders is minimal and no training will be required for individuals to attend to such minor fire incidents.

Users can accept the fire alert notification, and go on to put out the fires via options such as using a domestic hose, a fire extinguisher or rubbish chute drencher systems. They can also call SCDF through the app or submit photos and videos of the fire.

The new function was officially launched yesterday by Mr K. Shanmugam, Law and Home Affairs Minister, at the SCDF's annual workplan seminar.

"Prompt intervention by residents prevents the fire from spreading and also saves valuable SCDF resources, which can be deployed to more urgent incidents," he said in his keynote address.

According to the SCDF, minor rubbish fires account for around half of residential fires, with the force responding to more than 1,000 such cases yearly.

Since the fire alert function's soft

launch in January, close to 3,000 users have signed up for the alert. Notifications have been sent out for more than 300 fires.

The function is an extension to SCDF's myResponder app, which was unveiled at its workplan seminar in 2015 to allow registered users to render immediate medical aid to victims of cardiac arrest.

The app, which has been downloaded more than 80,000 times since its launch, has seen its share of successes.

SCDF reports that close to 1,700 users have responded to alerts of cardiac arrest and rendered necessary assistance since the app's inception.

The app also utilises a GPS geo-location feature, allowing the SCDF Operation Centre to locate incidents and deploy emergency resources swiftly when required.

The SCDF myResponder app is available on the Apple and Google Play app stores.

Mr Amos Hoe, 42, a manager, had earlier signed up for the fire alert notification. So when he received an alert earlier this month, he rushed to a burning rubbish bin one street away with a fire extinguisher in hand.

Calling the app "super useful", Mr Hoe said: "It basically broadens the available resources to include previously untapped personnel in the community."

"And for cardiac arrest victims and fires, time is of the essence."

kchia@sph.com.sg

Source: The Straits Times, 18 April 2018

# Future Ready To Safeguard Our Nation

