



**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*



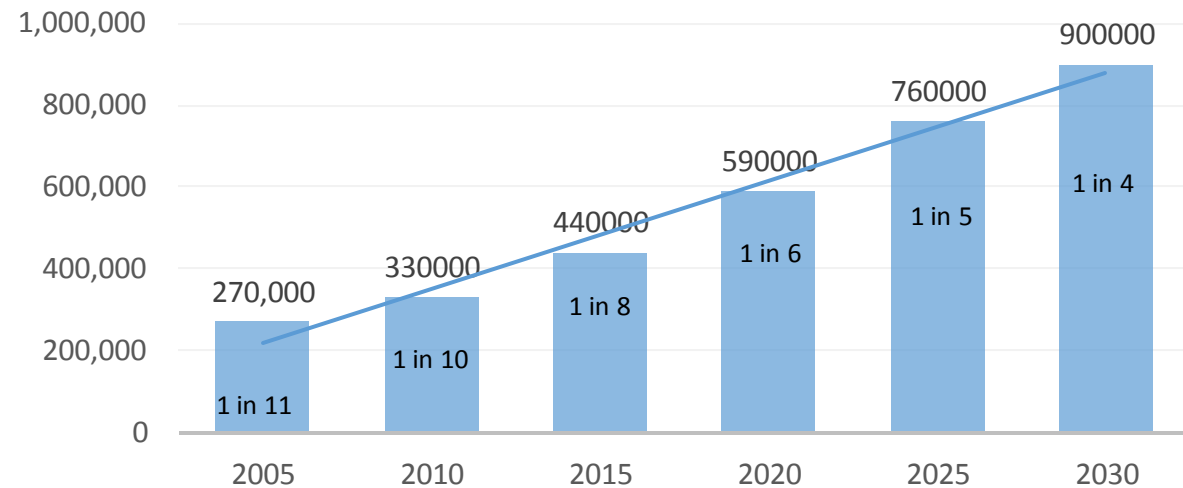
# Singapore's Profile



## 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

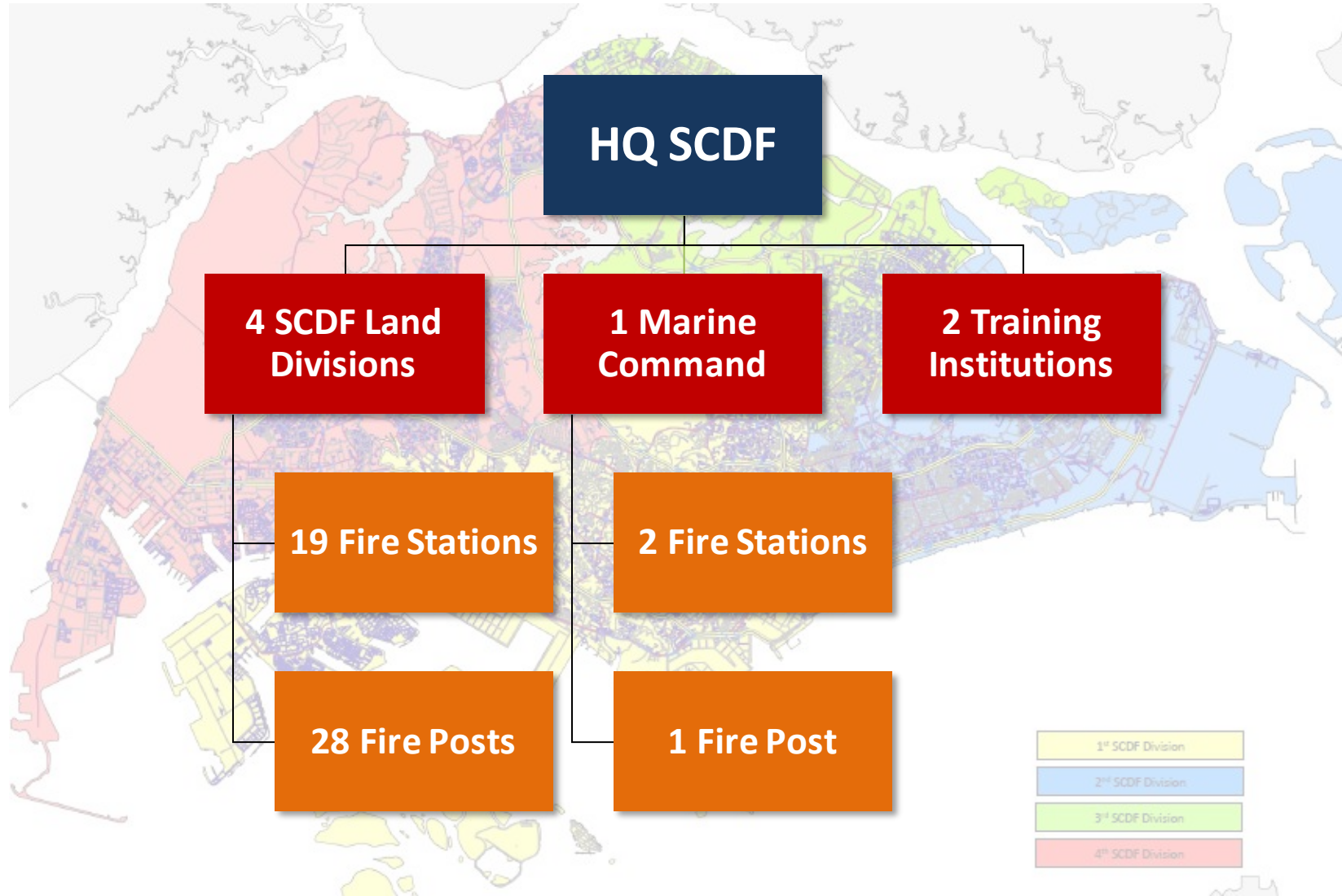


Central Business District





# Singapore Civil Defence Force



» **2,500**  
Uniformed Officer

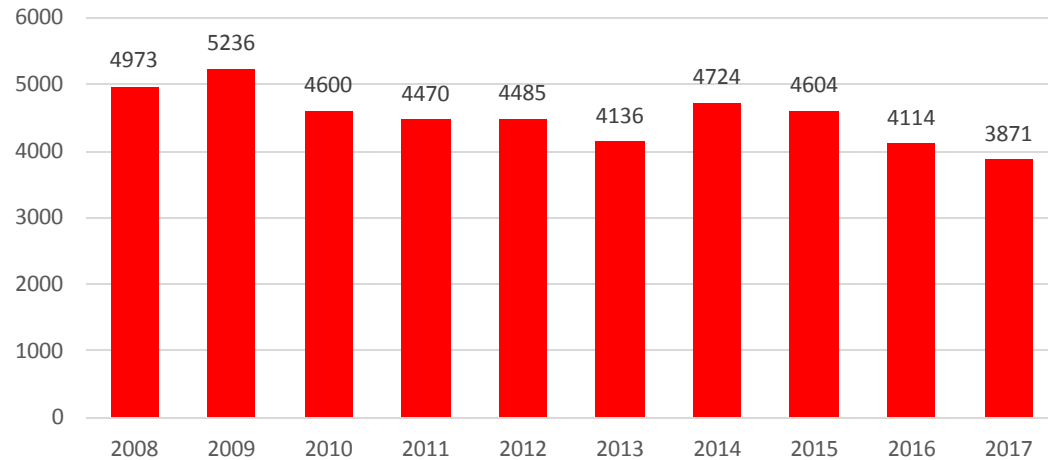
» **280**  
Civilian Staff

» **3,100**  
NS Full-time

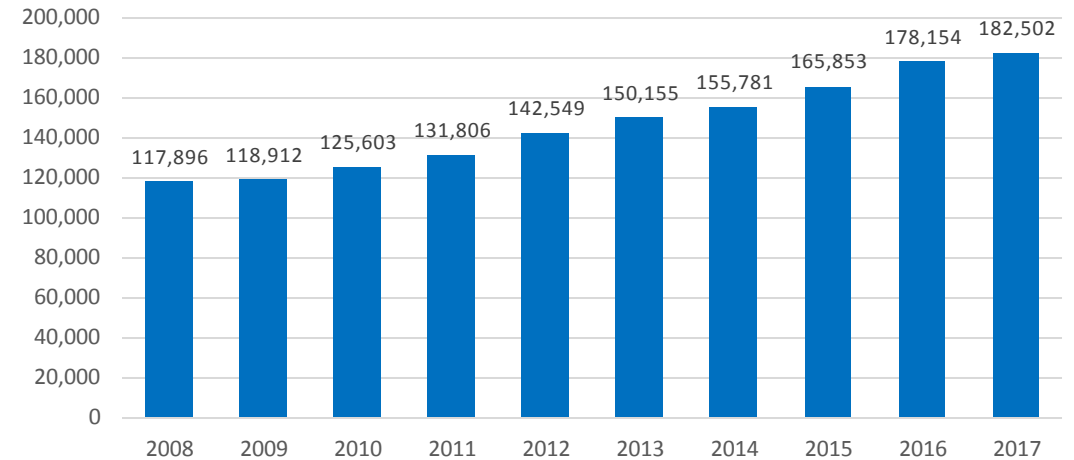
» **16,700**  
Active ORNSmen

# Operations Statistics

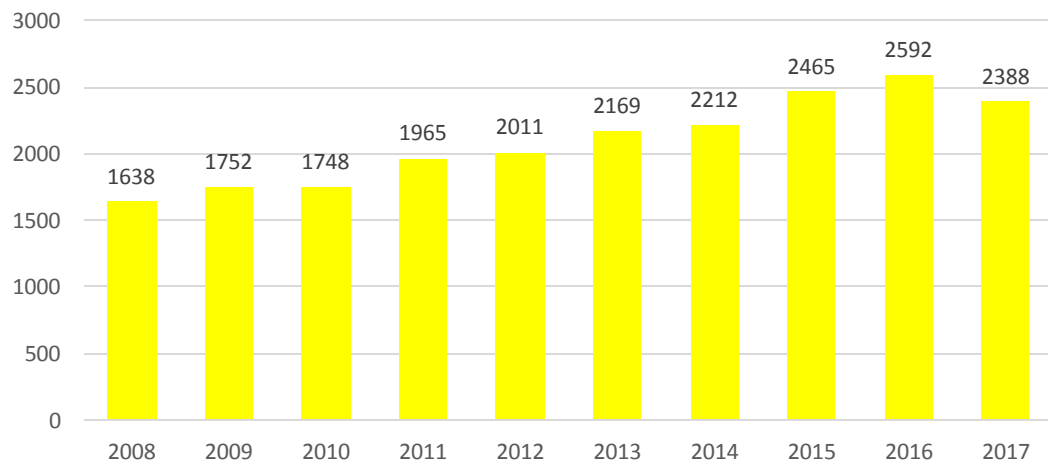
## Fire



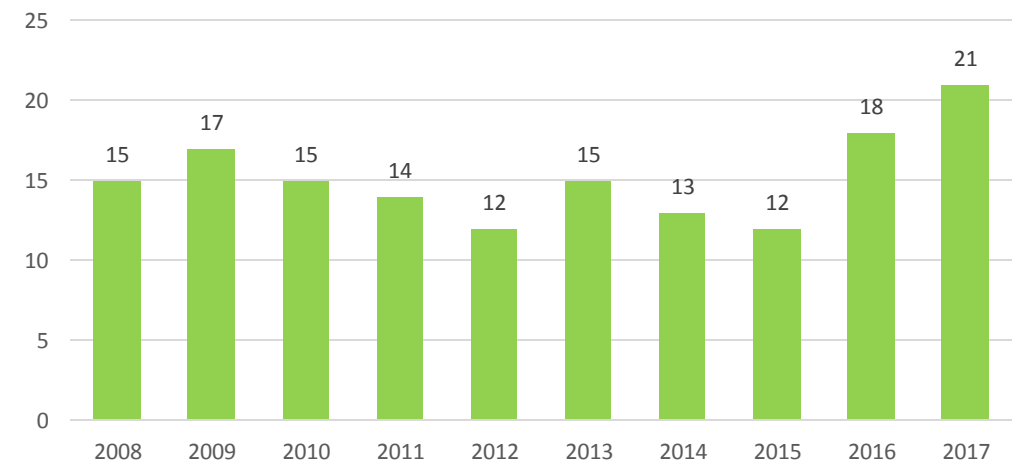
## EMS



## Rescue



## HazMat



# SCDF's Strategic Challenges

# Volatility

## Myriad of response scenarios

# Uncertainty

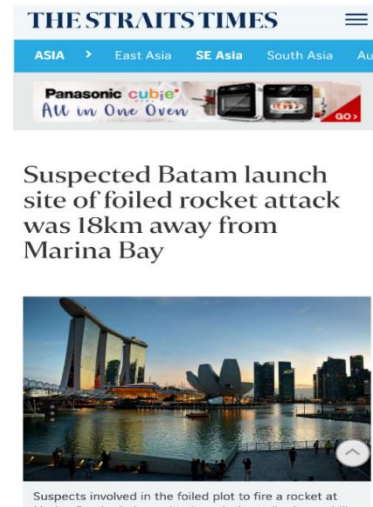
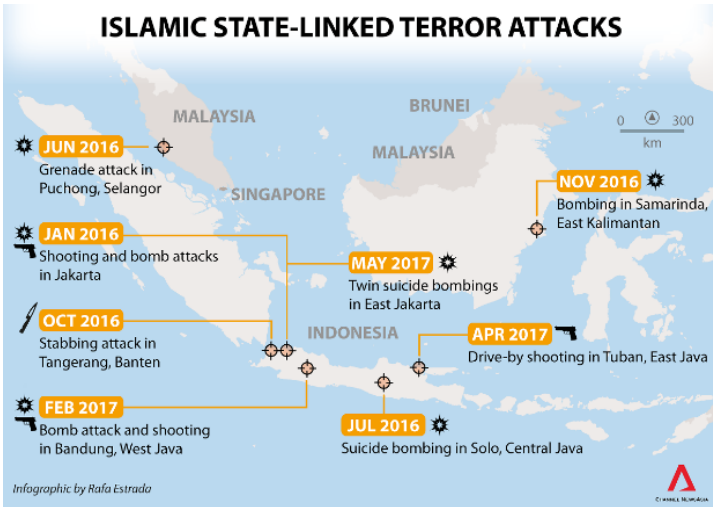
Evolving Operating Environment  
(Threat of terrorism)

# Complex

## Pace of technological Advancements

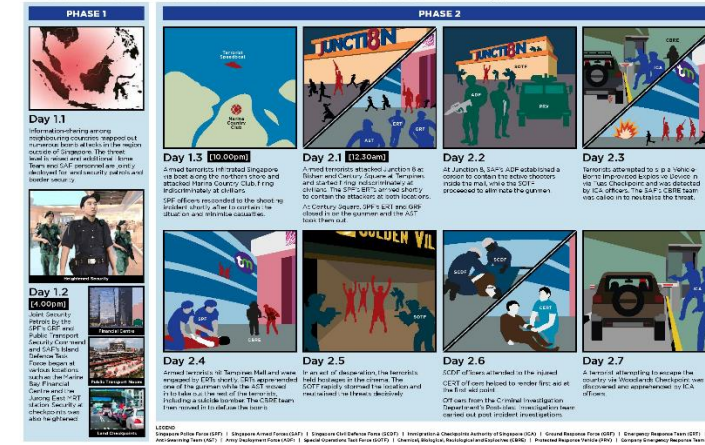
# Ambiguous

High Potential for mis-reading conditions



## 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.



**UNCLASSIFIED**

# SCDF's Driving Forces

1

Increasing Workload



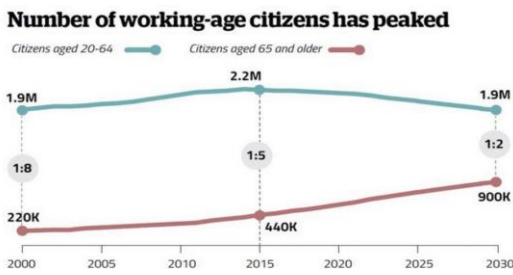
Traveler Volume

Ambulance Load



2

Manpower Constraints

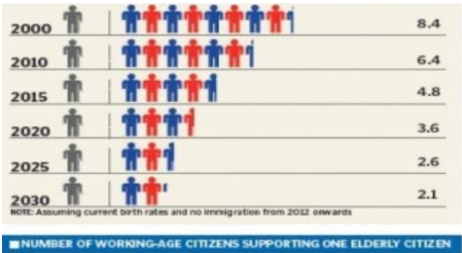


3

Higher Public Expectations

4

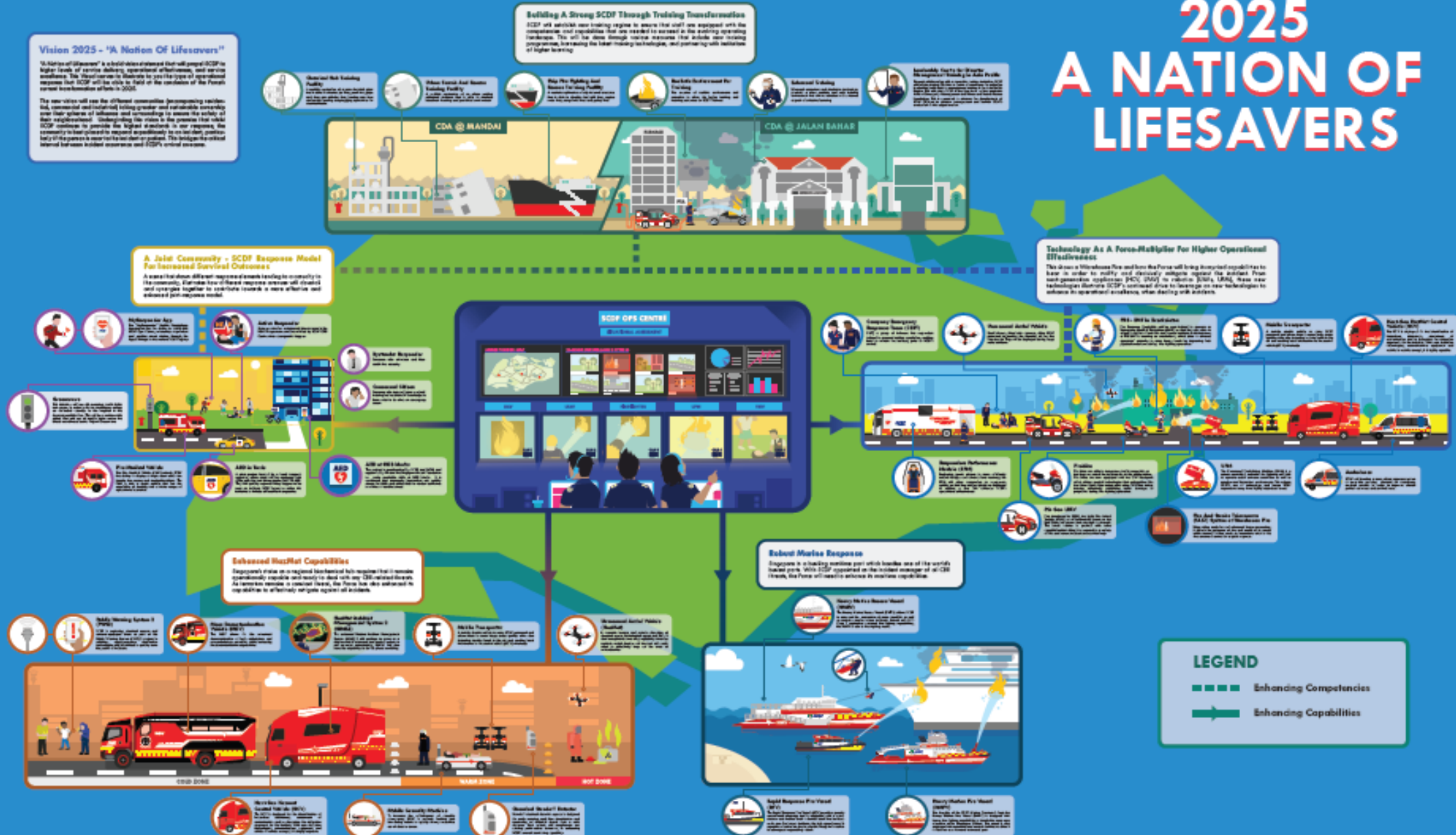
Ageing Population





# SCDF Transformation Vision 2025

# 2025 A NATION OF LIFESAVERS



# Transformation Framework

Building  
**A NATION OF LIFESAVERS**

**Vision**

Transforming  
Emergency Response

Institutionalise Safety  
& Public Protection

Enable & Empower  
The Community

**Strategic  
Outcomes**

Embrace Operations  
Technology & Innovation

Inculcate  
High Performance

**Enablers**



***Leveraging Technology and Innovation***



***Robust Fire Safety Regime***



***Enabled and Empowered Community***

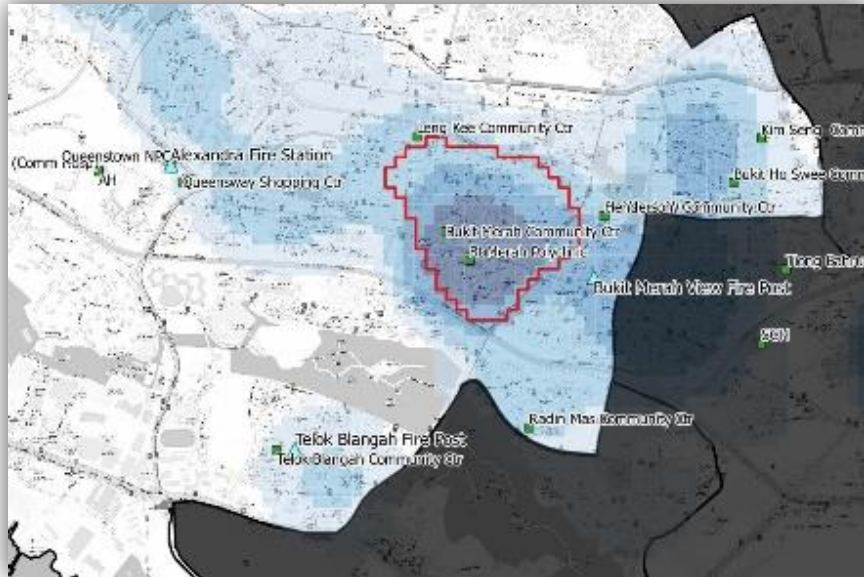
# Transforming Fire and Rescue Response



# Leveraging Technology and Innovation

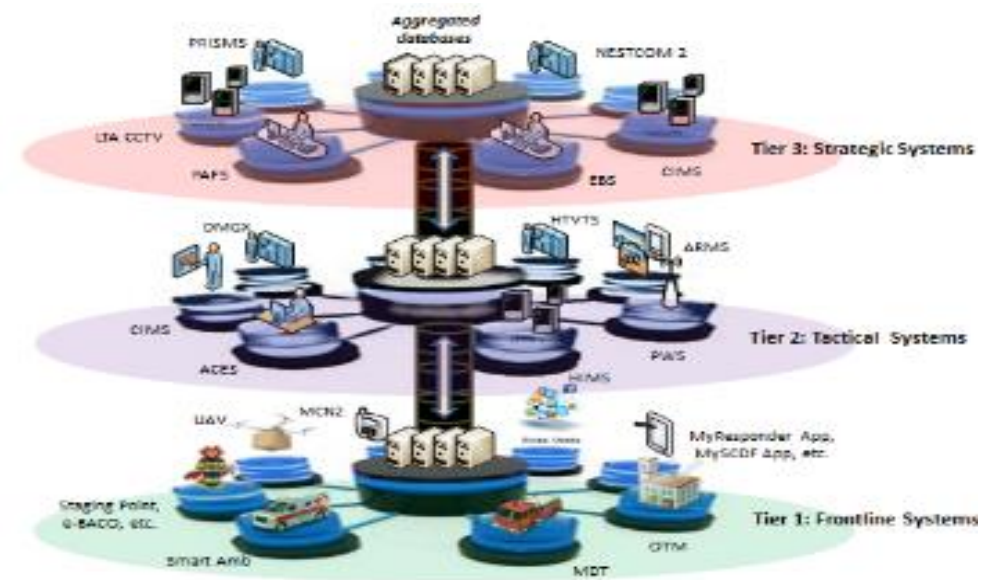
## 1 Data Analytics //

- 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



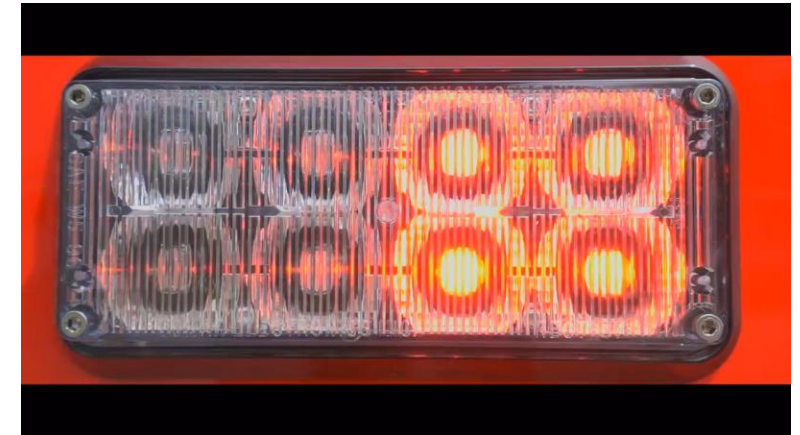
CATEGORY OF CASES	EXAMPLES	RESPONSE
LIFE-THREATENING EMERGENCIES	Cardiac arrest, unconsciousness, breathlessness, active seizure, major trauma and stroke.	Highest priority Fastest response Extra resources deployed
EMERGENCIES	Severe allergy, emergency labour, head injury, bone fracture, asthma, elderly 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, IFF, JIA WEN, 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)

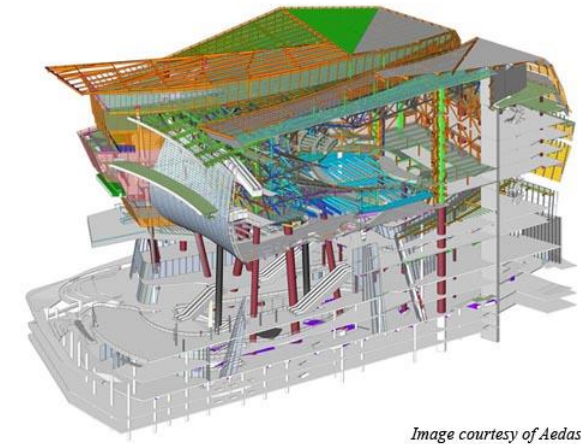


EXCEL – Emergency Responders  
Fitness Conditioning &  
Enhancement Lab

# 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



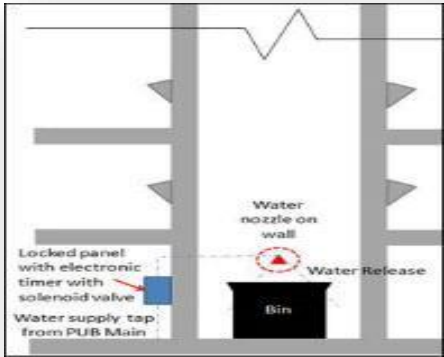
Interactive  
Easy to cross reference

### 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**



**Enhanced Hazardous Transport Vehicle Tracking System**



**Community-based enforcement approach to safeguard fire safety standards**



**Video Image Fire Detection System (VIFDS)**



**CERT Standards Extended to Public & Industrial Buildings**

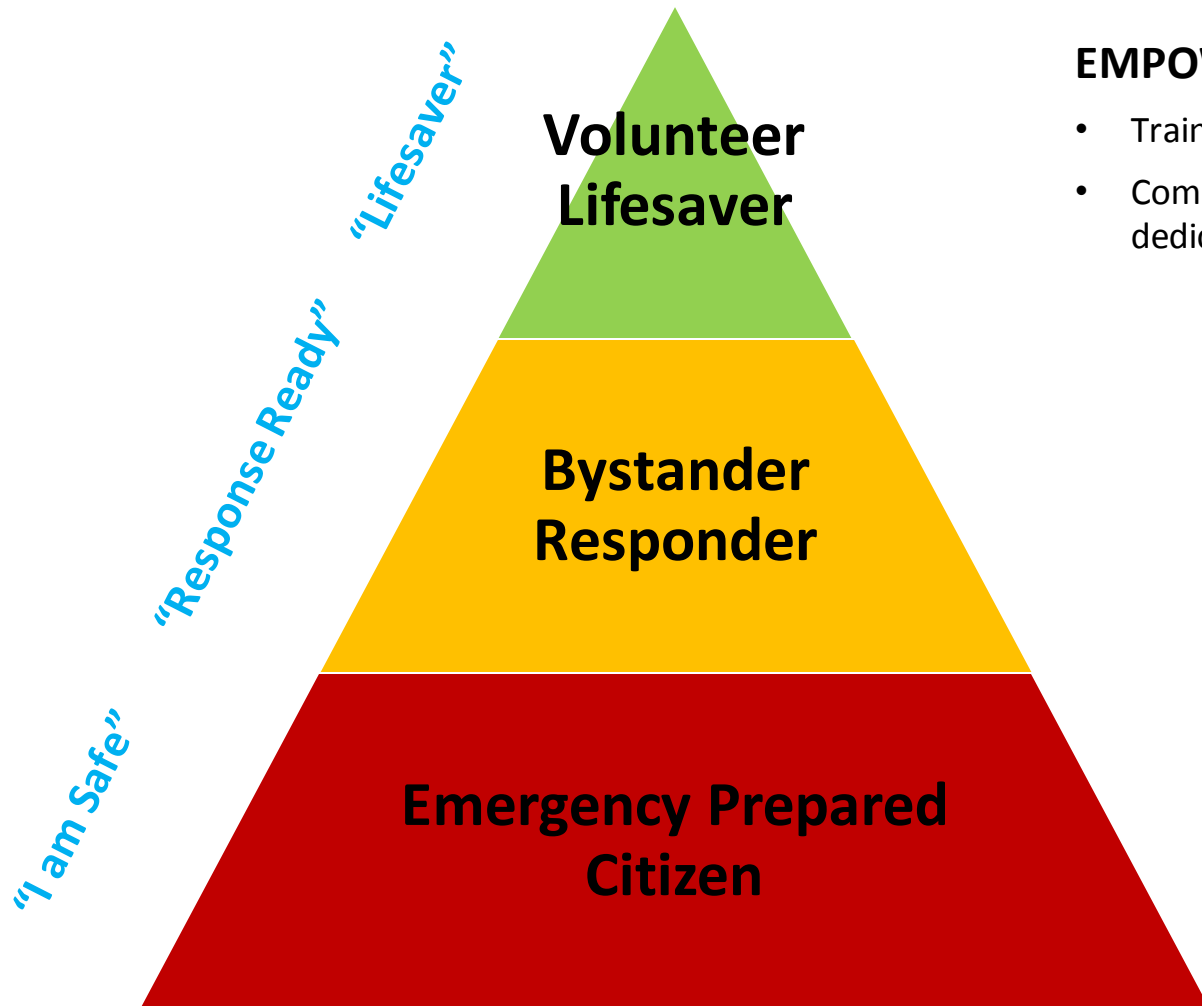


**Integration with Smart Nation Framework**





# 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**



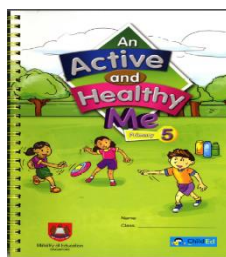
**CD Lionhearters**



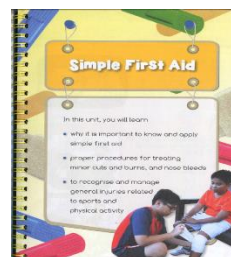
**CD Auxiliary Unit**



**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.



Previous

Next

TOGETHER  
A NATION OF LIFESAVERS

I Am Safe

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

## Future-Ready



**Future 7-Storey EP Centre**



**Emergency Preparedness (EP) Days**



Enabling and Empowering the Community To Be

# 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

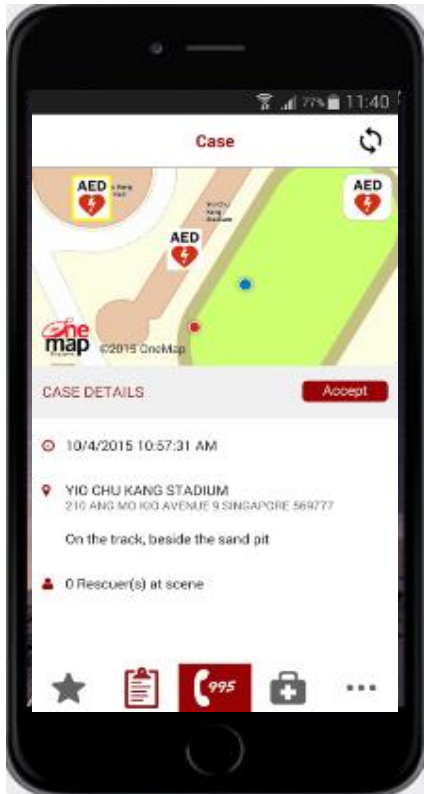


Enabling and Empowering the Community To Be

# Community First Responders



## MyResponder App

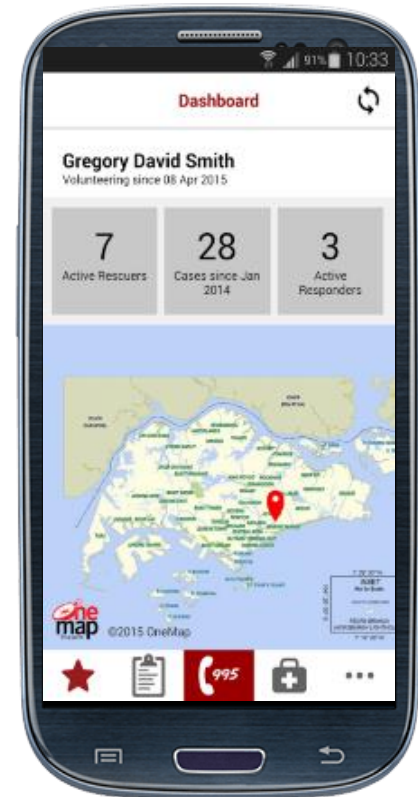


**92,327**  
Downloads

**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

