Climate Resilience for Landslide Risk Management

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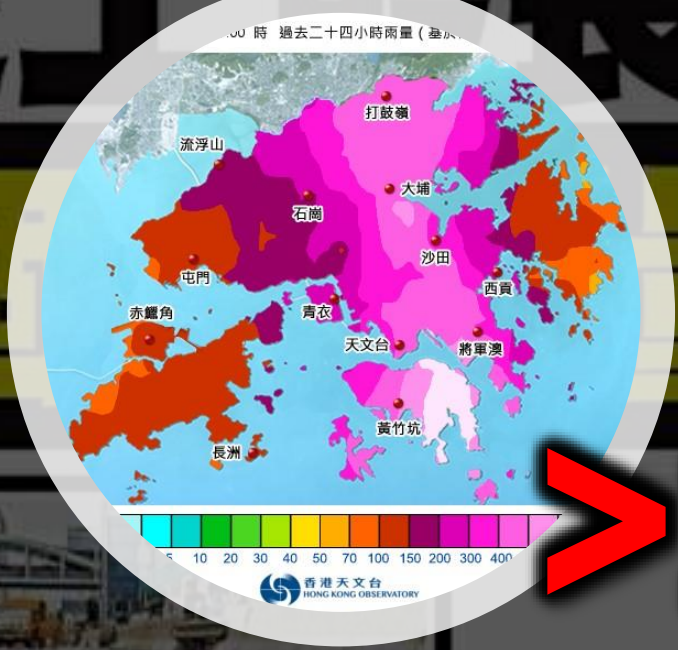
https://www.citadel.com/wp-content/uploads/2022/11/Hong_Kong.jpg



>158 mm rainfall in 1 hour

Record-breaking Rainfall on 7 & 8 September 2023

>600 mm rainfall in 24 hours

Landslides on 7 & 8 September 2023


Red Hill Peninsula


Shek O Road


Yiu Tung Estate


Cha Kwo Ling Village

Many severe landslides occurred in the past

1972 Sau Mau Ping

1972 Po Shan Road

1976 Sau Mau Ping

Many severe landslides occurred in the past

18 June 1972
Sau Mau Ping

6,000 m^3 **71** fatalities

1972 Po Shan Road

1976 Sau Mau Ping

Many severe landslides occurred in the past

1972 Po Shan Road

20,000 m^3 **67** **fatalities**

1972 Sau Mau Ping

1976 Sau Mau Ping

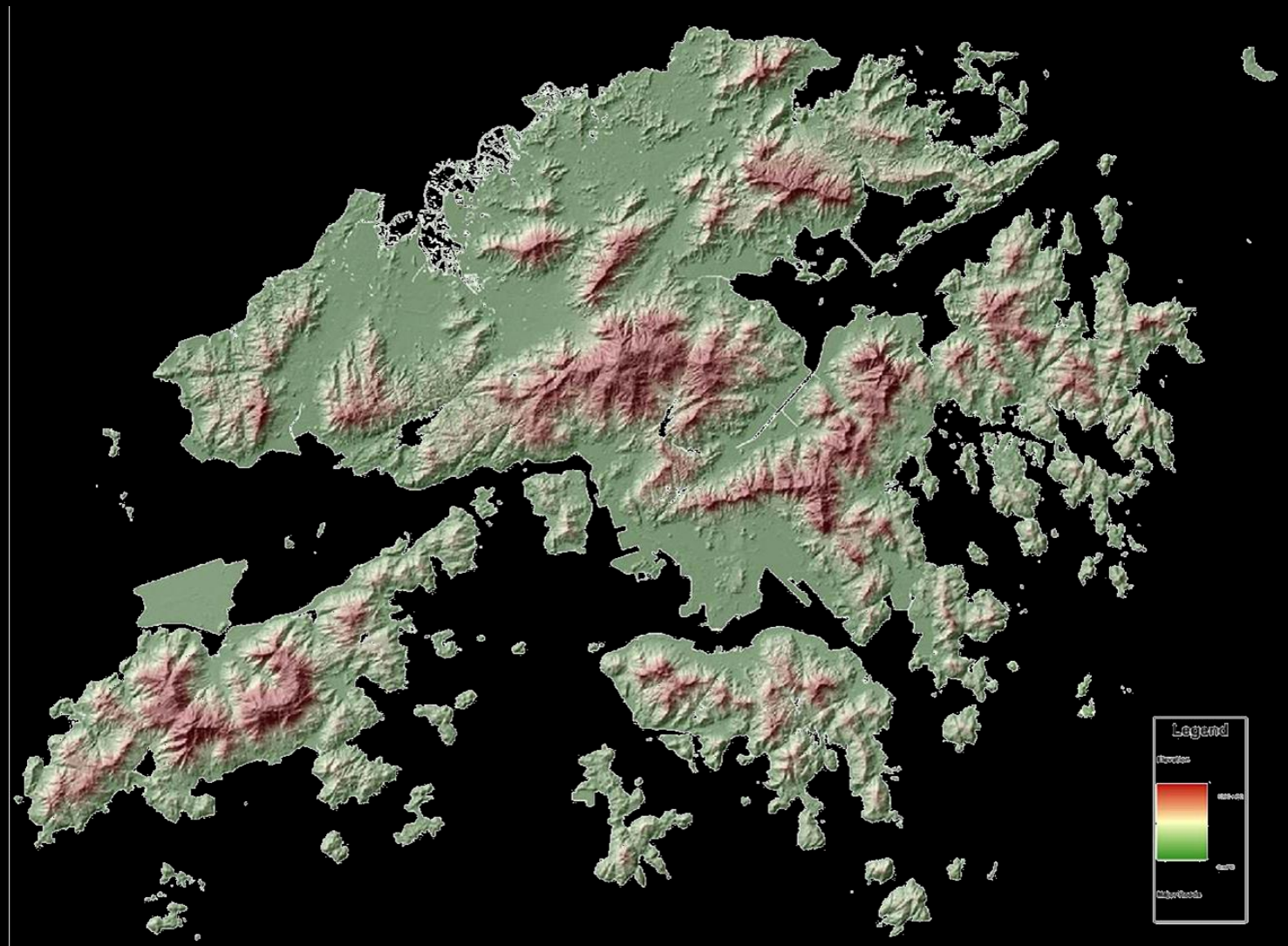
1977: Geotechnical Engineering Office Established

Mission

To regulate hillside development and the design, construction and maintenance of slopes.


英國工程專家應聘來港
出掌工務署土力工程處
羅德賢具有三十年豐富經驗

Vulnerable Geographical Setting of Hong Kong

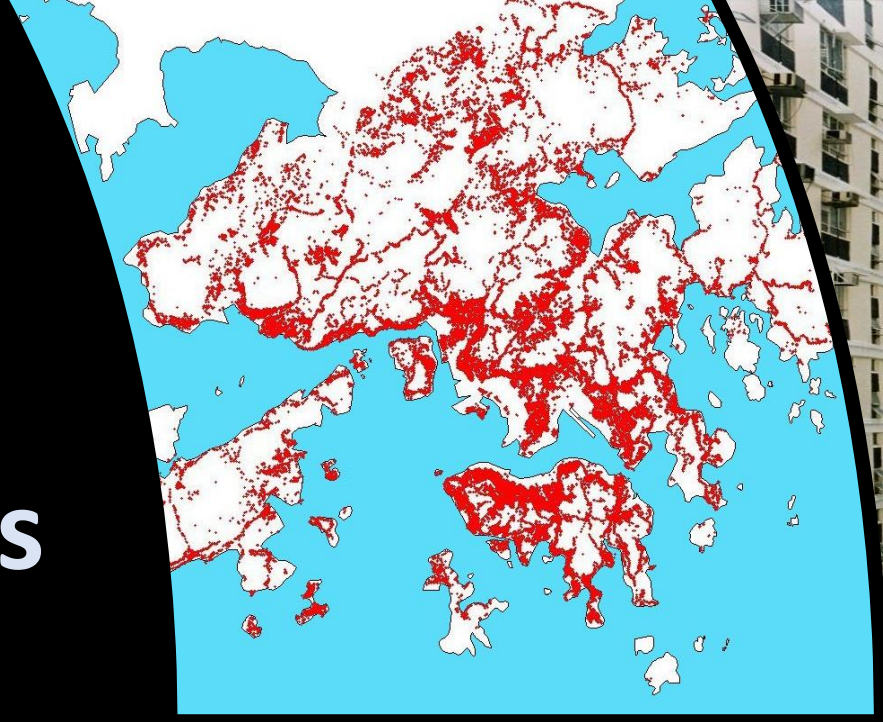


Hilly Terrain

Dense Population

Sub-tropical Climate with Heavy Rainfall

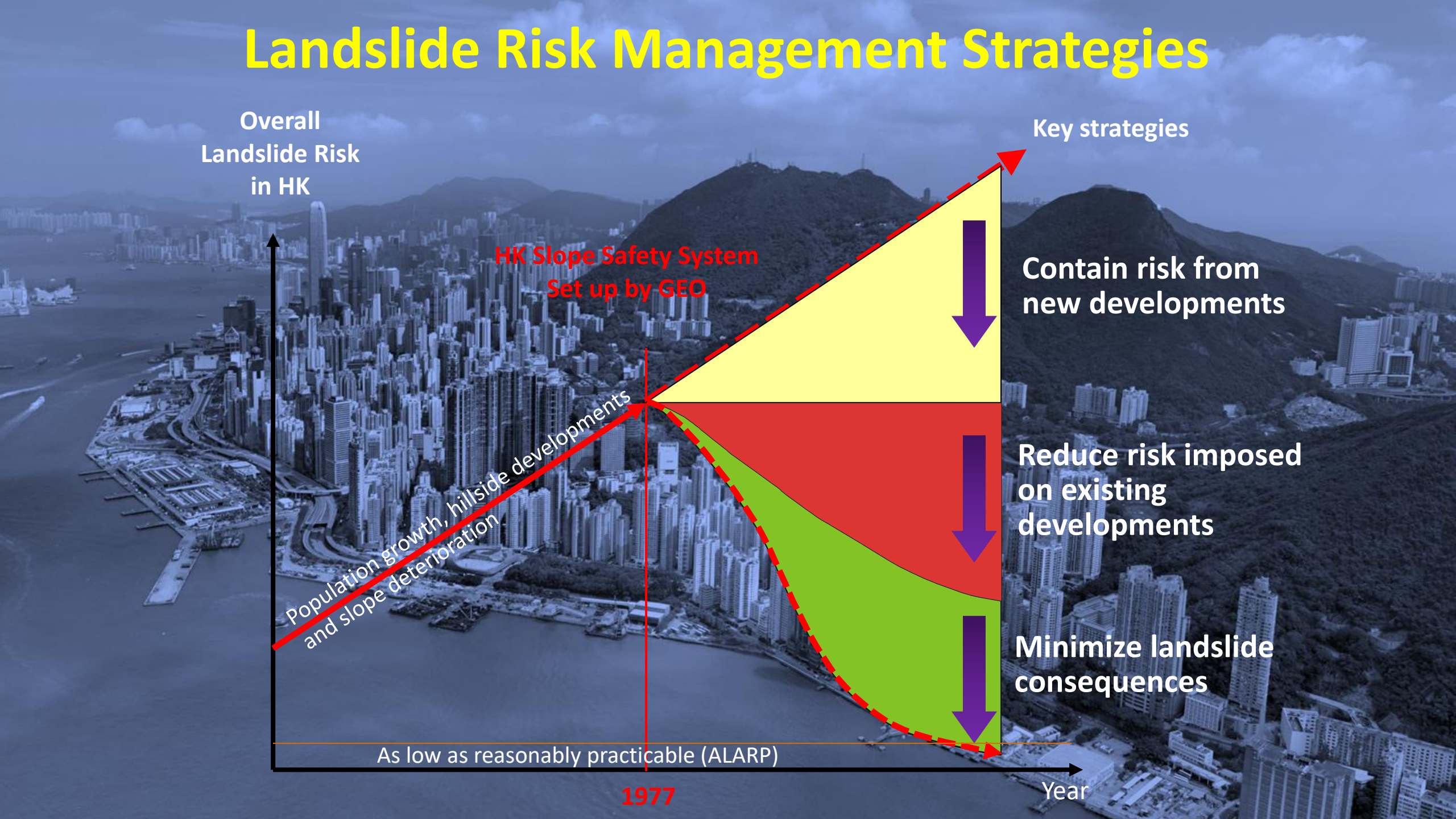
Catalogue of Slopes
(about 60,000
registered sizeable
man-made slopes)



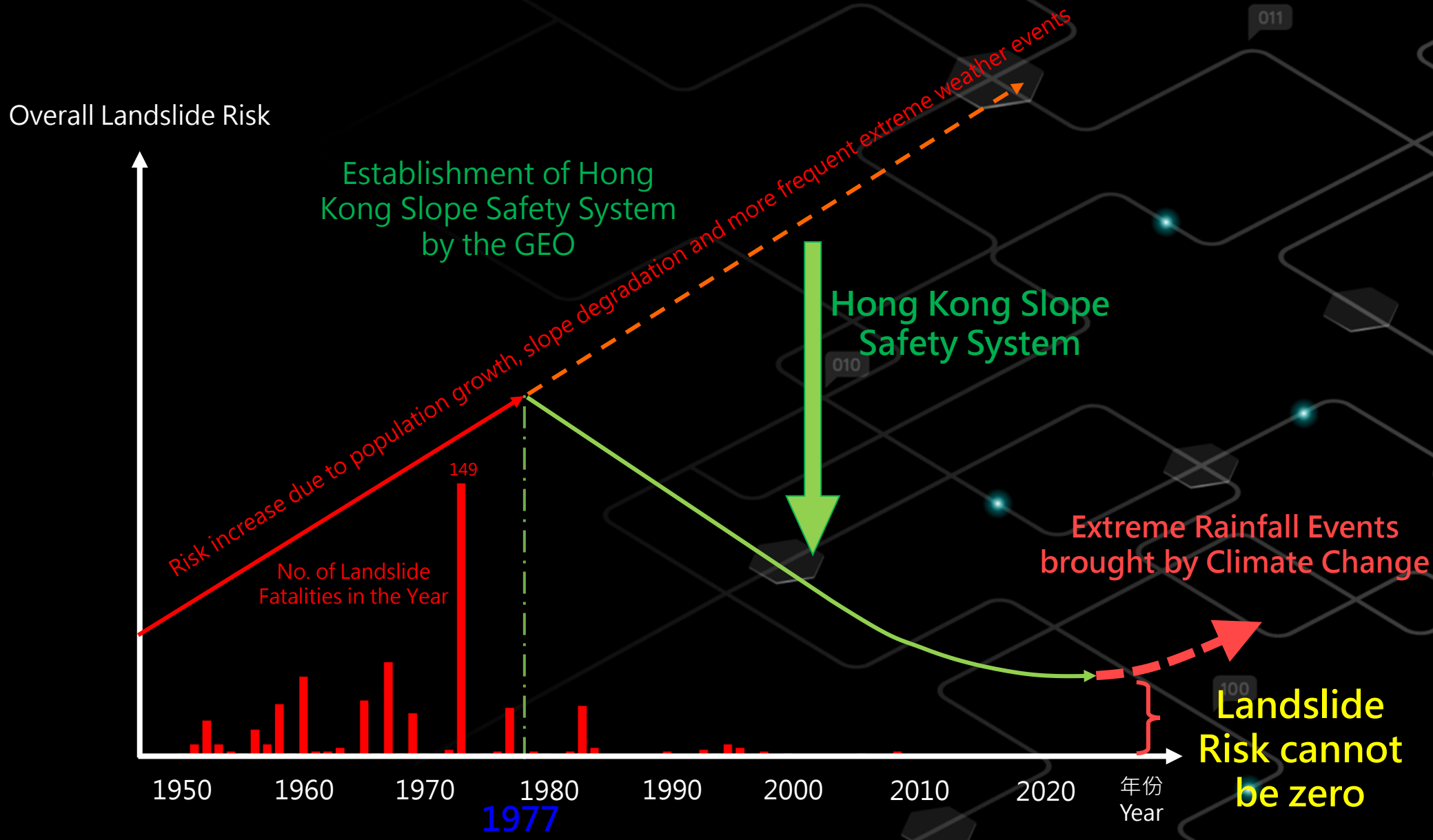
Enhanced Natural Terrain Landslide Inventory (ENTLI) (>110,000 landslides in natural terrain)

Landslide Risk Management Strategies

Landslide Risk Management Strategies



Landslide Risk in Hong Kong



Comparing Three Major Rainstorms

	18-6-1972		7-6-2008		8-9-2023
Max. 24-hr Rainfall (mm)	 >200	VS	 >300	VS	 >600
No. of Landslides	No data		360		181
No. of Deaths	140		2		0
Impact	Many buildings and structures collapsed, causing chaos in society.		The road leading to airport is blocked. Widespread areas (including Tai O) were affected.		Some roads were blocked, and most of them could be fully or partially opened within one to two days.

Climate Change and Extreme Rainstorm Events

In recent years, extreme weather events have caused landslides with significant casualties and economic losses in places near Hong Kong.

2014 rainstorm in Hiroshima Japan (74 fatalities)

2011 rainstorm in Seoul, South Korea (69 fatalities)

2008 rainstorm in Lantau, Hong Kong

2018 rainstorm in Western Japan (>200 fatalities)

2009 Typhoon Morakot in Taiwan (around 650 fatalities)

Extracted from the Google Map

Hong Kong


01
Enhance slope design standards and adopt innovative measures and technology
02
Improve the Government's emergency response capacity
03
Improve community resilience against extreme rainstorm
04
Development of new technologies

01 Enhance slope design standards; adopt innovative measures and technology

Use of soil nails to enhance the robustness of slope

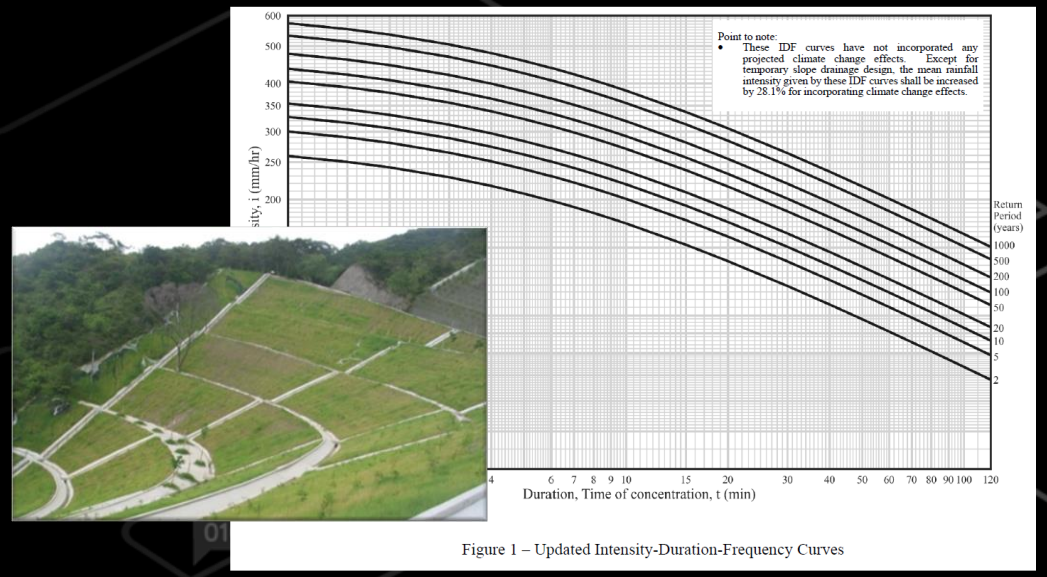
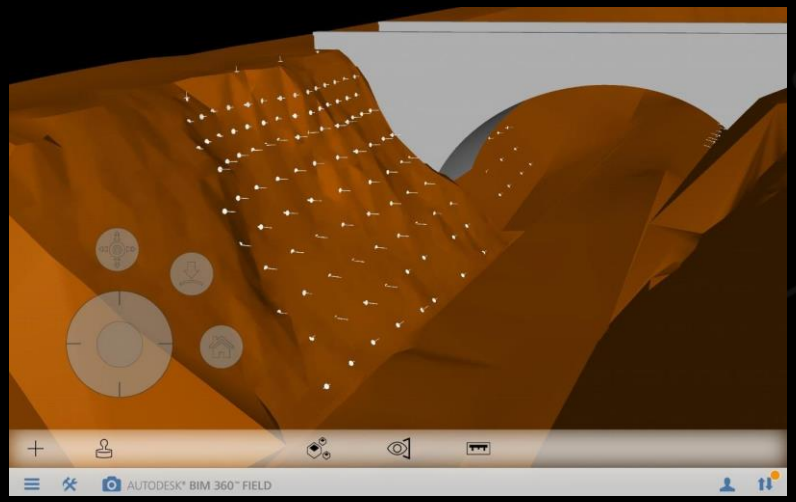
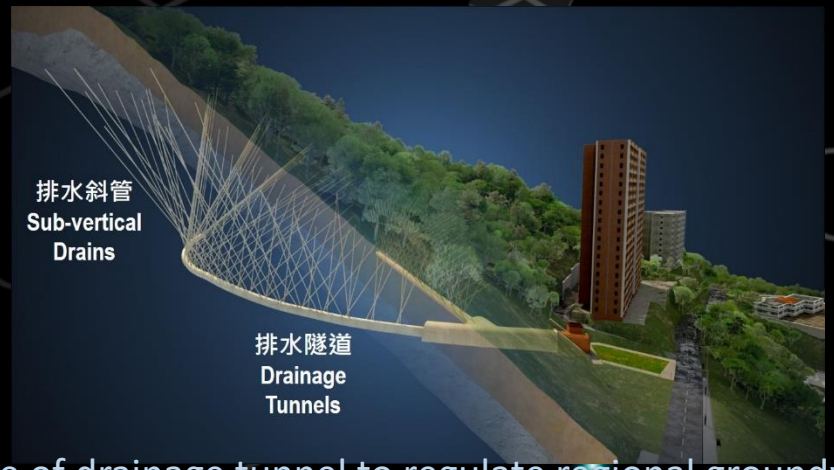


Figure 1 – Updated Intensity-Duration-Frequency Curves

Improve slope surface drainage



Adopt BIM for Slope Design



Use of drainage tunnel to regulate regional groundwater

02 Improve the Government's emergency response capacity

GEO Emergency Service

Smart Barrier System

COP for Emergency Management

Show Major Cases Only | Show Active Cases Only

Custom
05/06/2022 13:56 To 09/06/2022 13:57

WORKS DEPTS | FSD/HKPF | TRAFFIC

Emergency Control Centre

ArchSD	Inactive
BD	Inactive
CEDD	Inactive
DSD	Inactive
HB ICU	Inactive
HD	Inactive

Status

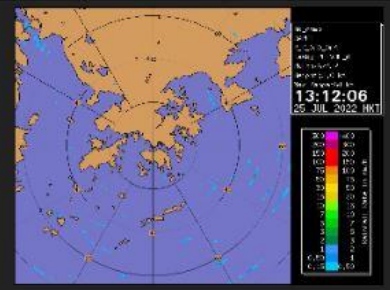
Incident Summary List

2022/06/3137 (Minor)
Created Date: 09/06/2022 11:24:18

Reported Incident Overview Map

GIS Map Platform

FULL FUNCTION MODE | QUICK PREVIEW MODE

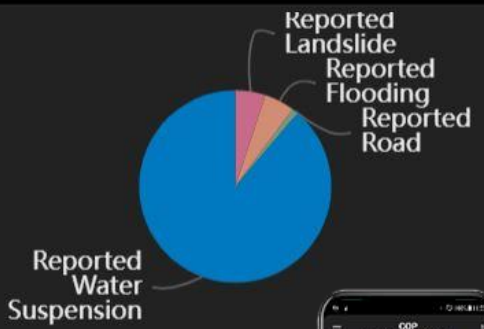


Radar (64km)

BD Incidents	DSD Incidents	CEDD Incidents	HyD Incidents	HD Incidents
0	5	4	1	0

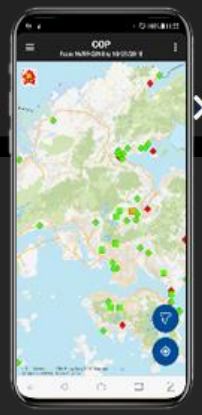
D Incidents	ArchSD Incidents	HB ICU Incidents	WSD Incidents
1	0	0	87

Incident Summary by Departments



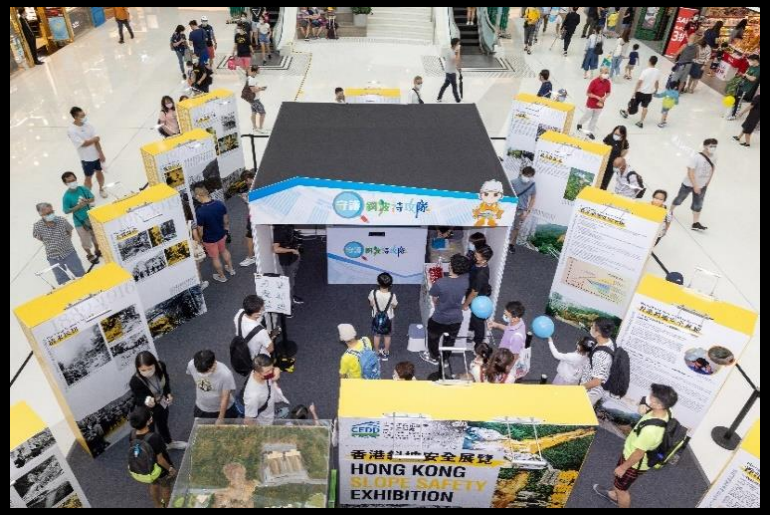
All Incidents

Inter-departmental Multi-faceted Common Operational Picture



03 Improving Community Resilience against Extreme Rainstorm

Public Education Activities



TV - API

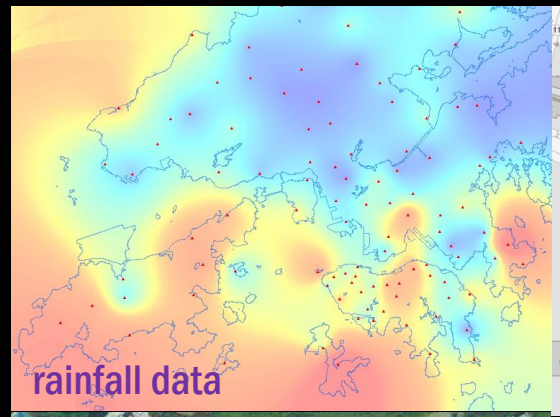
Landslip Warning

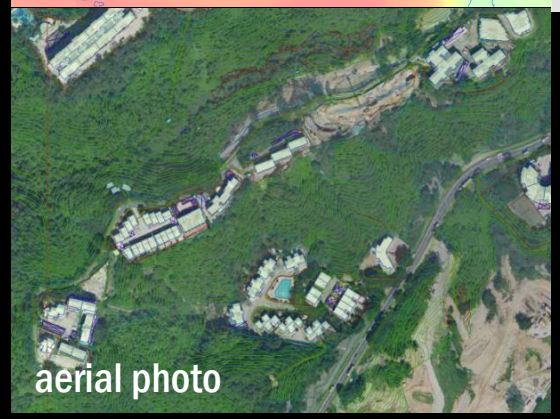
Landslide Self-help Tips

04

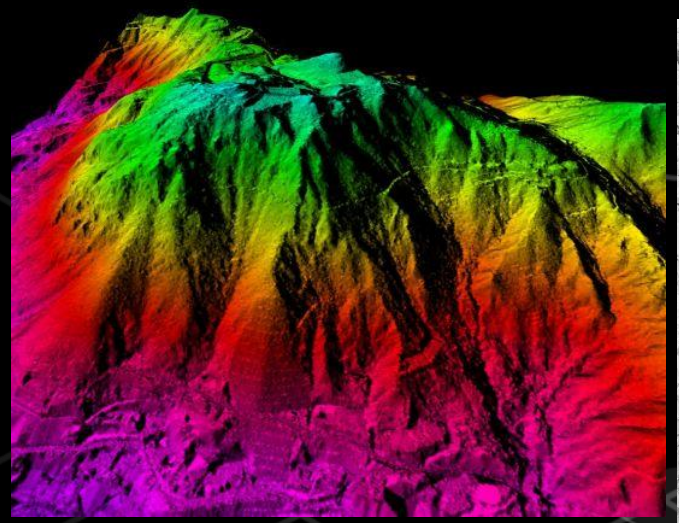
Development of new technologies

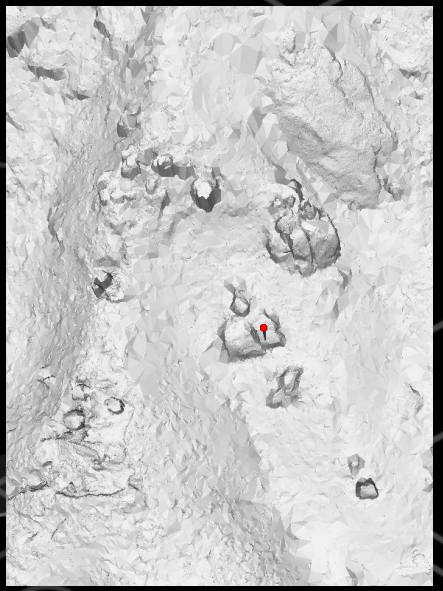
1 Digital Technology



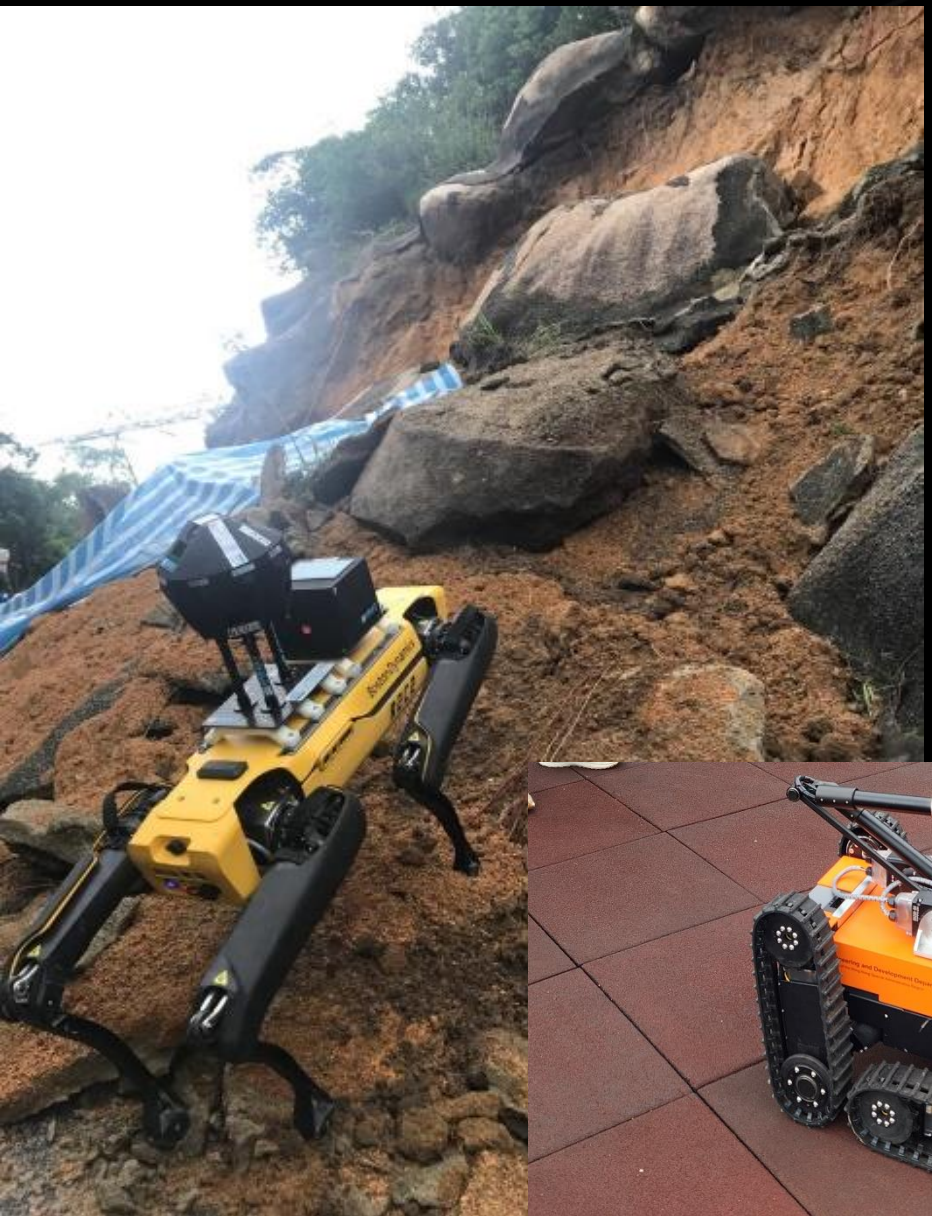


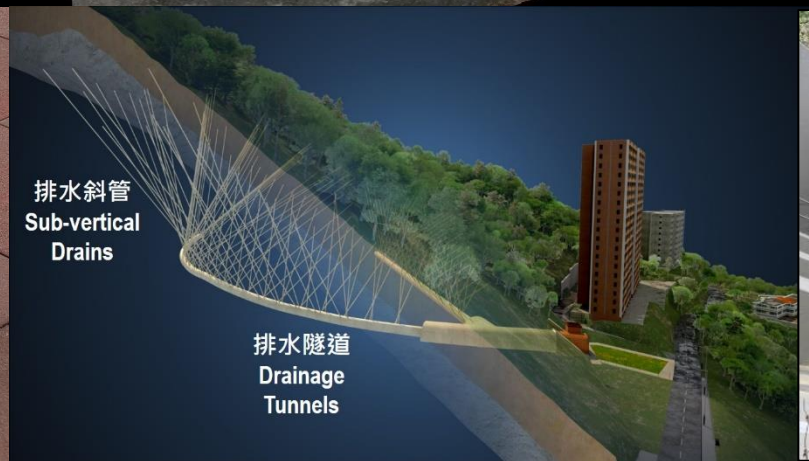
2 Remote Sensing and AI Technology





3 Robotics, IoT and Digital Twins





In closing,

- Climate change will likely cause more frequent extreme weather events and we should get prepared for them.
- The latest innovation and technology (I&T) is a good tool for us to get ourselves better prepared and to improve our services.
- The collaboration among all Government departments as is vital to deal with challenges caused by extreme weather.

Expect the Unexpected

https://live.staticflickr.com/65535/51979798185_b32936c078_b.jpg