Utilization of Unmanned System for Environmental Sampling in CTBT OSI

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outline

Introduction

Challenges of OSI

Unmanned system

Requirements for an OSI unmanned system

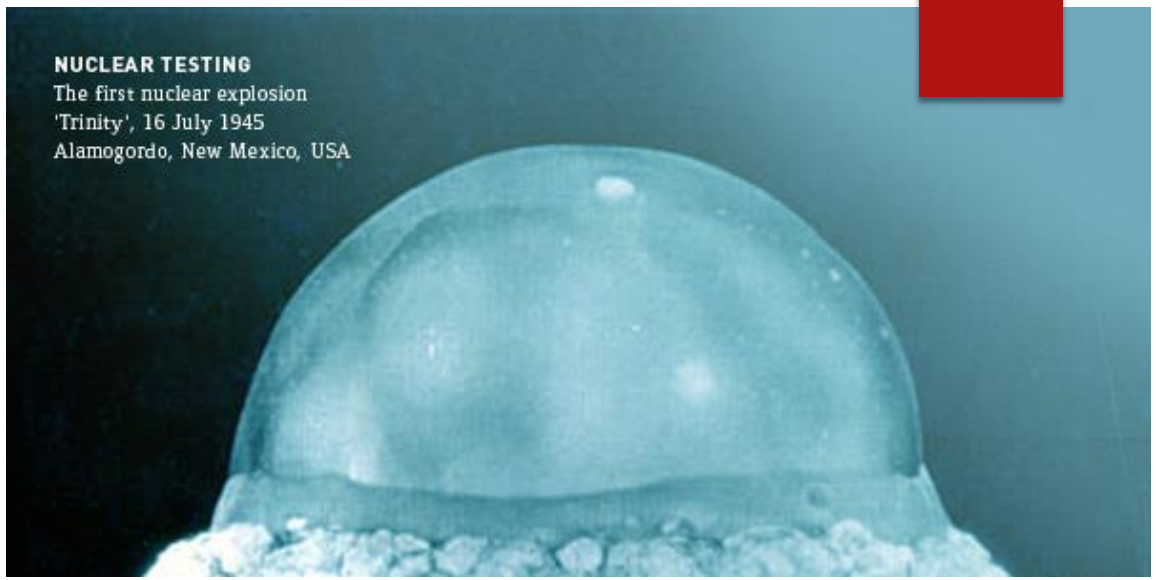
Conceptual illustration

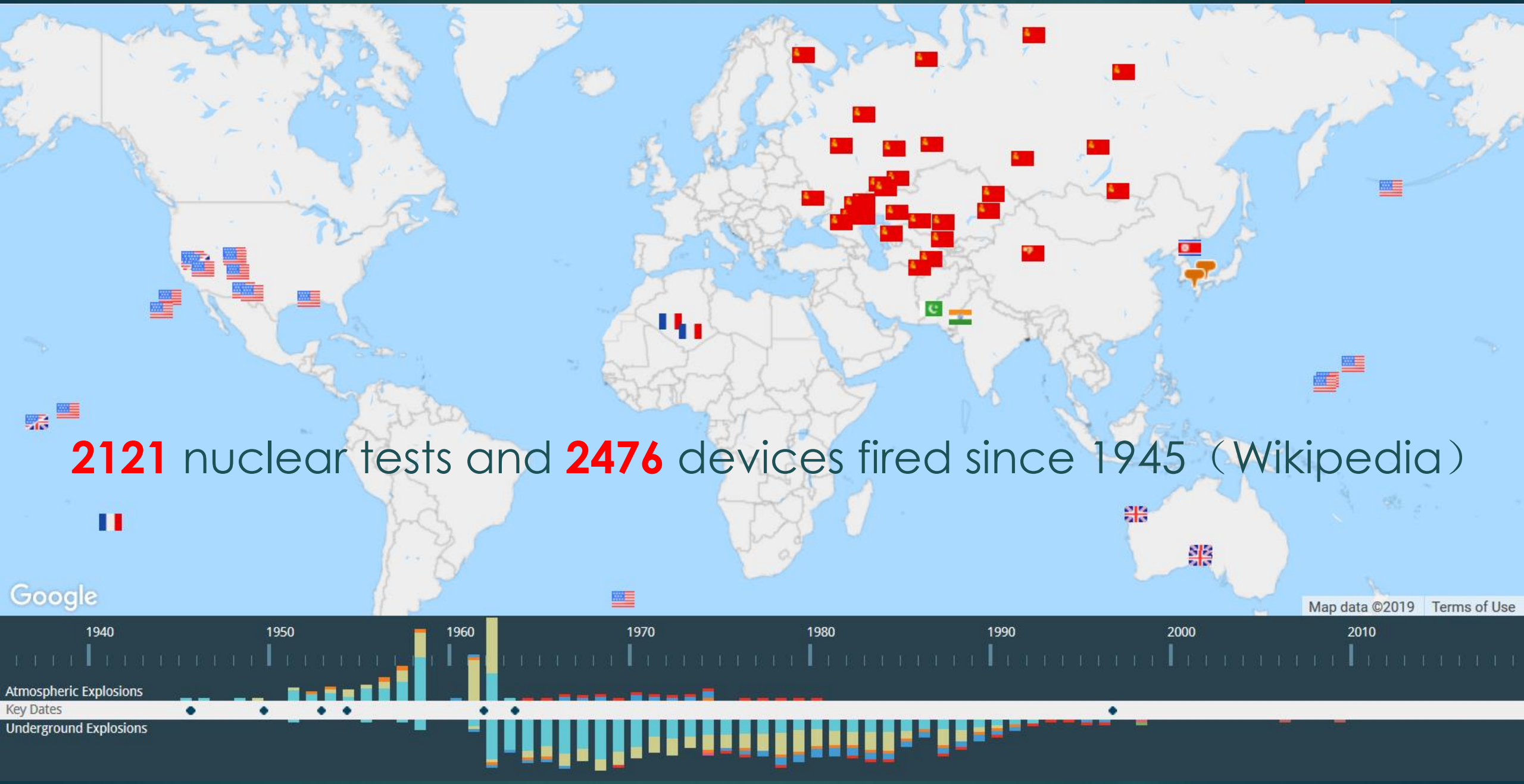
Discussion and challenges

Conclusions

Introduction

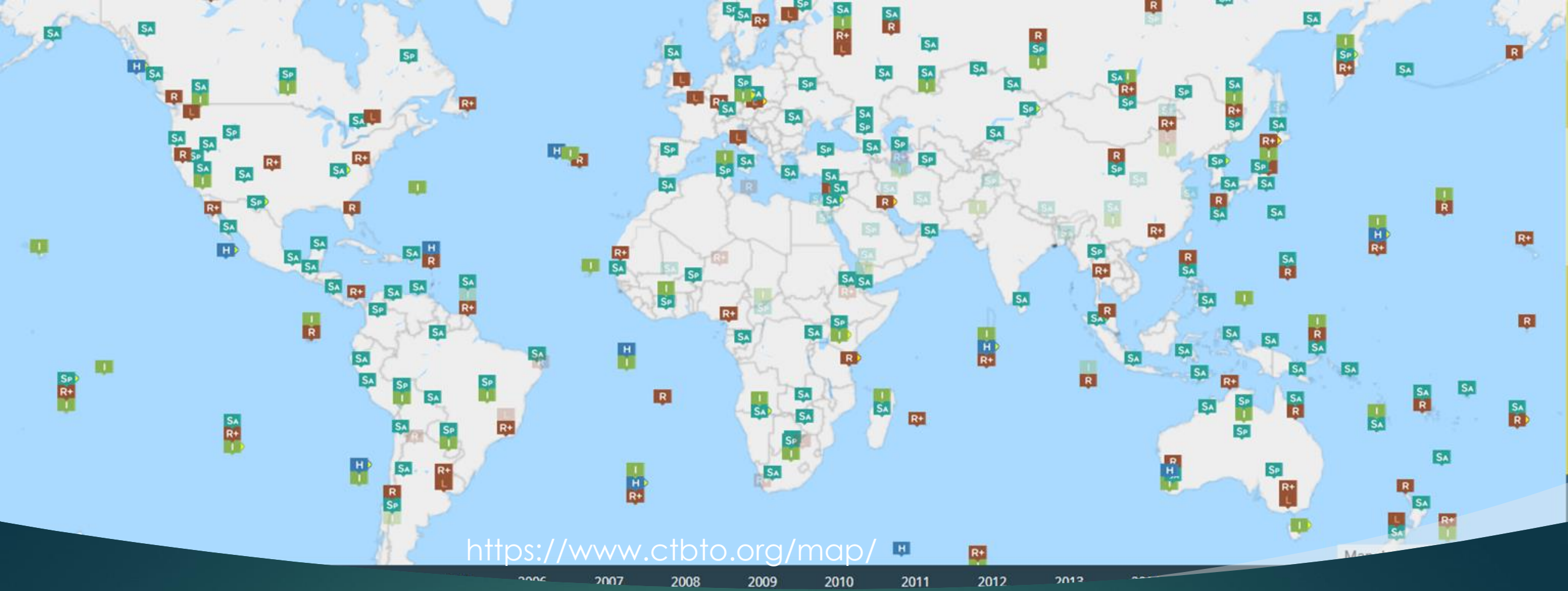
- CTBT in retrospect





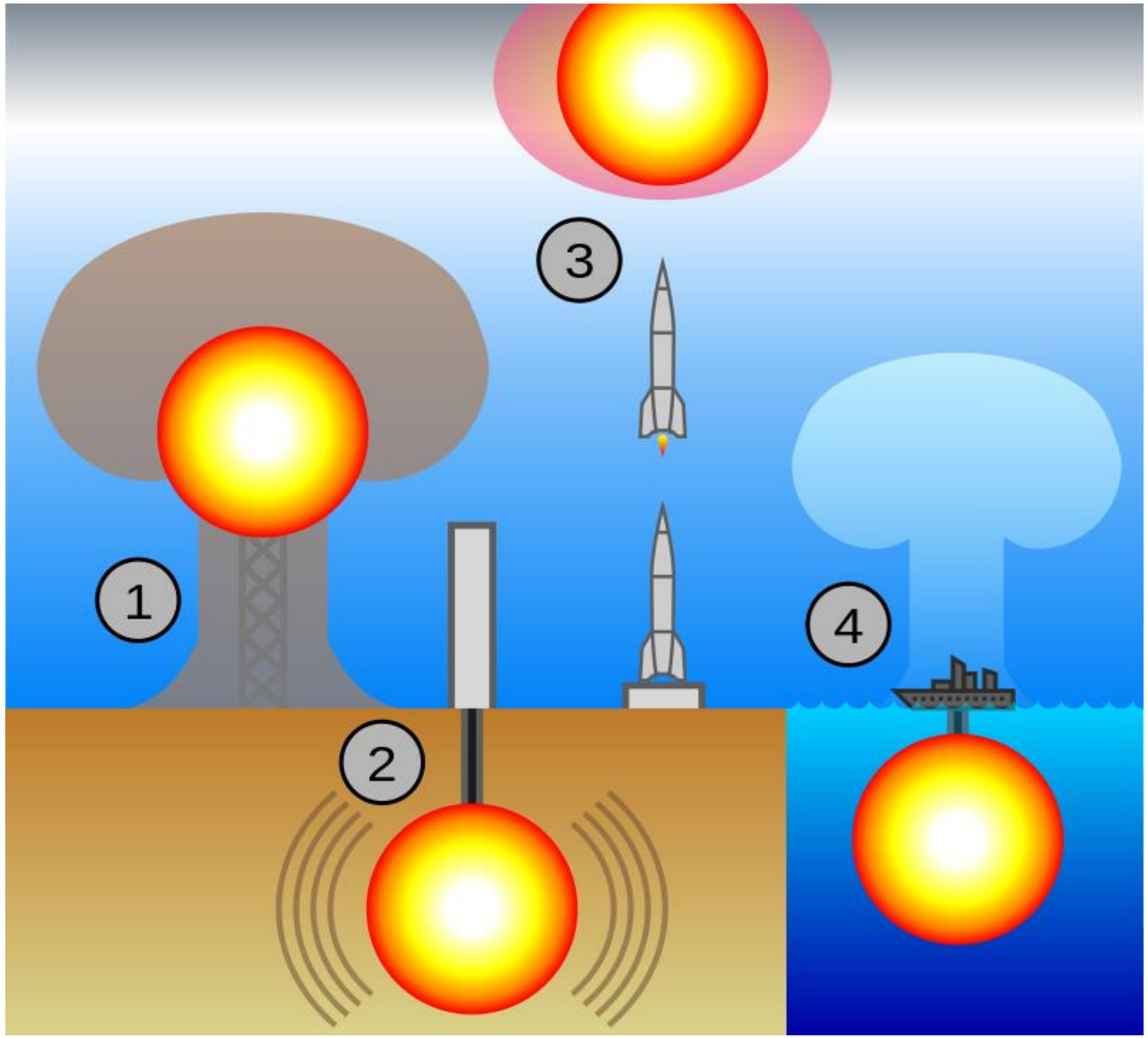
2121 nuclear tests and **2476** devices fired since 1945（Wikipedia）

https://www.ctbto.org/map/



Challenges of OSI

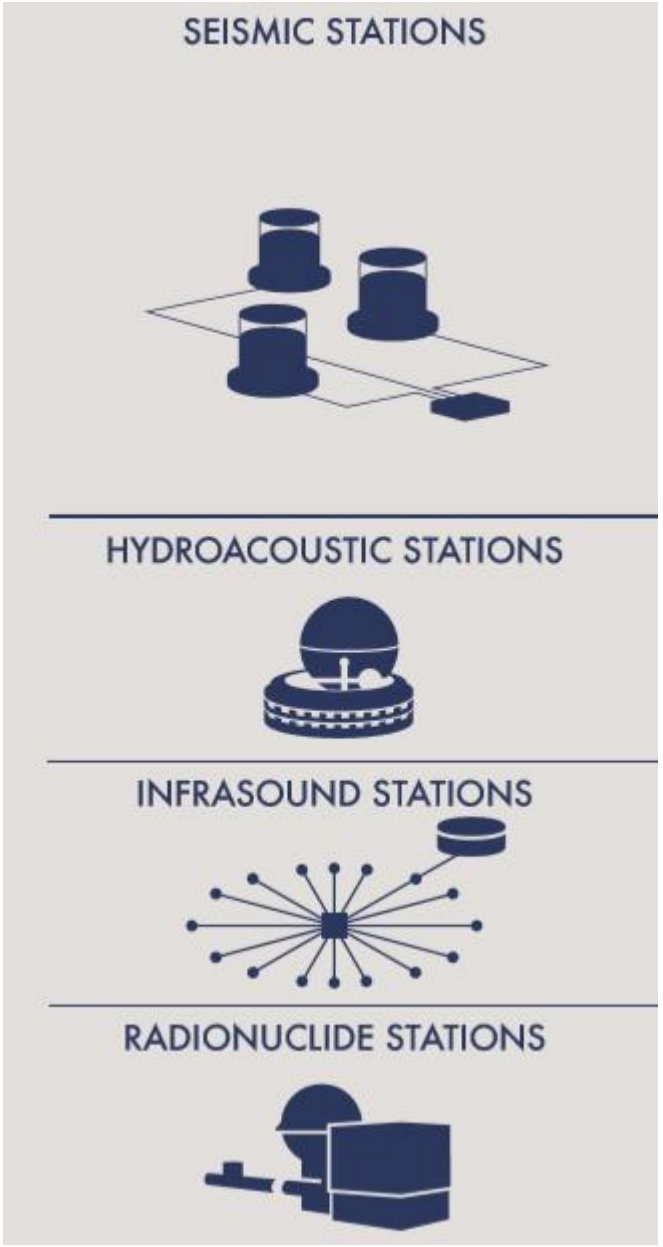
Challenges of OSI



Four major types of nuclear testing: 1. atmospheric, 2. underground, 3. exoatmospheric, 4. underwater

Challenges of OSI

The International Monitoring System(IMS)



Challenges of OSI

- Harsh Environments
- Tough conditions
- Limited pesonnel

Remote area

Mountainous

High vegetation

Challenges of OSI

- Harsh Environments
- Tough conditions
- Limited pesonnel

Extreme hot/cold

Extreme wet/dry

High radioactivity

Unreachable area

Challenges of OSI

The small number of sieverts absorbed in a shorter time will generally cause more damage, but cumulative long-term dose plays a big role in things like cancer risk.

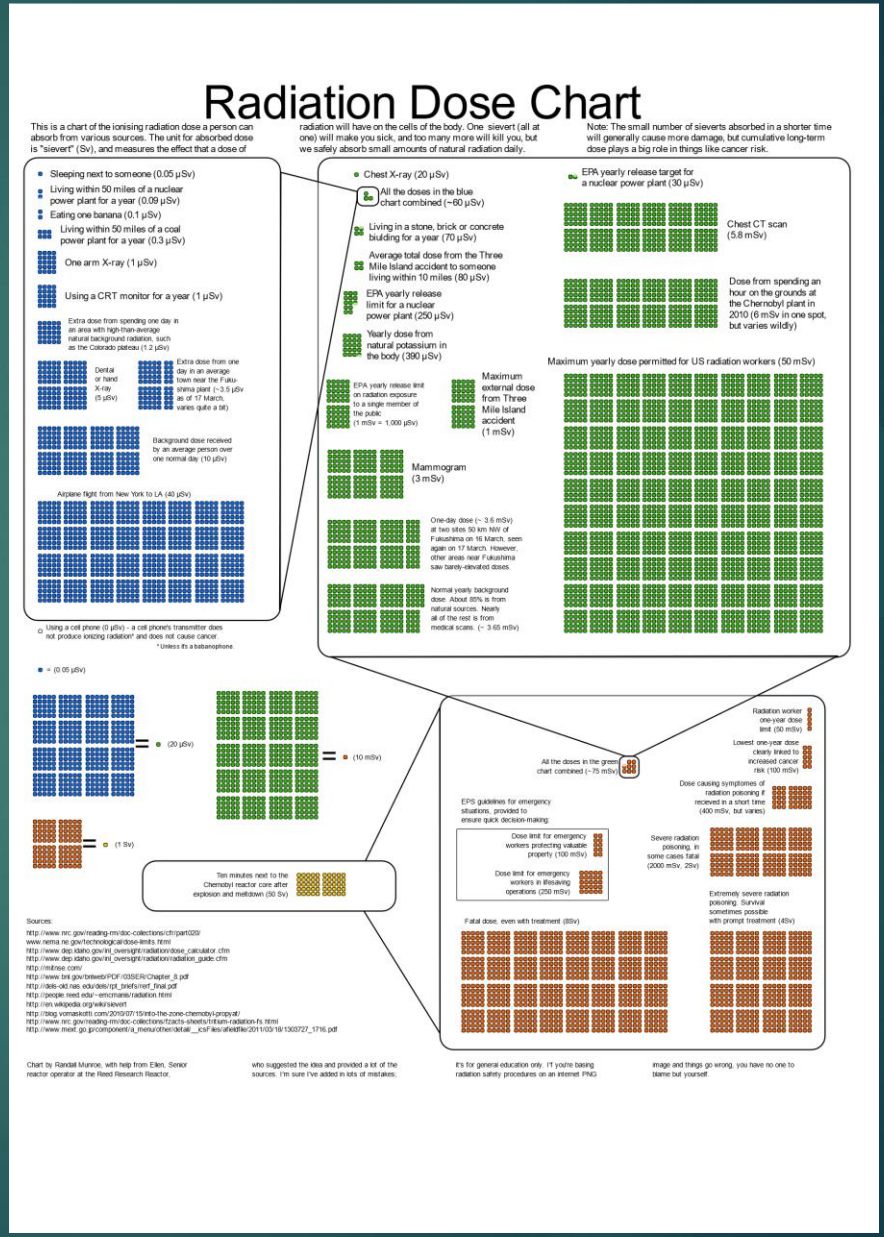


Chart by Randall Munroe, with help from Ellen, Senior reactor operator at the Reed Research Reactor

Challenges of an OSI

- Harsh Environments
- Tough conditions
- Limited pesonnel

Soil-gas sampling for noble gas detection.

The inspection team conducting electrical resistivity tomography.

*During an OSI, an inspection area of up to **1000** square kilometers would be searched by a team of inspectors (up to **40**)*

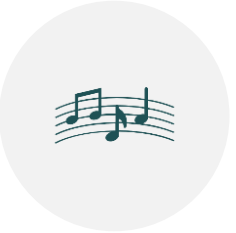
Unmmaned system

Unmmaned system

PLATFORM

MOBILITY

CONTROL



PERFORMANCE

FUNCTIONALITY

Requirements for an OSI unmanned system

RN detector	Sampling gears	Navigation	Control mode
Mobility	Size, weight ,power	Communication	Maintainability
	Reliability	Persistence	

Conceptual Illustration

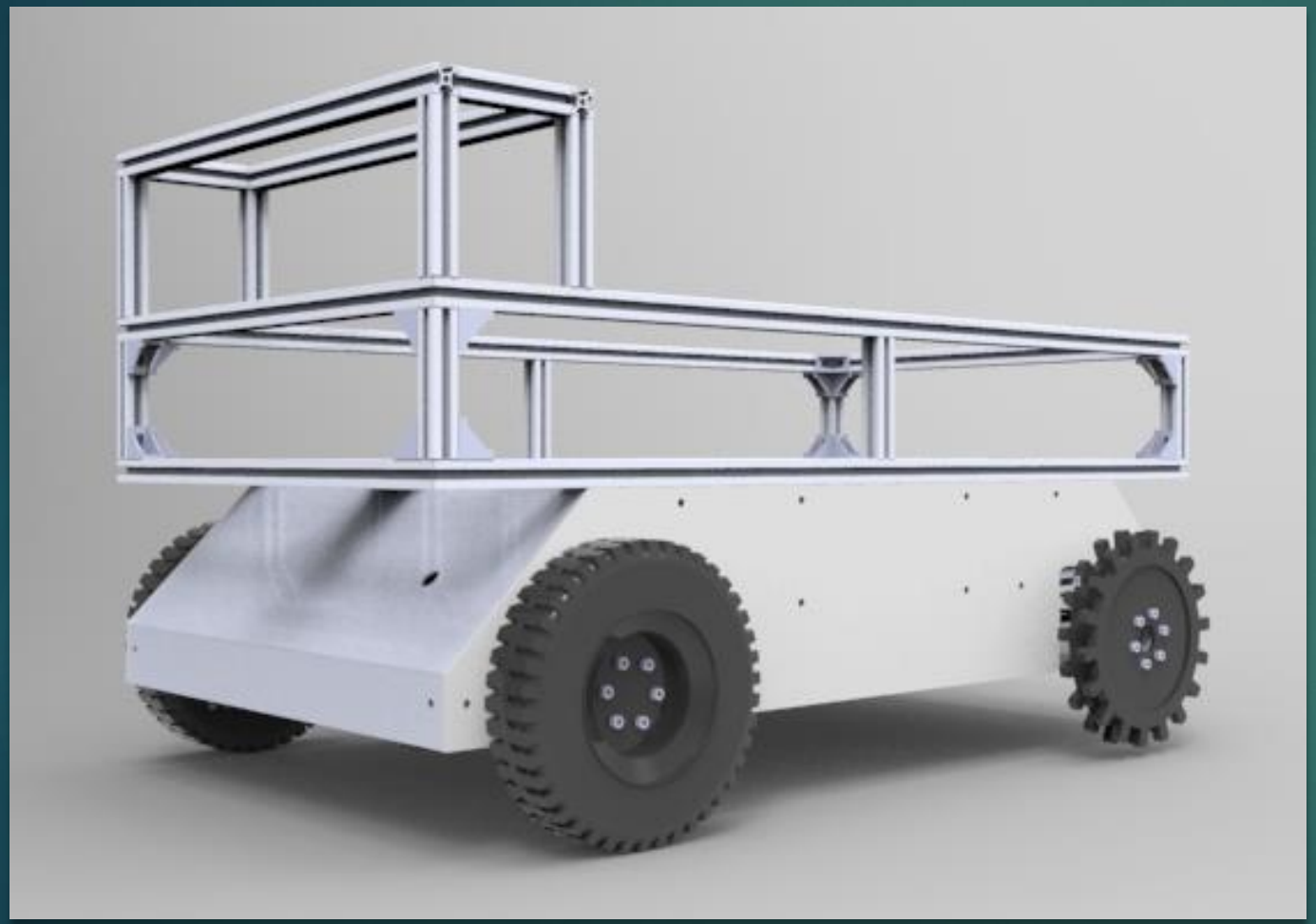
BRIEF INTRODUCTION
OF THE SYSTEM

- Modular design
- Wire/Wireless control
- Day/night duty
- Multi-terrain
- Versatile Interface

Conceptual Illustration

TECHNICAL SPECIFICATION

- Replaceable wheels/tracks
- Navigation: manual/target/guided
- Reliability: anti-nuclear-radiation/water&dust proof
- Persistence > 6 hours
- Max speed of 30km/h



Conceptual Illustration

VIDEOS AND PICTURES

Conceptual Illustration

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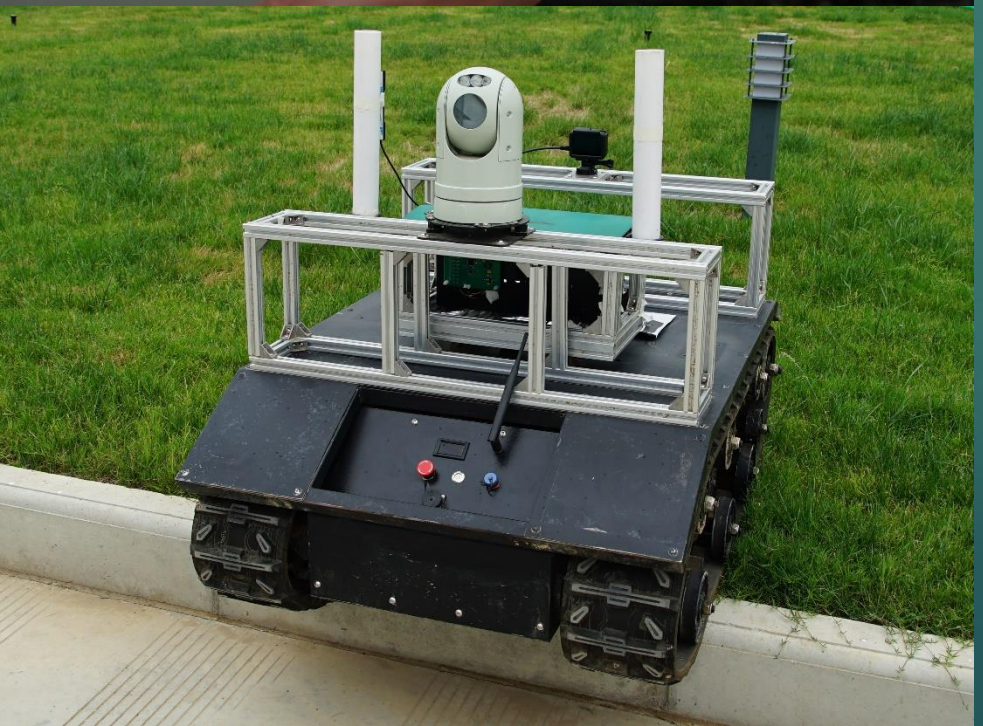

Conceptual Illustration

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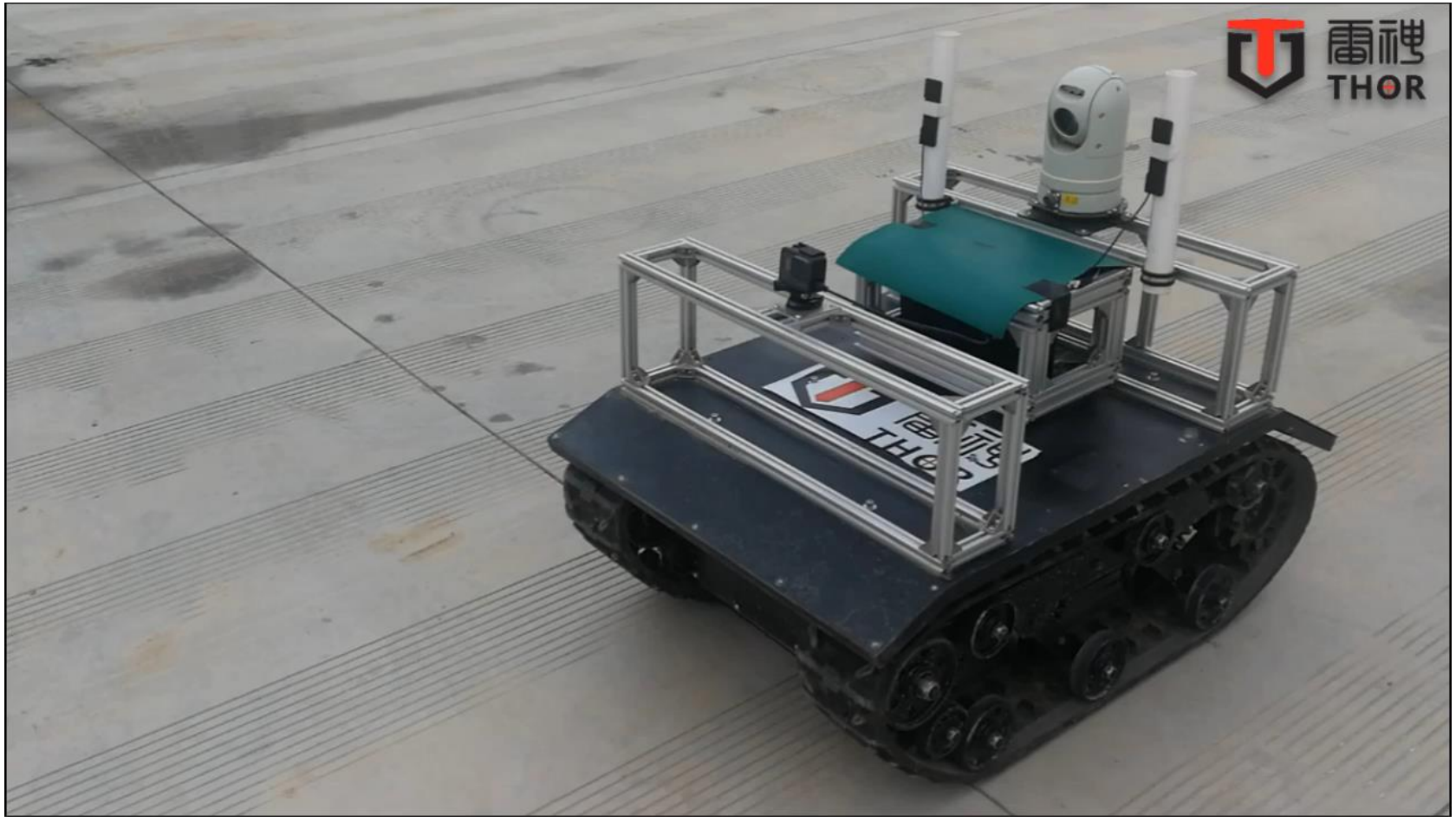


Discussion and challenges

POLICY AND DOCTRINE

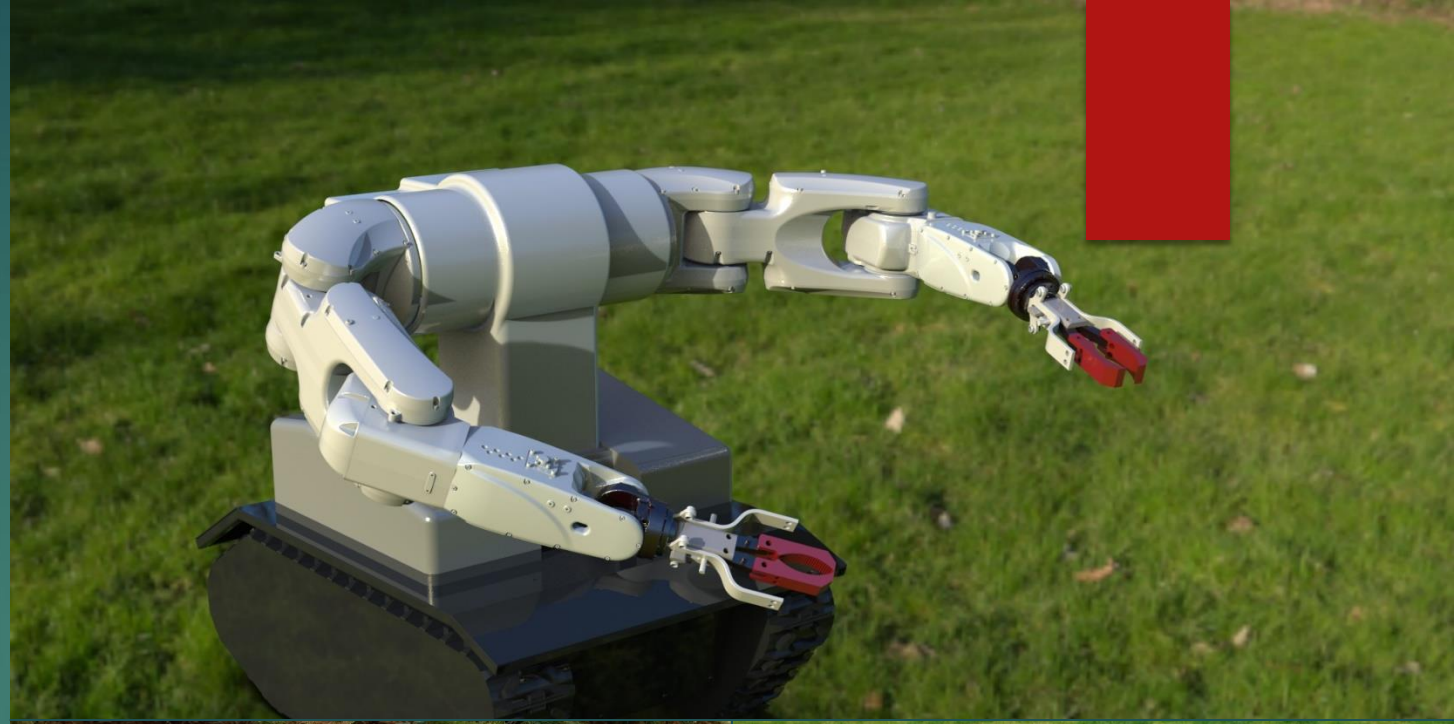
FURTHER DEVELOPMENT

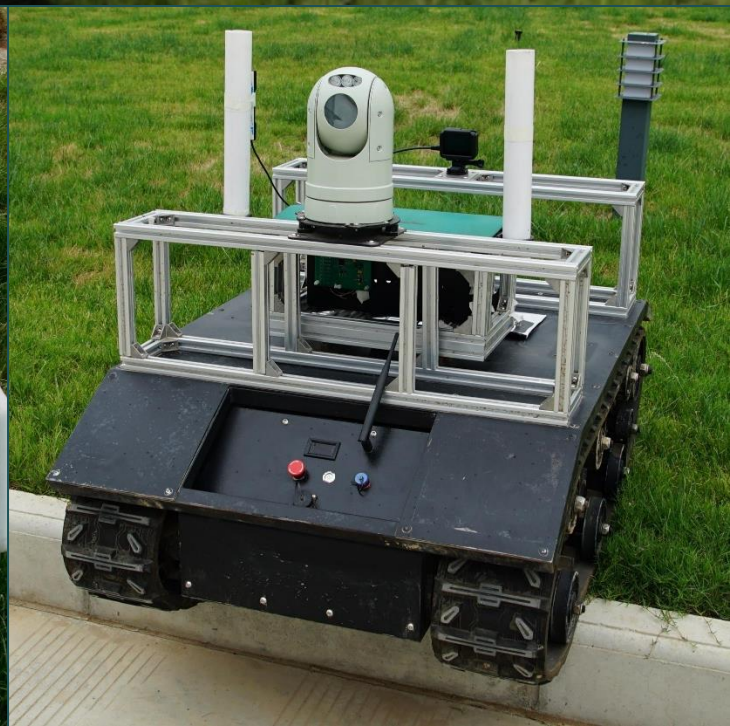
Discussion and challenges

FURTHER DEVELOPMENT

Conclusions

UGV WOULD BE PRACTICABLE AND HELPFUL IN THE PROCESS OF ENVIRONMENTAL SAMPLING IN OSI





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DZIĘKUJE
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DANKE
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TEŞEKKÜR EDERIM
धन्यवाद
TAKK
감사합니다
GO RAIBH MAITH AGAT
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DANK U
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