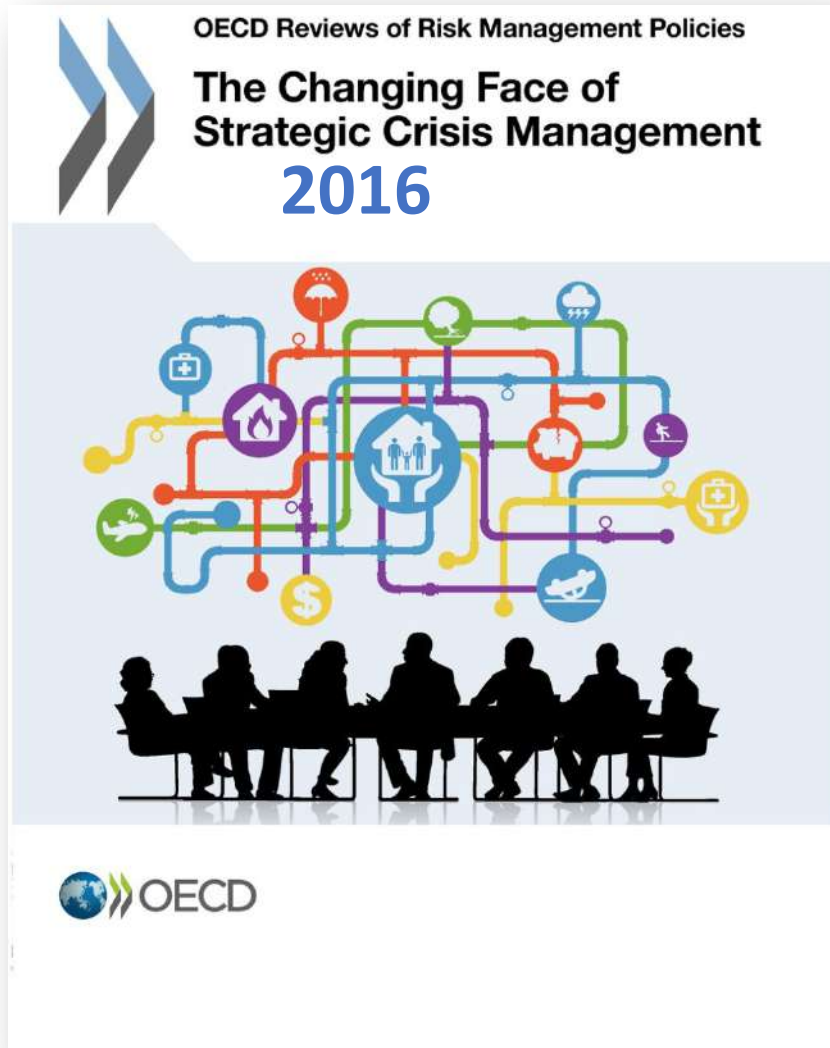# NERIS Workshop 2018

25-27 April 2018
Dublin, Ireland

Challenges in a changing world to be prepared for nuclear emergency response

Marie Claire Cantone, Ivan Veronese
Università di Milano

1) New crises call for new crisis management responses

OECD Reviews of Risk Management Policies

The Changing Face of Strategic Crisis Management
2016

OECD

"*Recent* **large-scale natural hazards, terrorist attacks**, *global pandemics, refugee crises and* **industrial accidents** *have demonstrated the diversity and complexity of today's crises.*
The increasing **interconnectedness of modern societies** *makes them also vulnerable to shock events originating outside their national territory, as socio-economic impacts can cascade across physical borders.* "

https://read.oecd-ilibrary.org/governance/the-changing-face-of-strategic-crisis-management_9789264249127-en#page13

1) **The world is changing**

EUROPEAN COMMISSION

Brussels, 23.5.2017
SWD(2017) 176 final

COMMISSION STAFF WORKING DOCUMENT

Overview of Natural and Man-made Disaster Risks the European Union may face
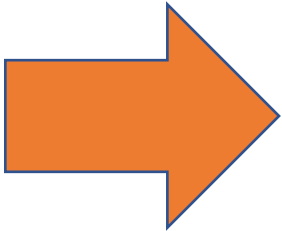
Natech risk is expected to increase in the future due to more natural hazards associated with climate change and a higher vulnerability of society -**urbanisation, and inter-connectedness**.

(…) **the impacts of infrastructure disruption on risks** of flood and environmental pollution, as well as further cascading effects on other forms of critical infrastructure across a range of sectors; the loss of critical infrastructure, **nuclear and industrial accidents may also be linked to increased risks of terrorist and cyber-attacks.**

1) The world is changing

The concept of critical infrastructure considers different factors

- " the impact on delivery of essential societal functions and services, e.g. to *provide water, food and shelter*, and to maintain law and order;

- the economic impact on the well-being and viability of the city, e.g. the ability to operate as a business and financial centre and provide employment;

- the impact on life, health and well-being of city occupants, e.g. to *provide medical and social services to protect and care for citizens;*

- *the ability to respond to major incidents or disasters, e.g. to provide emergency services including sites to manage emergency operations and to provide housing in the event of a disaster."*

critical city infrastructures → communication, emergency services, energy, transport ....

1) The world is changing

Challenges

The number of interconnected devices continues to increase and so the number of **potential access to disrupt critical infrastructure** grows.

The **crowdsourced web ratings** are used significantly to inform many of the decisions people make in their daily lives.

to be active in facing the growing problem

The need to secure future digital devices '*while they are still evolving'*

"Cybersecurity talent deficit"

To be proactive in technology with attention to awareness and behavior

potential approch for sustainable digital ethics

The U.S. is still using floppy disks to run its nuclear program

By James Griffiths, CNN
Updated 1241 GMT (2041 HKT) May 26, 2016

26 May 2016

(CNN) — Want to launch a nuclear missile? You'll need a floppy disk.

That's according to a new report by the U.S. Government Accountability Office (GAO), which found that the Pentagon was still using 1970s-era computing systems that require "eight-inch floppy disks."

Such disks were already becoming obsolete by the end of that decade, being edged out by smaller, non-floppy 3.5 to 5.25-inch disks, before being almost completely replaced by the CD in the late 90s.

Except in Washington that is. The GAO report says that U.S. government departments spend upwards of $60 billion a year on operating and maintaining out-of-date technologies.

Photos: Gadget graveyard

computers built in the 1970s that still use 8in floppy disks
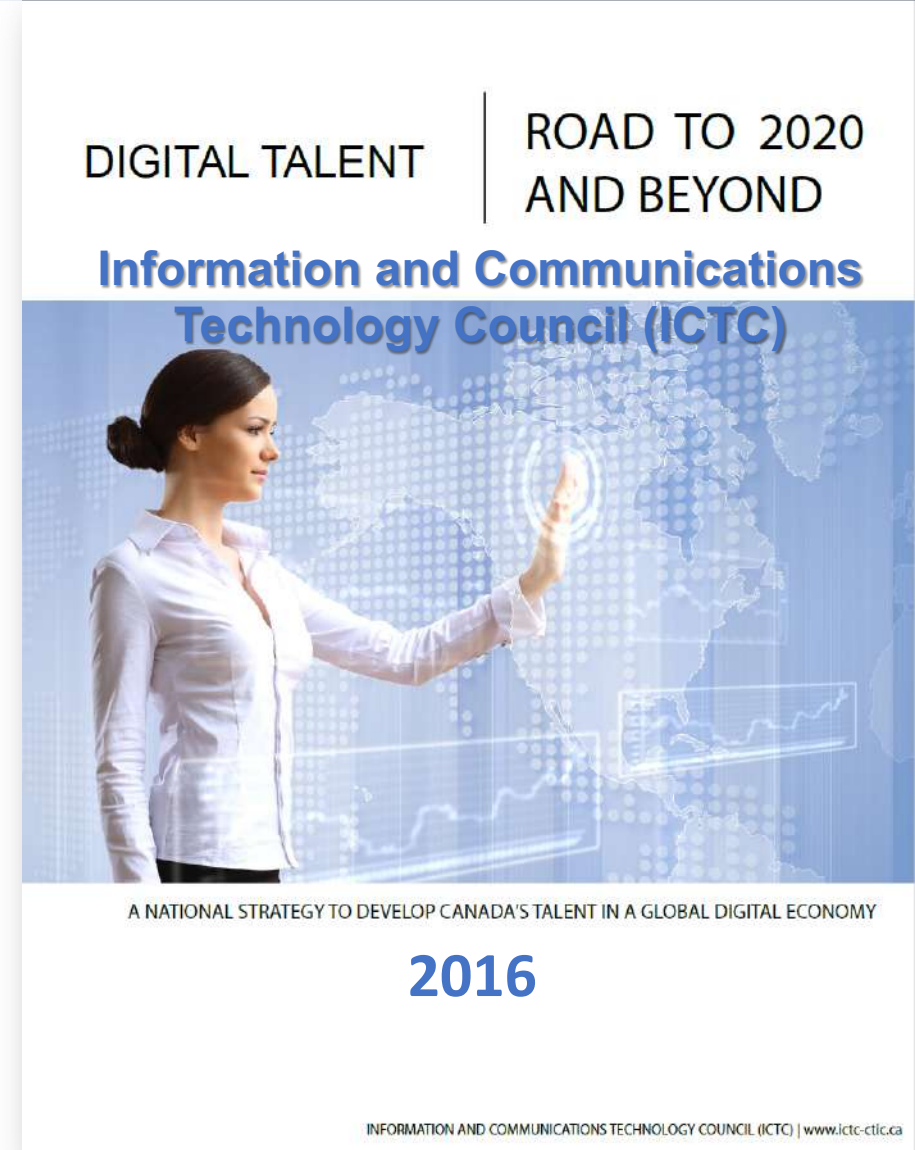
an upgrade beginning in 2017, it will be complete by 2020

Challenges

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DIGITAL TALENT | ROAD TO 2020 AND BEYOND

Information and Communications Technology Council (ICTC)

A NATIONAL STRATEGY TO DEVELOP CANADA'S TALENT IN A GLOBAL DIGITAL ECONOMY

2016

INFORMATION AND COMMUNICATIONS TECHNOLOGY COUNCIL (ICTC) | www.ictc-ctic.ca

2) The world is changing

Research efforts have focused on the **development of families of robotos** specialized in prevention and intervation and widely used in many civil and military applications.

Robotic systems based on the interaction between human-robot - environment, **to be used instead of human operators.**

Challenges

the evaluation of risk connected with robots use in a nuclear emergency response

*different scenarios may have extreme terrain and operating conditions which affect **the size and performance of the systems** and, more generally, **the correct operation** and survival of the robot.*

2) The world is changing

Challenges

Research efforts have focused on the **development of families of robotos** specialized in prevention and intervation and widely used in many civil and military applications.

Robotic systems based on the interaction between human-robot - environment, **to be used instead of human operators.**

a system-oriented approach, such as FMEA failure mode and effects analysis:

- *to identifying the components that may most contribute to a failure,*
- *to evaluating the reliability of the robot equipment*
- *to emphasizing the conditions for it to possibly function successfully.*

2) The world is changing

Challenges

Experiences from JAEA-3 emergency response robot at Fukushima Daiichi NPP

IAEA Robotics Challenge

Fig. 6 JAEA-3 robot equipped with gamma imaging and measure-ment device

Kawatsuma et al. Robomech J. (2017) 4:6 DOI 10.1186/s40648-017-0073-7

To reduce dose and improving working condition for measurements in areas of:
-difficult access   - high radiation level

3) **The world is changing**

Challenges

A number of lessons learned are available in relation to past emergencies.

The **emergency exercises** provide the basis for a **review of the arrangements in a nuclear emergency response,** at national and international levels.
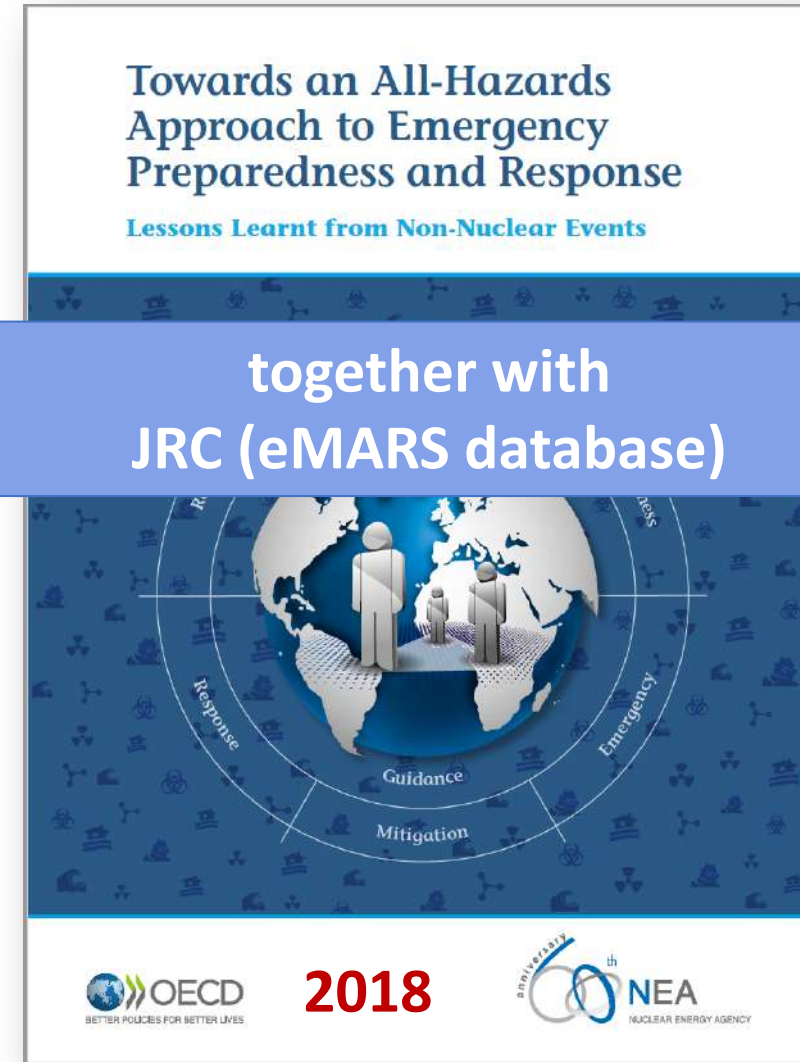
- **to avoid a gap in the application of those lessons to possible new cases of emergency response.**

- **to highlight whether positive changes, identified through these exercises, are followed up with proper implementation**

3) The world is changing

Challenges

A **number of lessons learned are available** in relation to past emergencies.

The **emergency exercises** provide the basis for a **review of the arrangements in a nuclear emergency response,** at national and international levels.

**together with
JRC (eMARS database)**

2018

https://www.oecd-nea.org/rp/pubs/2018/7308-all-hazards-epr.pdf

3) **The world is changing**

Challenges

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The **emergency exercises** provide the basis for a **review of the arrangements in a nuclear emergency response,** at national and international levels.

Ch. 2 Lessons learnt from major accidents relating to emergency response

'many accidents in which the emergency response is inadequate'

The analysis
'It aims to fill gaps in the learning drawn from emergency responses to reported accidents, and specifically to answer the questions of **why emergency plans fail and which deficiencies have been observed in emergency responses.'**
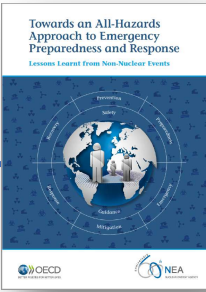
4) The world is changing

‘need to know’ → ‘need to share’

social media is recognised as **bringing beneficial changes** in the communication of risk directly with the public and, at the same time **number of lessons learned on need to know and need to share are available** in relation to past emergencies.

Challenges

towards creating an effective and continuously resilient community

*to really concentrate on **how to work in partnership** with other countries*

to create coordination at national and international levels

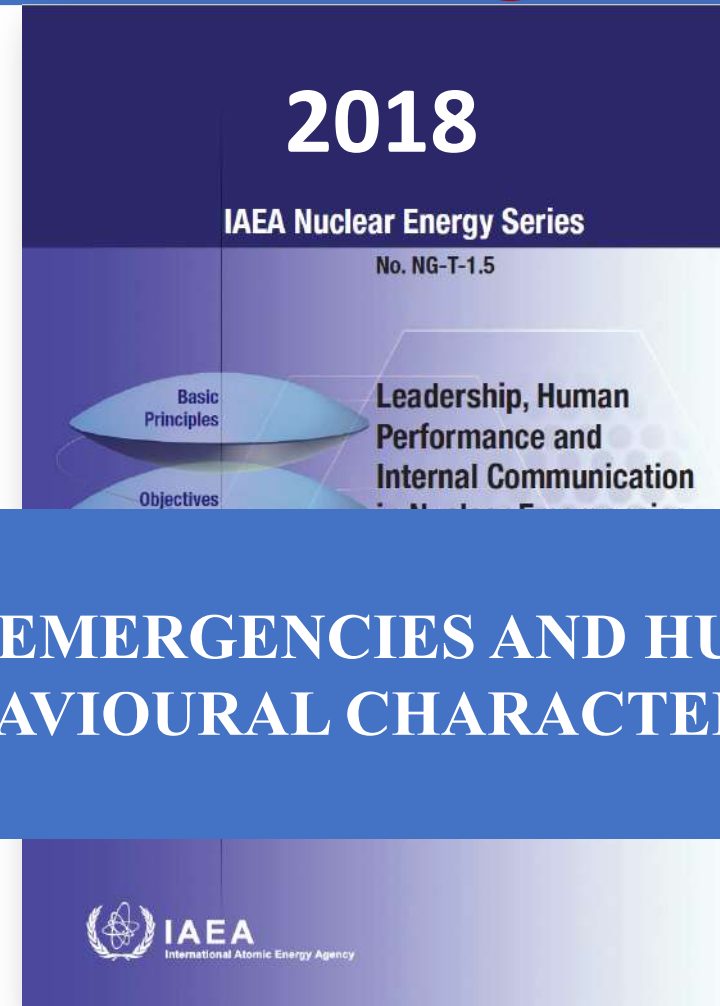*to integrate decision-making process **with stakeholders***

4) **The world is changing**

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2018

IAEA Nuclear Energy Series
No. NG-T-1.5

Basic Principles

Leadership, Human Performance and Internal Communication

Objectives

2. EMERGENCIES AND HUMAN BEHAVIOURAL CHARACTERISTICS

IAEA
International Atomic Energy Agency

https://www.hsdl.org/?abstract&did=807967

4) The world is changing

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Challenges

to continue to trace whether these recognised changes on the 'need to share' really persist over the time.

What about the case of Ru -106 release ?

● Which challenges to be addressed in such a case ?

● Which lessons are emerging ?