GIE: EDF – CEA – AREVA

INTERVENTION ROBOTIQUE SUR ACCIDENTS

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Agenda

- Who are we?
- Equipment
- Organization - Drills
Groupe INTRA was created by the three French Nuclear Operators.

It is located on the industrial site on the EDF Chinon Nuclear Power Station (since July 1995).
Main missions in the constitutive contract

- **A mission of equipment**, to DESIGN, IMPLEMENT, OPERATE, and MAINTAIN a fleet of specific remote-controlled equipment, able to intervene instead of human beings, in the case of an accident in one of its members’ nuclear site.

- **A mission of intervention**, to be ready to intervene permanently with its resources, as quickly as possible, and always within 24 hours all over the French territory.
Applied Methodology

1. Study of potential accidents
   - EDF, CEA, AREVA

2. Definition of missions
   - EDF, CEA, AREVA, Groupe INTRA

3. Definition of tools
   - Groupe INTRA, Manufacturers

4. Implementation of an organisation
   - Groupe INTRA

Experience feedback of operation
MISSIONS

- To make site inventories
- To supervise equipment
- To carry out specific operations
- To carry out civil engineering
- Inspections
- Measurement of contamination and radiation levels
- Recovering samples
To make site inventories

To supervise equipment

To carry out specific operations

To carry out civil engineering

Penetrations

Pumps on safety circuits

Safety equipment

Indicators, measuring devices
MISSIONS

To make site inventories
To supervise equipment
To carry out specific operations
To carry out civil engineering

Operation on valves
Operation on actuators, switches
Withdrawal of sources (filters..)
MISSIONS

To make site inventories
To supervise equipment
To carry out specific operations
To carry out civil engineering

Access recognition
Building roads
Digging, banking, groundwork
Scraping the soil
Main Information

Permanent staff : 20

Pilots from members : <30

Yearly Budget : # 4 M€

Global investment : # 40 M€

Members shares : 50 % EDF
                 : 37.5% CEA
                 : 12.5% AREVA
Pilots training

• Pilots come from plants of operators. They are on call for Group Intra.

• They are trained and qualified in Chinon training’s center

• When they are able to drive robots, they obtain a « driving licence » (certificate of safe ability) for one year.
Radiological characterization means
Hélinuc
Aerial Mapping

EQUIPMENT

Logistics

Indoor robots

Outdoor robots

Civil Engineering

Indoor robots

Indoor robots

Civil Engineering

Indoor robots

Civil Engineering

Indoor robots

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Indoor robots

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Indoor robots

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Civil Engineering

Indoor robots

Civil Engineering
Indoor robots

**EOLE**  Robotised Device for Observation and Localisation in the Environment

**EROS**  Robotised Device for Observation and Surveying
EROS/EOLE concept

An onboard cable drum (length of the cable: 350m) linked to 4 simultaneous videos

A harsh-environment resistant electronics (integrated dose up to $10^4$ Gy)

A large autonomy of energy ($\approx 8h$: batteries Lithium Ion)

Measurement devices (ex: gamma goniometer for measurement and localisation of isolated sources)
Outdoor robots

ERASE: External Reconnaissance, Assistance and Surveillance Robot
ERASE External Reconnaissance, Assistance and Surveillance Robot

Some of its characteristics:

- Autonomy: 10 h
- Max speed: 4.2 m/s
- Vision: 5 cameras
- Max integrated radioactivity level: $10^3$ Gy
- Remote controlled up to: 5 km
Civil Engineering
Civil Engineering
EPPB Armoured Mobile Command Post
UAV for pictures, video and measurement
Radiological characterization means

Aerial Gamma system mapping: HELINUC

Skylink Gamma tracer
HELINUC  Airborne gamma mapping system
HELINUC : Implementation

2 – Data storing

Operating conditions

- **Integration time**: 2s
- **Altitude**: 50m
- **Speed**: 70km/h
- **Offset**: 80m

→ **Analysed area**: 5 to 10 km²/day
HELINUC: Map of the exercise of Belleville (NPP) (simulation)

Dose rate from 1m ground level (µSv/h)
Skylink mobile system
SKYLINK: Transmitting radiometers
Interventions
There are several sorts of drills:

- **2 drills minimum per year (5)**
  - With all the equipment, in an external site

About

- **5 call drills per year,**
  - Without mobilisation

**Restricted drills**

- Depending on the internal needs
- Every Friday, with the « on call team »
Real Interventions

Radiological ground characterisation: initial situation of NPP, post-Tchernobyl measurements
Characterisation of installations
Transfer of radiological sources (irradiated filters) on NPP
Work on irradiated environment (drilling)
Organization
Groupe INTRA was founded to intervene in the case of a major accident in one of its members’ plants.

The team and the equipment must be ready to intervene within 24 hours on the whole French Territory

This is verified in exercises and real interventions.
In case of a major crisis, Groupe INTRA can be requested by:

- The national Crisis Centre of one of its members
- The National Authorities (Defense and Civil Security of France)
- A foreign company if an assistance agreement exists

The intervention team, on call 24 hours a day, is immediately called after the initial alert. It must be ready in Groupe INTRA premises in less than 1 hour
Groupe INTRA mobilization

- Alert
- < 1 hour: intervention team is mobilized
- < 3-5 hours: equipment is tested, loaded, and ready for joining the plant
- Journey: between 1 and 12 hours, depending on the plant
- Test and qualification after unloading
- < 24 hours after alert: ready to intervene
After the accident in Fukushima-Daiishi NPP

One week after the accident, Groupe INTRA was ready in Chateauroux airport
International relations

Reception and visits with foreign services (Europe, asia,...).

With our foreign counterparts connected to nuclear operators:

• **Germany** : KHG – Agreement of mutual assistance in the case of accidents. Common exercises. Purchasing of same equipment

• **Russia** : ITUCR (Emergency center of St Petersburg) – Information exchanges - Part of agreement CEA-ROSATOM

• **Japan** : FEPC and JAPC, in charge of the creation of a “Japanese Group INTRA”
Thank you for your attention
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