



# **Groupe INTRA : Activities and Organization in France**

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Groupe INTRA  
Pascal IZYDORCZYK– Deputy Manager  
Pascal.izydorczyk@groupe-intra.com

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## Groupe I N T R A creation

**Groupe INTRA was created by the three  
French Nuclear Operators,**

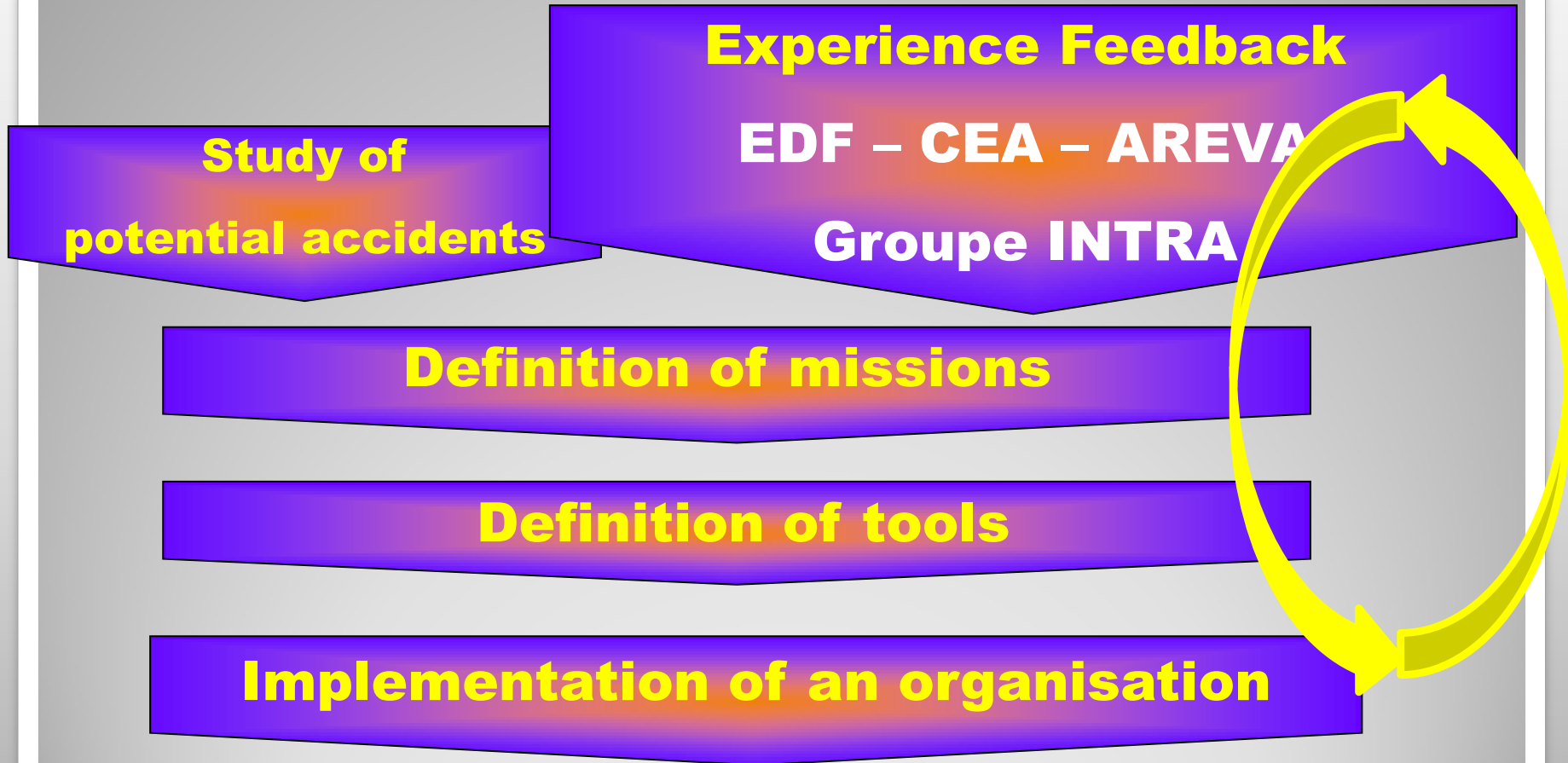


**2 years after the Chernobyl accident**

# **OBJECTIVES given to Groupe INTRA**

- **Equipment :**  
**DEVELOP, OPERATE, and MAINTAIN a fleet of specific remote-controlled vehicles, able to intervene in place of man, in case of major accidents in one of its members' nuclear sites**
- **Intervention :**  
**Be always ready to intervene with its resources, as quickly as possible, and always within 24 hours throughout the French territory**

# Applied Methodology



# 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



# Missions

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

**Entrance on hostile sites**  
**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**

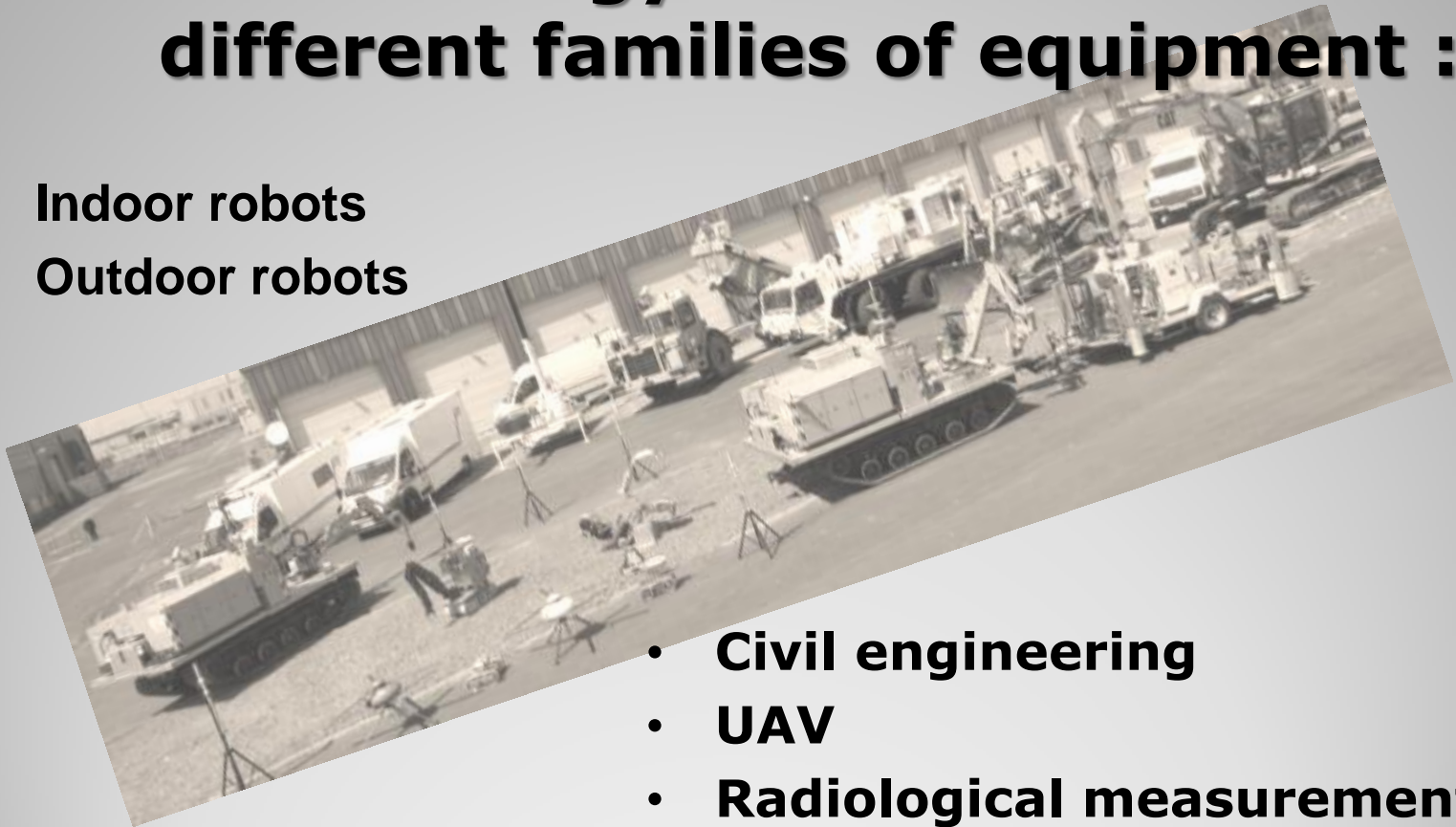
**Scraping the soil**





# The result produced with this methodology was to create different families of equipment :

- Indoor robots
- Outdoor robots



- Civil engineering
- UAV
- Radiological measurement

# EQUIPMENT

# Indoor robots

## EOLE

Robotised  
Device for  
Observation  
and  
Localisation  
in the  
Environment



## EROS

Robotised  
Device for  
Observation  
and  
Surveying



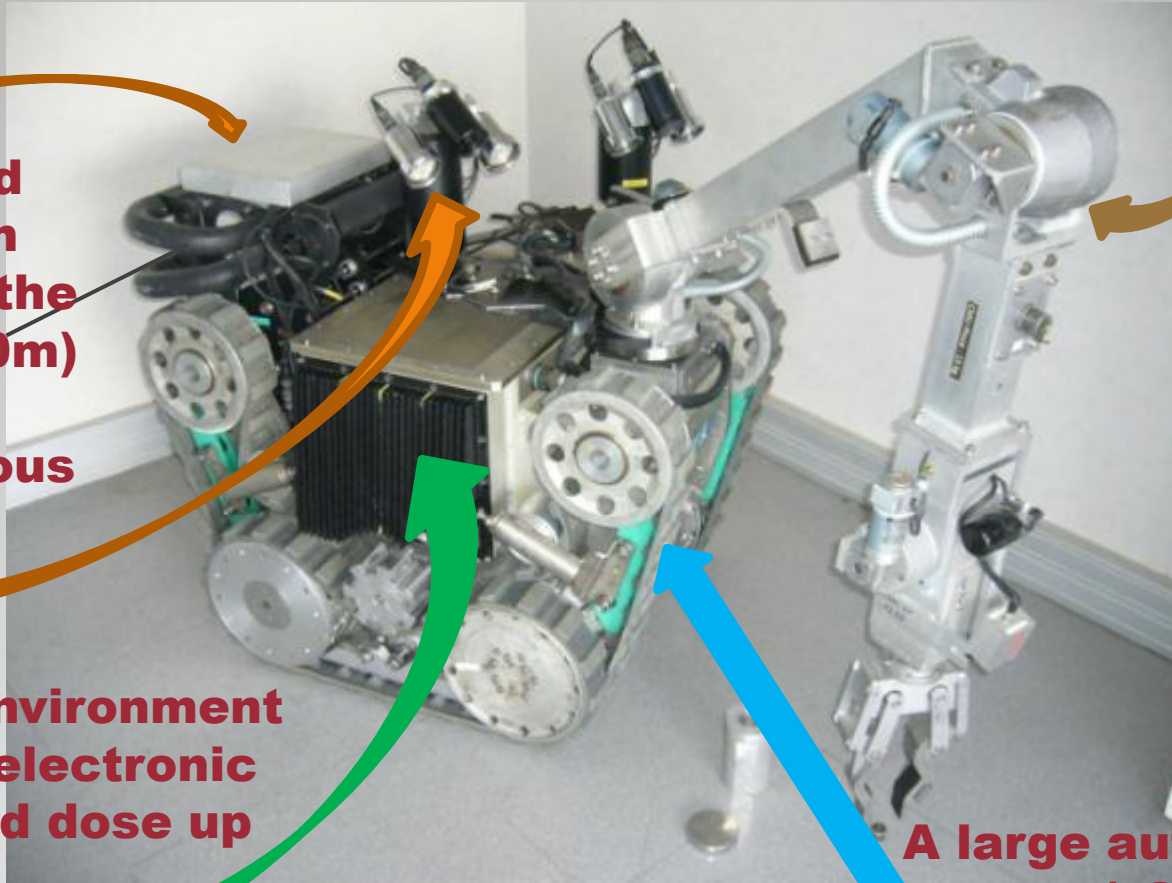
# EOLE

An arm , 5 degrees of freedom + grip

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

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

A large autonomy of energy (~8h : batteries Lithium Ion)



# Outdoor robot : ERASE

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



# Outdoor robots : ERASE

## Some of ERASE characteristics :

**Autonomy : 10 h**

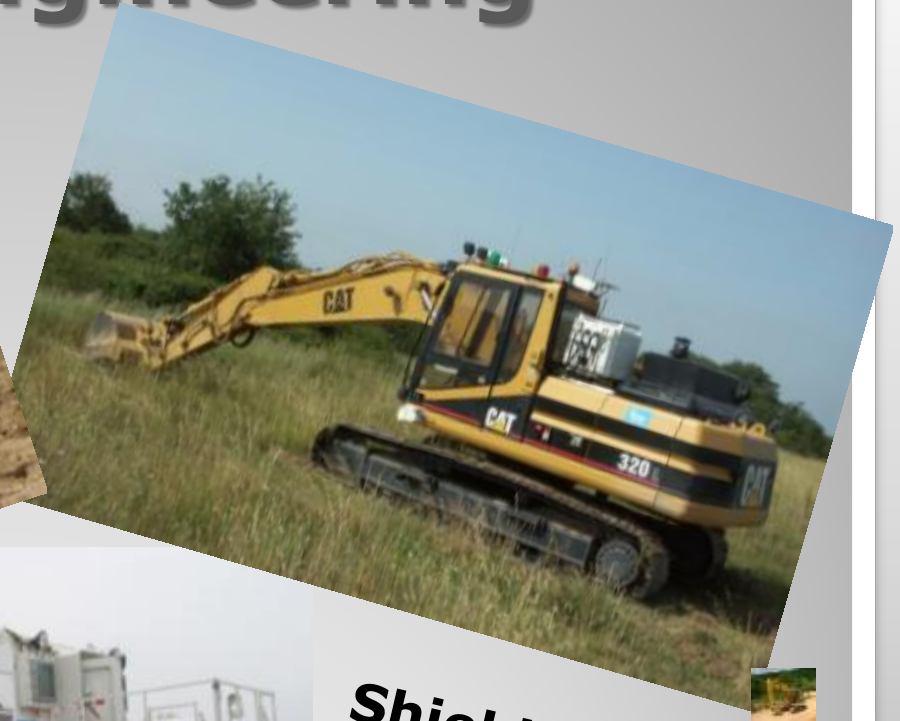
**Max speed : 4,2 m/s**

**Vision : 5 cameras**

**Remote controlled  
up to 5 km**



# Civil engineering



**Shielded pilot desk**  
**Range : 300 m**

Range : →10 km





# UAVs



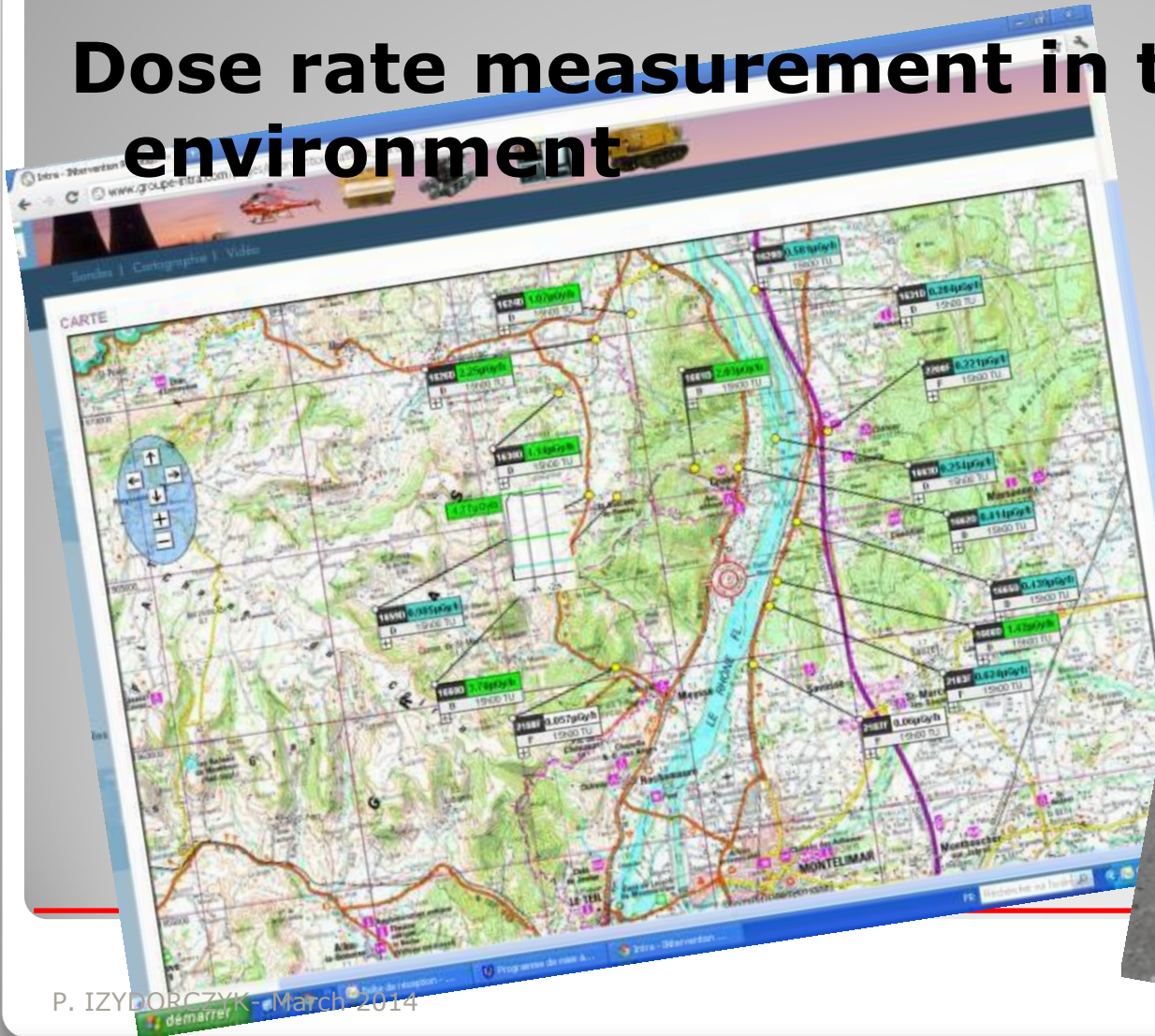
**For pictures,  
videos and  
measurement**

**Payload 3-5 kg  
Range : 1-10 km  
Autonomy : > 25 mn**



# SKYLINK SYSTEM

## Dose rate measurement in the environment



# HELINUC



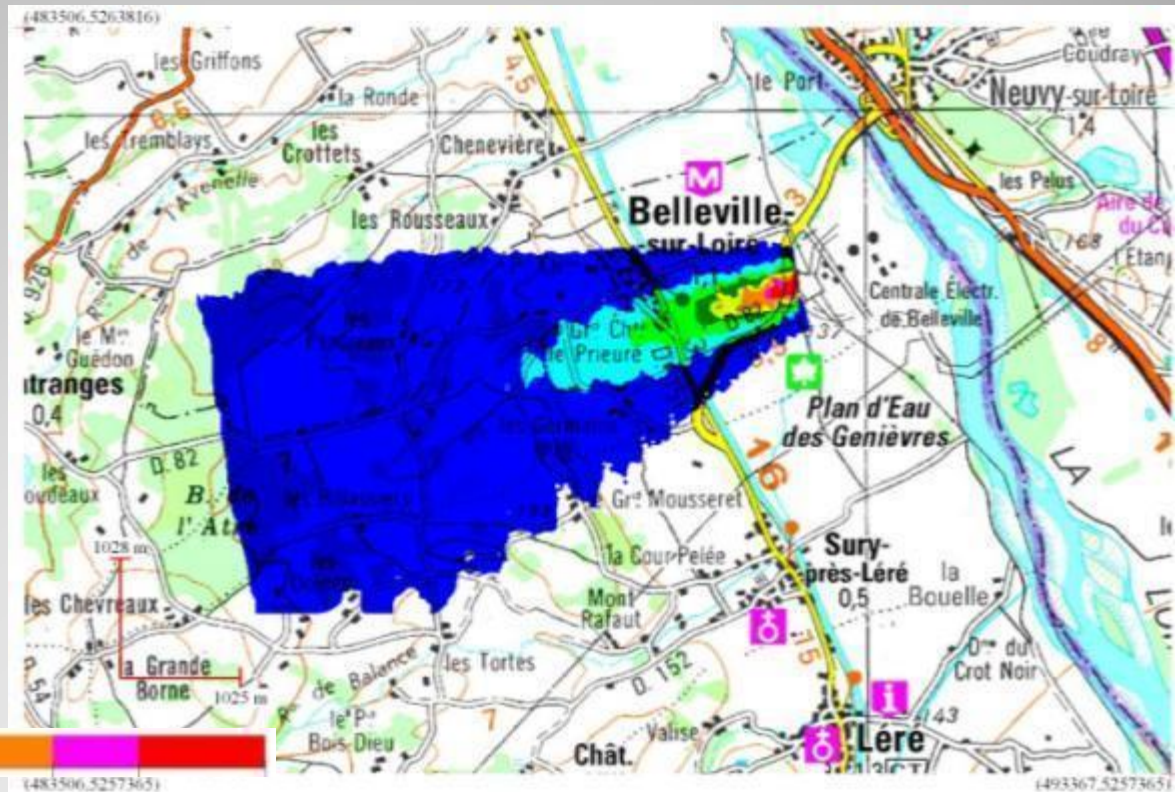
## Airborne gamma mapping system



# HELINUC :

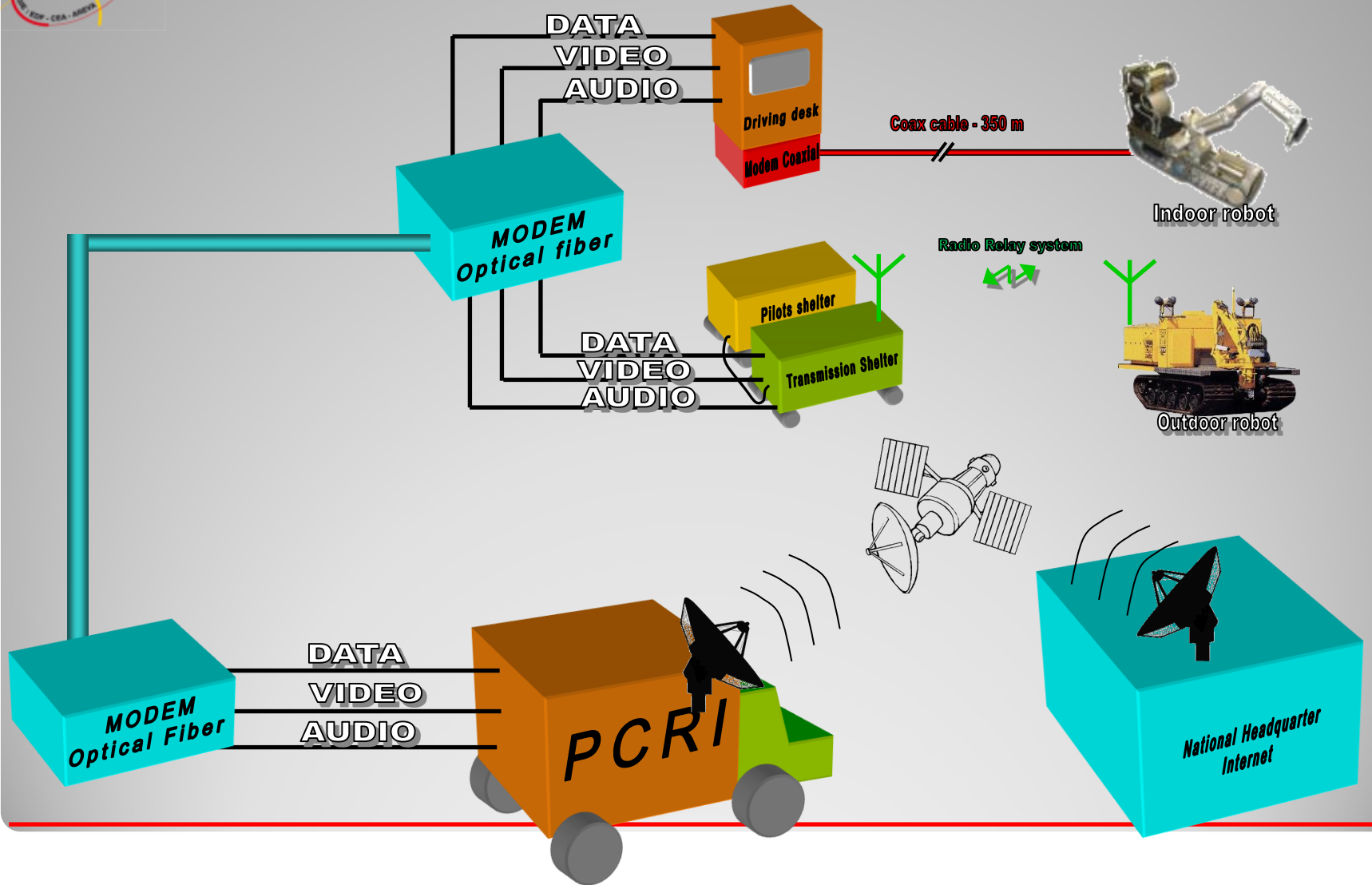
## Map of the exercise of a french NPP (simulation)

Dose rate,  
contamination,  
radionuclides,...



0,1 10 20 30 40 50 60 70 100  $\mu\text{Sv/h}$   
Dose rate from 1m ground level ( $\mu\text{Sv/h}$ )

# Organization : Structure of informations



# Organization

# Organization

- **Permanent staff** : **20**
- **Pilots from members** : **25**
- **Members shares** : **50 % EDF**  
**37.5% CEA**  
**12.5% AREVA**

**Groupe INTRA has been located on the industrial site of the EDF Chinon Nuclear Power Plant since July 1995**

# Exercises - Drills

**In order to check its efficiency, Groupe INTRA organises or participates in national and local drills :  
2 to 5 drills per year**

**With all or a part of the equipment, on an external site**

## **Restricted drills**

**Depending on the internal needs  
without any warning,  
or every Friday, with the « on call team »,**

**5 call drills per year**

**Without mobilisation**



# 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, cutting)**

**Each intervention or exercise is an opportunity to develop new tools, new methodologies,...**

# ALARA Approach

**For Groupe INTRA, ALARA approach is the same as for a nuclear operator !**

**In case of intervention, the « intervention team » is connected with the staff of the accidented plant, especially for the radiological aspects.**

**Groupe INTRA is allowed to intervene in case of a nuclear accident, on emergency situation. It means that our staff can integrate a dose of 100 mSv for the mission (and not only 20 mSv/year)**

# Emergency situation

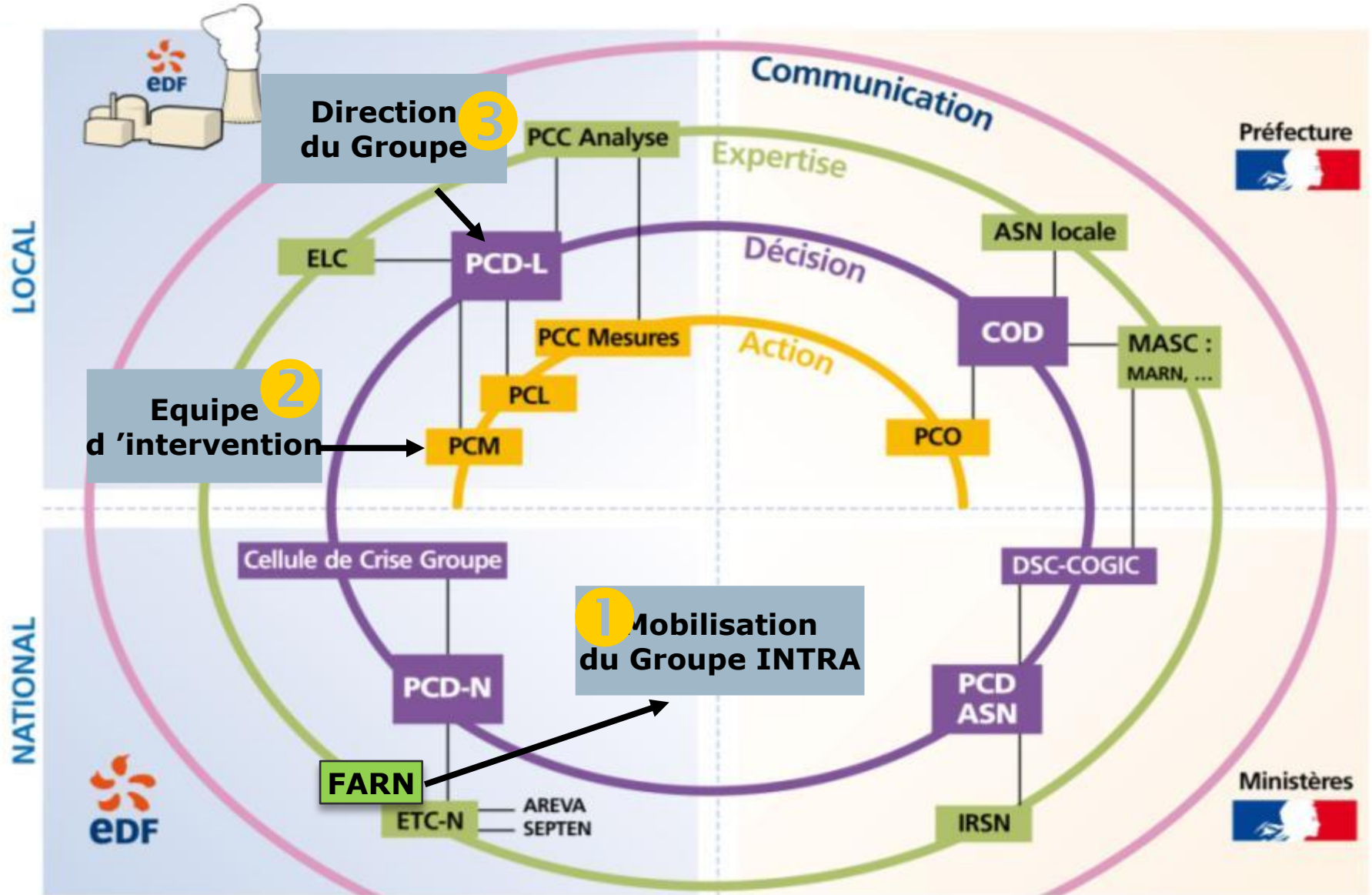
# Emergency situation

**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  
1hour**



# International links

# International links

- **To welcome and to visit foreign companies or nuclear operators (Europe, Asia, South Africa,...).**
- **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 : JAEA (robotics) and JAPC (in charge of the creation of J-NEACE)**
  - **IAEA : international meetings**
  - **China, South Africa : contacts**

# FUKUSHIMA feedback experience



# Ways of improvement

- **The whole INTRA fleet would have been useful after the accident**
- **But there are some questions about :**
  - **transmission (distance between pilot desk and robots)**
  - **shielded control desk**
  - **using standard electronic robots**

