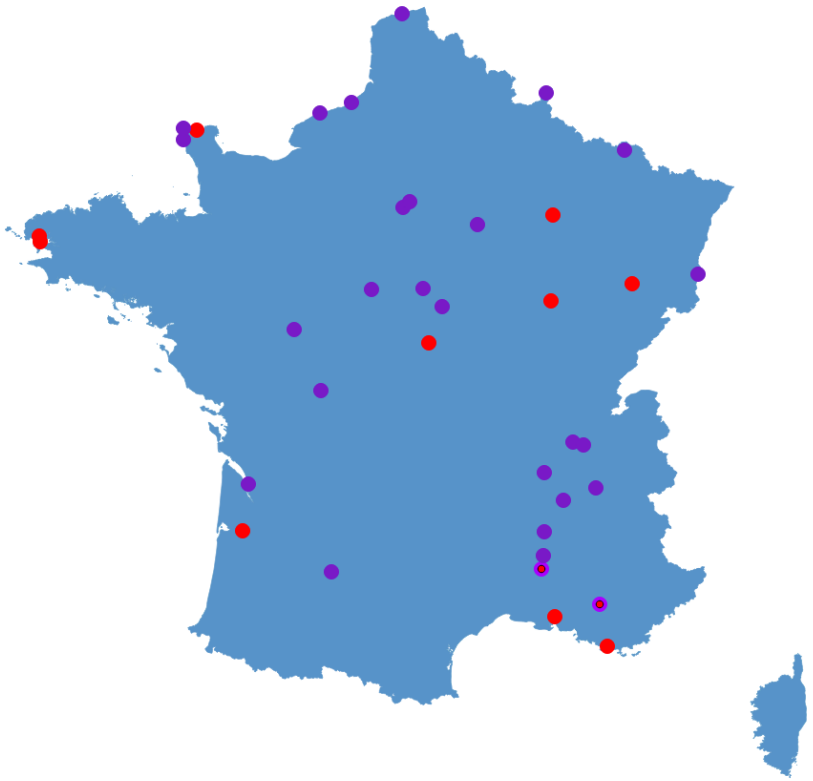
IRSN
INSTITUT
DE RADIOPROTECTION
ET DE SÛRETÉ NUCLÉAIRE

Faire avancer la sûreté nucléaire

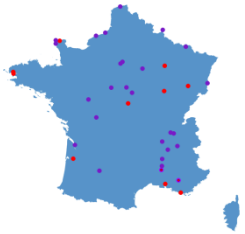
IRSN role, organisation, methodology and means as the French TSO for Emergency Preparedness and Response

Emergency Response Department
IRSN

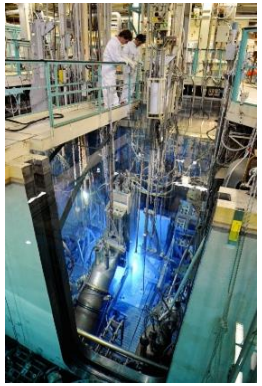


Nuclear Outlook

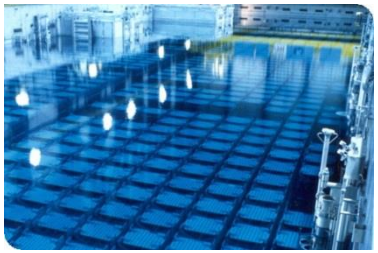
- 24 Civil Nuclear Sites (19 NPP)
- 10 Defense Nuclear Sites (Air & Naval Bases)
- 2 Mixed Nuclear Sites
- 2 Safety Authorities: ASN & ASND
- 1 TSO: IRSN
- 4 ‘big’ Operators: EdF, AREVA, CEA, Ministry of Defense

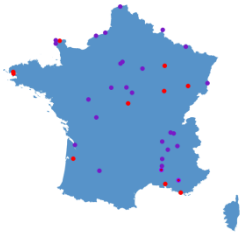


Nuclear Power Plant & research reactors



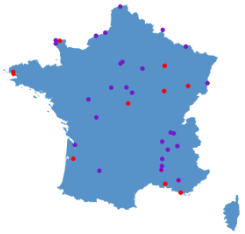
Civil & Defence nuclear installations





Nuclear Transports

Nuclear Warships & Nuclear Weapons

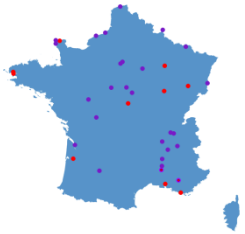


Medical framework

About 15,000 devices for radiology

Overexposed from radiotherapy of Epinal in 2008

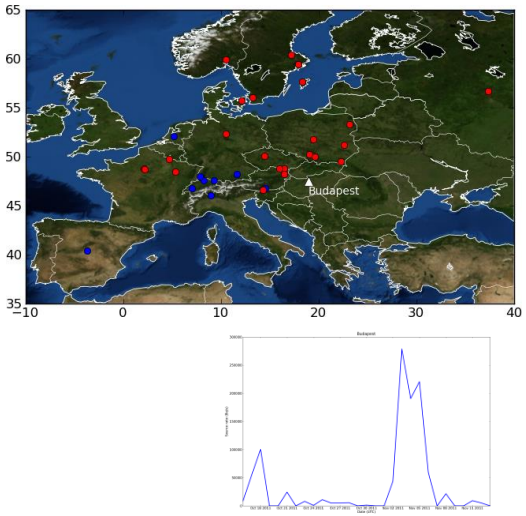
Industrial framework

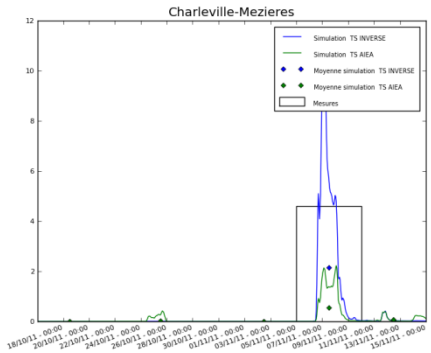


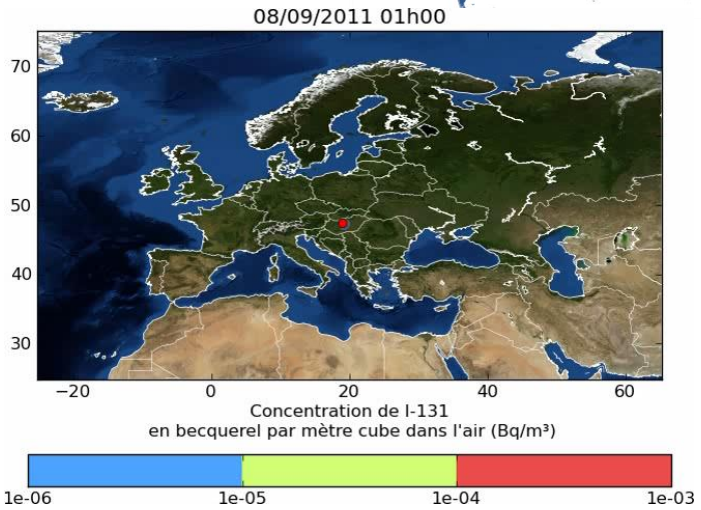
Gammagraphy for industrial welding

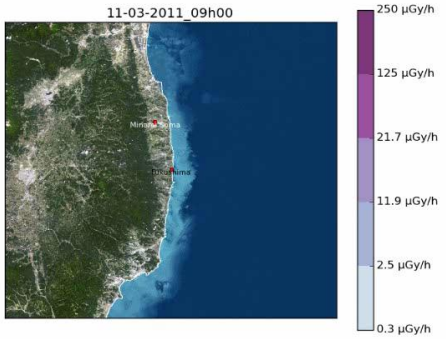
Nuclear installations abroad

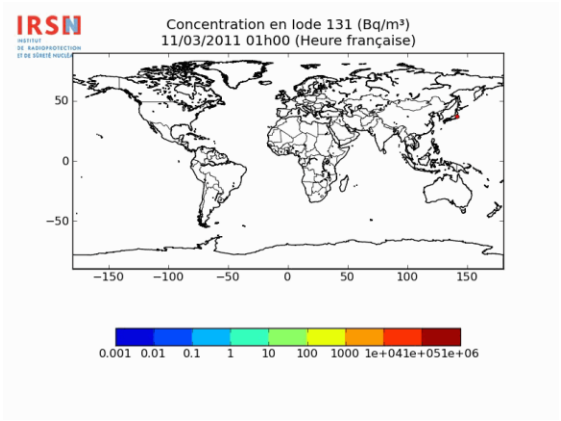
Iodine in Hungary











Fukushima

1

Assess the risks induced by the emergency situation and potential consequences:

- Diagnostic & Prognostic of the accident
- Diagnostic & Prognostic of the consequences
- Use of measurements to characterise the consequence into environment and on people
- Adapt the organic environment monitoring mission

2

Provide a technical expertise and support to public authorities and medical/health organisations

3

Be a source of technical and scientific information which support the action of public authorities

National Response Plan for Major Nuclear or Radiological Accidents

POST FUKUSHIMA

The response plan is situation driven

Situation of uncertainty

- 0 — Rumor of an accident, suspected release, accident that remains to be characterised, etc.

Situation on a fixed installation

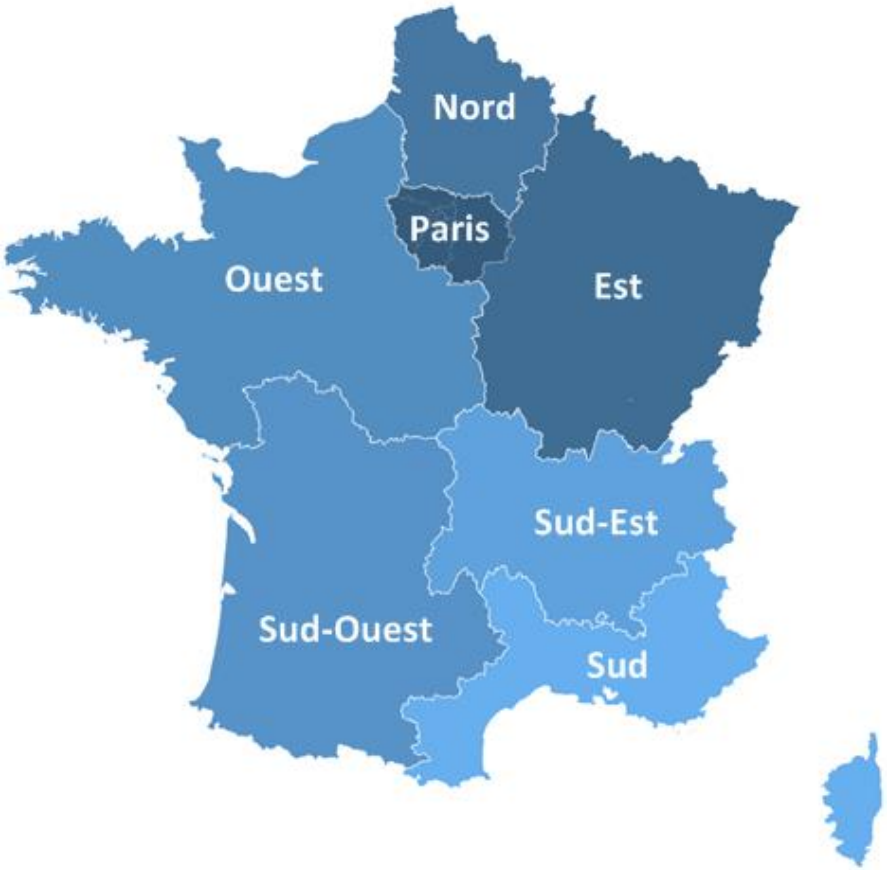
- 1 — Confirmed, immediate and short-term release (less than 1 hour) from a nuclear facility (INB/INBS) with moderate consequences
- 2 — Confirmed, immediate and long-term release (lasting from a few days to a few weeks) from a nuclear facility (INB/INBS) with porentially high consequences
- 3 — Threat of a release followed or not b a delayed long-term release (lasting from a few days to a few weeks) from a nuclear facility (INB/INBS) with porentially high consequences

Situation of transport

- 4 — Accident during the transport of radioactive materials (solid, liquid or gaseous) in France (on land or inland waterways). The kinetics of a release are often fast (immediate and short-termà and the consequences are generally limited
- 7 — Offshore accident. Damage to a vessel carrying or using nuclear material may result in the release of radioactivity.

Situation abroad

- 5 — Accident occuring abroad and with a potential significant impact in France. Issues related to French nationals present in the accident country must also be addressed
- 6 — Accident occuring abroad and having small impact in France (not requiring public protection measure in principle). Issues related to French nationals present in the accident country must also be addressed

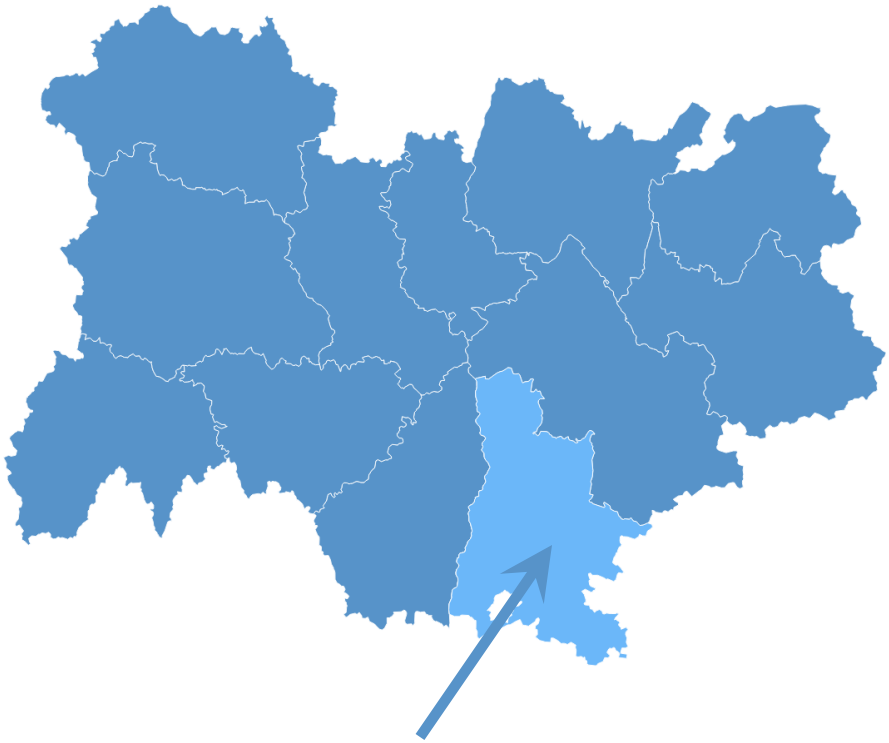


7 defense and security zones
96 metropolitan departments + 5 overseas

National

- **Government**: CIC
  - Centralize all information
  - Analyze / Anticipate
  - Prepare strategic & policy decisions
  - Prepare communication
- **ASN / ASND**: Safety – Radioprotection authority - Government adviser
- **IRSN: Technical adviser to ASN, ASND & public authorities**
- **CEA**: Special duties
- **Operator**: by invitation

At the zonal level



Impacted Department

Regional/Local

- Departmental Prefect : COD
  - Centralize all information
  - Directs the local emergency response
  - Public safety and civil protection
  - Inform the public & local officials
- Zonal Prefect: COZ
  - Coordinates between Dept. prefects
  - Gives assistance to Dept.
  - Coordinates with zones & neighbors
- **IRSN: Mobile team**
  - **Advises the Prefect**
  - **Coordinates monitoring strategies**
  - **Contributes to the monitoring actions**
  - **Does the population controls**
- Other operators:
  - Environmental monitoring means

3 Mobilisation Levels

POST FUKUSHIMA

1

Simple situations: thematic director is the crisis director using any departments in its thematic area

2

Intermediate situations: the CTC needs to be activated with a multi-disciplinary team. The head of the CTC is the crisis director. Links with external actors

3

Complex situations: the national emergency organisation needs to be activated with a large IRSN mobilisation. The CTC, mobile and labs means are mobilised. The DG is the crisis director.

LEVEL 3

Crisis Director (IRSN DG)

IRSN
INSTITUT DE RADIOPROTECTION ET DE SÛRETÉ NUCLÉAIRE
Enhancing nuclear safety

Post-Fukushima

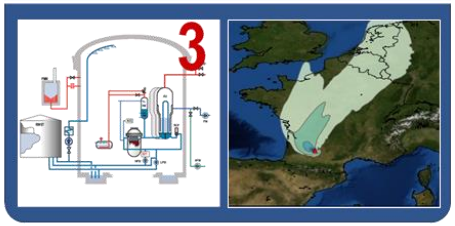
LEVEL 2

To be RANET

EC - EURDEP

Communication Unit

Technical Emergency Centre



Remote Monitoring

Mobile Unit

RANET

RANET

Advisers to Public Authorities

ASND
CIC Gouvernement
asn
IRSN

Environmental Monitoring Unit

Post-Fukushima

International Unit

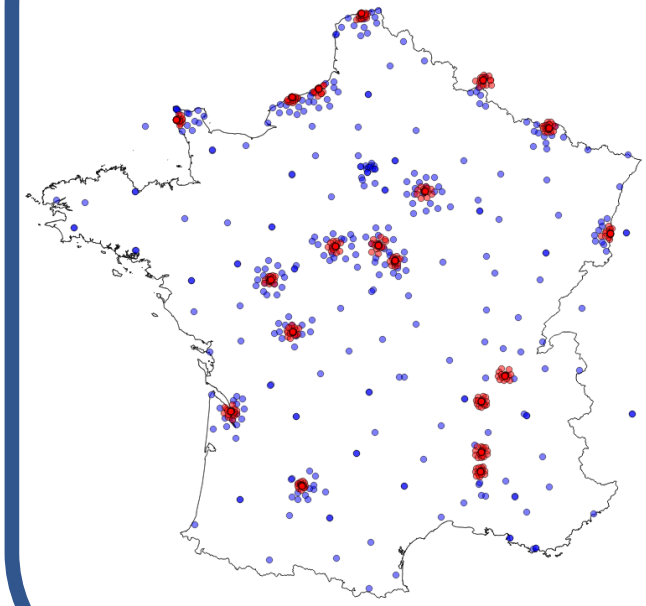
Post-Fukushima

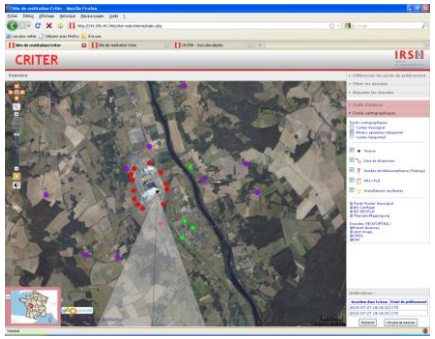
Health Unit

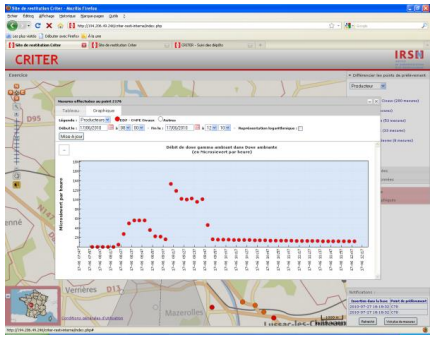
Remote Monitoring

40 Aerosols stations

Actually 446 gamma stations (+520 from EdF)







CRITER online restitution of measurements

Emergency Mobile Unit

1. Technical coordination of monitoring plans in the affected area and organise the monitoring results dispatch

2. Provide local authorities with information

3. Measurements with specific means: mobile environmental laboratories

Emergency Mobile Means

Human impact assessment

- 4 light trucks (800 p/d)
- 2 heavy trucks (80 p/d)
- 4 shelters (1600 p/d)

Emergency Mobile Means

Environment impact assessment

- 1 metrological light truck
- 4 light trucks for intervention
- 3 mobile lab trucks (1200 meas./d)
- 1 light trucks for transportation crisis

Emergency Mobile Means

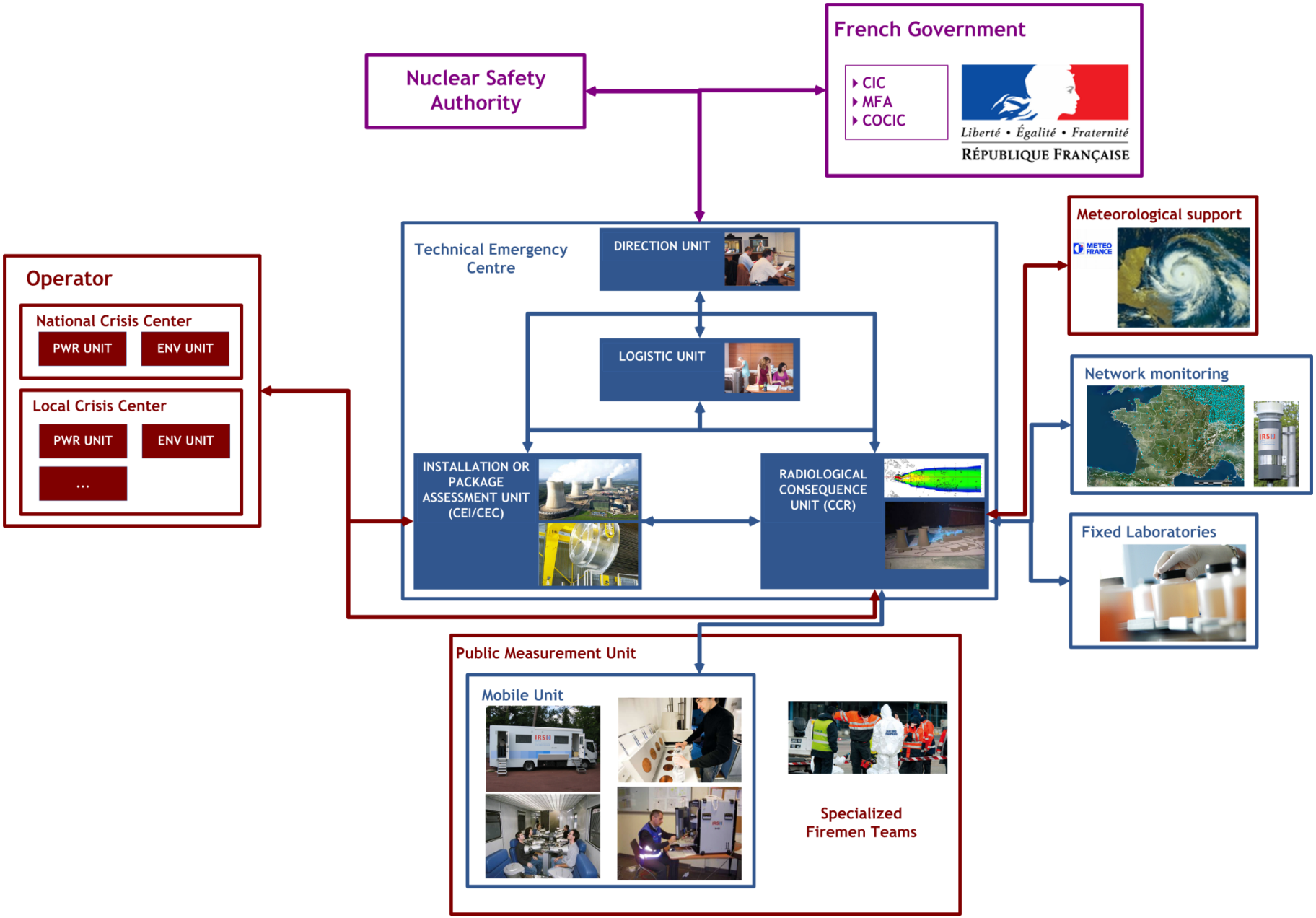
Post-Fukushima

Environment impact assessment

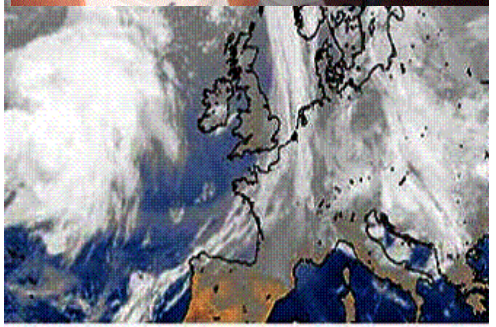
- 1 Quad-borne spectrometry system
- 1 Car/Air-Borne dose rate system
- 9 in-situ spectrometry
- 8 aquatic probes
- 20 standalone gamma dose rate probes
- 20 autonomous aerosol samplers

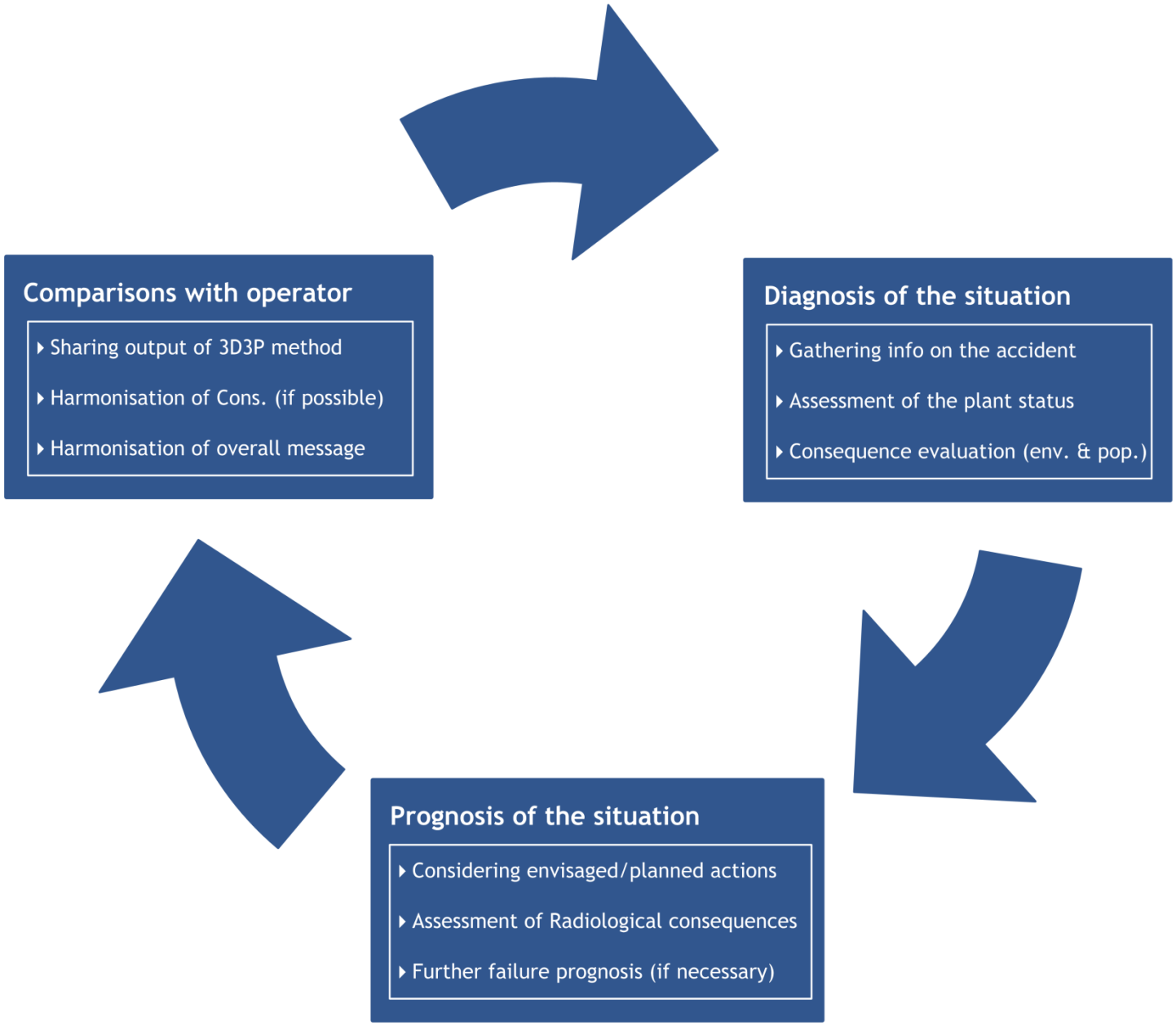
Technical Emergency Centre

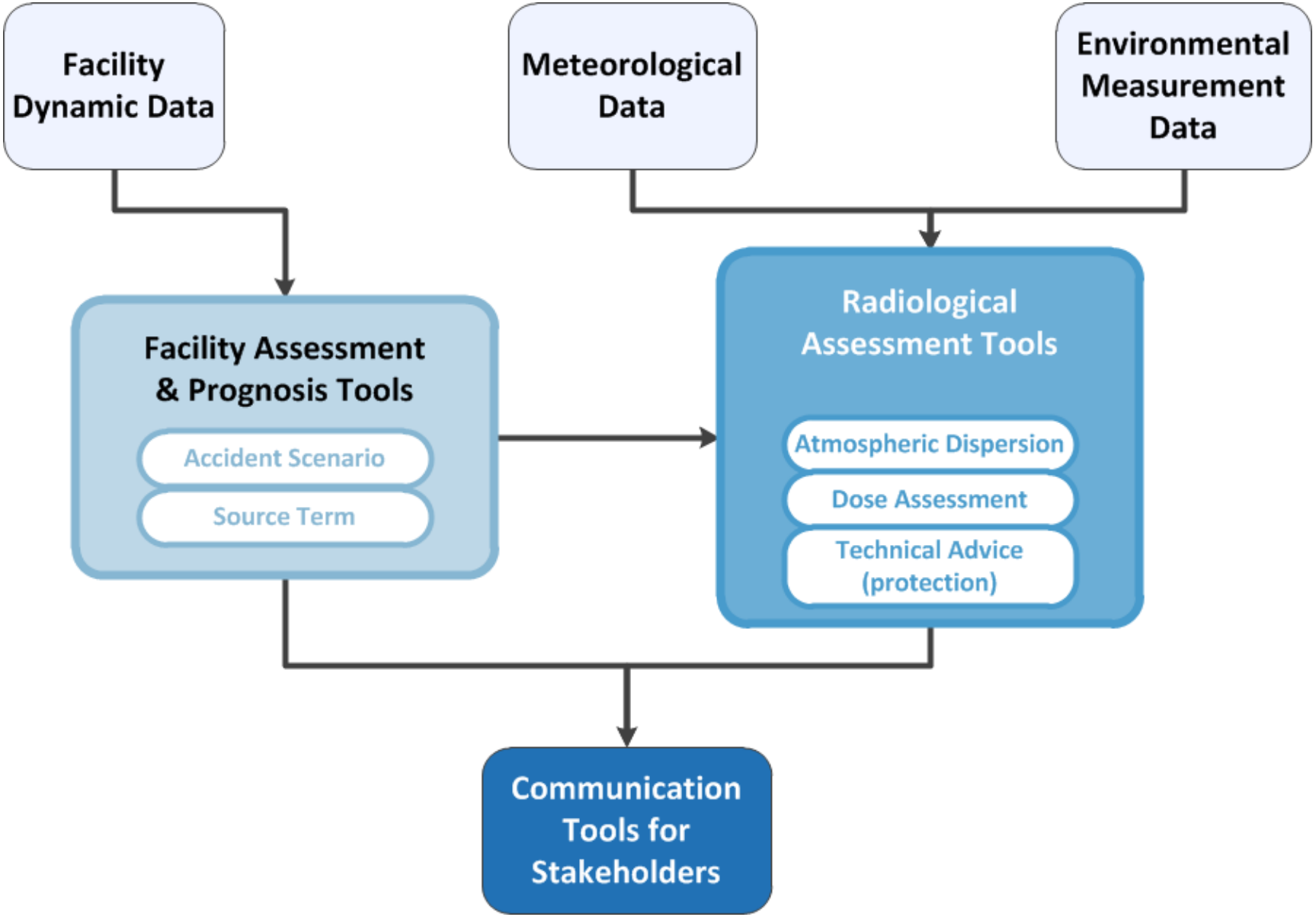
- Activation in less than 1 hour
- Complete the initial team (10 to 25 p.)
- First expertise in less than 1 hour
- 200 m^2 dedicated to a crisis
- 25 m^3 of specific documentation
- A dozen of specific softwares


French Government
CIC
MFA
COCIC
Liberté • Égalité • Fraternité
RÉPUBLIQUE FRANÇAISE
Nuclear Safety Authority
Meteorological support
METEO FRANCE
Technical Emergency Centre
DIRECTION UNIT
LOGISTIC UNIT
Operator
National Crisis Center
PWR UNIT
ENV UNIT
Local Crisis Center
PWR UNIT
ENV UNIT
...
INSTALLATION OR PACKAGE ASSESSMENT UNIT (CEI/CEC)
RADIOLOGICAL CONSEQUENCE UNIT (CCR)
Network monitoring
Fixed Laboratories
Public Measurement Unit
Mobile Unit
Specialized Firemen Teams

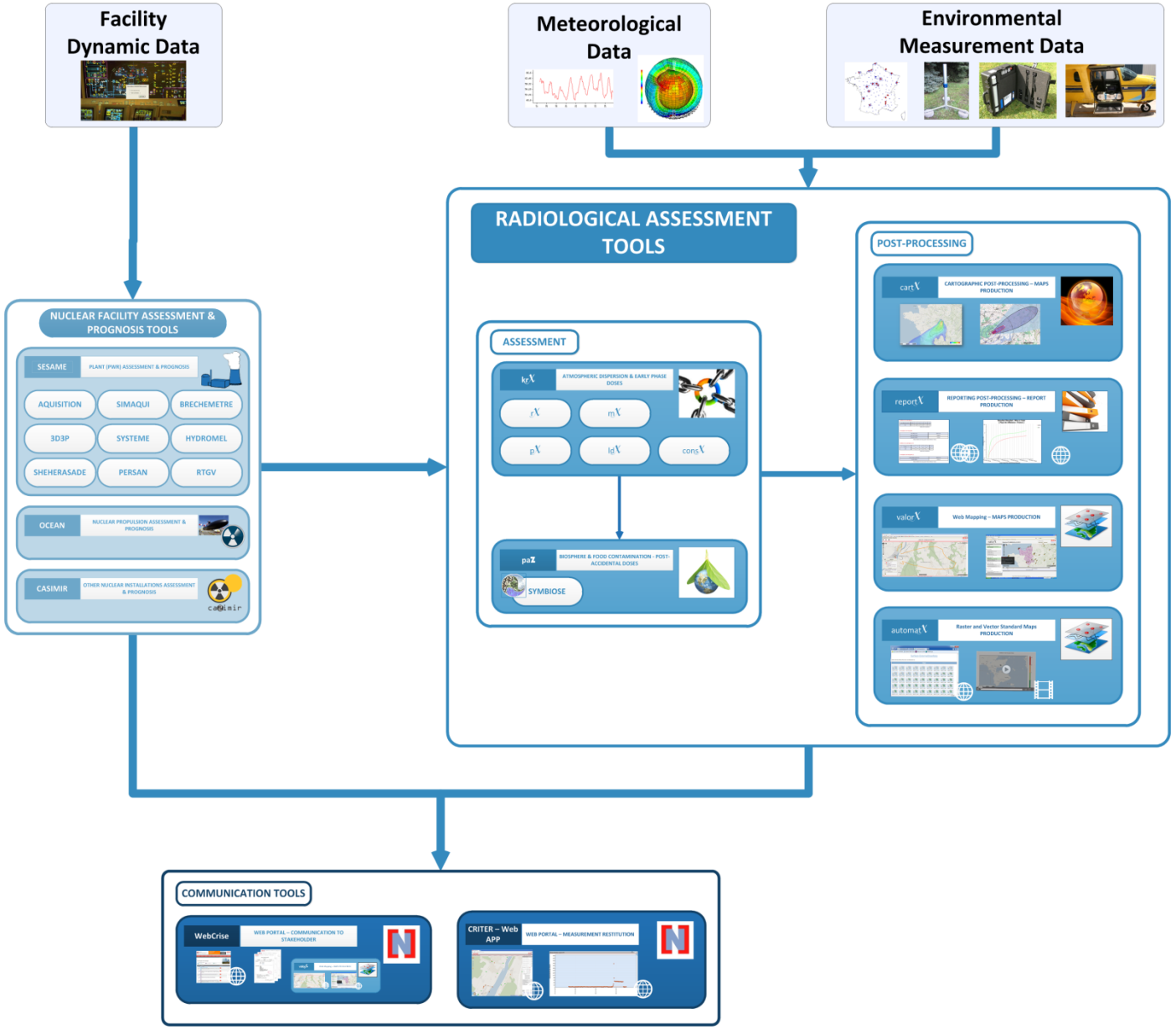
Audioconferences	Reception of preformated messages
Installation/Environment	Messages (Fax, emai)
PWR: automatic online connexion	Monitoring Network
100 parameters/minutes	446 (+520) TELERAY, 40 Aérosols
French Met Office	Mobile Unt
Observations et Forecasts	Local Mesures




Diagnosis of the situation
Gathering info on the accident
Assessment of the plant status
Consequence evaluation (env. & pop.)
Prognosis of the situation
Considering envisaged/planned actions
Assessment of Radiological consequences
Further failure prognosis (if necessary)
Comparisons with operator
Sharing output of 3D3P method
Harmonisation of Cons. (if possible)
Harmonisation of overall message


Facility Dynamic Data
Meteorological Data
Environmental Measurement Data
Facility Assessment & Prognosis Tools
Accident Scenario
Source Term
Radiological Assessment Tools
Atmospheric Dispersion
Dose Assessment
Technical Advice (protection)
Communication Tools for Stakeholders

The Technical Emergency Centre: softwares for evaluation



Training

- Experts: 470 out of 1700
- 20 fields of expertise
- 2000 hours of training a year given by the EP&R dept.
- 12 to 15 national exercises a year
- 8 local exercises (with operators only)
- Specific drills – Un-annonced exercises

Response of the CTC

- 28 situations in the past 15 years required the activation
- Equivalent of 130 days of activation (Fukushima: 6 weeks)