

HELINUC: Airborne gamma mapping system of CEA

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The CEA DAM has a number of high-capacity (2 –20 liters) sodium iodide gamma detectors and high performance germanium detectors used for operational response in nuclear security events. The detectors are positioned in packaging adapted to their use: transport suitcases, measuring container... The knowledge of the energy response and the minimum detectable activities of these systems make it possible to ensure the adequacy of their employment to the needs.

One of the systems is the HELINUC Airborne gamma detection System. The container is loaded with 4*4 liters of sodium iodide scintillation detectors. Two germanium detectors installed on either side of the container can also be deployed.

HELINUC is developed and implemented by the CEA/DAM at the benefit of the French nuclear intervention actors (Ministry of interior, Ministry of Defense), civilian nuclear operators (GIE INTRA), national public authorities and international agencies (IAEA...).

The missions of HELINUC are:

- The realization of radiological references of large agglomerations, civil and military installations
- Securing Major Events
- Emergency response in case of incident/accident at a civilian or military site and the search for emission points
- Searching for Point sources
- International assistance.

During a flight mission, gamma detected by the Helinuc system come from:

- Natural radiation sources (cosmic rays, natural terrestrial radionuclides ...)
- Industrial activities (phosphate processing, building materials, waste ...)
- Radionuclide release of nuclear accidents : 137Cs in soil ...

Two supplemental type certificates (STCs) validated by the European Aviation Safety Agency (EASA) in 2016 allow the installation of the HELINUC system on two types of helicopters: AS 355 and EC 145. CEA/DAM obtained a PART 145 agreement in 2018 to maintain the components of these two STCs.

Every day three persons from CEA are on duty (24h/7d) and ready to operate in case of emergency in France. The presentation will focus on

- The presentation of the HELINUC system
- The examples of airborne gamma mapping surveys
- The challenges of the training of the HELINUC team
- The challenges of an operational system

HELINUC has been operated in France since 36 years, and is continuously improved in the CEA laboratory. HELINUC is used in routine in France to perform between 3 and 5 surveys per year of French nuclear sites. There are two objectives for these surveys: first to evaluate the impact of the site on its environment, and secondly to establish a baseline which would be used as a reference in case of emergency.

Gender

Female

State

France

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Track Classification: CC: Emergency preparedness and response and nuclear security interfaces