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Eidgenössisches Nuklearsicherheitsinspektorat ENSI  
Inspection fédérale de la sécurité nucléaire IFSN  
Ispettorato federale della sicurezza nucleare IFSN  
Swiss Federal Nuclear Safety Inspectorate ENSI

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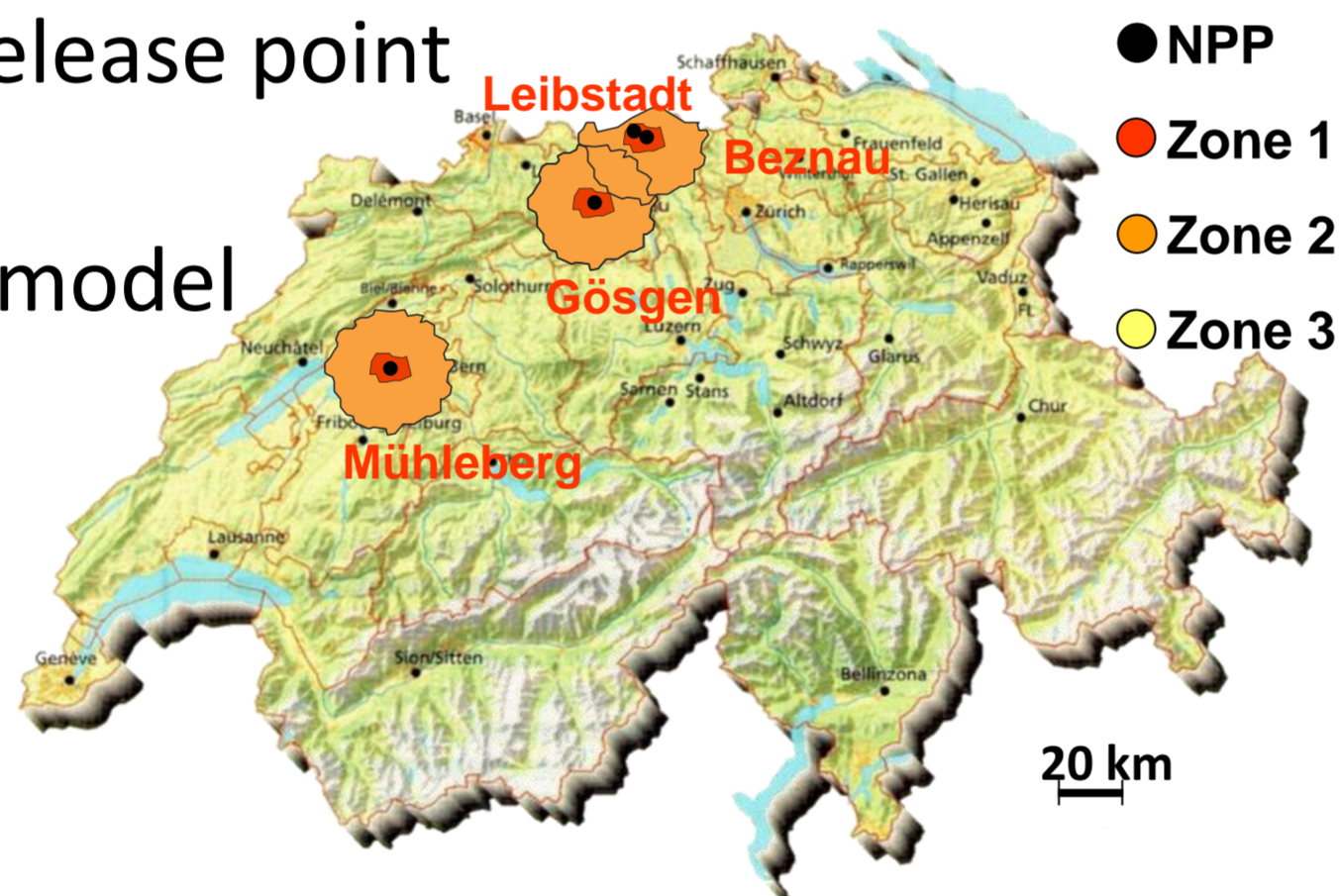
# FUTURE RADIOLOGICAL DISPERSION CALCULATIONS IN SWITZERLAND WITH JRODOS AND LASAT

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**Intro:** In 2010, the Swiss Federal Nuclear Safety Inspectorate ENSI launched the project RADUK to replace the current atmospheric dispersion calculation system ADPIC by 2015. The goal is to provide high-quality dispersion calculations on an Intel-based, high-performance computing platform. In collaboration with the developers of JRODOS and LASAT, ENSI is currently implementing a new atmospheric dispersion system for a range of up to 250 km from the site, based on the requirements of the Swiss concept for emergency preparedness in case of radiological accidents in nuclear power plants.

## General requirements

- ❖ Area at least 500x500 km<sup>2</sup> around the Swiss NPPs
- ❖ Horizontal spatial resolution of NWP 2.2 km, (1 km after 2016), windfield resolution 250 m in the vicinity of release point
- ❖ Lagrange particle model
- ❖ 24 h forecast
- ❖ Modern software platform



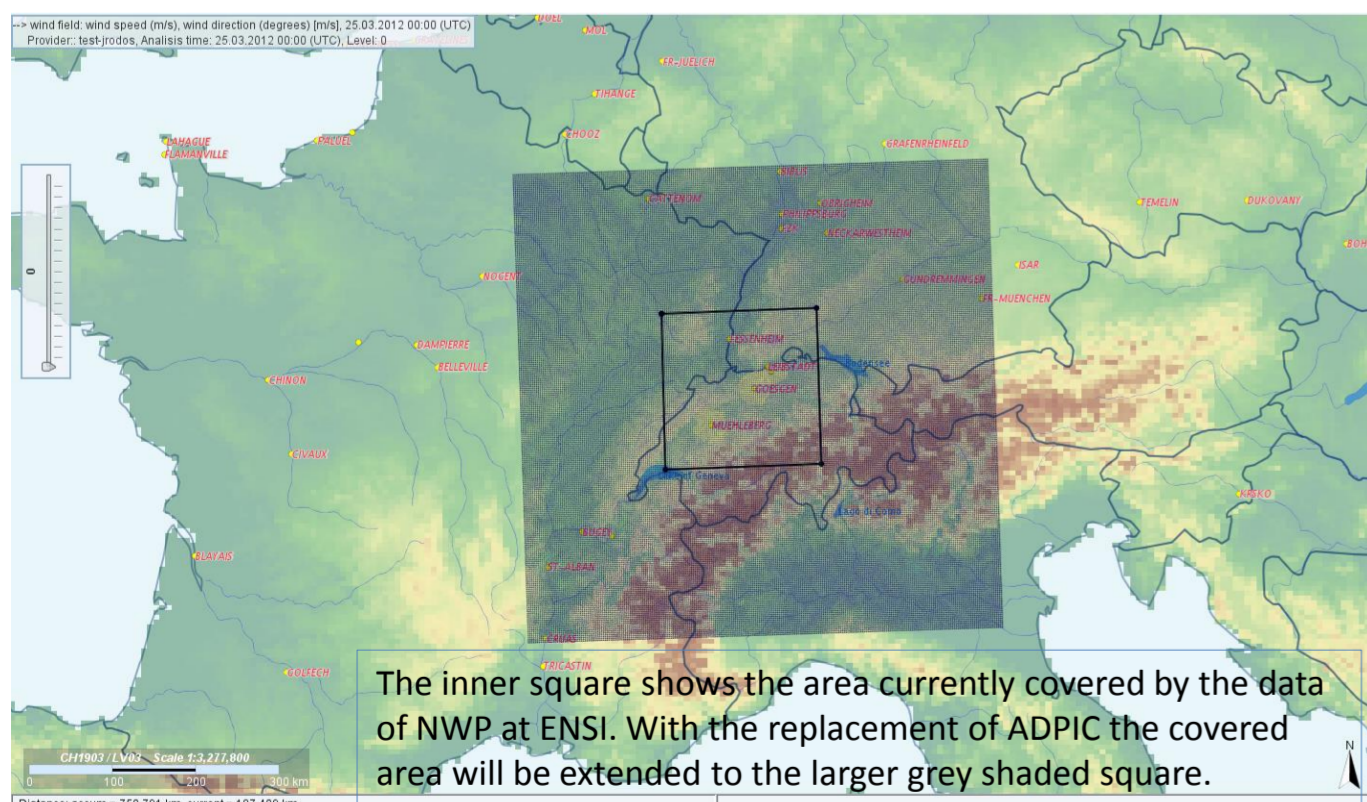
## Technical requirements

- ❖ Intel-based platform with Windows OS
  - ❖ High availability (>99%)
- Solution:
- ❖ IBM server X3850 X5
  - ❖ 8 Intel Xeon E7-8870 processor units (10 dual-threaded processors each)
  - ❖ 512 GB RAM and 4.8 TB SAS-hard disks
  - ❖ OS Windows Server 2012
  - ❖ Full redundancy at a 2<sup>nd</sup> location, →National Emergency Operation Centre



## JRODOS

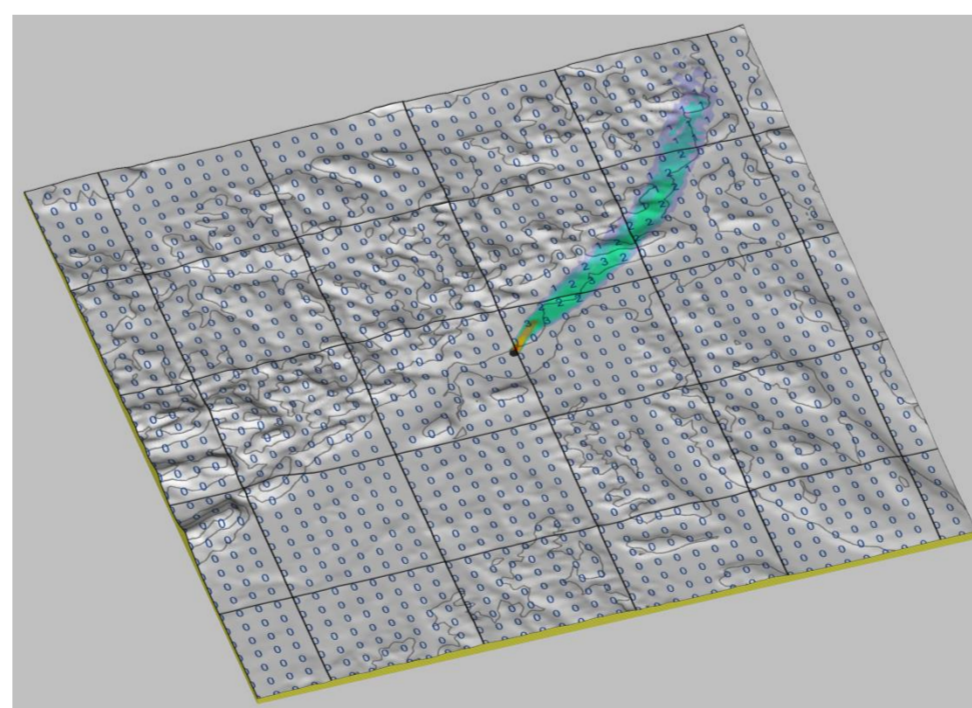
- ❖ Java-based real-time online decision support system
- ❖ Client-server application



- ❖ 2 simultaneous sources with variable release rates
- ❖ Capability of a 5-fold nesting
- ❖ Includes dose calculation modules
- ❖ Fully parallelized wind field processors & graphical output

## LASAT

- ❖ Generic Lagrange particle dispersion model
- ❖ Nested grids, turbulence parametrization, multiple sources

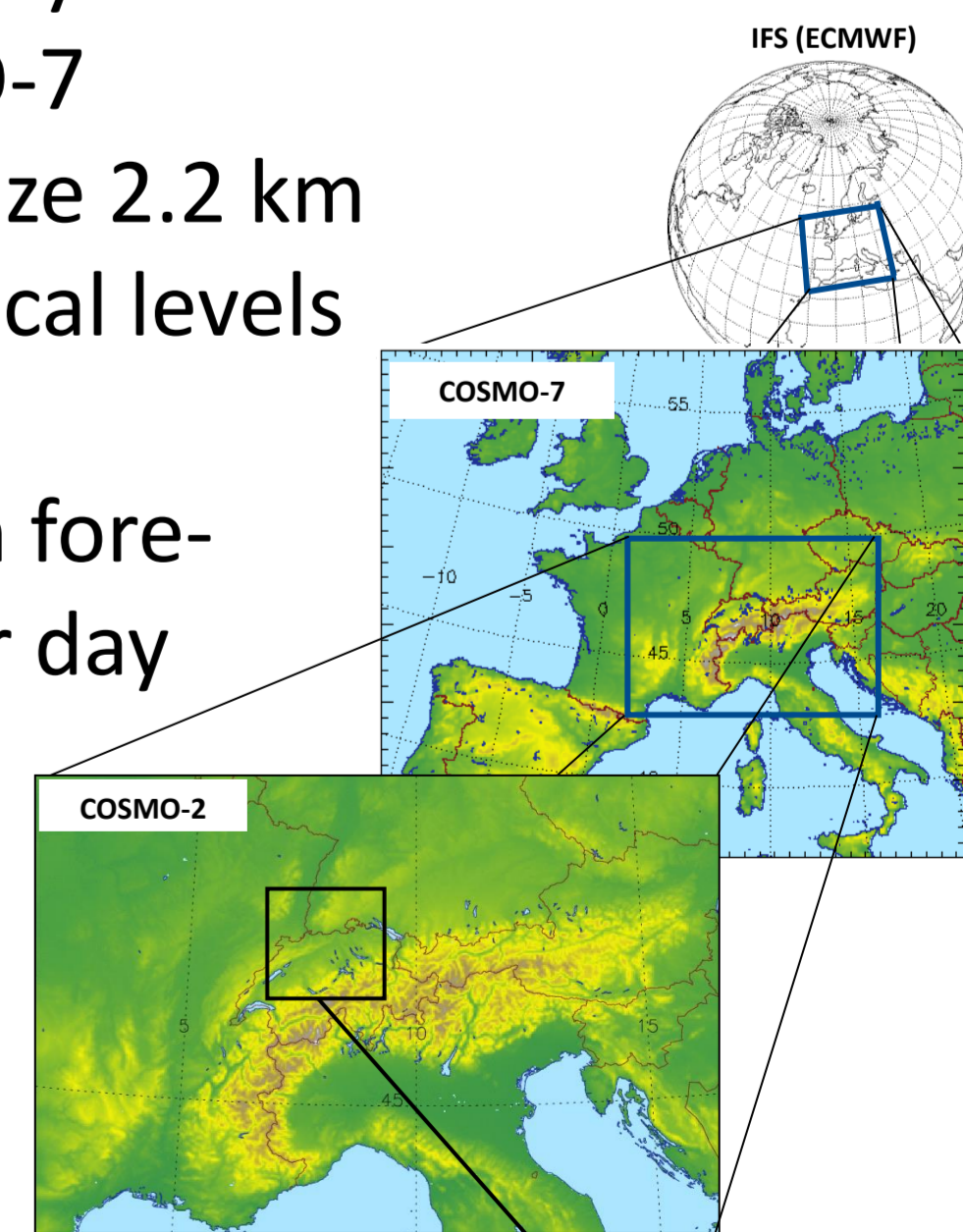


- ❖ Features OpenMP
- ❖ Complies with the German guideline VDI 3945 Part 3
- ❖ Widely used and accepted by national authorities in Germany

## COSMO-2

- ❖ NWP produced by MeteoSwiss
- ❖ Boundary conditions from COSMO-7
- ❖ Mesh size 2.2 km
- ❖ 60 vertical levels

- ❖ 8 x 24 h forecast per day



- ❖ Time resolution 10 minutes!

- ❖ In 2016 →COSMO-1

