

# e@lin: Wind velocity field approximation

*Wind velocity field approximation: Modelling and visualization on real datasets*

H2020 SOCIETAL CHALLENGES: Climate Action, Environment, Resource Efficiency and Raw Materials

PRODUCTIVE SECTOR: Energy and Environment

## PROBLEM DESCRIPTION

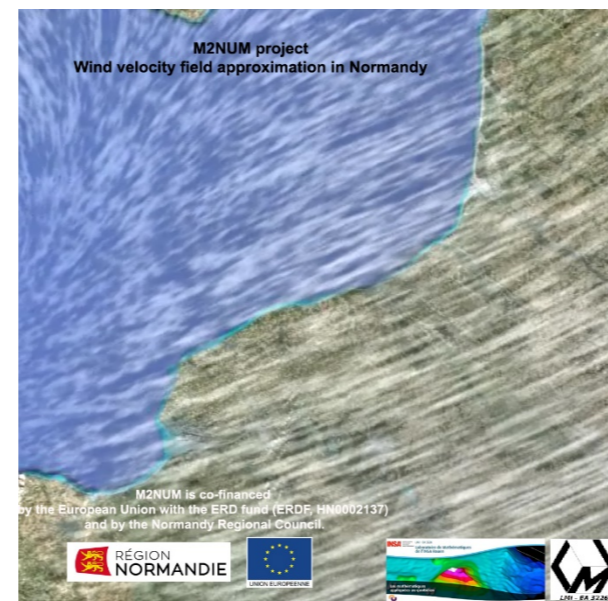
Approximation of wind velocity field from sparse datasets, taking into account the topography, is a crucial step in order to build wind turbine farm.

## CHALLENGES AND GOALS

Regular approximation of the wind velocity field  
Optimal visualization of the wind field simulation

## MATHEMATICAL AND COMPUTATIONAL METHODS

The problem of vector field approximation from sparse data emerges in a wide range of fields such as: motion control, computer vision, geometrical analysis, geometrical design, analysis of acoustic or electromagnetic waves, as well as in geophysics, medical imaging, fluid mechanics and so on... Many different approaches have been introduced to solve each specific problem occurring in the above fields of investigation to fit the vector field dataset. In this work, we use a regularized least-square problem defined on a space of potentials.



Numerical simulation in Normandy

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## Results and Benefits

We have developed cutting-edge technologies for rigorous wind velocity field approximation from sparse datasets.

The underlying mathematical techniques form the cornerstone of very challenging collaborations between LMI INSA Rouen and Energy industry.



Building  
new wind farms

**A unique modelling and  
visualization  
algorithm  
for greening  
the economy**



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