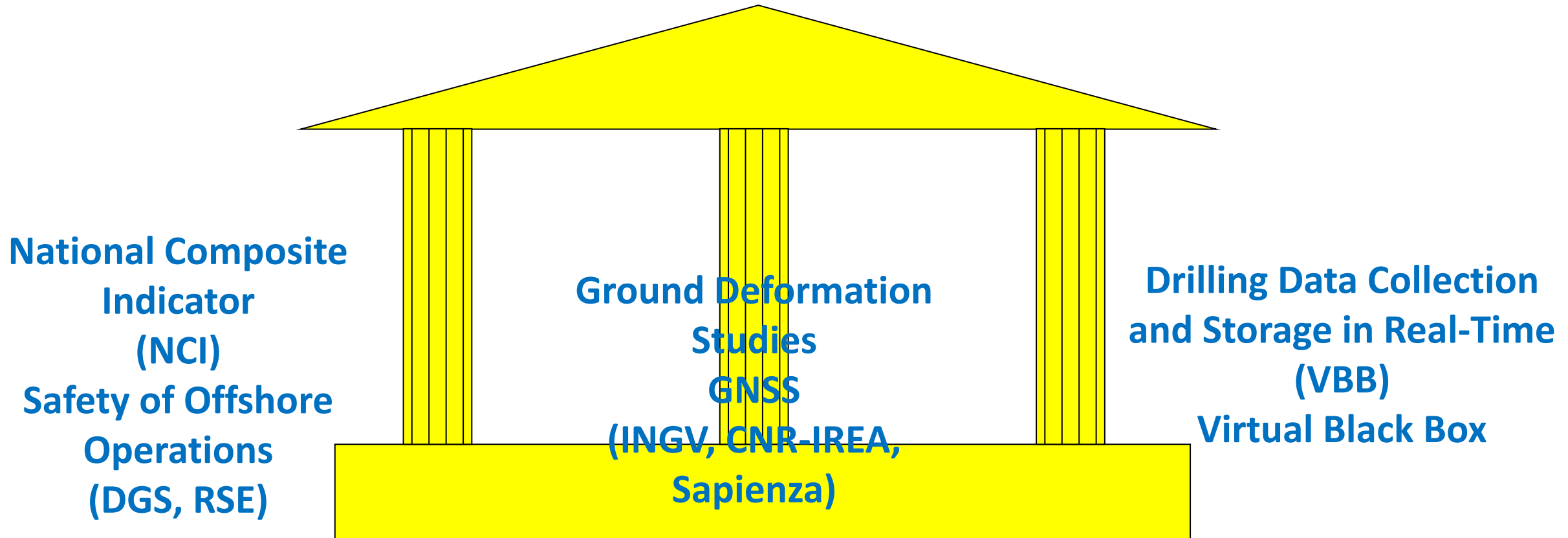


Safety and Environmental Monitoring Studies, Italian Offshore

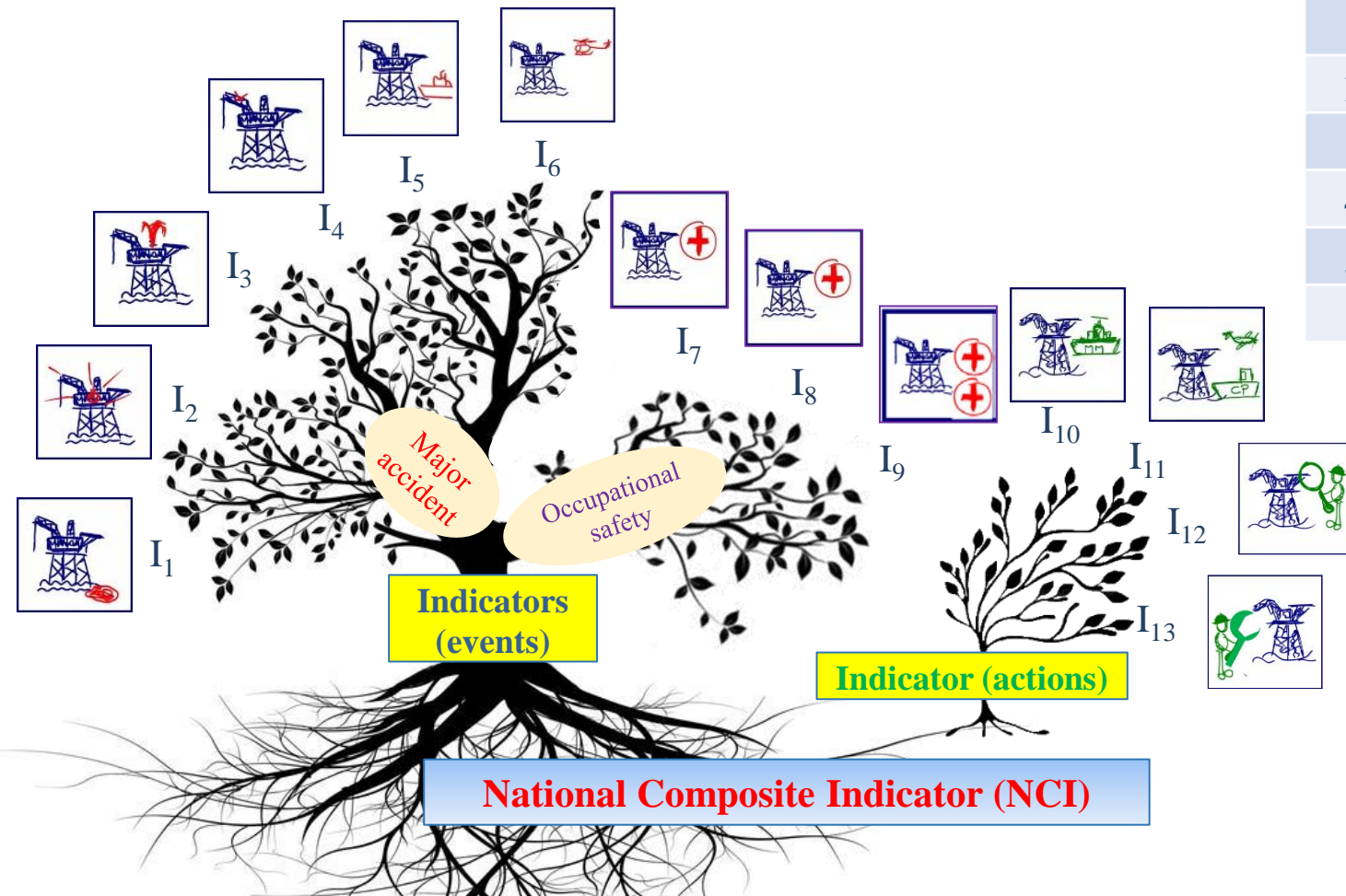
University of Bologna



Key Performance Indicators (KPI) and Multi-criteria approach for measuring Safety of Oil & Gas facilities in the Italian Offshore

- **Elaboration of specific Key Performance Indicators (KPI)**
- **Construction of a Composite Indicator** which allows to quantify and monitor over time safety performance of Oil & Gas production facilities in the Italian offshore
- **Method based on the combined use of:**
 - **Tree of impacts concept**, which identifies the significant criteria and the related set of key indicators (KPIs) that cover specific aspects of safety.
 - **Multi-criteria analysis approach**, which defines the KPI combination procedures and calculate the composite indicator.

Tree of Impacts on Safety



ID	Major accident
1	Accidental release of liquid/gaseous HC and/or other pollutants
2	Fires & Explosions
3	Criticalities in Drilling Operations
4	Structural Integrity Losses
5	Collisions with other Vessels
6	Helicopter Accidents

ID	Occupational Safety
7	Lost Time Injury Frequency, LTIF
8	Lost Work Day Case Severity, LWDC
9	Fatal Accident Rate, FAR

ID	Actions
10	Sea Patrol, MM (Navy)
11	Sea Patrol, CGCCP (Coast Guard)
12	On-board Inspections, UNMIG
13	Maintenance Programmes

Ground Deformation Studies

Working on real Datasets

GNSS data analysis, «certification» of the results

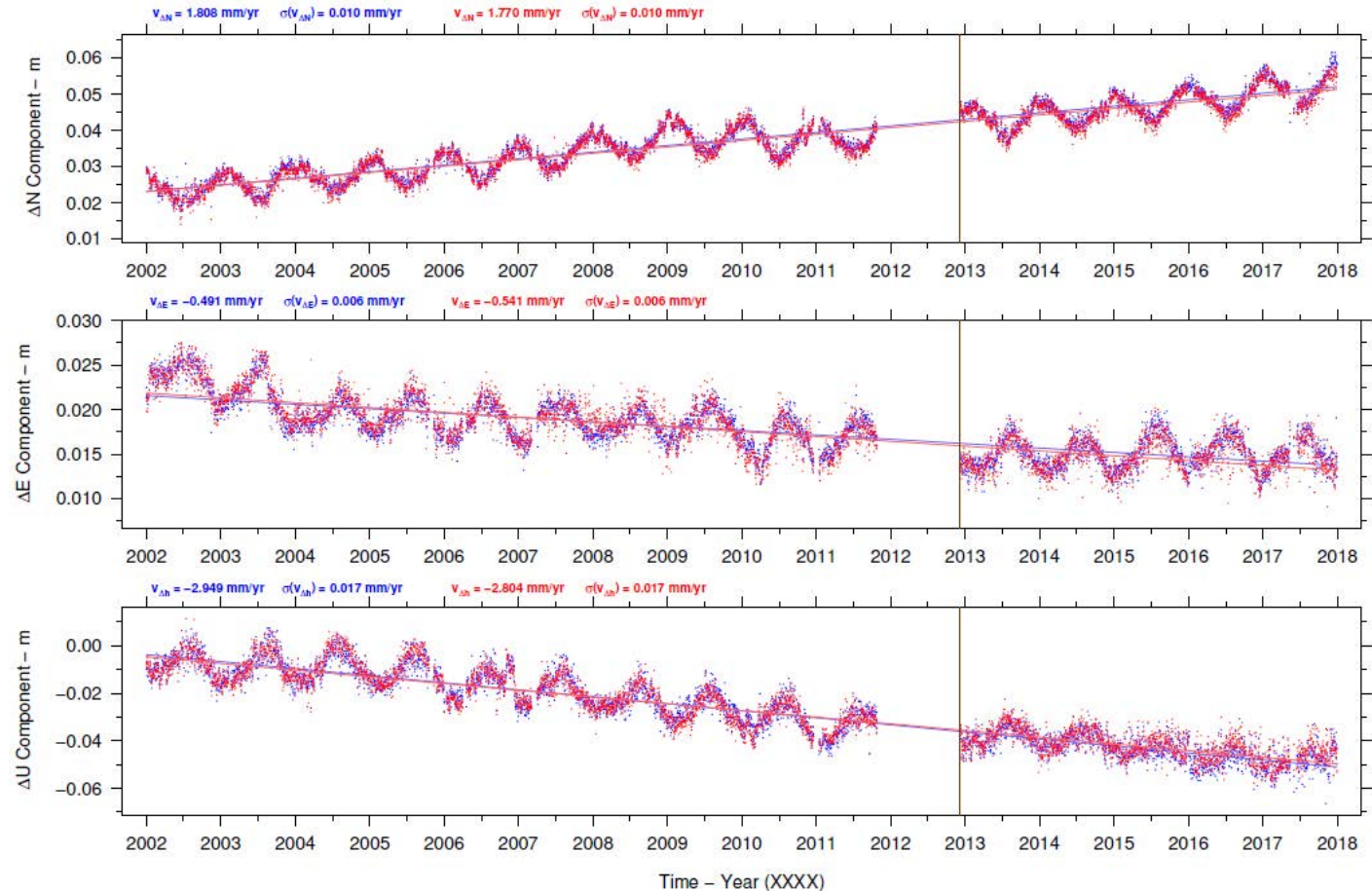
At present, GNSS is not certifiable technique because the satellite segment of the USA and Russian Constellation are managed by the Defense Depts.

The only action that we can do now is a validation of the result, re-processing raw data with different scientific software packages.

Today, many scientific softwares are available for GNSS data-processing, which use different approaches:

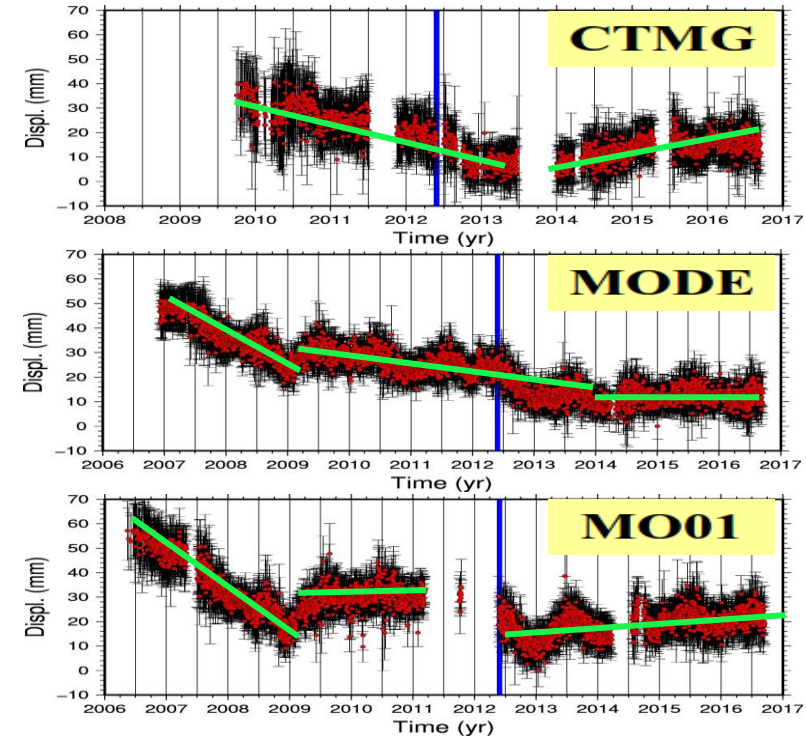
- 1) Bernese (Univ. Berna – CH) & 2) GAMIT (MIT – USA) → Differenced approach;
- 3) GIPSY OASIS II (JPL – NASA – USA) → Undifferenced approach (PPP)

Starting from the same dataset is important to evaluate what are the differences in term of mean velocity estimation obtained from a GNSS Time series processed by different software packages.

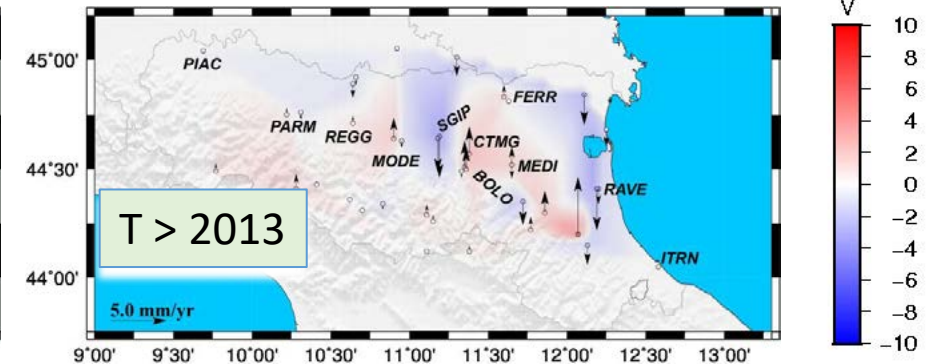
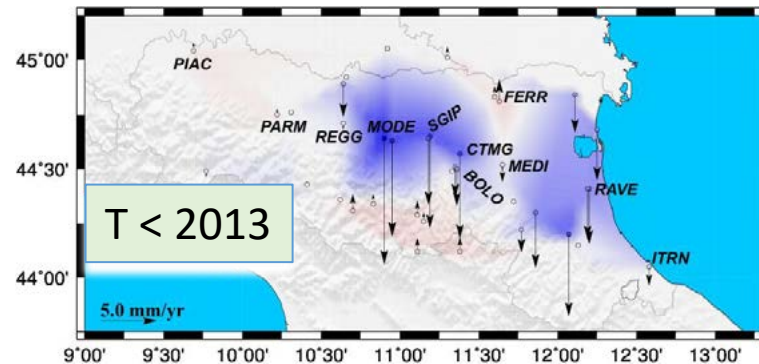


Advanced methods of GNSS time series analysis for:

- Periodical signal detection (including seasonal)
- Mean Velocity estimation and its changes during the time
- Discontinuity detection
- PCA – CME (Principal Component Analysis and Common Mode Errors)
- Kinematic pattern evaluation (planar and height) also in offshore environment with a focus on Oil & Gas Industry



GNSS =
Global Navigation
Satellite Systems

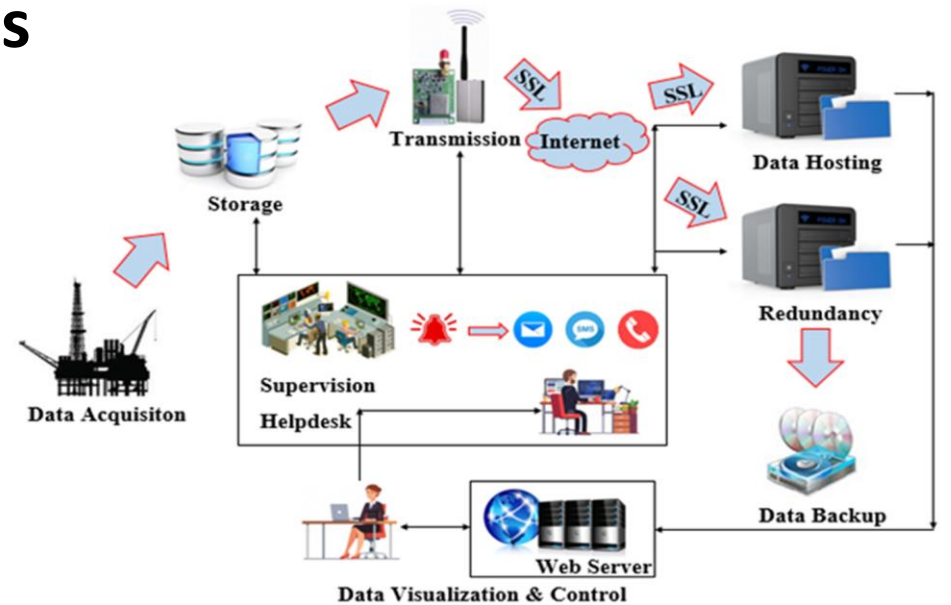


Offshore Safety: Collection and Recording of Relevant Drilling Data in the Italian Offshore by Means of Virtual Black Boxes

The main scope of this study is to present the novel system implemented for the Italian offshore drilling activities monitoring, the **Virtual Black Box (VBB)**.

Aim of such a tool is to grant the Competent Authority a reliable access to drilling data in case of accident, also in the light of taking the necessary legal actions.

“Member States shall ensure that ... operators and owners take suitable measures to use suitable technical means or procedures in order to promote the reliability of the collection and recording of relevant data and to prevent possible manipulation thereof” (EU Offshore Directive).





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