

When GIS Meets AI

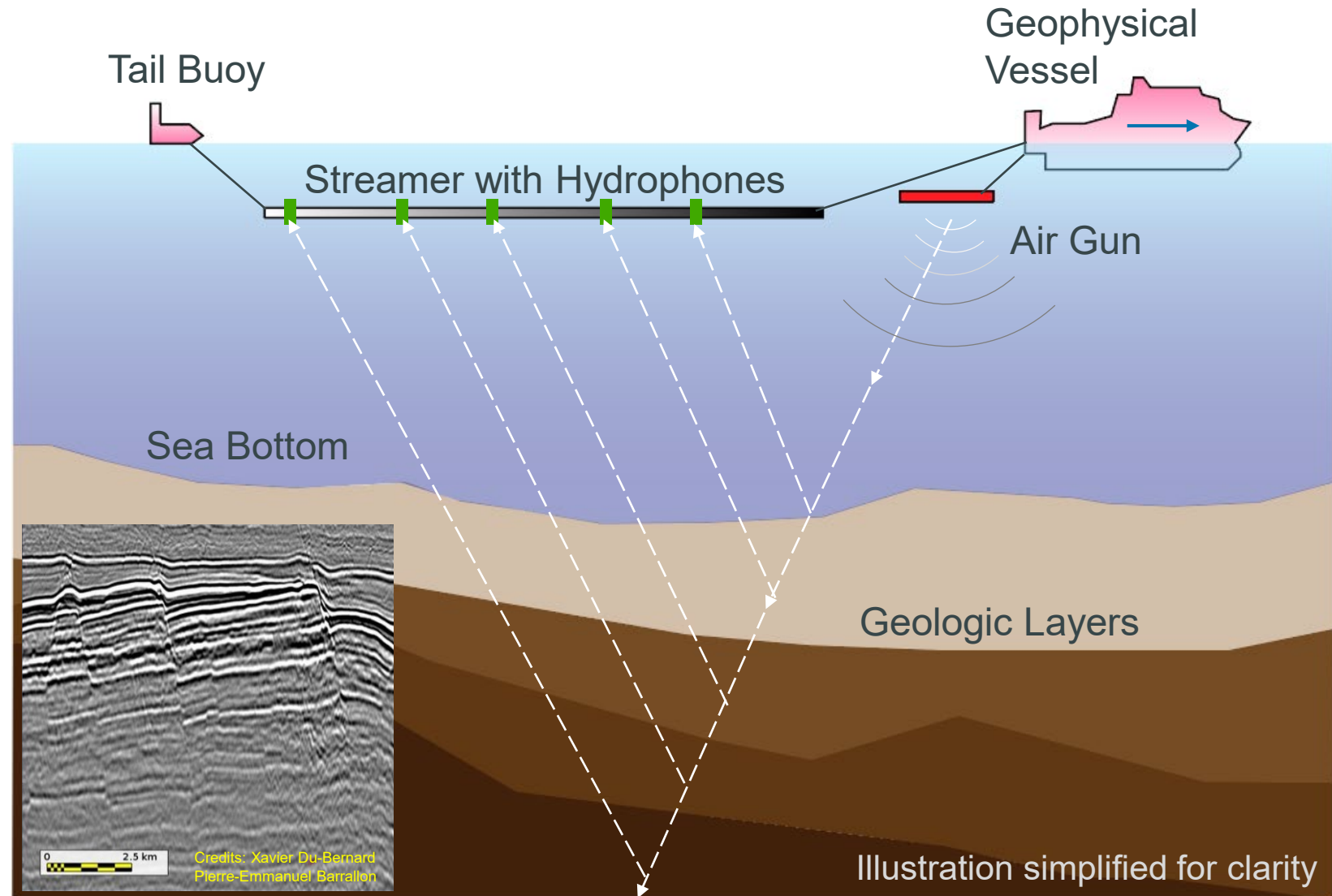
A Seismic Uplift Fees Validation

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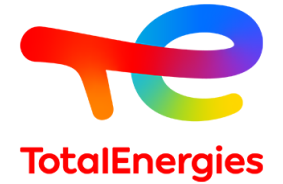
Deep Water Seismic Surveys



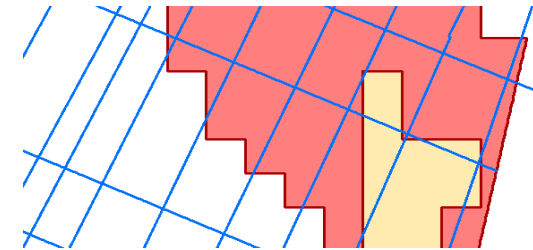
- Seismic contractors like CGG, PGS, TGS, ION, etc. collect and process these surveys
- Sound is generated by an air gun which in turn generates a shock wave
- Formations below the sea bottom reflect the shock wave and these are picked up by the hydrophones
- Seismic sections (2D data) are created by the vessel's onboard computers, and these allow us to see the boundaries of the geological layers
- These sections are used by geoscientists to determine if a good oil/gas prospect is in the subsurface



Uplift Fees



- TotalEnergies licenses blocks onshore, and offshore to explore for potential oil and gas deposits. Multi-client and proprietary seismic surveys exist often in these areas
- The goal of the project was to search each 2D Seismic contract for “Uplift Fees” and validate if these needed to be paid
- With the contract signature date, and the date of entry into a block(s) we can determine if these fees need to be paid:
 - Block Entry Date > Contract Signature Date = Fees apply
 - Block Entry Date < Contract Signature Date = Fees don't apply
- Identifying this information has significant importance to highlight potential capital exposure on New Ventures, millions of dollars.
- We used two technologies:
 - GAIA, an artificial intelligence tool developed between TotalEnergies and Google. It is effective at searching documents for the occurrence of a specific key words.
 - ArcGIS Pro was used to analyze the spatial component (survey vs. block intersections in time), and then integrating the findings into maps.



AI Assists Geoscientists in Tedious Tasks

Credit: Xavier Du-Bernard, Pierre-Emmanuel Barrallon



Pattern recognition
Vision

Pattern recognition
Technical documents

Access to relevant data
> Massive amount of data available

Get information
> Biblio, previous work, analogs



Repetitive tasks
> Quality control, correlations, attributes

Ideation
> Prospect generation

Interpretation
> Drawing, correcting
> Interpolating, smoothing

Seismic → **Fault predict & extract**

Reporting

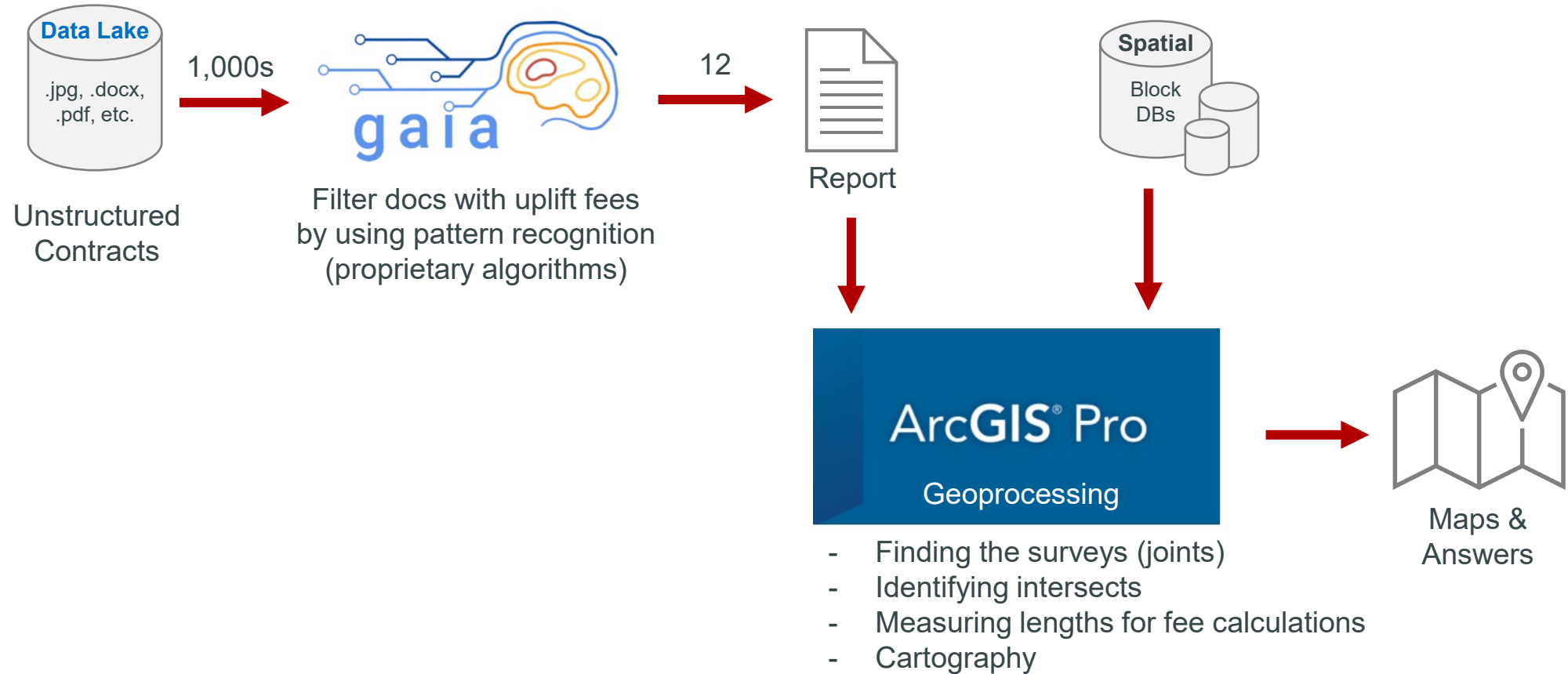
- > Slides for committees
- > Reports

Getting & integrating feedback

- > QCR, peer reviews

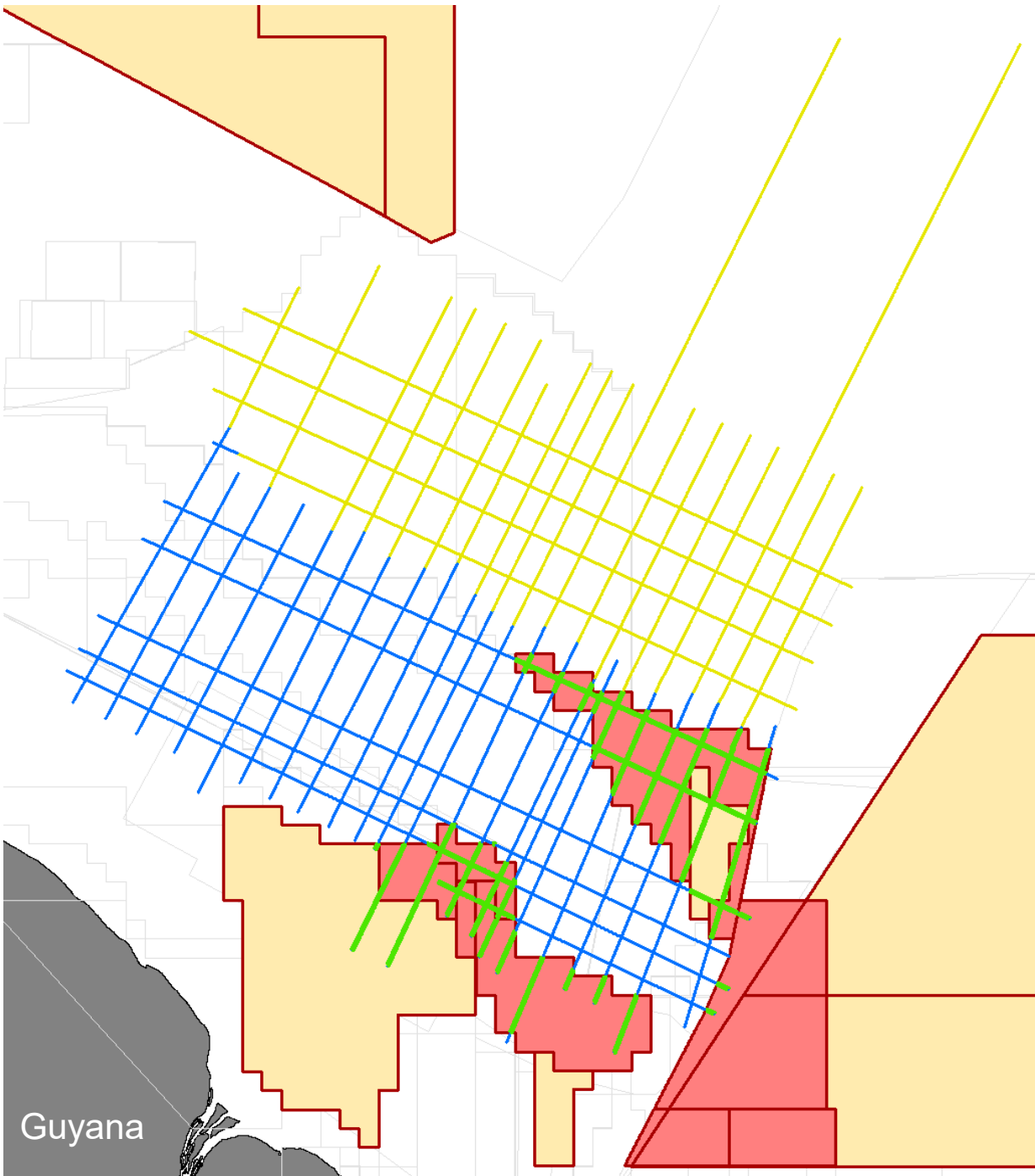
- > Reduce time to get the right information
- > Automate manual & repetitive tasks
- > Accelerate and improve interpretation

Workflow

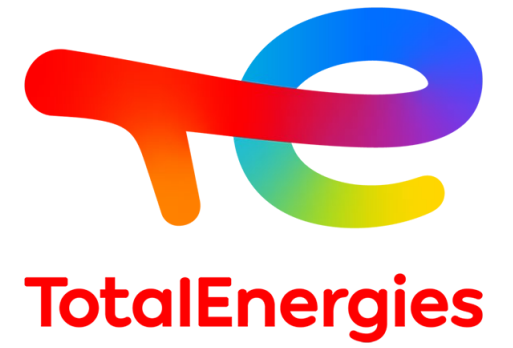


Outcome

- The initial pilot project contained a small area of interest around offshore Guyana/Suriname
- GAIA analyzed thousands of documents quickly, and 12 contracts were identified containing uplift fees. The same work manually would have taken weeks
- After the spatial, and historical analysis was done we realized saving of 2 million dollars! Fees that otherwise without the analysis would have been paid

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- Survey 2 Example
 - Survey 1 Example
 - Survey 1 Example: Intersects
 - TotalEnergies Block: Current
 - TotalEnergies Block: Historic

All data shown (surveys, blocks, etc.) is not proprietary or confidential, cartography has been simplified for clarity



Q&A