



# **ULF-PSSM – Non Structural Solutions**

Green Field Reconnaissance in Underexplored Basins

SPE Meeting Geneva March 2012

**Ernst-D. Rode**  
March 1, 2012

## Marmot Passive Monitoring Technologies SA Parc Scientifique @ EPFL, Lausanne

15 years application of Passive Monitoring  
Technologies for oil field characterization

More than 20'000 data sets

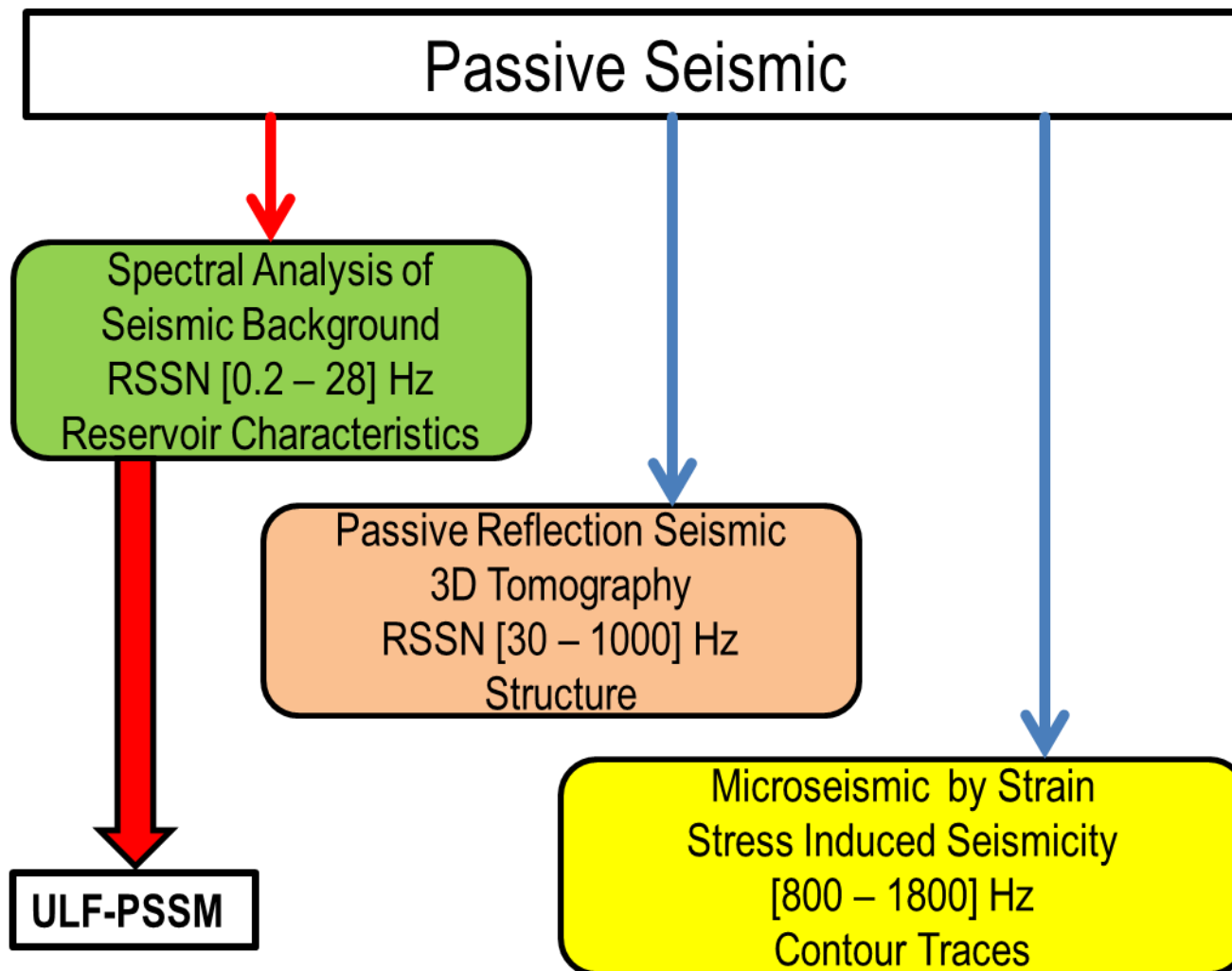
More than 100 projects in 12 countries on 4 continents

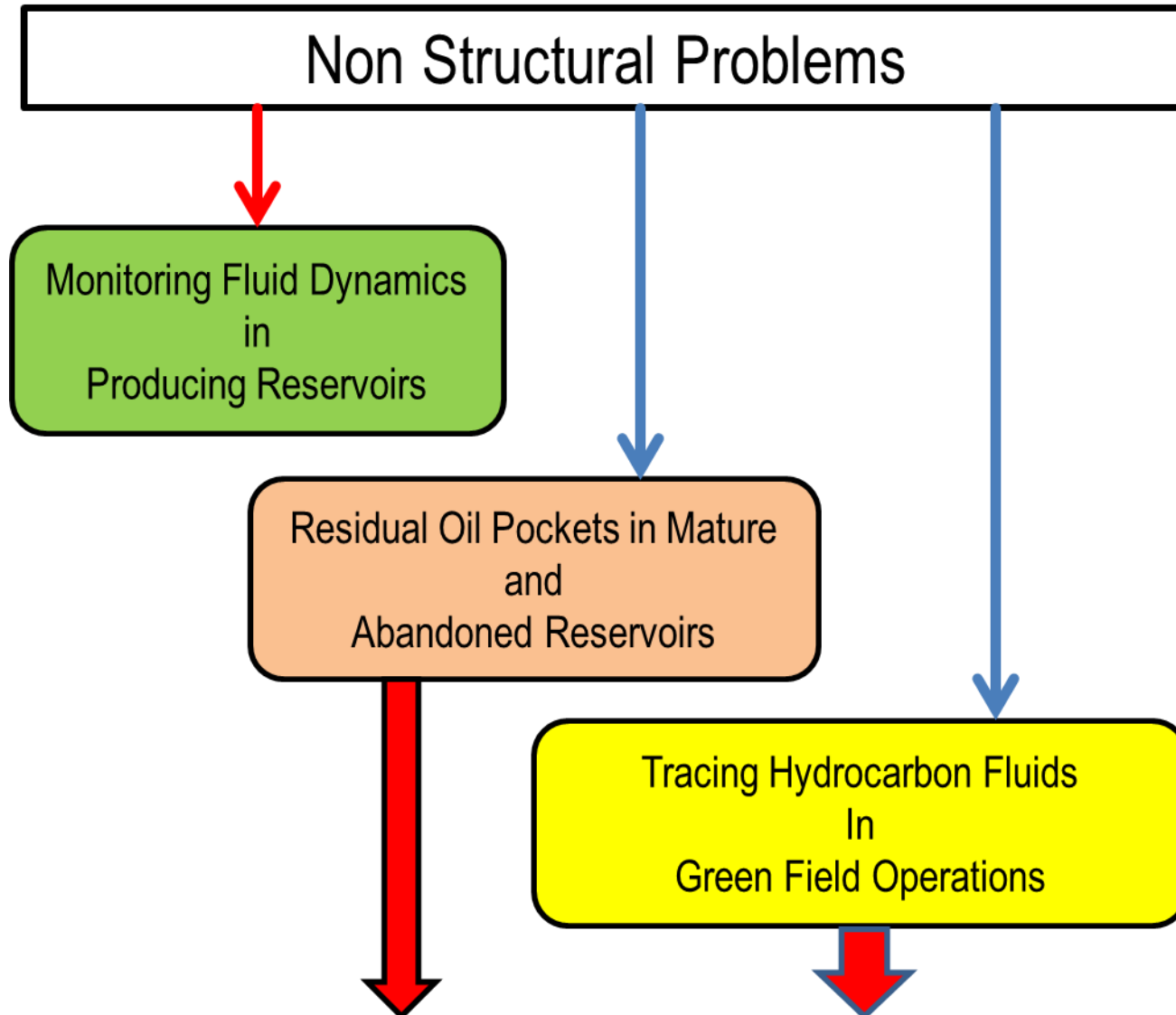
More than 250'000 Off road km

In-house designed Signal Converter

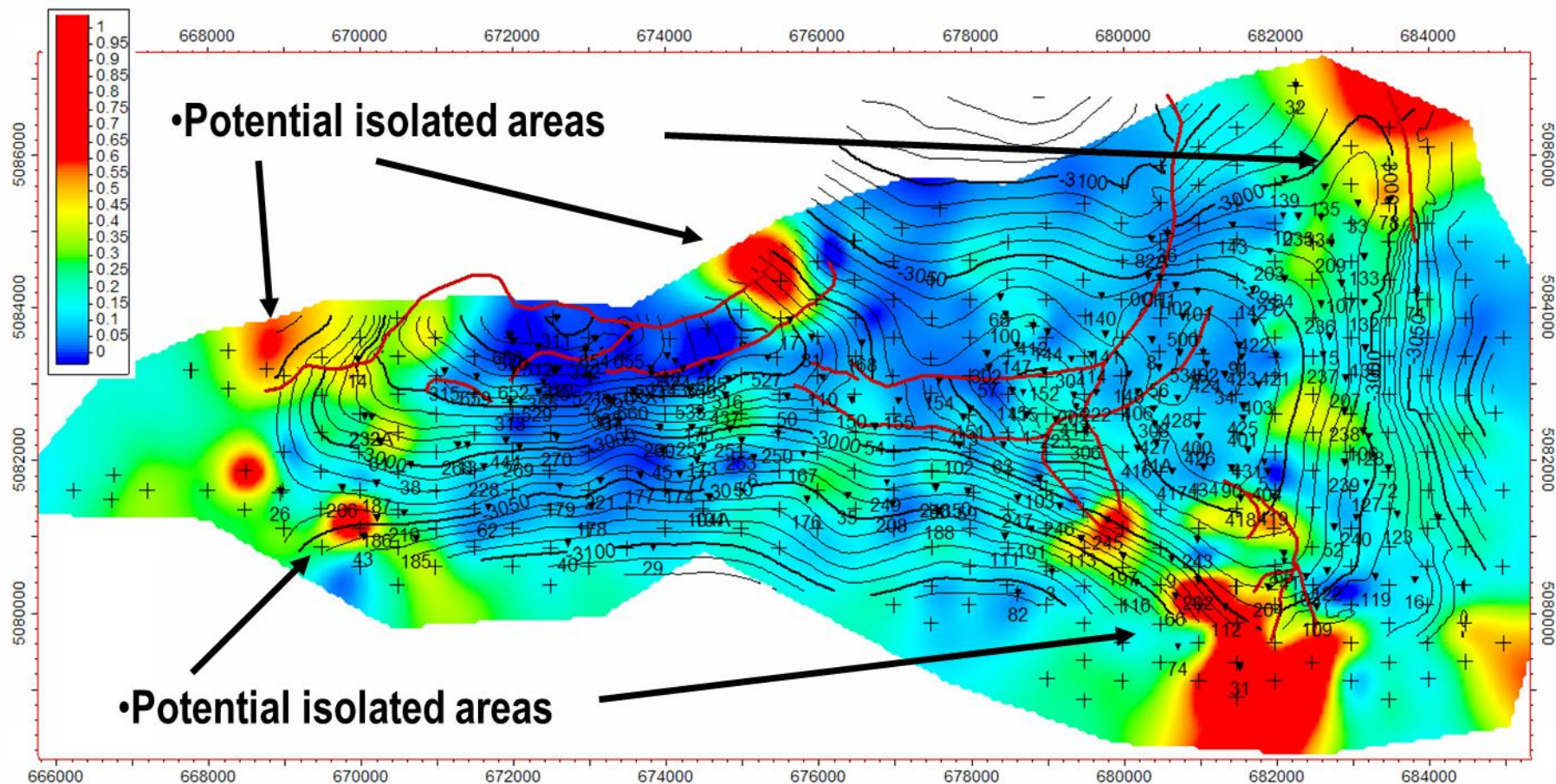
4 patents approved and 9 pending



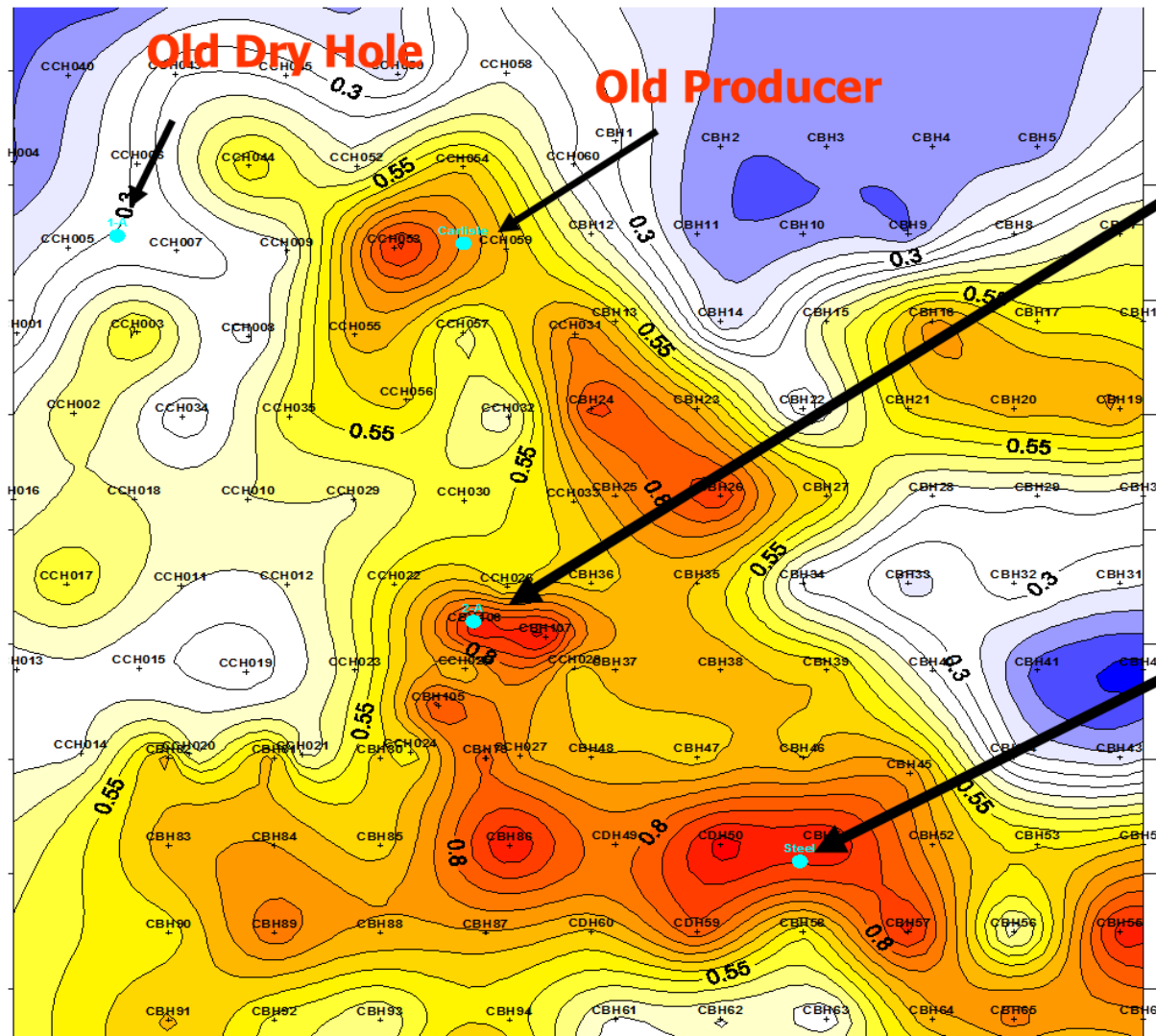




# Residual Oil Pockets (pre Caspian)



# Underexplored Fluid Indication



**New Well  
drilled in  
January 2005**

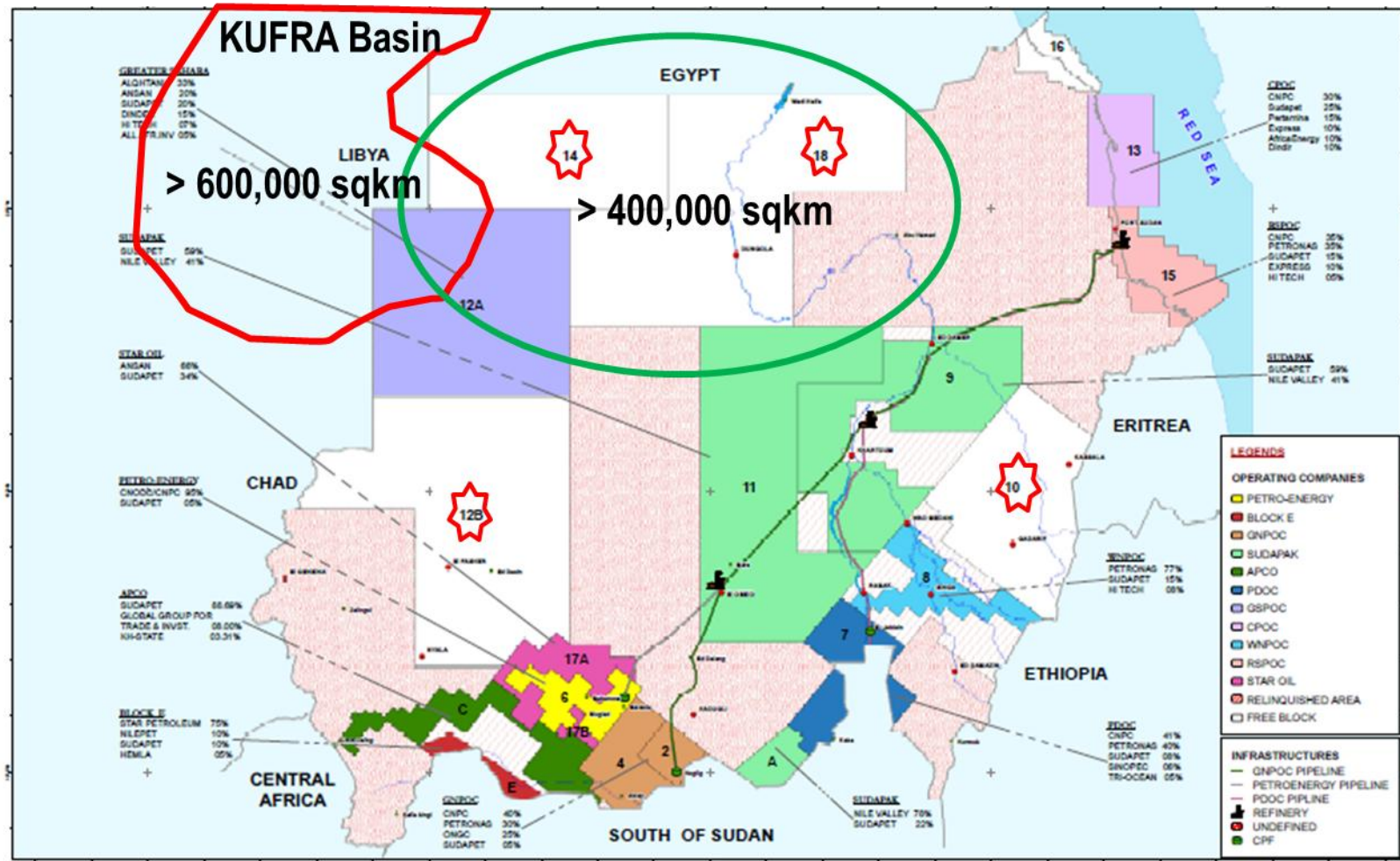
**80 bopd**

**New Well  
drilled in  
February  
2005**

**150 bopd**



# Joint Survey Operation North Sudan-Chad-Libya (Echnaton)

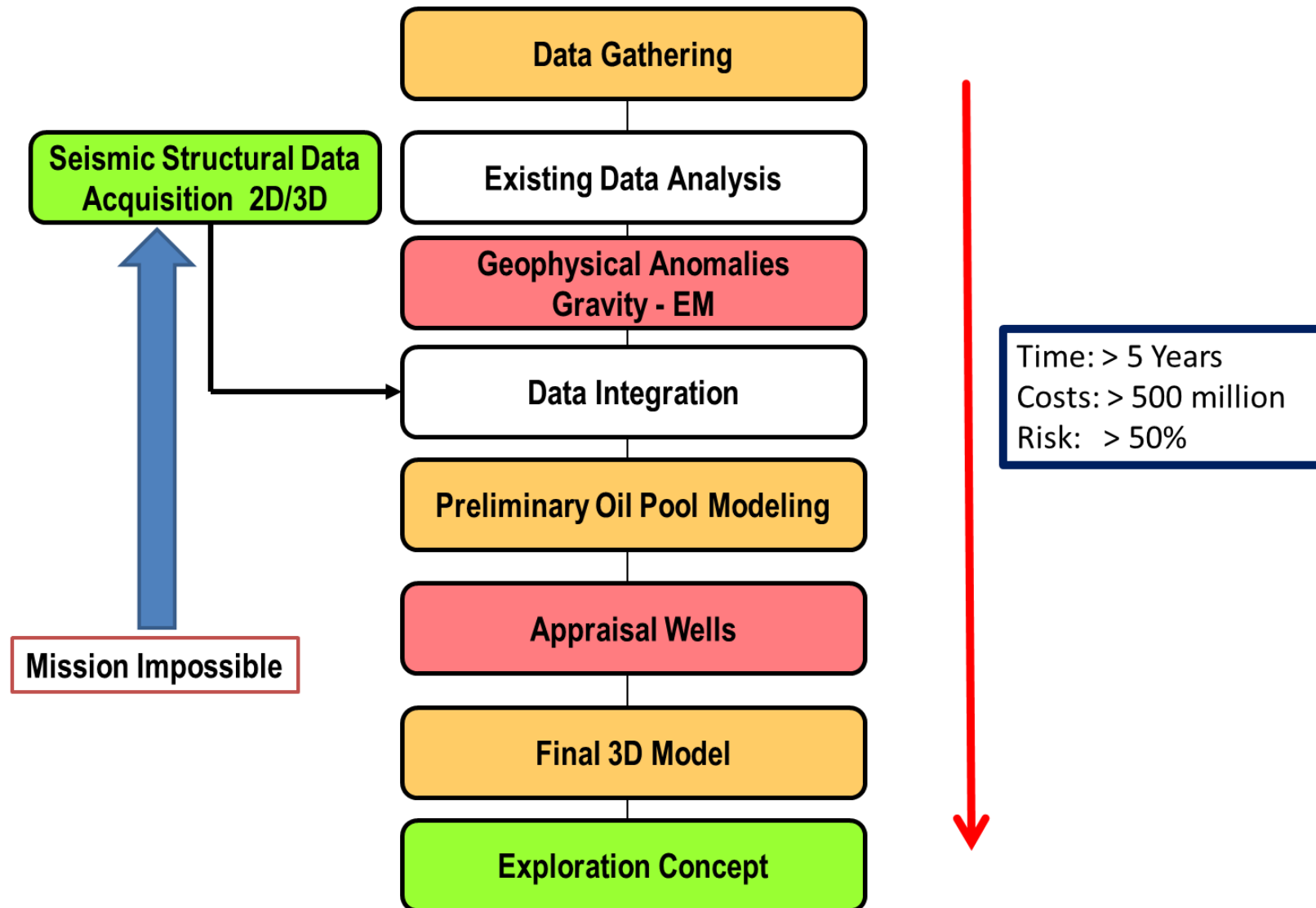


Prepared by ODFB Revision

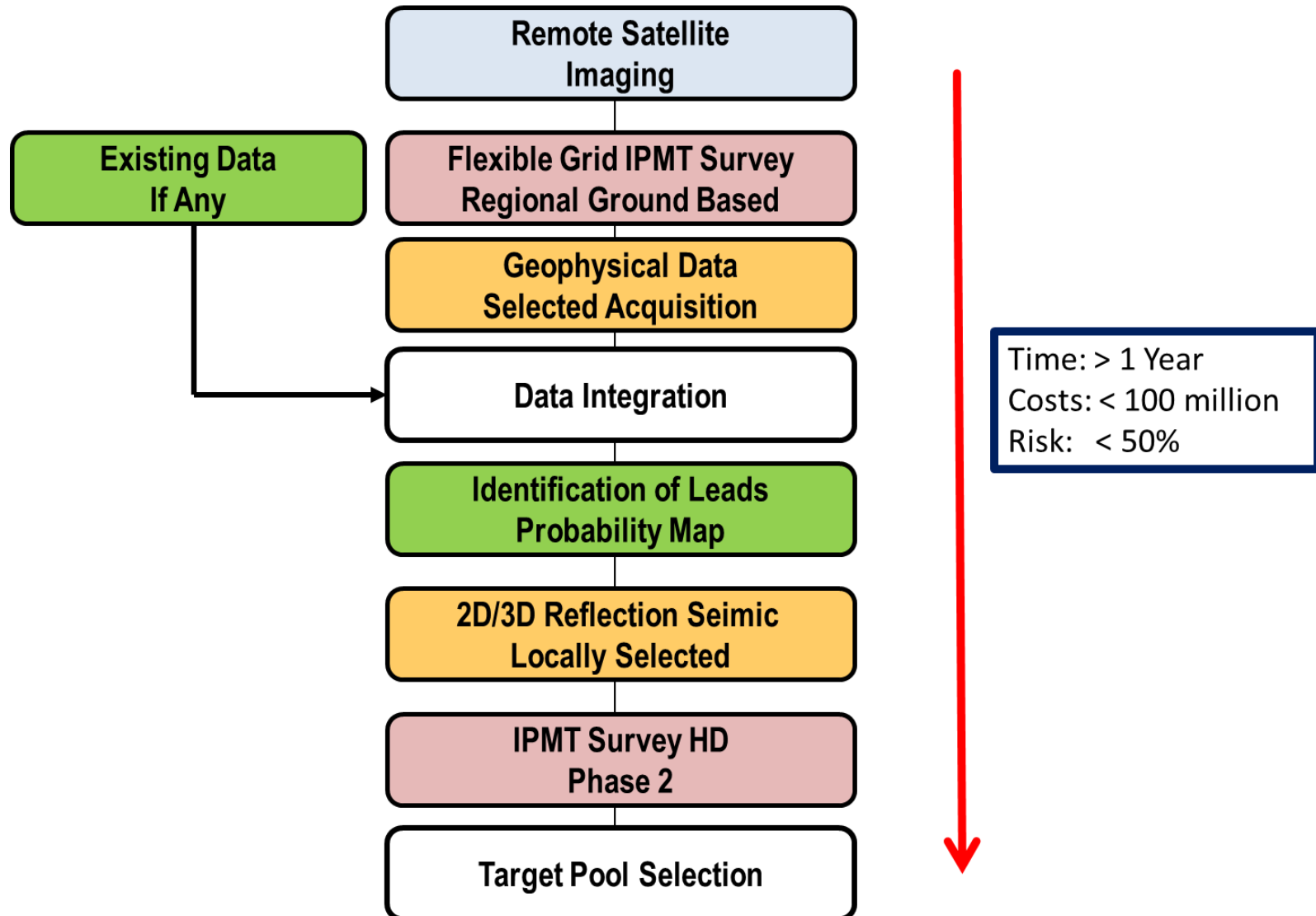
THIS MAP ATTACHED ONLY FOR USE OF MINISTRY OF PETROLEUM AND OIL-OPERATING COMPANIES.



Free Blocks



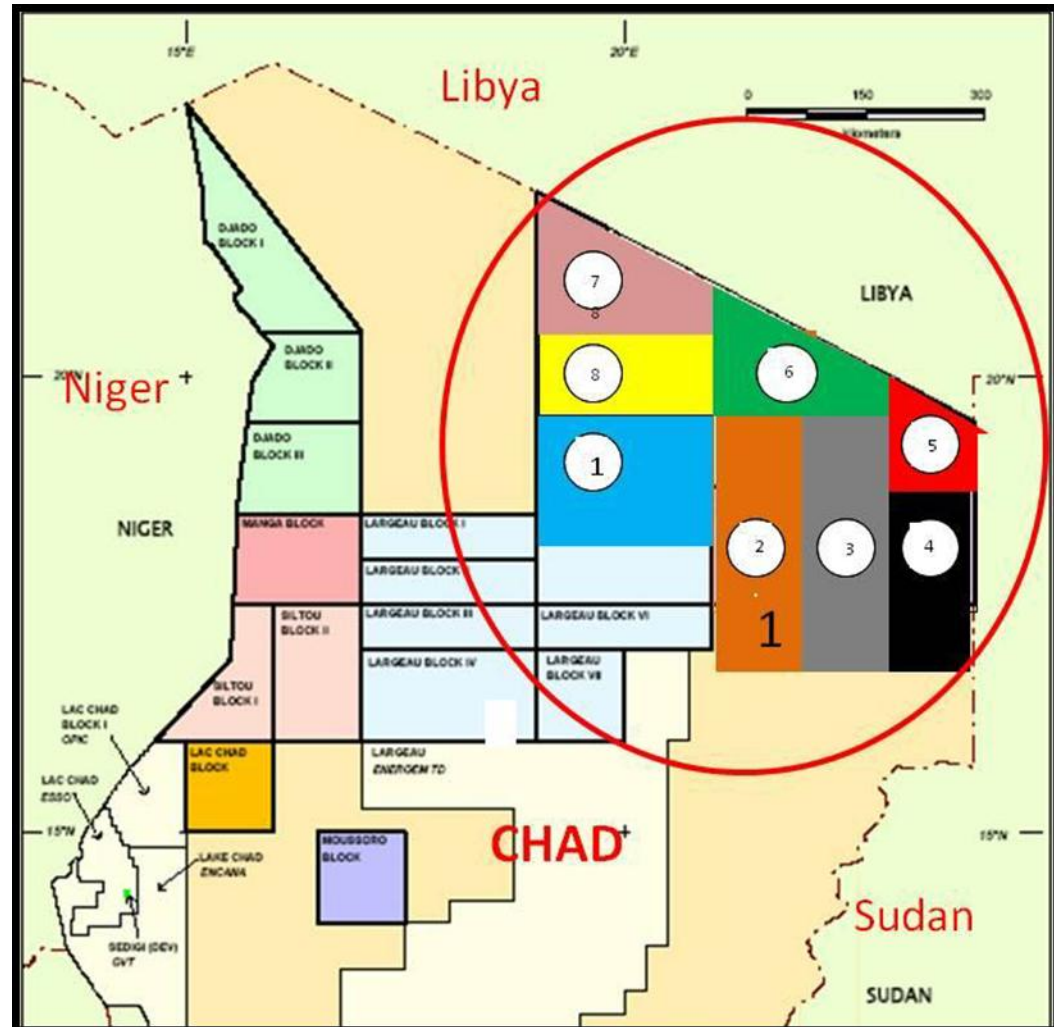




## Chad : 8 new Blocks in Kufra – Erdis Basin

Each Block has a Size  
Approx. 35000 sqkm.  
No data existing except  
Some gravity  
Total 245,100 sqkm

Mission Impossible  
For  
Conventional approach

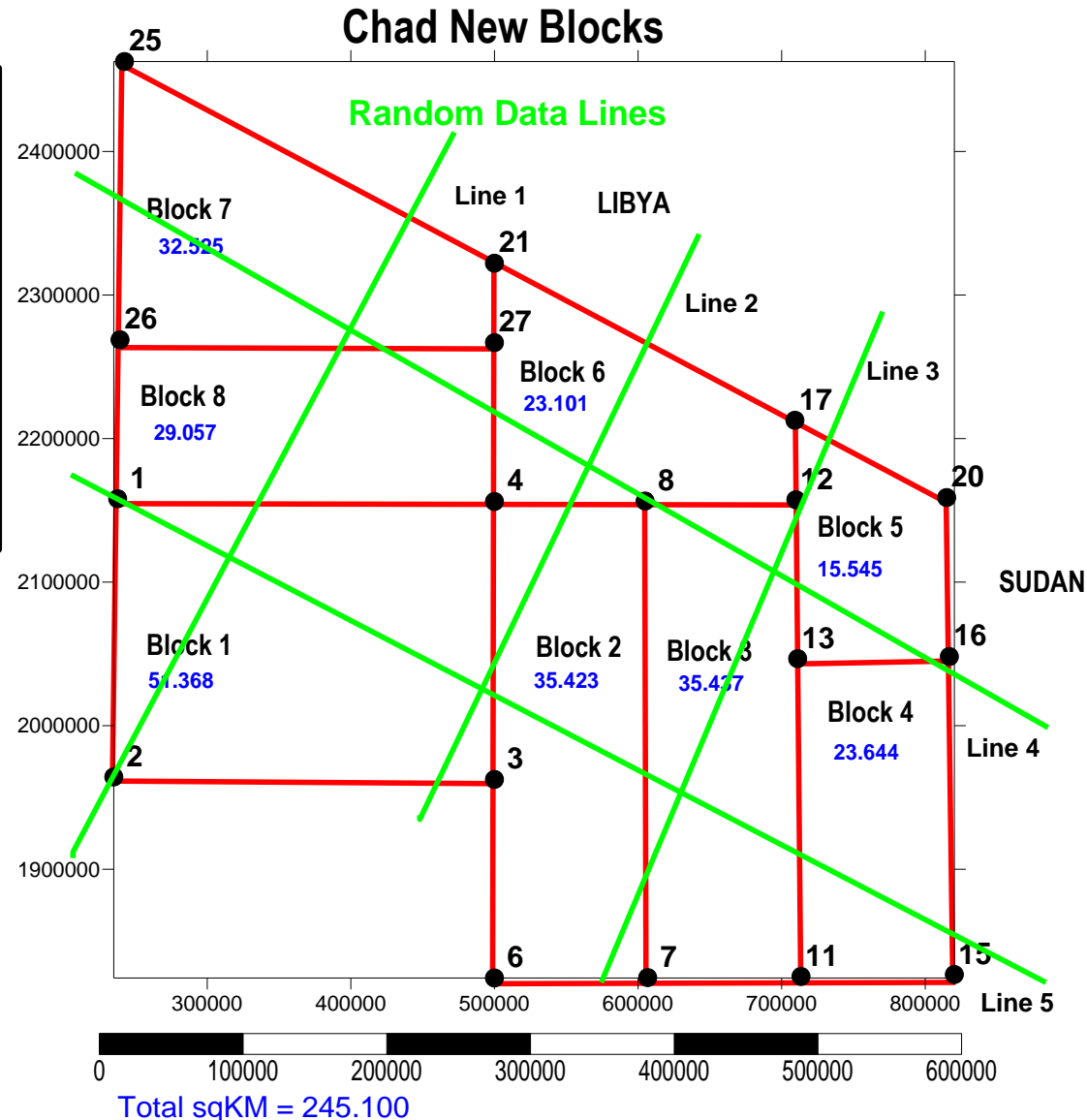


# Phase 1 Survey Set Up

Total Area Size 245,100 sqkm  
 Random IPDS Lines + 3054 km  
 Spacing 5 km – Quadrupol 1 km  
 Cost for Acquisition CHF 4,275,600  
 Time for ACQU – 204 working days  
 Line Cost CHF 1,400 / km  
 Area Cost CHF 17.44 / sqkm

Time to Result  
 120 Days after Mob  
 2 Teams Operating

Coord: UTM WGS 84 – 34 Q



# Example for first Approximation

## Phase 1

### Random IPDS Data

### Gravity Overlay

Total Area: 900 sqkm

Coverage 200 Dp lines

Acquisition time 24 days

Data integration Report 30 days

Total time 8 weeks

Total cost US\$ 675,000

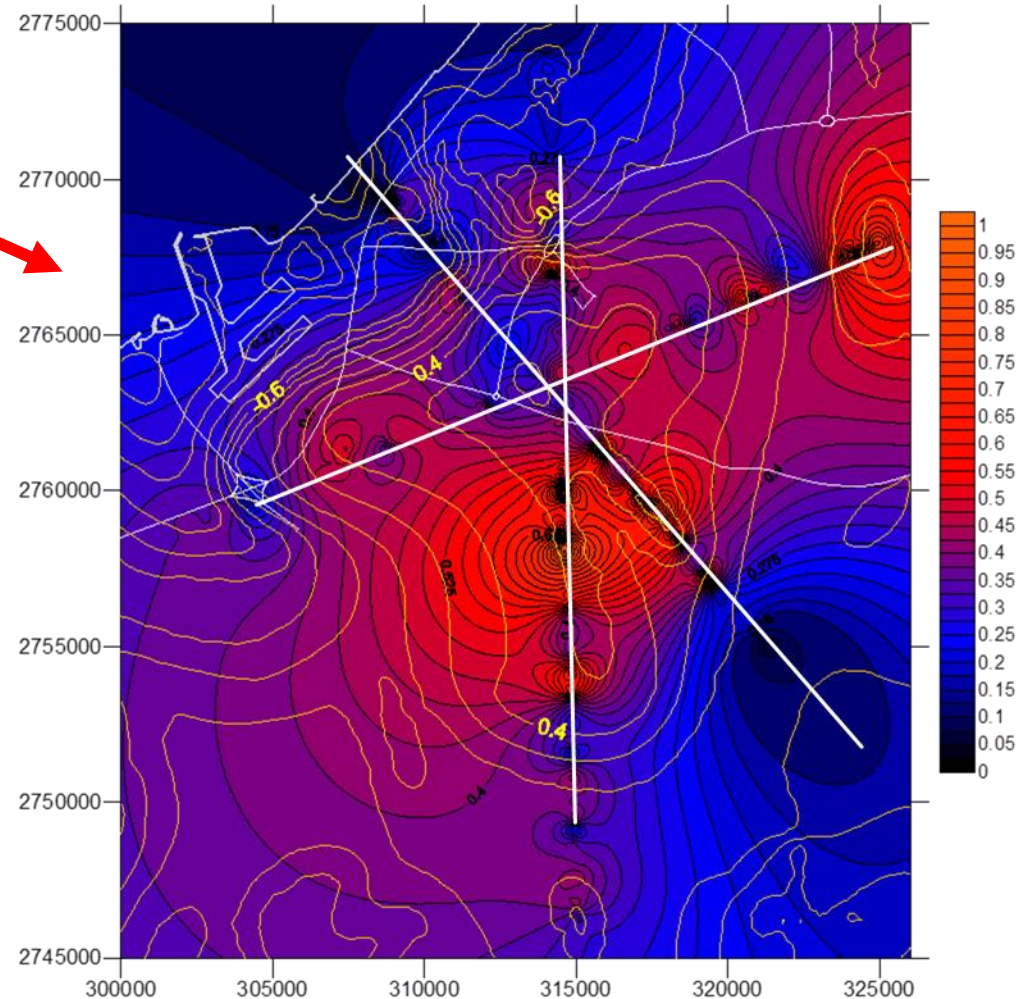
Correlation with gravity map

Decision Point

Phase 2 – higher density grid

Time 2 months

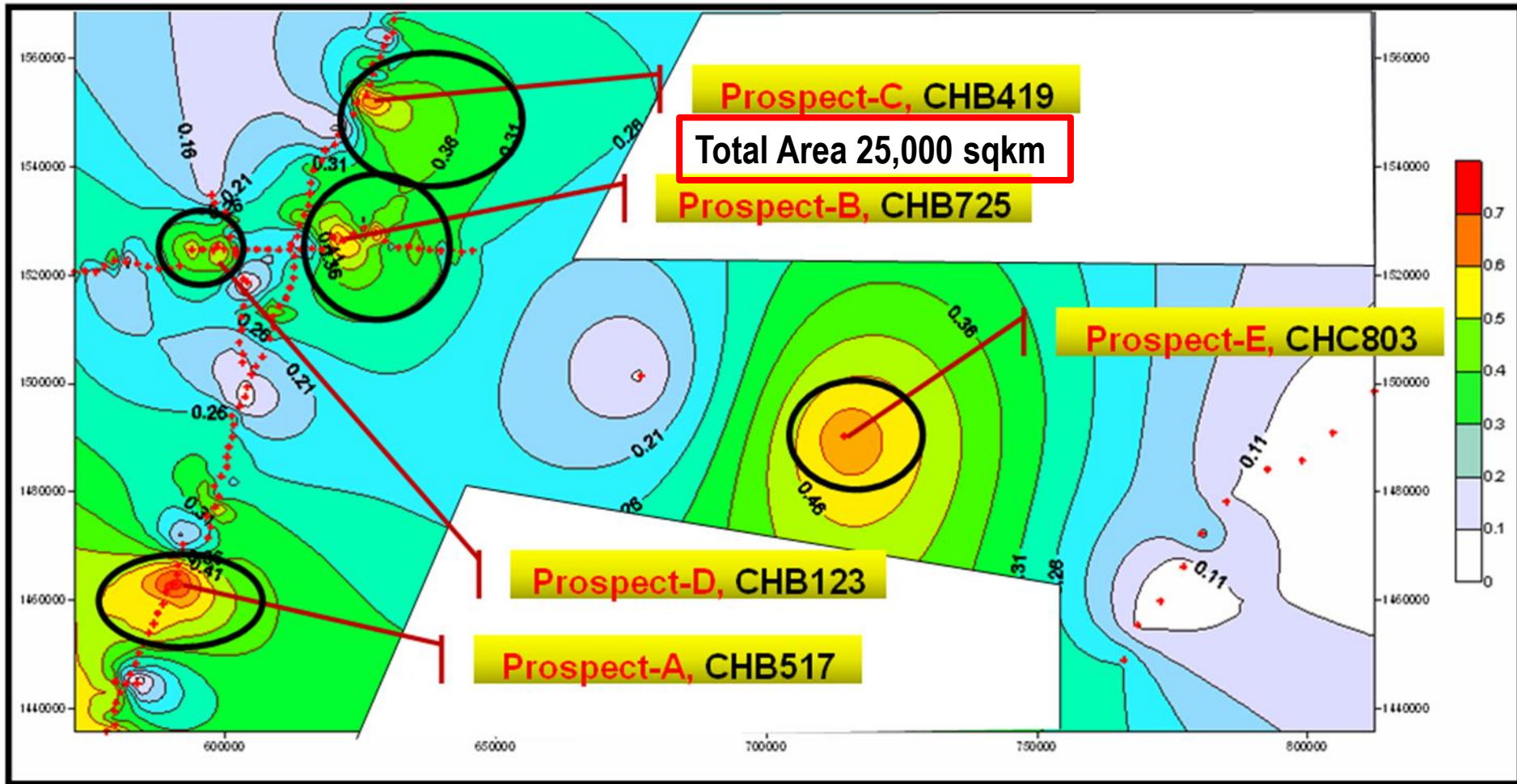
Est. Costs US\$ 1.000.000. -



UAE/DUBAI, Jebel Ali Area



# Example for pre Reconnaissance – NARA/Taudeni Basin MALI



Location of  
potential leads

**A** CHB517: 0590304, 01462944

**C** CHB419: 0626142, 01553241

**E** CHC803: 0714379, 01490298

**B** CHB725: 0621824, 01526345

**D** CHB123: 0599901, 01524766

Coordinate system: UTM WGS84, ZONE 29P

**Unconventional Problems need unconventional Methods**

**Reduce the uncertainty before running expensive Technologies**

**Select the technology which you apply according to the problem you have**

**Do not try to adjust a problem according to the technology you are used to only because it is tradition and your grandfather did so**

**Keep the Time to Decision short and go in smaller steps to reach higher cost efficiency =  $\text{Cost} / \text{Uncertainty}$**

**Yesterday is Past and the Future is Passive**

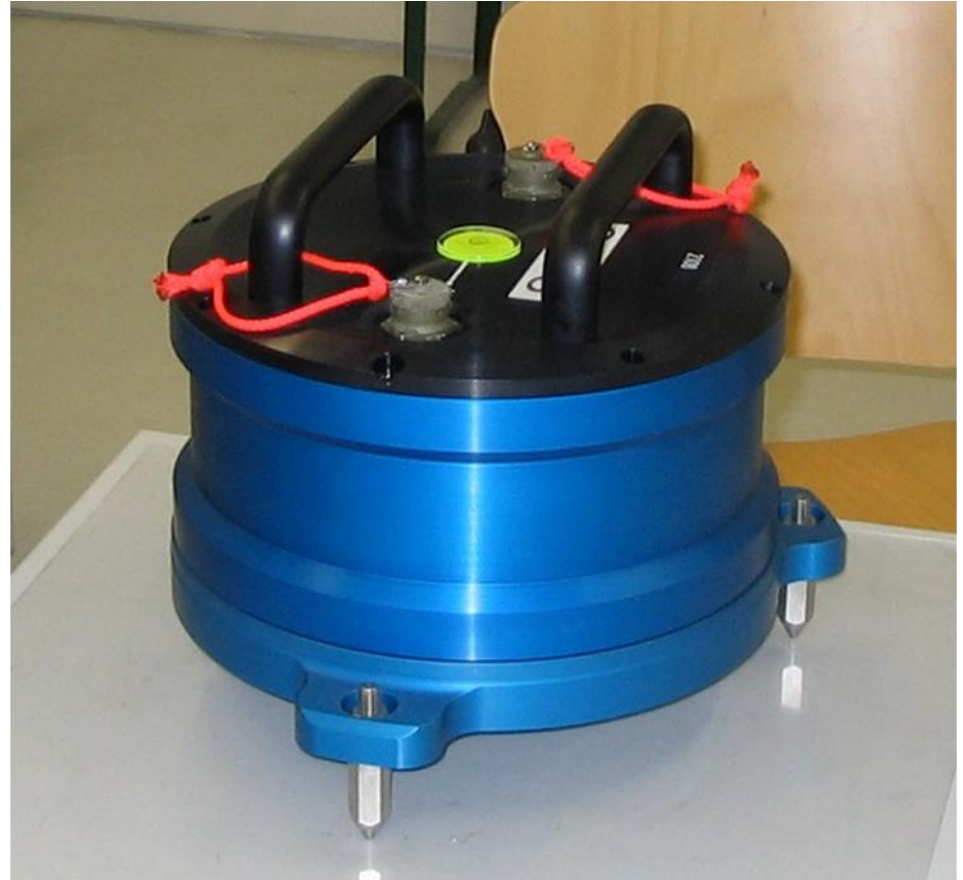




## Arabian Desert

## Marmot Signal Converter

- 30'000 – 120'000 V sec/m
- 18 kg
- 0.1 – 40 Hz
- Electrodynamic Inverse Loop  
Magnetic System (patent  
pending)
- Optical Feed Back
- Zero Friction Fly Bearings
- Self Calibrating



# Thank you for your attention.

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