Компания «Геонавигационные Технологии» занимается производством программного обеспечения для сопровождения наклонно-направленного бурения скважин, а также оказывает консультационные услуги в данной области.

Компания активно работает в нефтегазовой сфере, сотрудничая с крупнейшими российскими нефтегазодобывающими компаниями. ООО «Геонавигационные Технологии» постоянно увеличивает спектр предоставляемых услуг и расширяет зоны своего действия.

“Geosteering Technologies” develops the software for geosteering in real-time and provides technical support in this areas.

Our personnel has wide experience in oil industry applications and is working together with major oil and gas companies.

“Geosteering Technologies” is constantly increasing the range of provided services as well as the areas of our activity.
WHAT IS GEOSTEERING FOR?

The right position of the borehole in the reservoir is a key component of the drilling process, which affects not only the well productivity and well production life, but also the economic viability of field development as a whole. Our company offers a full range of well placement services of horizontal wells and sidetracks.

OBJECTIVES:

- To achieve the maximum productive interval of the horizontal well.
- To stay at the right distance from OWC (Oil-Water Contact) and/or GOC (Gas-Oil Contact).
- To maximize well productivity by placing a hole in the section most productive part based on information obtained from LWD.
- To reduce drilling’s risks.

RESULTS:

- Increased well productivity.
- Increased oil recovery (later water-cut).
- Optimized amount of the wells.
- Reduction of the EOR (enhanced oil recovery methods) costs.
Placing the horizontal wellbore in the reservoir according to the geological objectives:

**Well drilling (geosteering) 24/7**

- Updating the 2D-model
- Wellbore positioning in the reservoir
- Providing recommendations for the well path
- Well-timed drilling’s stop

**PREPARATORY PHASE**

The preparatory stage of geosteering job includes:

- Receiving data and objectives from the customer to build a geological 3D model of the sector:
  - The structural plan, targets
  - Offset wells’ data
  - Project well’s trajectory
- Risks analysis: the geological risks while drilling are assessed (loosing the target reservoir, the risk of OWC/GOC penetration).
- Recommendations of the optimal well logging while drilling (LWD).

**DRILLING**

- Obtaining drilling data in real-time mode.
- Landing to the top of a target zone (typically 200 m MD before entering the target reservoir), updating the geosteering model in real-time mode, geostopping.
- Placing the horizontal wellbore in the reservoir according to the geological objectives:
  - Well drilling (geosteering) 24/7
  - Updating the 2D-model
  - Wellbore positioning in the reservoir
  - Providing recommendations for the well path
  - Well-timed drilling’s stop

**ANALYSIS, OPTIMIZATION**

- Preparation of the final report of the well drilling.
- Decision quality assessment:
  - Lessons learned
  - Efficiency calculations
- Updating 3D static model for future planning.
One of the most important parts of the geosteering process is landing the well to the target reservoir (and performing geostopping). Well landing quality is crucial for the well placement effectiveness to the entire horizontal section of the well.

**WELL PLANNING, MODELING**

At the preparatory stage nearby offset wells analysis is performed as well as selection the best candidates to use in geosteering work. Then initial pre-drilling geosteering model will be built and all possible scenarios of the geological situations will be considered.

**PRE-DRILLING MEETING WITH CUSTOMER**

An essential part of the first stage is a meeting with customer’s specialists involved in the drilling process. In the meeting the geosteering engineer presents pre-drilling preparation results which include geological objective of the well, key geological targets, modeling results and scenarios, main decision points, requirements to minimize drilling risks. An important part of the meeting is to adopt a communication protocol to get an excellent quality of interaction between all specialists involved in the drilling.

**LANDING**

- Landing the well to the top of the target reservoir.
- Real-time updating of the well correlation with

**GEOSTOPPING**

- Call hole section’s total depth.
- Improving drilling safety by prognosing exact depth of abnormally high/low formation pressure.
- Precise execution of the well objectives.
Well drilling is an iterative (repetitive) process. When new data is received, it is required to perform the lithology estimation and determination of the wellbore stratigraphic position.

The geosteering engineer in real-time mode decides to (or not to) adjust the well path and transfers the relevant information to the customer. The customer decides on further actions. After receiving the new data the cycle is repeated.

Azimuthal log data (borehole images) can be interpreted in the module “QI dip” of the Geonaft software. The result of the interpretation gives information about formation true dip and apparent dip in the curtain section.

Updating 3D model allows to the best use of the information obtained while drilling for understanding the regional geology of the field. Updated 3D model is useful for proper planning future wells. Analyze the difference between the prognosis and the actual model improves quality of the model.