



Nord Stream 2

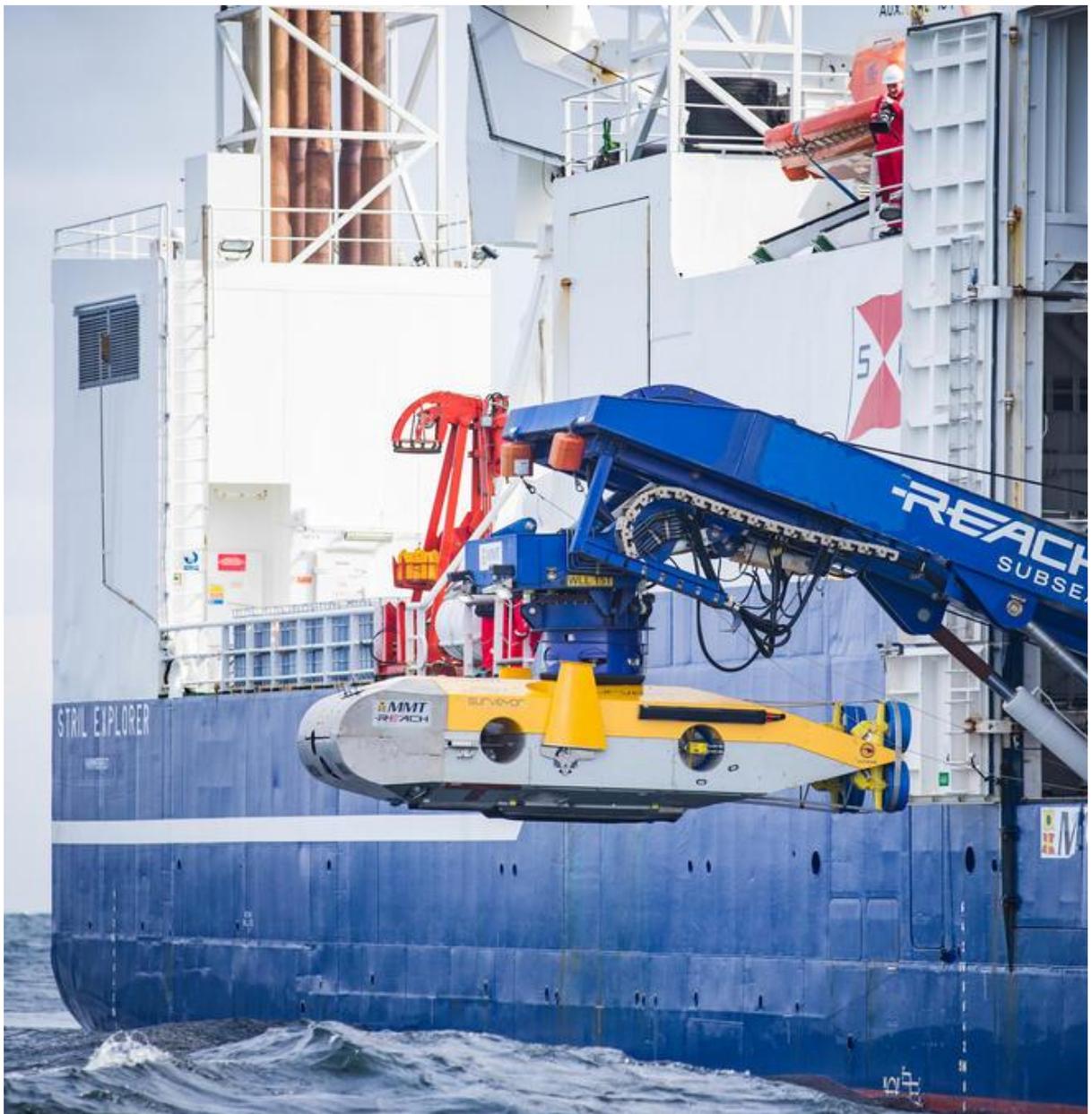
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## Fact Sheet: Surveying the Pipeline Route

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Nord Stream 2 AG | Jan-19





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## 1. The Basics

**Survey operations are the cornerstone of infrastructure projects like Nord Stream 2.**

They play a critical role in moving the project forward safely at all stages, providing input for:

- > feasibility studies
- > planning
- > engineering
- > permitting
- > route clearance
- > environmental management
- > construction
- > operation
- > insurance and quality control

The **1,230 km Baltic Sea route** from Russia to Germany will be surveyed over a **width of at least 1.5 km** from surface to seabed **depths of 200+ m**.

To ensure a clear and safe route we must identify:

- > Every detail of the seabed shape, such as steep slopes, sediment types and rock outcrops
- > Environmentally sensitive areas
- > Water depth
- > Cables/infrastructure
- > Items that would affect installation of pipeline, from dumped cars to shipwrecks to unexploded ordnance (UXO)

## 2. Timeline

**Surveys** began in late 2015 and will include **11 stages**:

### **Pre-construction:**

- > Reconnaissance: mapping the best route (complete)
- > Geotechnical: detailing geological features (complete)
- > Detailed corridor: identifying objects on route (complete)
- > UXO detection: finding munitions (complete)
- > Visual inspection: identifying specific objects (complete)
- > Detailed geotechnical: exhaustive seabed analysis (complete)
- > Cultural heritage: assessing potential sites (complete)
- > Additional surveys are in progress where alternative route options are being considered.



#### During construction:

- > Route clearance & seabed intervention: preparing the path
- > Anchor route surveys: ensuring safe corridor for pipelay vessels
- > Construction support: ad hoc surveys to meet changing underwater conditions

#### Post-construction:

- > As laid/post-lay: ensuring pipeline integrity

### 3. Current Status (January 2019)

- > So far, **49 vessels from contractors in 8 countries** have been deployed, from canoes to state-of-the-art survey ships.
- > **59,000 line kilometres** have been surveyed.
- > **2,300+ samples** have been collected to confirm the geology of the seabed.
- > **870,000 man hours** worked to find the best route.
- > **150 terabytes of data** has been gathered.
- > By the end of the project, Nord Stream 2 will have spent around **120 million euros** on survey works alone.

### 4. Advanced technology

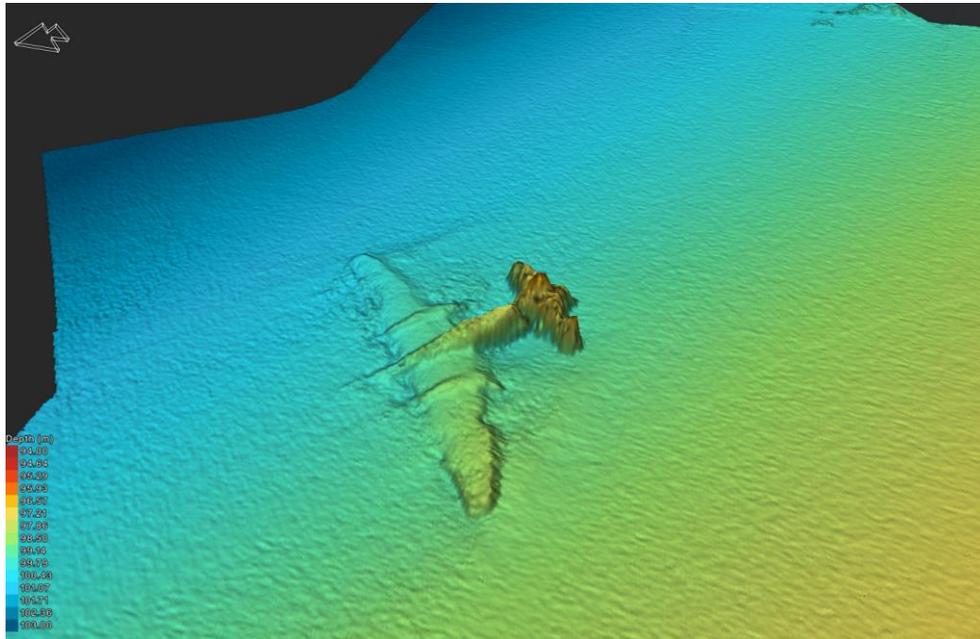
- > Compared to work on the existing Nord Stream Pipeline, finished in 2011, **data acquisition and analysis have improved greatly** thanks to previous experience and better technology for equipment such as ROVs (remotely operated vehicles).
- > Equipment and survey vessels have developed and modernised.
- > More resolute, high-quality data means that we can now build 3D models of the seabed and the objects it holds.
- > Bottom sediments can be examined up to 40 m below the seabed.

### 5. Interesting findings

- > **Past experience with the existing Nord Stream Pipeline** has shown that anything from dumped cars and household items, to UXO left over from World War II, or even shipwrecks, might be in the pipeline's potential path.
- > If an object is suspected to be potential **cultural heritage**, the relevant authorities are notified immediately.



- > So far, Nord Stream 2 surveys have turned up **a variety of objects**, from a discarded washing machine, to a shoe, to this intact Douglas DB-7 Boston/A-20 Havoc from the World War II in Finnish waters in early 2016 (located outside the scope of the project).





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**About Nord Stream 2**

Nord Stream 2 is a planned pipeline through the Baltic Sea, which will transport natural gas over some 1,230 km from the world's largest gas reserves in Russia via the most efficient route to consumers in Europe. Nord Stream 2 will largely follow the route and technical concept of the successful Nord Stream Pipeline. The new pipeline will have the capacity to transport 55 billion cubic metres of gas per year, enough to supply 26 million European households. This secure supply of natural gas with its low CO<sub>2</sub> emissions will also contribute to Europe's objective to have a more climate-friendly energy mix with gas substituting for coal in power generation and providing back-up for intermittent renewable sources of energy such as wind and solar power.

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