

MINING - STX DRILL

STX-DRILL is a GPS guidance system for jet grouting capable to determine the correct planimetric position of the columns, the verticality of the drilling tower and the deviations from the designed coordinates.

STX DRILL guides the operator straight to the designed coordinates thanks to the easy and intuitive user interface.

It is only required to drive the machine and match the head and tail edges of the probe against the crosshairs displayed on the screen.



STX-MI-DRILL with

Hardware Component

Sensors Input / Output



Tilt Sensor



Encoder



Pressor



GPS and Double Antenna



Machine Tablet Display UT30 Android OS



Machine Control PLC Danfoss PLUS One

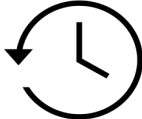


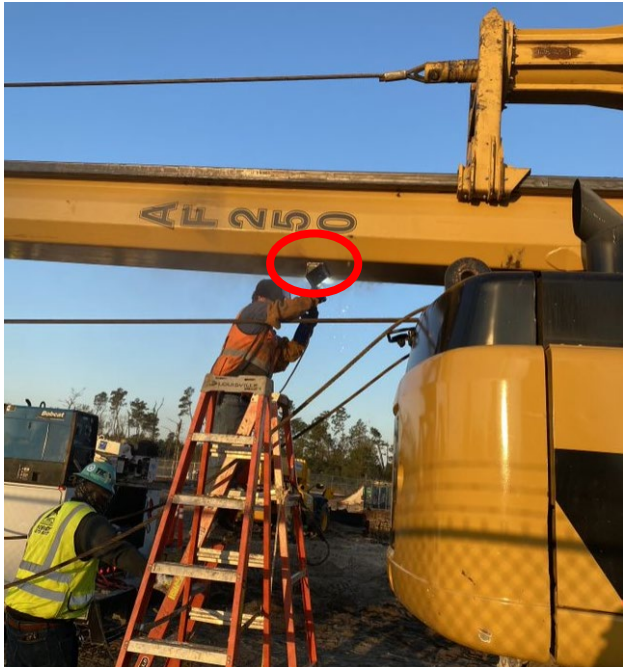
GUIDANCE: Indicate



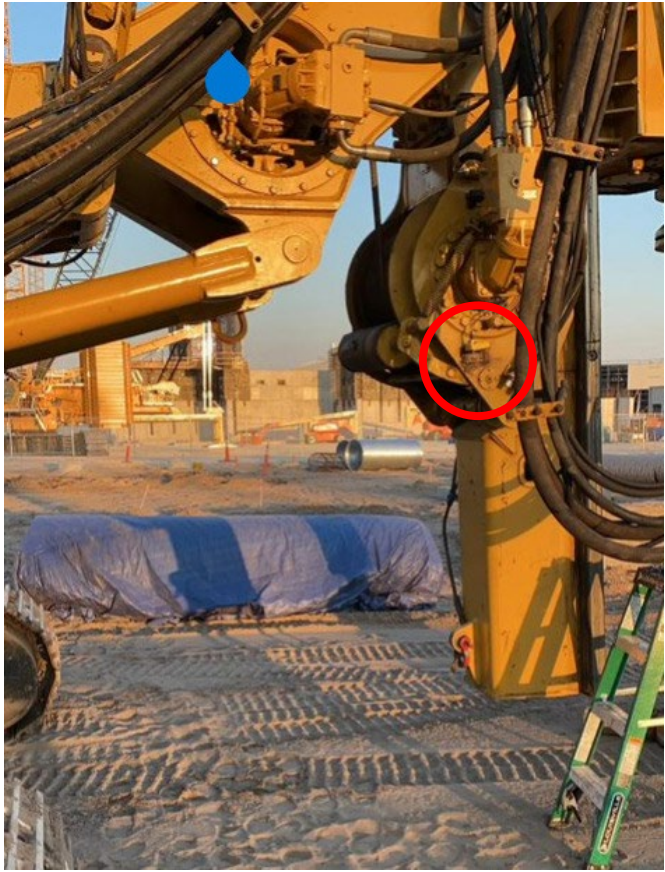
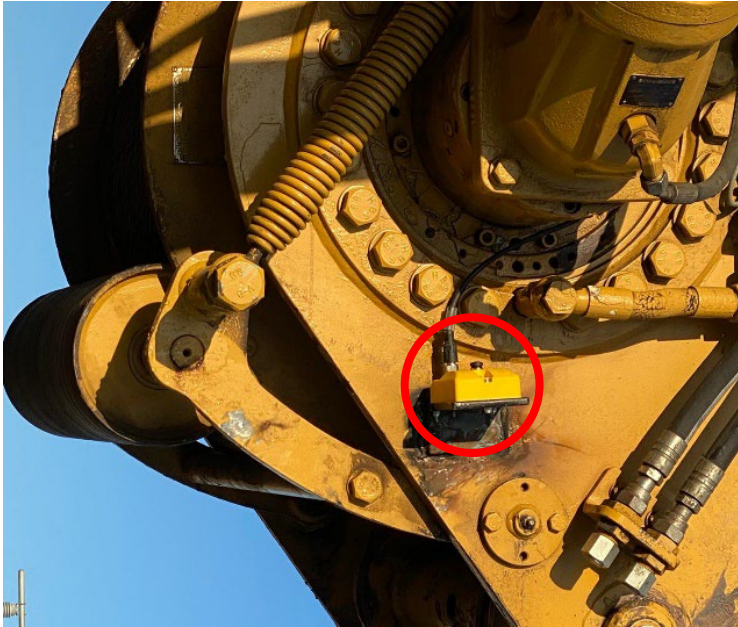
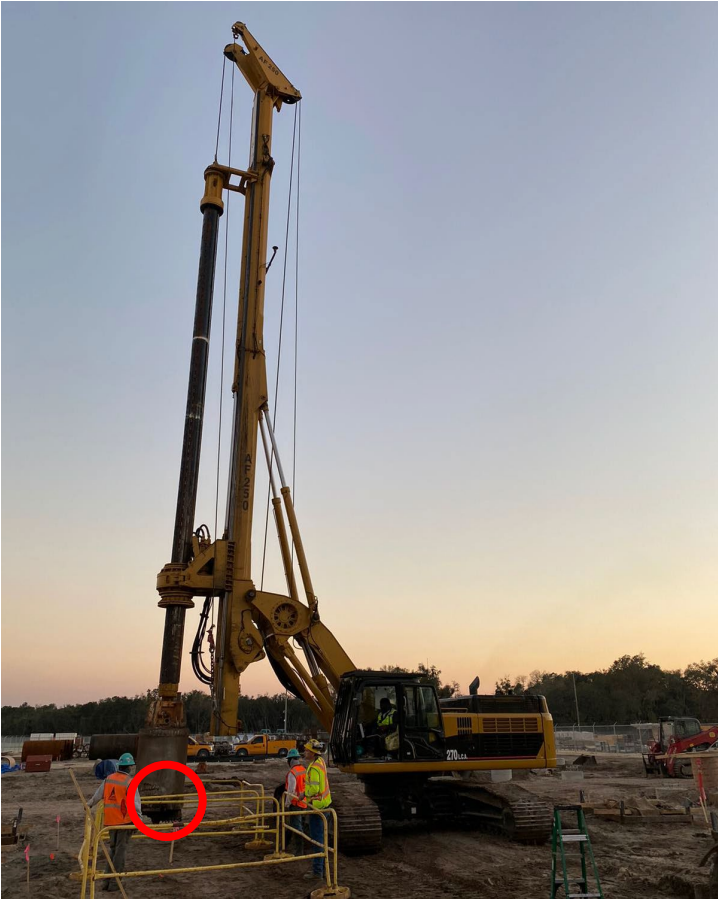
STX-MI-DRILL with STONEX

Antenna Installation

 1 hour



STX-MI-DRILL with Tilt Installation



STX-MI-DRILL with Installation



Tablet UT30

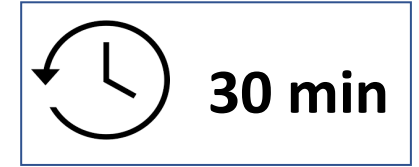


Calibration



Tilt calibration

- Select a known coordinates point
- Put the tower in the vertical position
- click on  Calibrate
- Cube SP set automatically the correct value → **Autocalibration**



Dual Head Setup

CONFIGURATION OF DUAL HEAD SETUPS

Front of machine

Rotation of P-H around P to align the P-H direction with the forward movement direction of the machine (decimal degrees, anticlockwise angle)

+90.000

Calibrate

-----FROM P TO M-----

Y offset +0.800

adjust +0.000

-----FROM M TO TARGET POINT-----

X offset +0.500

adjust +0.000

-----FROM GROUND TO M-----

Z offset +1.800

adjust +0.000

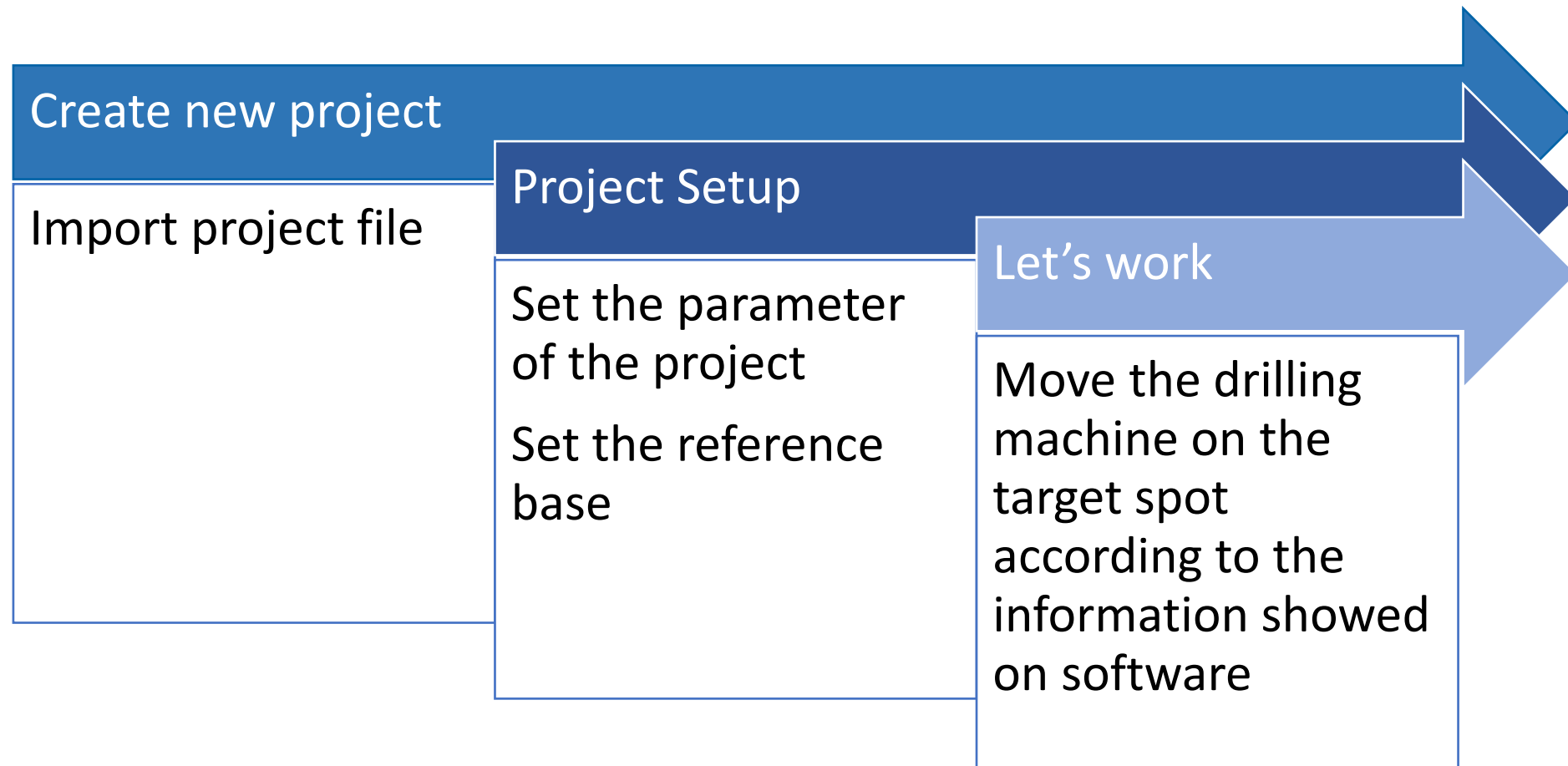
Cancel Apply OK

Dual Head Setup offsets from P (Position Antenna) to target point (red dot). H is the Heading Antenna.

Diagram: H (+Y), P (X=0, Y=0), M (-X, -Y)



Workflow



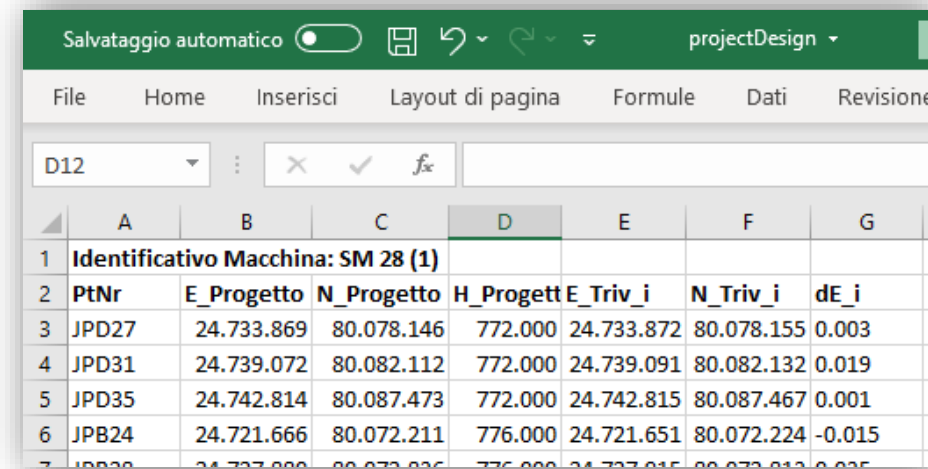
STX-MI-DRILL with

Project planimetry

Planimetry of the project is imported on CubeSP

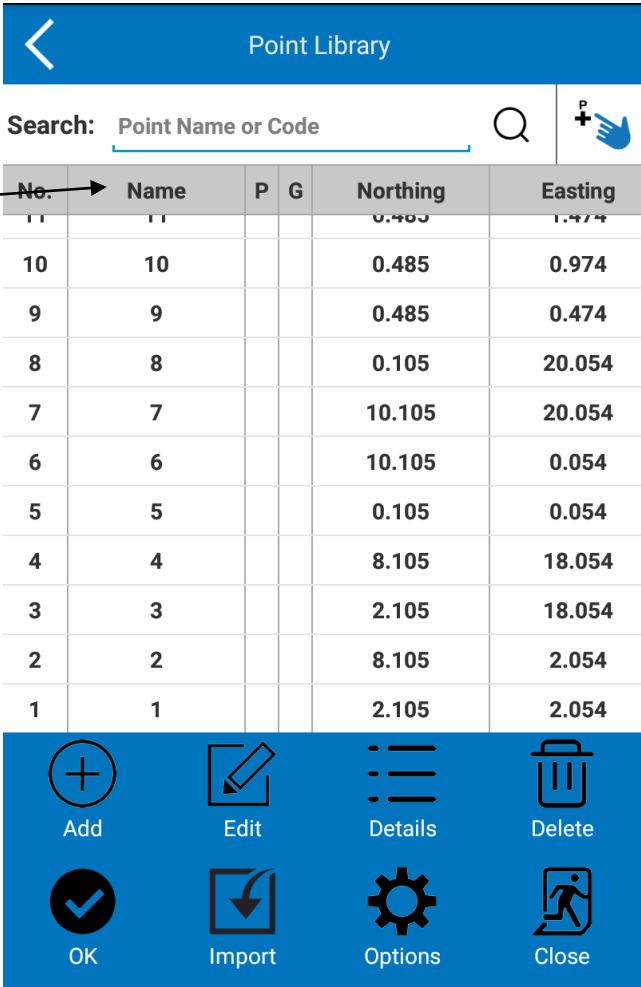
Each drilling point is associated to a **unique ID (name)**; operator could select the interest point from the table or on the project planimetry.

Once the point is selected the operator move the drilling machine on it, following the indication seen on tablet



PtNr	E_Progetto	N_Progetto	H_Progett	E_Triv_i	N_Triv_i	dE_i
JPD27	24.733.869	80.078.146	772.000	24.733.872	80.078.155	0.003
JPD31	24.739.072	80.082.112	772.000	24.739.091	80.082.132	0.019
JPD35	24.742.814	80.087.473	772.000	24.742.815	80.087.467	0.001
JPB24	24.721.666	80.072.211	776.000	24.721.651	80.072.224	-0.015

Example of csv file with project coordinates



No.	Name	P	G	Northing	Easting
10	10			0.485	0.974
9	9			0.485	0.474
8	8			0.105	20.054
7	7			10.105	20.054
6	6			10.105	0.054
5	5			0.105	0.054
4	4			8.105	18.054
3	3			2.105	18.054
2	2			8.105	2.054
1	1			2.105	2.054

STX-MI-DRILL with



Status of the system:

FIXED
FLOAT
SINGLE

Arrow : they are a visual
guidance for the operator
It's indicate the distance from
the target point

Green = inside tolerance
Red = outside tolerance

Target point

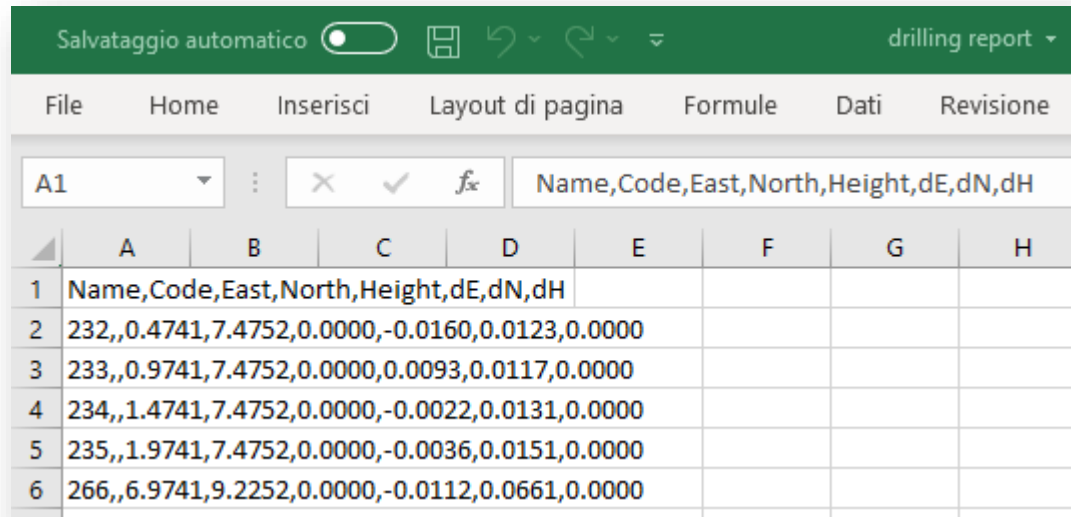
Centering of the target point



STX-MI-DRILL with

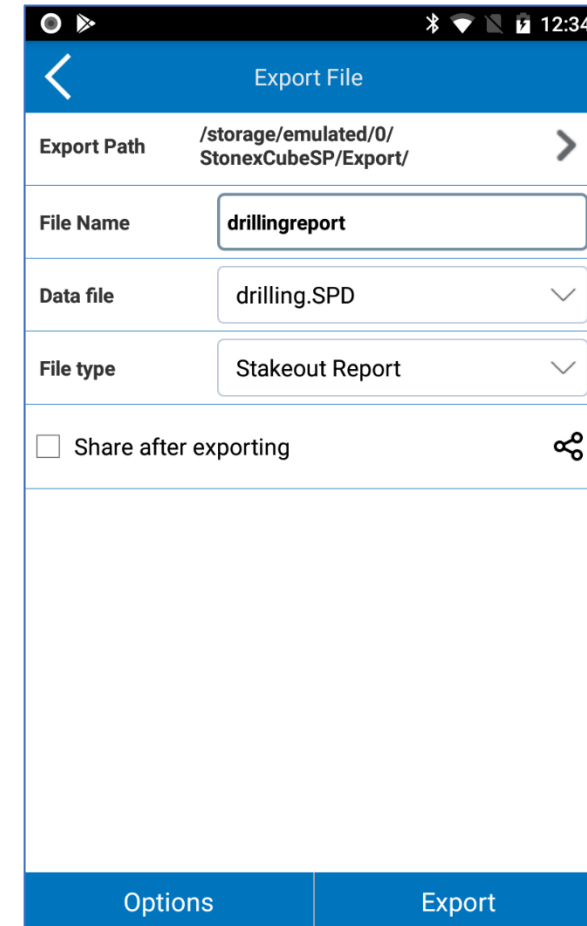
Report Exportation

- At the end of the work it is possible to download a report of the job
- The report contains project coordinates and delta as-built



The screenshot shows the STX-MI-DRILL software interface. At the top, there is a green bar with "Salvataggio automatico" (Auto Save) and a toggle switch. Below this is a menu bar with "File", "Home", "Inserisci", "Layout di pagina", "Formule", "Dati", and "Revisione". The main area is a spreadsheet with columns A through H. The first row (A1) contains the header "Name,Code,East,North,Height,dE,dN,dH". The subsequent rows contain numerical data representing drilling parameters.

	A	B	C	D	E	F	G	H
1	Name,Code,East,North,Height,dE,dN,dH							
2	232,,0.4741,7.4752,0.0000,-0.0160,0.0123,0.0000							
3	233,,0.9741,7.4752,0.0000,0.0093,0.0117,0.0000							
4	234,,1.4741,7.4752,0.0000,-0.0022,0.0131,0.0000							
5	235,,1.9741,7.4752,0.0000,-0.0036,0.0151,0.0000							
6	266,,6.9741,9.2252,0.0000,-0.0112,0.0661,0.0000							



The screenshot shows the "Export File" dialog box. It has a blue header bar with a back arrow and the title "Export File". The dialog contains the following fields:

- Export Path:** /storage/emulated/0/StonexCubeSP/Export/
- File Name:** drillingreport
- Data file:** drilling.SPD
- File type:** Stakeout Report
- Share after exporting:** A checkbox that is currently unchecked.

At the bottom of the dialog are two buttons: "Options" and "Export".

Sviluppo delle soluzioni di GUIDA GPS dal 2007

La soluzione STX-DRILL ha radici molto lontane,
dal primo utilizzo del GPS su di una macchina da
Fondazione per sonda JET Grouting

2007 ASTALDI PASSANTE FERROVIARIO DI TORINO (Danese)



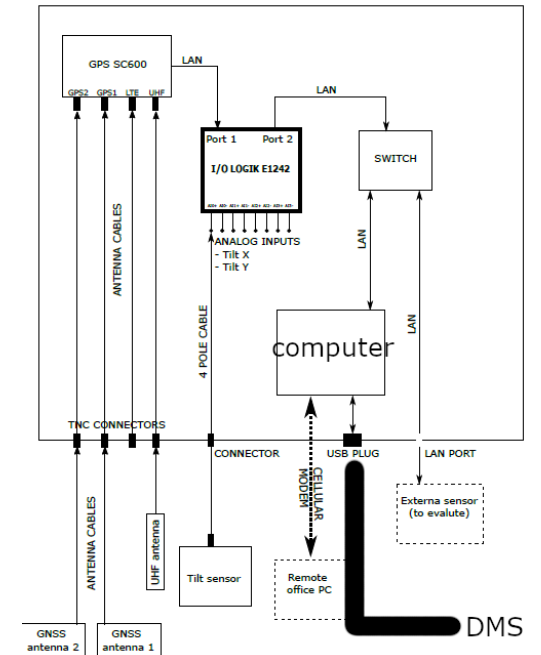
Soluzione di guida con tecnologia GPS applicata ad un **SOILMEC SR 70 gruppo TREVI (Bedont, Pietratonio, Ditillo)**

2008 TREVI (FIRENZE)



Soluzione di guida per SOILMEC APS integrata con DMS prime release (**Pagliacci**)

2010 SOILMEC (Cesena)



Soluzione di dragaggio con tecnologia GPS applicata ad un **CRANE SOILMEC SC120**

2023 PIACENTINI GROUP (Brasile)



Soluzione di guida per SOILMEC SM28 Galleria di Base del Brennero (Celot)

2018 WEBUILD (Brennero)



Soluzione di guida con Stazione Robotizzata per Posizionatore EGT Galleria di Base del Brennero (**Celot**)

2018 WEBUILD (Brennero)



Soluzione di guida GPS per macchine da JET GROUTING (**Celot**)

2022 WEBUILD (CEPAV 2 VERONA)



Special Projects Solution for Mining

STX-MI-DRILL

- **Solution:** STX-MI-DRILL
- **Aim of the solution:** guaranteeing the correct positioning of drilling machine with elevated level of accuracy.
- **End User:** Drill and foundation company
- **System component:**
 - Hardware:
 - GPS Stonex SC600 dual antenna
 - Tilt sensor
 - Tablet Stonex UT30 ANDROID
 - Software:
 - **Cube SP _ Drill realise**

