SAIPEM
ENGINEERING
ENERGY

20th IPLOCA
IPLOCA Environmental Award
sponsored by Shell

DIGITALIZING ONSHORE PIPELINE
AS BUILTS
ILLUSTRATION OF THE
INITIATIVE
SAIPEM
AT A GLANCE

EXTRAORDINARY
IS OUR
EVERYDAY

DIGITALIZING PIPELINE AS BUILTS

traditional approach to As built phase of pipeline projects involves topographical instrumentations (total station and GPS) and a survey crew that follows pipeline construction and manually collect data from site walking along pipeline.

As is status is to collect the minimum set of data on Welded Joints, bends, ground features and isolated point information.
Survey crew is obliged to walk within the trench after lowering or after partial backfilling.

Data are collected at site, downloaded in the office, postprocessed and passed to the field engineering team to update asbuilt drawings.

Saipem is working to be more agile, quicker, and more
effective in construction data management introducing the digitalization of asbuilts.
We wanted to deliver a great customer experiences, taking advantage of new technologies to cut costs, improve quality and transparency, and build value.

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DIGITALIZING PIPELINE AS BUILTS

On the Spence Growth Option Project (Chile), the 36" pipeline 156km, pipeline construction has been completed in early 2019.

Land mobile mapping solution have been used for pipeline as built survey.

The method is based on an integrated system to generate 3D (or point cloud) models of site from digital photos.

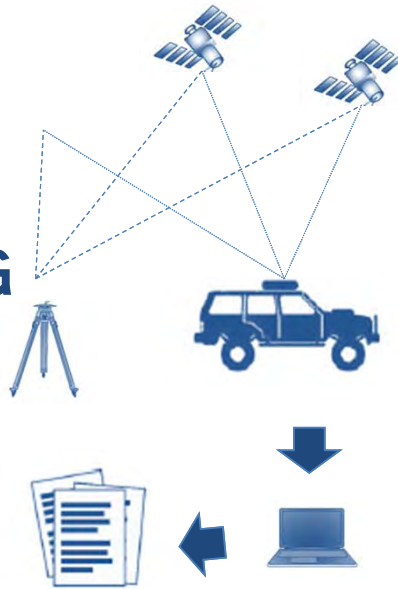The Image sensor system have been installed on the roof of a 4WD Pick-up.

The survey crew was composed by 2 people (Pick-up Driver and operator)

The crew was driving along the ROW, parallel to the lowered pipe as soon lowering phase was completed collecting site data (spherical images, GNSS position, IMU attitude information)

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DIGITALIZING PIPELINE AS BUILTS

Upon construction completion, the project shall hand over a digital twin of the site to the operations team. In addition to automatically generating as-built drawings, the digital twin will greatly simplify maintenance planning and reduce the number people required on the operations team

The system is composed by:
- 6 single cameras which produce a spherical image;
- 1 Applanix IMU Sensor;
- 1 Topographical GNSS installed on the top of the sensor
- Topographical GNSS as Base station

Data acquired are processed to extract geographical information and As Built data while allowing the team a full immersive navigation in a Virtual Reality environment

Data acquired are elaborated at site, but can be more efficiently sent to a centralized cloud database to allow Home office remote post processing activities and extraction of the geographical location and level of the AsBuilt pipeline in order to standardize the level of accuracy for all the Projects and to reduce the elaboration time using efficient processing unit in the Headquarter.
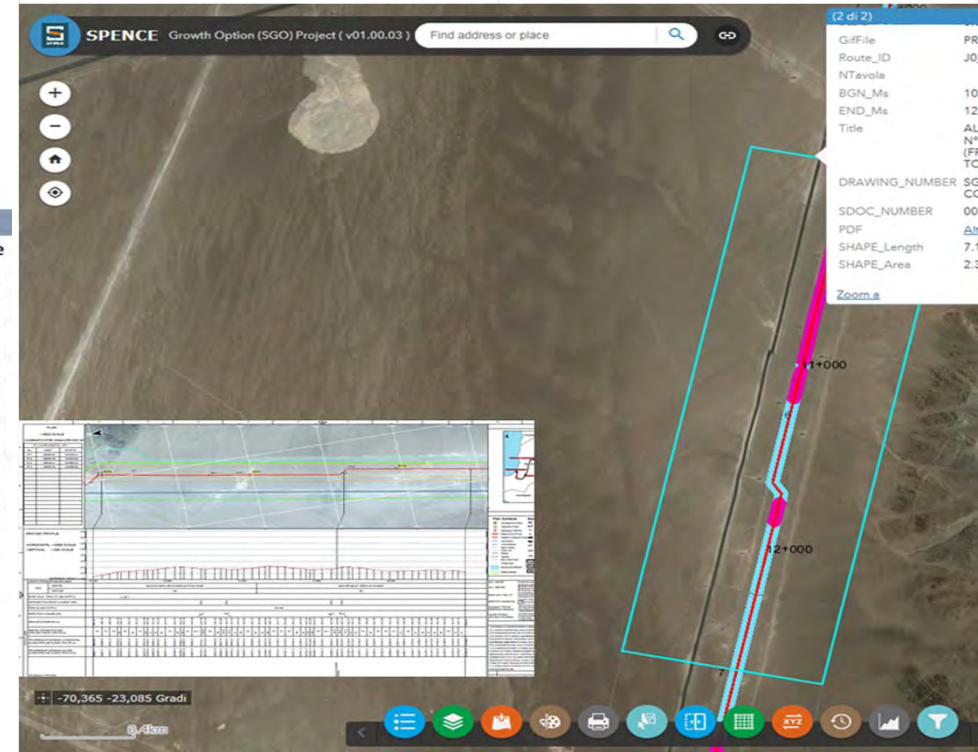
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SOLUTION

DIGITALIZING PIPELINE AS BUILTS

Dati LMM Trimble MX7

Welding	X	Y	Elev_Pipe
K08-26	497650.858	5016099.564	140.049
K08-27	497635.967	5016099.619	140.067
k08-28	497621.074	5016099.740	140.469
k08-29	497606.136	5016099.784	140.730
k08-30	497591.200	5016100.018	140.656
k08-31	497576.227	5016100.099	140.721
k08-31-1c	497561.403	5016100.270	140.793
k08-32	497546.465	5016100.496	140.895
k08-33	497531.705	5016100.605	140.890
k08-34	497516.827	5016100.705	140.848
k08-35	497502.130	5016100.741	140.794
k08-36	497487.322	5016100.894	140.652

SURVEY

POST PROCESSING

RESULTS AUTOMATICALLY UPLOADED IN GIS TO GENERATE ASBUILT ALIGNMENT SHEET

ASBUILTS DRAWINGS and DATA AVAILBLE IN REAL TIME WITHIN THE SPICOMs WEB application

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THANK YOU

EXTRAORDINARY IS OUR EVERYDAY