OptaSense®
a QinetiQ company

Case Study

OptaSense® Project - Cairn India

Overview

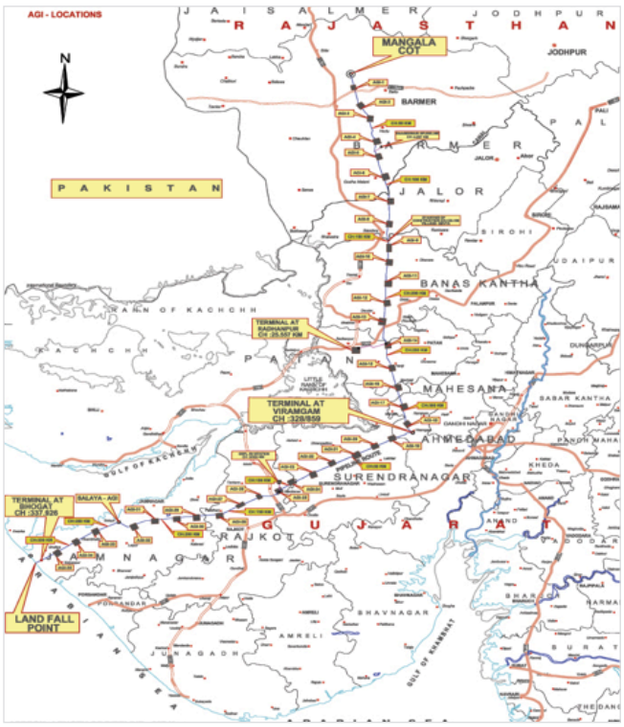
The Mangala Development Pipeline (MDP) is the world's longest continuously heated and insulated pipeline and will have access to 75% of India's refining capacity.

The MDP originates from Mangala Processing Terminal (MPT) in the Mangala Field and passes through two states (Rajasthan and Gujarat), eight districts and travels up to ~670 kms before it reaches its end at the coastal location of Bhogat near Jamnagar on the western coast line of India. About 154 km of the pipeline is in Rajasthan and the rest in Gujarat.

The MDP is a 24" crude oil pipeline which is using Skin Effect Heat Management System (SEHMS) to ensure that the crude oil remains above the Wax Appearance Temperature (WAT) of 65°C. It has 8" gas line which feeds gas each to of the 36 Above Ground Installations which produce the necessary power to keep the pipeline warm.

The pipeline crosses all major crude oil carrier pipelines in the Western part of India and thus, offers potential of blending the Rajasthan crude with these large crude carrier lines. There are two main clients involved in the implementation of OptaSense® as a Pipeline Intrusion and Detection System (PIDS) on MPD. They are Optilan and CEIL.

Location and Company



Projects

Shah Rul Izat Ab Salam
Andrew Cartwright

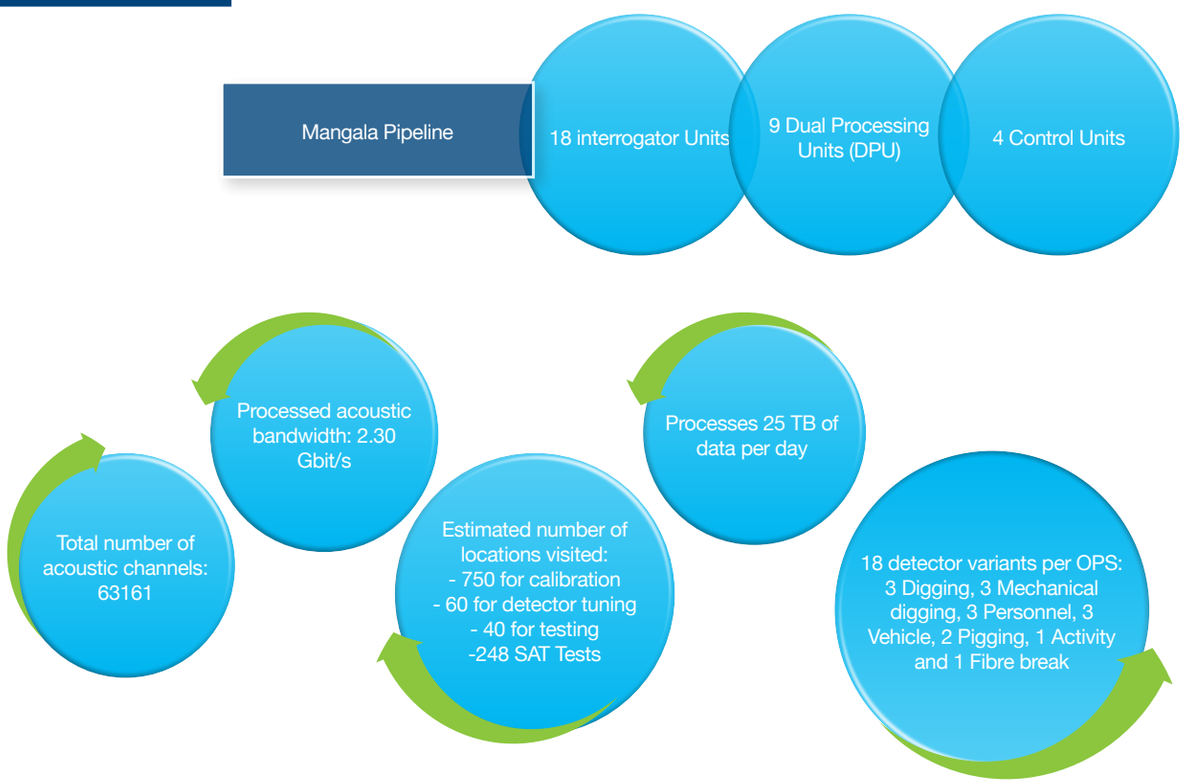
Security

Col. Sukumar Sudhakar
MD Meena

Operations

YK Singh

Key Facts



the world's largest single sensing system

OptaSense® pig tracking has revolutionised the way CEIL undertake their pigging runs. Previously, a hit and miss procedure, they vented gas to move the pig only when they thought they hadn't heard from it in a while, now they can intelligently vent - saving tens of thousands of dollars in pigging operational costs.

During the installation phase, multiple digging events were witnessed, acted upon and the CEIL security teams were able to intervene and supervise the digging before any damage was done.

Almost 100 different environmental zones cover the length of the pipeline, each individually configured to cater for the local environment over a vastly changing landscape. From the hot, dry deserts of Rajasthan to the humid, leafy coast on the Arabian Sea.

With more than 63000 individual sensors covering 670km of pipeline, this is the world's largest single sensing system.

Cairn India Escalation Matrix

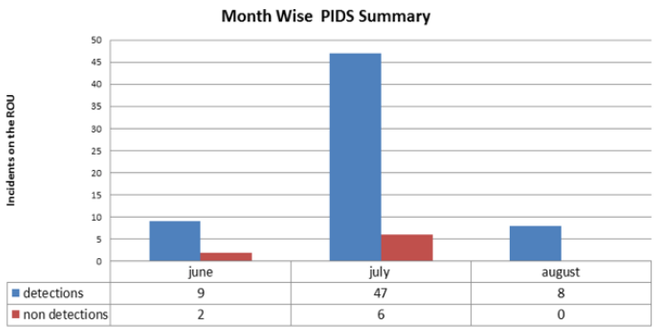
When an alert is trigerred on the OptaSense® system the CEIL operator follows a set of protocols that were designed to ensure that the ground teams only respond to threatening behaviour.

- When an alert is observed by the PIDS operator, he or she:
  - » Refers to a list of known pipeline activities, if in one of these locations – dismissed.
  - » Looks at the alert history to ascertain the duration of the activity.
  - » Watches the waterfall and, using knowledge from training and on the job experience, analyses the data to determine the activity type (alert verification).
  - » The operator also has a number of screenshots of different activities to help bolster any analysis.
  - » Listens to the acoustic signature to further verify the analysis of the alert.
- If the alert is considered a threat, the PIDS manager is informed who will investigate the situation on the ground using the nearest available resource.
- Once confirmed to be a real alarm on the ground, the Senior Manager (Security) and/or Operation Manager is informed and further action is taken.

Success Factors

During August of 2012 OptaSense® received a summary of the effectiveness of the PIDS system and how the tuning is improving over time. The following chart shows how the detection to non-detection rates have improved from June to mid-August.

Since installation, the detector settings have been altered continuously by trained staff (Optilan) to improve efficiency - this together with operators gaining experience has improved efficiency to 100% by the end of the 3 month initial period.



It is worth noting that the on-the-job tuning is being carried out by an Optilan India engineer who was contracted to remain on-site at Cairn for a 3 month support period. Additionally, the number of alerts in August has also dropped due to the rainy season.

Summary of Observations

The escalation matrix in place is working very well in India, it is helping the team deal with the hundreds of alerts they see over a vast installation in an incredibly busy part of the world.
The graphs presented to us essentially show the operational efficiency increasing from 80% to 100% and the number of non-detections decreasing to zero over a 3 month period. The full presentation is available on Huddle.

Appendix: Summary of OPS data acquisition architecture.

OPS	Optical Distance	Sample Frequency	Spatial Resolution	Channels
00	48175	2000	12.5	3854
01	40075	2000	12.5	3206
02	36440	2500	10	3644
03	41975	2000	12.5	3358
04	33340	2500	10	3334
05	47025	2000	12.5	3762
06	33310	2500	10	3331
07	35360	2500	10	3536
08	38140	2000	10	3814
09	45175	2000	12.5	3614
10	34180	2500	10	3418
11	37950	2500	10	3795
12	37000	2500	10	3700
13	36430	2500	10	3643
14	32030	2500	10	3203
15	43725	2000	12.5	3498
16	29310	2500	10	2931
17	44000	2000	12.5	3520
Totals	693640			63161

OptaSense®
Cody Technology Park
Ively Road, Farnborough
Hampshire GU14 0LX
United Kingdom
+44 1252 392000

OptaSense®
FSP Energy Tower 1
Suite 1320
11700 Katy Freeway
Houston, TX 77079
USA
+1 713 493 0350

OptaSense®
10911 50 Street SE
Calgary
Alberta T2C 3E5
Canada
+1 403 265 6165

OptaSense®
Unit Nos. 1302, 1303, 1304
13th Floor, Jumeirah Business Centre 3
Jumeirah Lakes Towers
PO Box 125674
Dubai, United Arab Emirates
+971 4 818 8200

OptaSense®
L3, 210 Kings Way
South Melbourne
Vic 3205
Australia
+61 3 9694 1086