

This is not an ADB material. The views expressed in this document are the views of the author/s and/or their organizations and do not necessarily reflect the views or policies of the Asian Development Bank, or its Board of Governors, or the governments they represent. ADB does not guarantee the accuracy and/or completeness of the material's contents, and accepts no responsibility for any direct or indirect consequence of their use or reliance, whether wholly or partially. Please feel free to contact the authors directly should you have queries.

Asia Water Forum 2022

8–11 August 2022 • Online

Side Event

S4a. Using Technology to Reduce Leakage in Water Distribution Networks

8th August, 2022 | 3.30 PM (UTC+0800)

Event-Triggered Leak Detection System for Water Supply Network



ADB



Who are we?



Dr. Rajat Mishra

PhD in Data-driven Planning @ NUS.
PostDoc Fellow @ ARL, NUS.



Liang Jie Wong

MEng (Research) @ FoE, NUS.
Ex Engineer @ NUS, DSTA & RSAF.

22 January 2019 | Highlights Entrepreneurship

NUS invests \$1.5m in 15 deep-tech start-ups



From left: Dr Zhu and Dr Tan, creators of NUSoil

Twenty start-ups under the new Graduate Research Innovation Programme (GRIP) pitched their ideas to potential investors at a Lift-Off event organised by the NUS Industry Liaison Office on 19 January. The teams, shortlisted from more than 90 applications received, showcased working prototypes featuring a broad range of deep technologies in three key tracks: engineering, biomedical, as well as information and communications technology



Network of Advisors



Acoustic Research Laboratory



Mandar Chitre
Assoc Prof, NUS
Head, ARL



Venugopalan Pallayil
Deputy Head, ARL



Sudarshan Amarnathan
Master Engineer



Dr. Helge Daebel
Managing Director



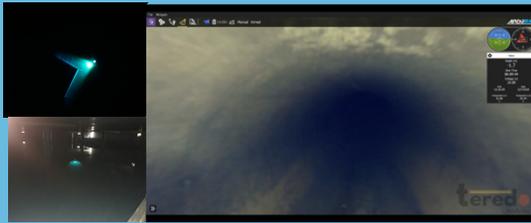
Dr. Catherine Yue
Assoc. Director





What do we offer?

teredo ROV



Detects pipeline leaks Internally using a Remotely Operated Vehicle (ROV)

teredo Pipeline Listener



Detects pipeline valve leak using a permanently placed in-situ sensor

teredo Machinery Listener

Detects abnormalities in machineries using an ex-situ sensor





What do we offer?

teredo ROV



Detects pipeline leaks Internally using a Remotely Operated Vehicle (ROV)

teredo Pipeline Listener



Detects pipeline valve leak using a permanently placed in-situ sensor

teredo Machinery Listener

Detects abnormalities in machineries using an ex-situ sensor



Why automated leak detection?

Prevent situations that -

1. Increase non-revenue water.
2. Harm the reputation of a utility board.



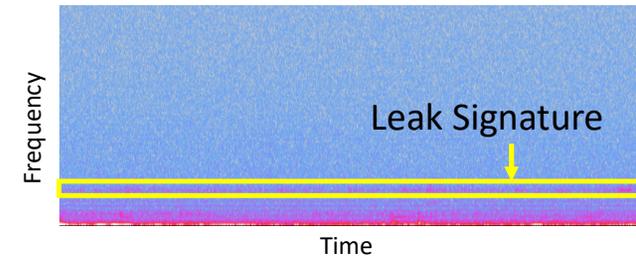


First Trials in 2019-20

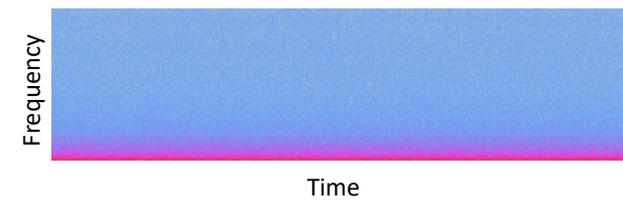
Monitored valves and pipelines at 8 different, some interesting findings -



Listener installed



Leak Detected



Leak Rectified



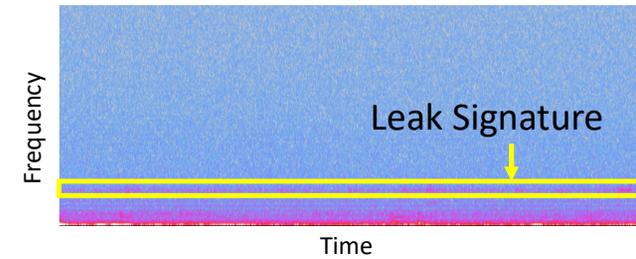


First Trials in 2019-20

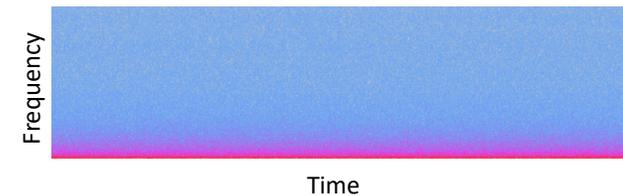
Monitored valves and pipelines at 8 different, some interesting findings -



Listener installed



Leak Detected



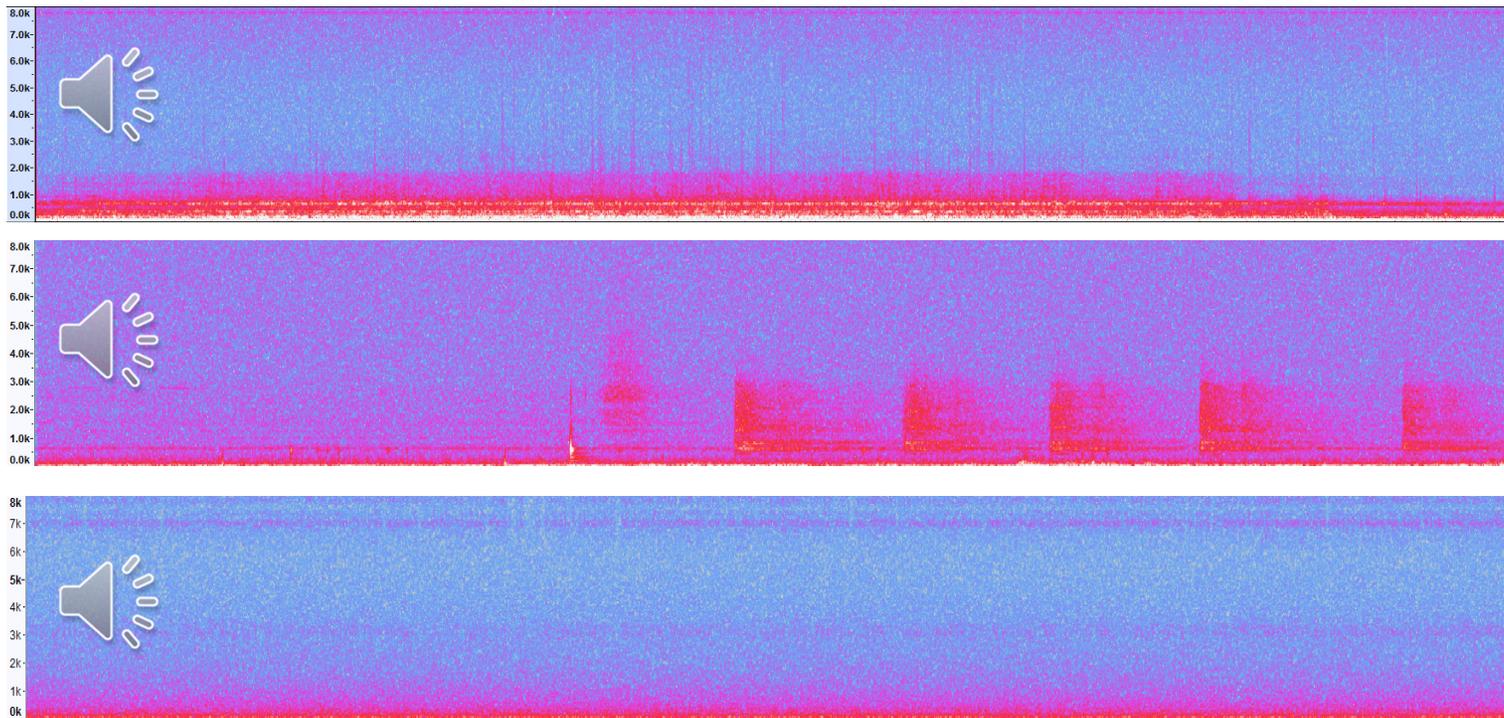
Leak Rectified





First Trials in 2019-20

Monitored valves and pipelines at 8 different, some interesting findings -





Motivation for Event-Triggered



Sensor takes
reading once every
24 hours

Any leak that occurs outside the sensor's scheduled monitoring time will **go undetected till the next leak monitoring schedule.**



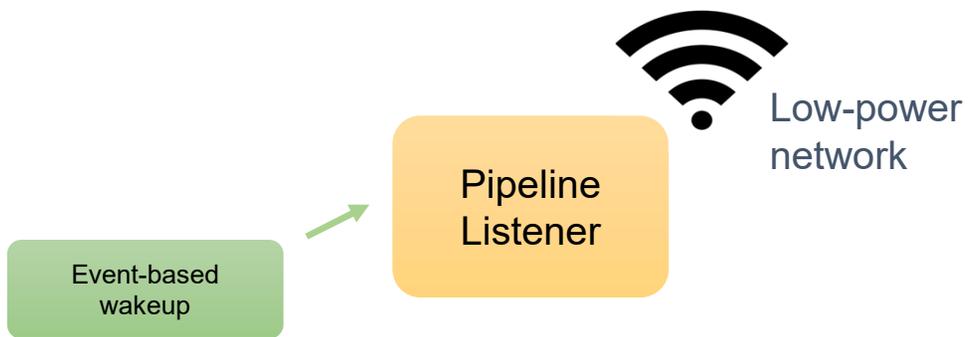
High **false positive** alarm rate.





The Event-Triggered Approach

A leak-detection device that **activates on certain frequency signature.**

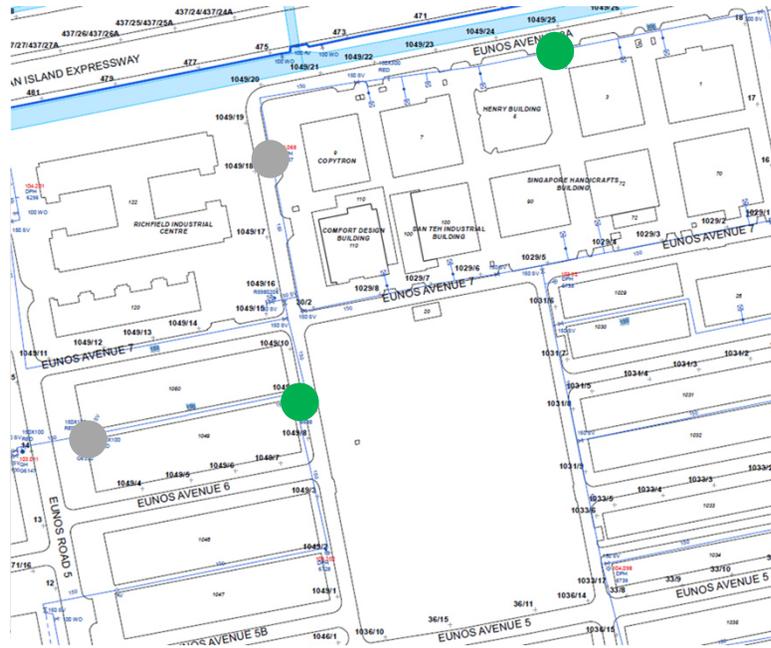


A multi-fold decision layer for detecting leaks.

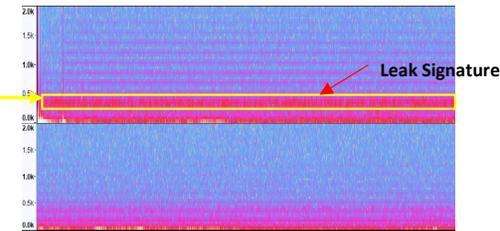
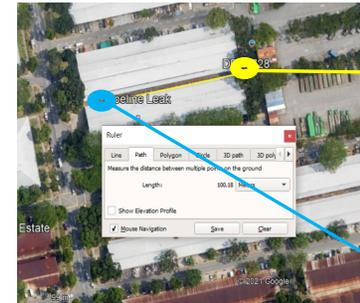




Results from Deployment

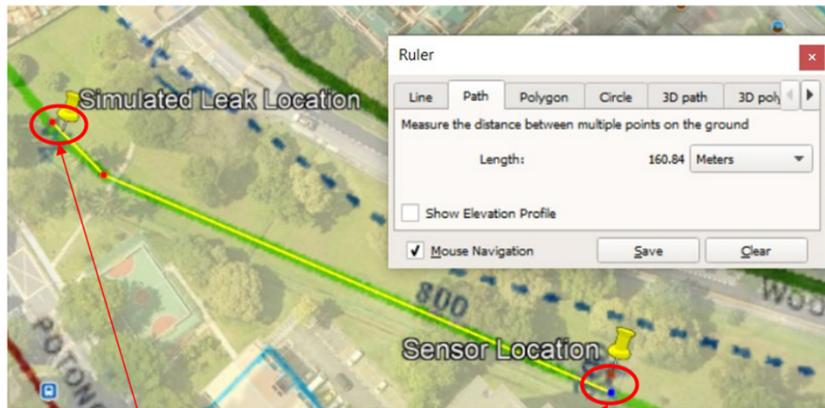


-  Sensor Location
-  Sensor Coverage
-  Simulated Leaks





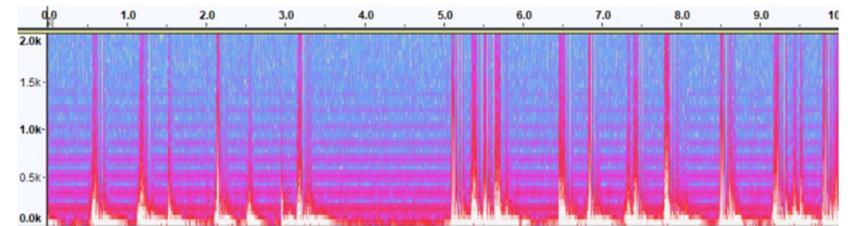
Results from Deployment



Simulated leak position at a washout valve



Installed sensor at another washout valve located approximately 160m away.



Able to detect false-positive produced by the construction work happening near-by the valve.





What is next?

- Exploring to deploy beyond Singapore.
- Actively looking for partners and investors in ASEAN and OCEANIA countries.



Customer Support



Build Trust





Thank You!
We are just one-email away..

Rajat Mishra
rajat@teredo.sg

Wong Liang Jie
wlj@teredo.sg