Paper ID: 86014
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IAF EARTH OBSERVATION SYMPOSIUM (B1)
Interactive Presentations - IAF EARTH OBSERVATION SYMPOSIUM (IP)

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SAR-BASED LEAK DETECTION AND CARBON FOOTPRINT REDUCTION

Abstract

In the US alone, an estimated 6 billion gallons of treated water is lost to leaks each day (2021 ASCE Report Card for America's Infrastructure). Today's methods of pipe replacement and leak mitigation are often times inefficient because leak detection teams will physically scan an entire network over years to find, on average, 1.3 leaks per day. This slow method leads to immense water loss over time. An already limited resource, water loss wastes not only water, but manpower and energy, two highly valuable resources. Wasted manpower translates not only into wasted funding for water utilities, but also into copious amounts of wasted energy. Traditional leak detection and resolution involves crews visiting pinpointed locations, scanning entire systems, wasting gas, and creating unnecessary emissions. Even more wasteful, though, is the loss of treated water. For every liter or gallon of treated water lost in a pipe system, the treatment energy is also wasted, which translates directly into wasted carbon dioxide emissions. In today's climate, both environmental and economic, every metric ton of carbon dioxide is crucial both to slow the affects of climate change and to mitigate the damage that has already been done. ASTERRA's leak detection algorithm uses L-Band polarimetric SAR (JAXA's ALOS-2 PALSAR-2 CONAE's SAOCOM-1A 1B) technology to detect treated water leakages, and efficiently send field crews directly to the source of potential leaks. This allows for more efficient and rapid leak detection and mitigation, which in turn cuts down on the amount of water lost, the amount of energy wasted, and ultimately the amount of greenhouse gas emissions. Since 2017, the leak detection algorithm identified over 100,000 verified leaks, over 368 billion gallons of drinkable water, which equates to 920,000 megawatt hours of energy, and a total of 642,703 metric tons of carbon dioxide emissions reduced.