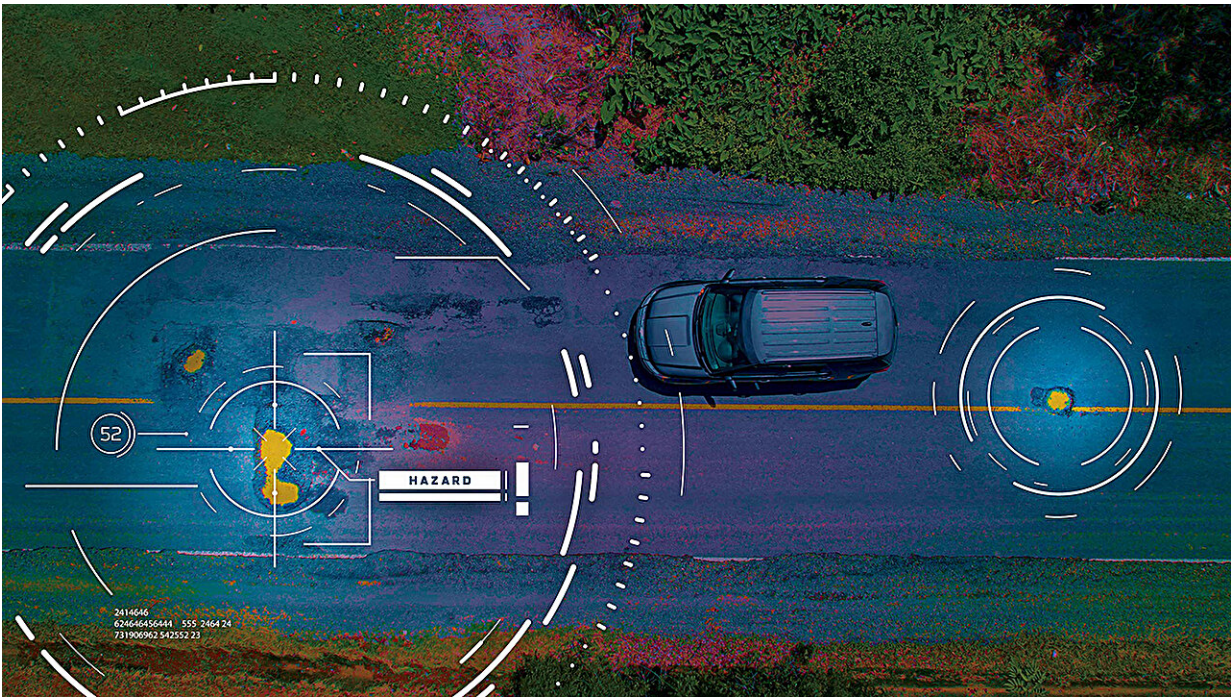


Researchers harness the power of satellites to constantly monitor damaged infrastructure from space

June 7 2024, by Alyssa Schaechinger



A rendering of Synthetic Aperture Radar (SAR) technology. Credit: Texas A&M University Engineering

As infrastructure ages, it becomes more susceptible to failure, which can cause safety and mobility concerns for drivers and pedestrians, and economic woes for taxpayers.

A [study](#) published in *Transportation Research Record* shows that high-resolution [synthetic aperture radar](#) (SAR) [satellite data](#) can detect [infrastructure](#) issues early on, which can help prevent further damage to roads in the same way that annual checkups can help prevent more complex health issues in humans.

Led by Dr. Anand Puppala and Ph.D. candidate Amit Gajurel, researchers at Texas A&M University are working on a new method of infrastructure monitoring using Synthetic Aperture Radar (SAR) remote sensing systems. SAR allows researchers to inspect and characterize pavements, retaining walls, and embankments from space and can help determine if there are flaws that should be further inspected for repair, saving valuable time.

"If a given area would typically take five days to complete—between surveying the data and determining large and small areas of failure—when using the satellites, we could actually look at the data and make the same determinations in only two days, which can be very useful for time-saving," said Puppala, A.P. & Florence Wiley Chair Professor in the Zachry Department of Civil and Environmental Engineering Department.

In addition to saving agencies time on repairs and preventative measures, utilizing satellites to monitor infrastructure and pavement conditions has the potential to reduce costs associated with managing roadway infrastructure assets.

"We're building this up to use as a source of data for geotechnical asset management and looking at how to integrate this [remote sensing data](#) into geotechnical asset management," said Gajurel. "We can use SAR data for managing the geotechnical assets. This could be a great method for organizations that are looking for a cost-effective way to manage these assets."

SAR remote sensing technology has been used to study geomorphological changes and sudden movements like earthquakes and landslides.

"When there is damage due to a natural disaster, authorities use the [satellite systems](#) to determine what caused it. Recently we started utilizing this method to look at [transportation infrastructure](#), including highway embankments, roads, and even airport runways," said Puppala, who also serves as the director of the Center for Infrastructure Renewal at Texas A&M University.

As most doctors and patients would agree, preventative medicine is a better option than responding to an emergency. Preventative care provides doctors with more time to create the best plan for their patients.

Likewise, by incorporating infrastructure condition data from SAR technology, asset managers can be proactive in repairing any flaws, budgeting for potential issues which can save both time and money that may be otherwise lost.

More information: Amit Gajurel et al, Application of Satellite-Based Remote Sensing for the Management of Pavement Infrastructure Assets, *Transportation Research Record: Journal of the Transportation Research Board* (2024). [DOI: 10.1177/03611981241230535](https://doi.org/10.1177/03611981241230535)

Provided by Texas A&M University

Citation: Researchers harness the power of satellites to constantly monitor damaged infrastructure from space (2024, June 7) retrieved 23 June 2024 from

<https://techxplore.com/news/2024-06-harness-power-satellites-constantly-infrastructure.html>

This document is subject to copyright. Apart from any fair dealing for the purpose of private study or research, no part may be reproduced without the written permission. The content is provided for information purposes only.