

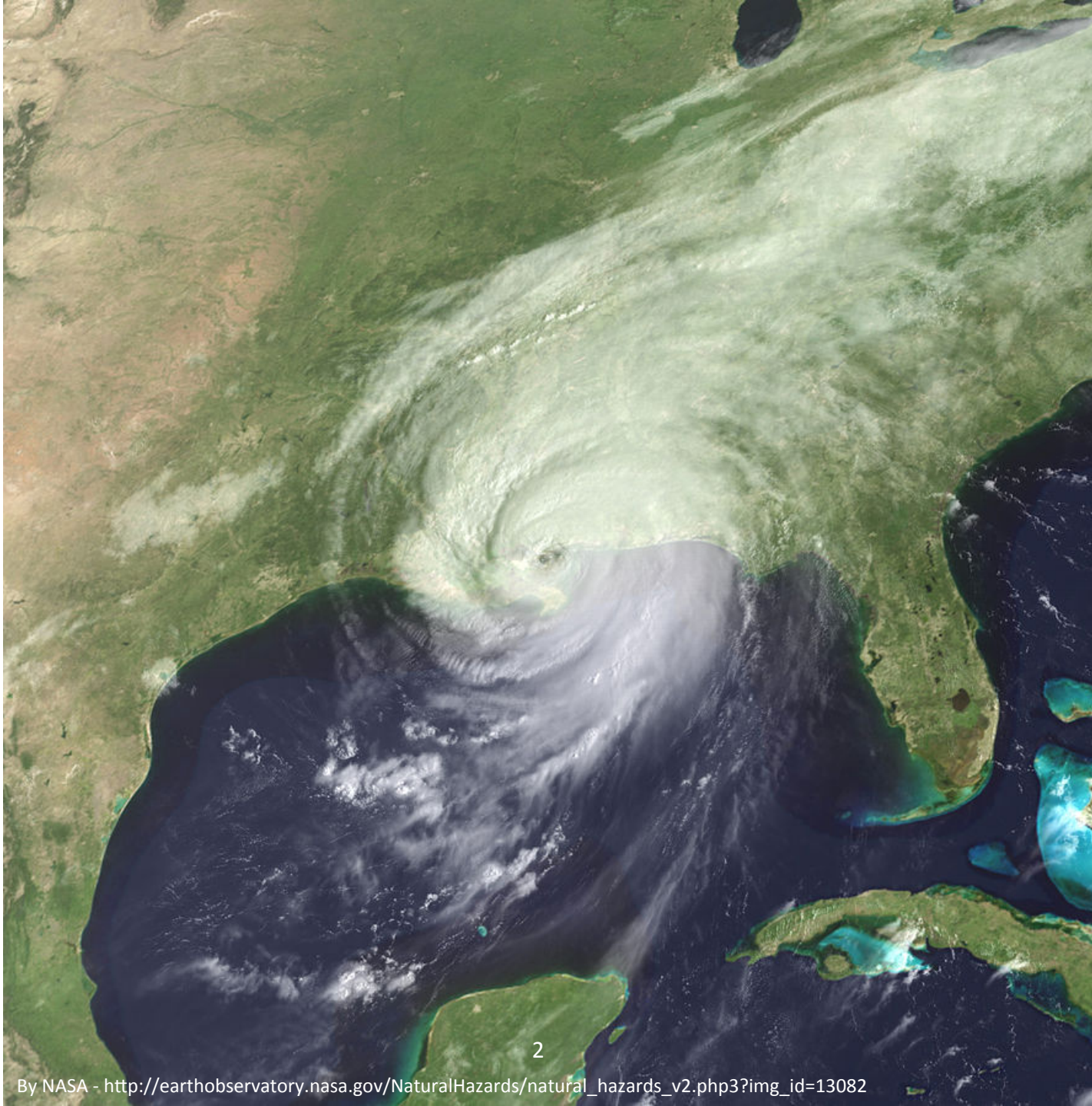
CRC 1st Annual Meeting: March 2-3, 2016
Chapel Hill, NC

***Establishment of Remote-Sensing Based Monitoring Program for
Performance Limit State Assessment of the Sacramento Delta Levees***

Victoria Bennett, Tarek Abdoun, Mourad Zeghal
Rensselaer Polytechnic Institute, Troy, NY

Mohammed Gabr, Brina Montoya
North Carolina State University, Raleigh, NC

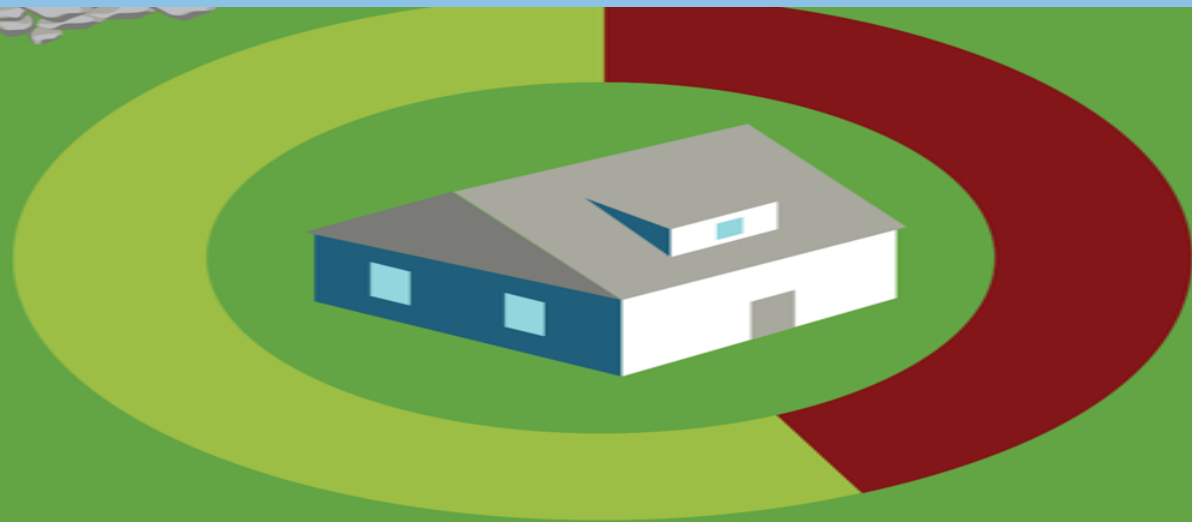
Cathleen Jones
NASA Jet Propulsion Laboratory, Pasadena, CA





2013 | REPORT CARD | for *** | america's
INFRASTRUCTURE

DAMS **D** LEVEES **D-**



LEVEES PROTECT

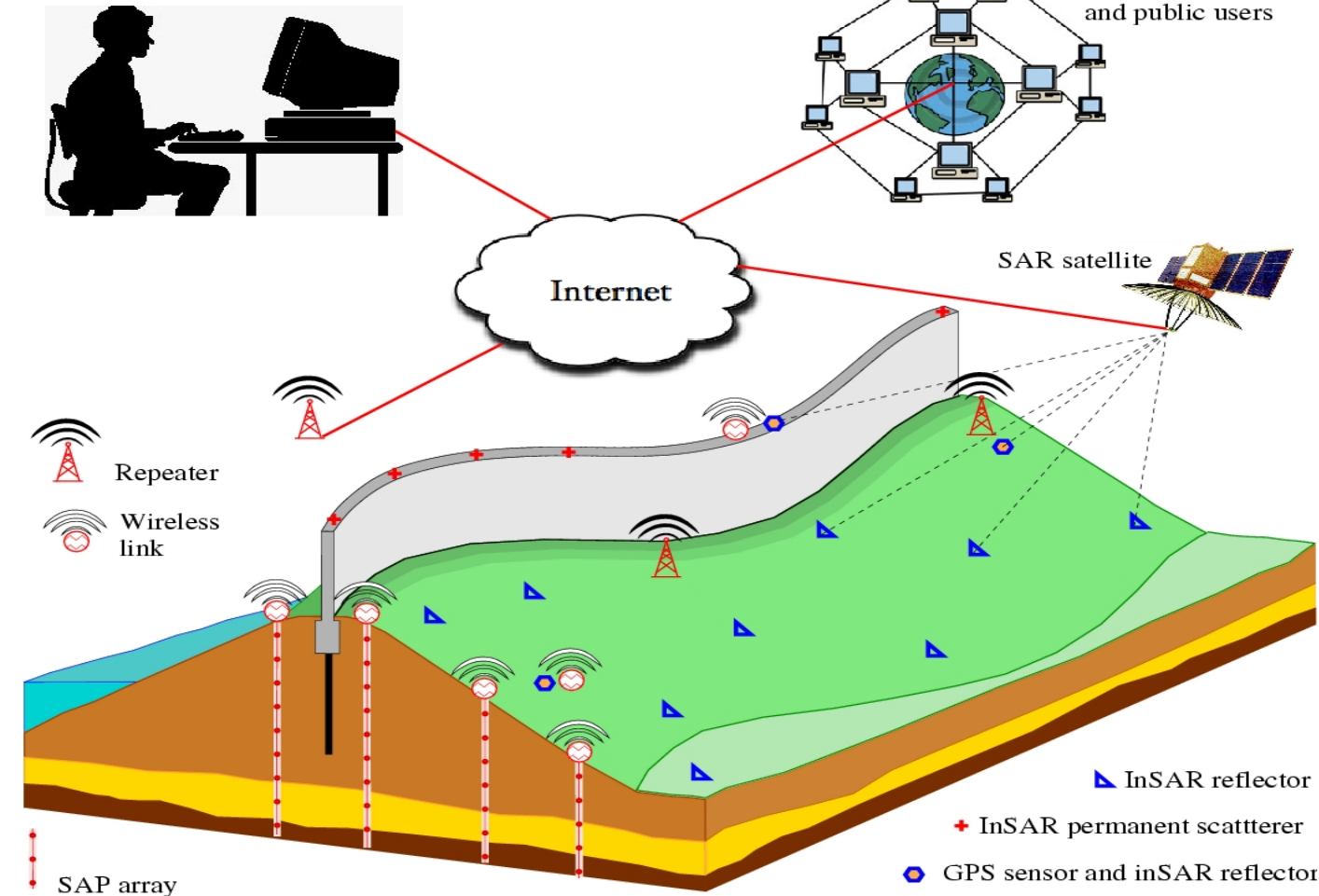
43%

OF THE NATION'S
POPULATION

Project Overview/Goal(s)

- *Use remote sensing monitoring program for network-level assessment of Sacramento Delta levees with in-ground instrumentation for validation of remote measurements.*
- *Provide field engineers with a health assessment tool for effective management of flood-control infrastructure – integrated use of measured data and performance limit states.*

Monitoring and Modeling Center

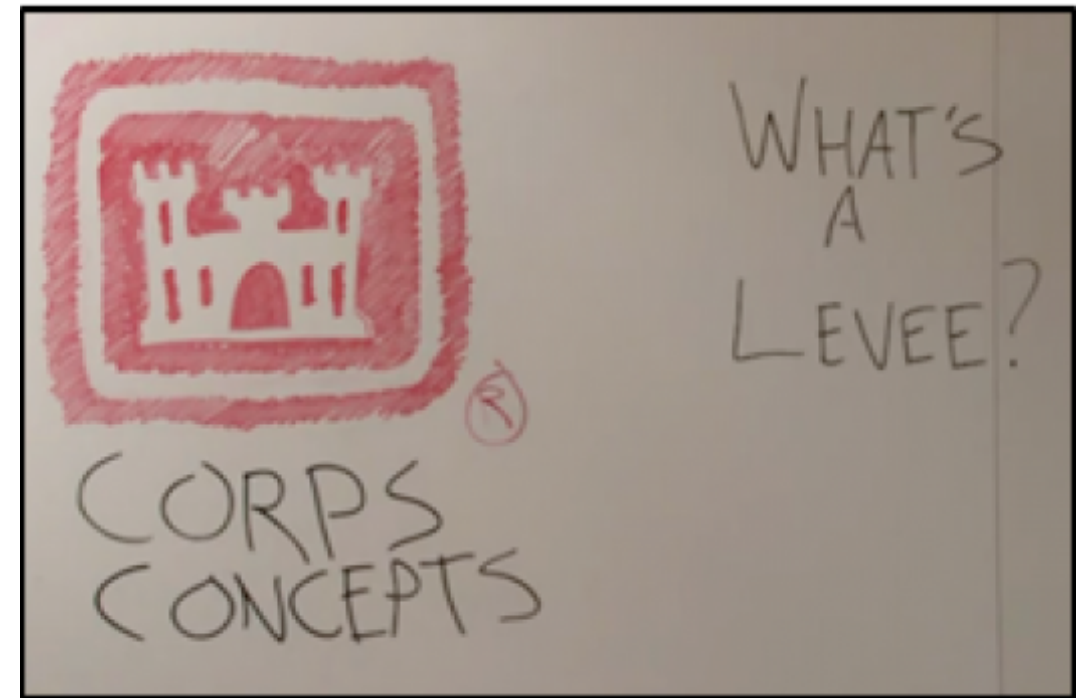


Project Relevance to DHS S&T Mission / Impact of Project

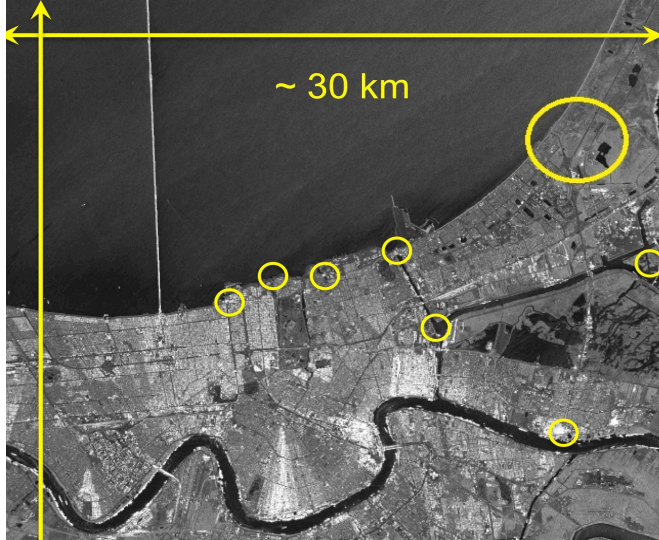
- Levee Subsector of the Dams Sector – ‘*Rapid assessment of levee condition is the number 1 priority request*’
- Levee Government Coordinating Council (LGCC)

2014 Quadrennial Homeland Security Review

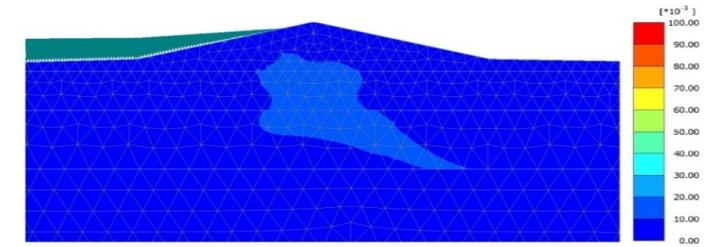
“Natural hazards are becoming more costly to address, with increasingly variable consequences due in part to drivers such as climate change and interdependent and aging infrastructure.”



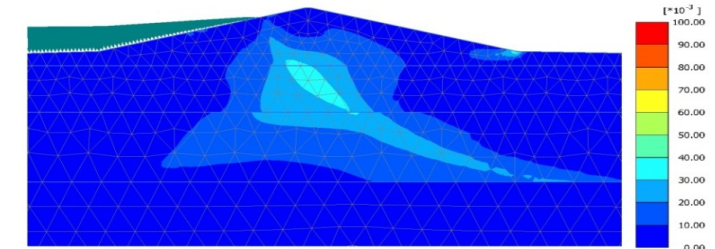
Technical Approach



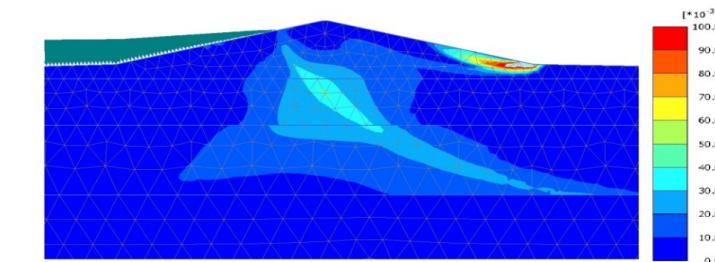
L.S. I:



L.S. II:

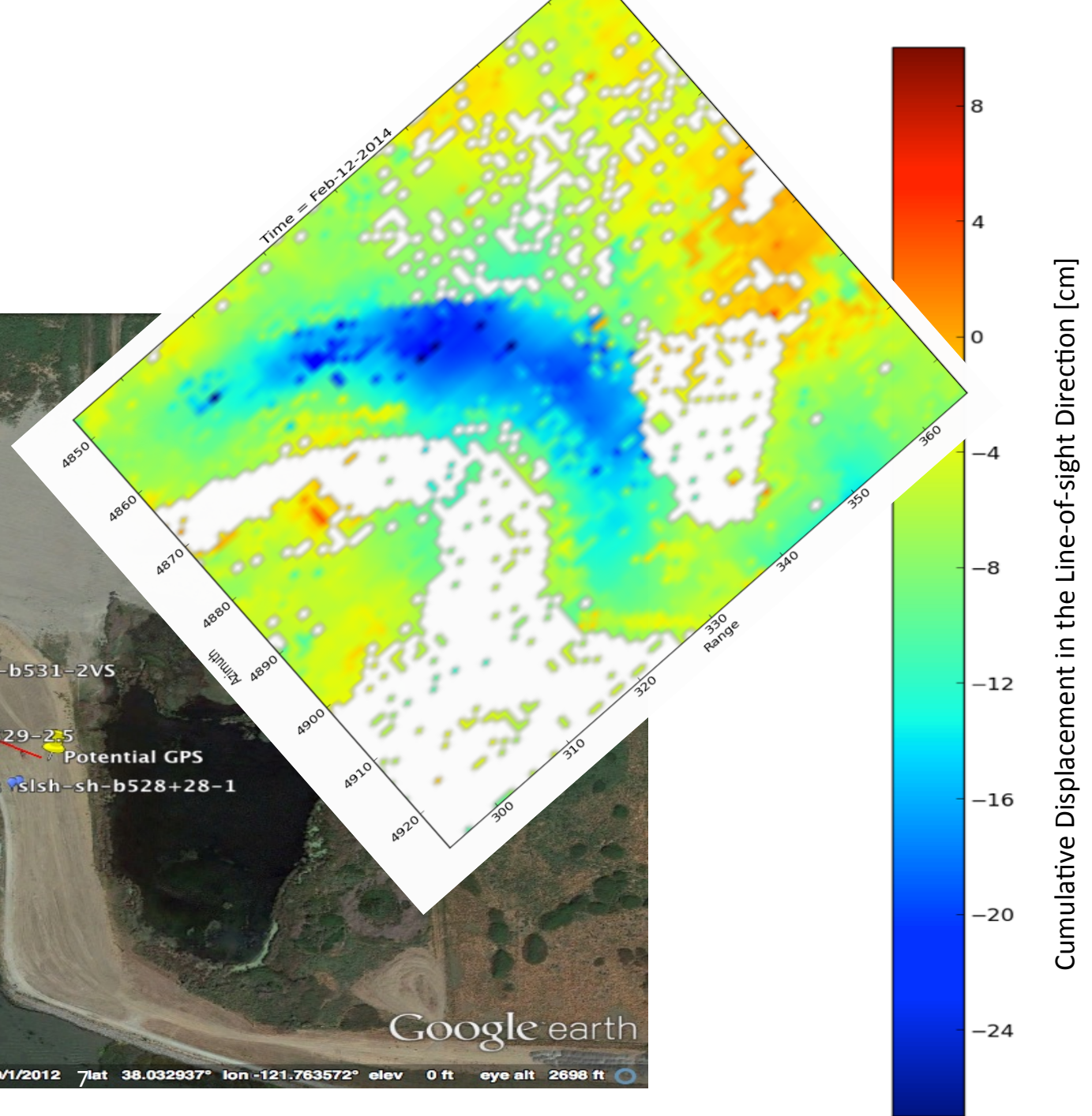


L.S. III:



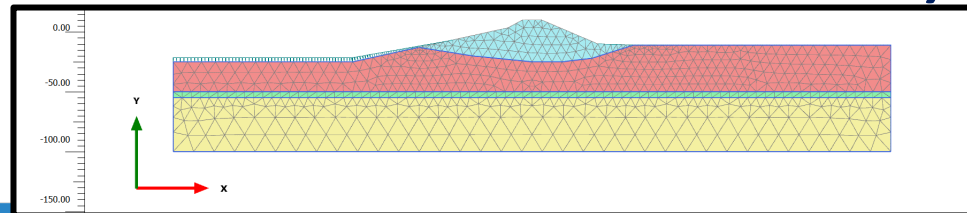
Photos by Getty and Associated Press 2011

Proposed Instrumentation



Major Milestones

- **Report on Instrumented Test Site on Sherman Island – 6/30/2016**
- **Report on Characterization of the Subsurface Properties and Constitutive Model – 6/30/2016**
- **GeoCongress Papers on Validation of InSAR Measurements with Sacramento Delta subsidence measurements & Establishment of Levee Section Fragility in terms of Probability of Exceedance versus Flood Cycle and Level – 6/30/2017**
- **Calibrated model of the levee section – 6/30/2017**
- **Report to DWR on the condition of the levee section and corresponding scale of critical limit states – 6/30/2017**
- **Paper on Established Coupled Model-Monitored Data Approach as a means to Identify Vulnerabilities of Sherman Island Levee Section – 12/31/2017**



Results

- ***Outcome 1: Field Deployment of Advanced Sensors and Remote Data Collection***
- ***Outcome 2: Deployment of Remote Sensing Monitoring Program***
- ***Outcome 3: Performance Based Health Assessment of Sacramento Delta Levees***

Translation Activities and End Users

End Users:

- ***California's Department of Water Resources (DWR)***
- ***US Army Corps of Engineers (USACE)***
- ***Federal Emergency Management Agency (FEMA)***
- ***US Bureau of Reclamation***

Translation Activities

- ***DWR Review of Report on Subsurface Properties of Sherman Island Levee section***
- ***Training workshop for DWR and USACE***

CRC Project Integration

- “SUMREX” program:
 - Guest Lectures at Education Partner Universities
 - Student Intern from Education Partner Universities
- Other opportunity:
 - Geo-Explorer: Mixed Reality & Mobile Game



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Thank You!