

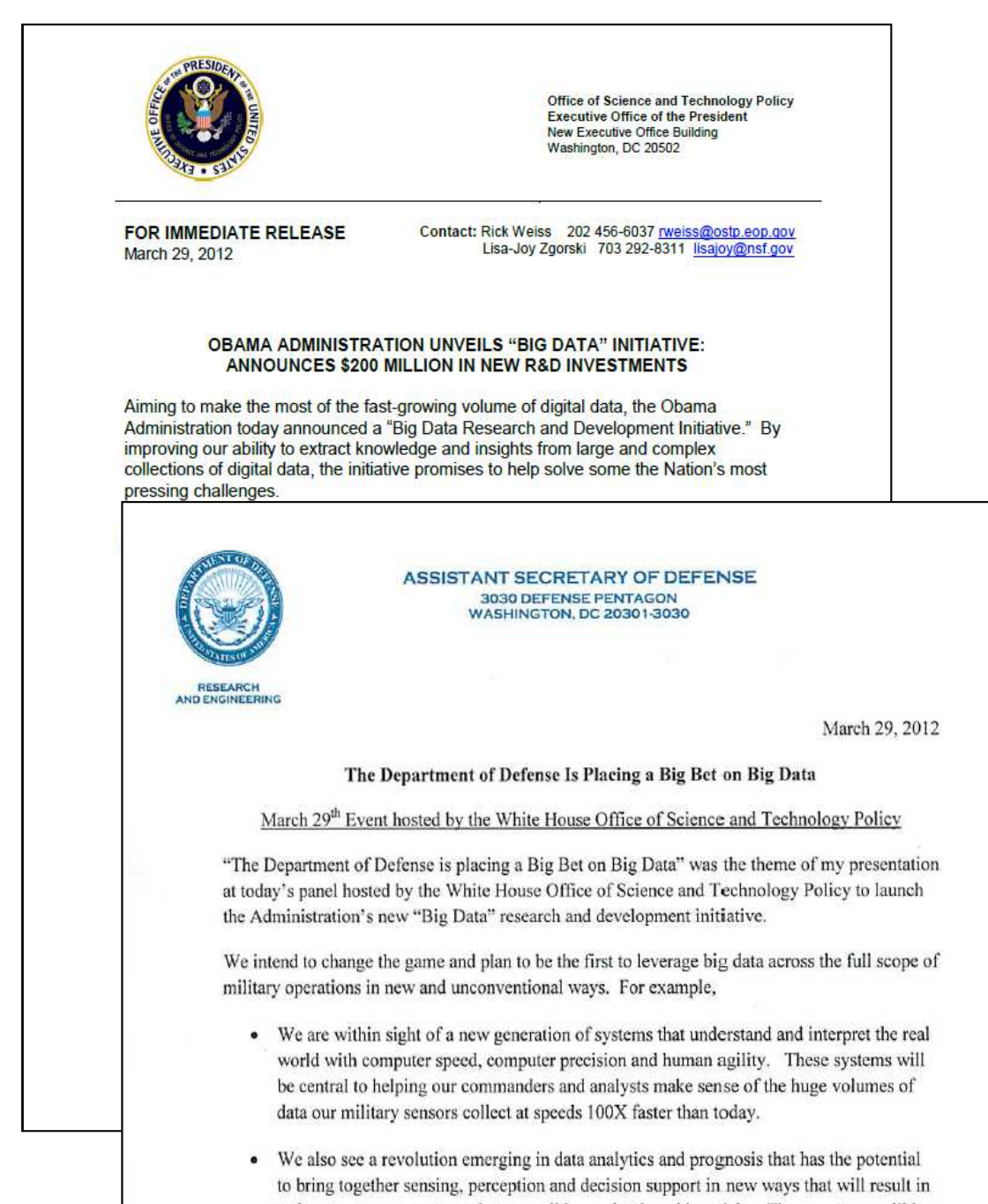
PANTHER: Pattern ANalytics To support High-performance Exploitation and Reasoning

Sandia National Laboratories, Albuquerque NM

PM: Bill Hart (presenter), PI: Kristina Czuchlewski; Team Leads: Randy Brost, Laura McNamara, Jim Chow

What is the challenge?

Everyone recognizes "big data" as an issue...



"Obviously, it's not the data per se that create value... what really matters is our ability to derive from them new insights, to recognize relationships, to make increasingly accurate predictions. Our ability, that is, to move from data to knowledge to action."
—John Holdren, Director, White House Office of Science and Technology Policy, March 2012

"The Department of Defense is placing a Big Bet on Big Data ... We also see a revolution emerging in data analytics and prognosis that has the potential to bring together sensing, perception and decision support in new ways ..."
—Zachary Lemnios, Assistant Secretary of Defense for Research and Engineering, March 2012

...but the challenges are directly affecting SNL now.

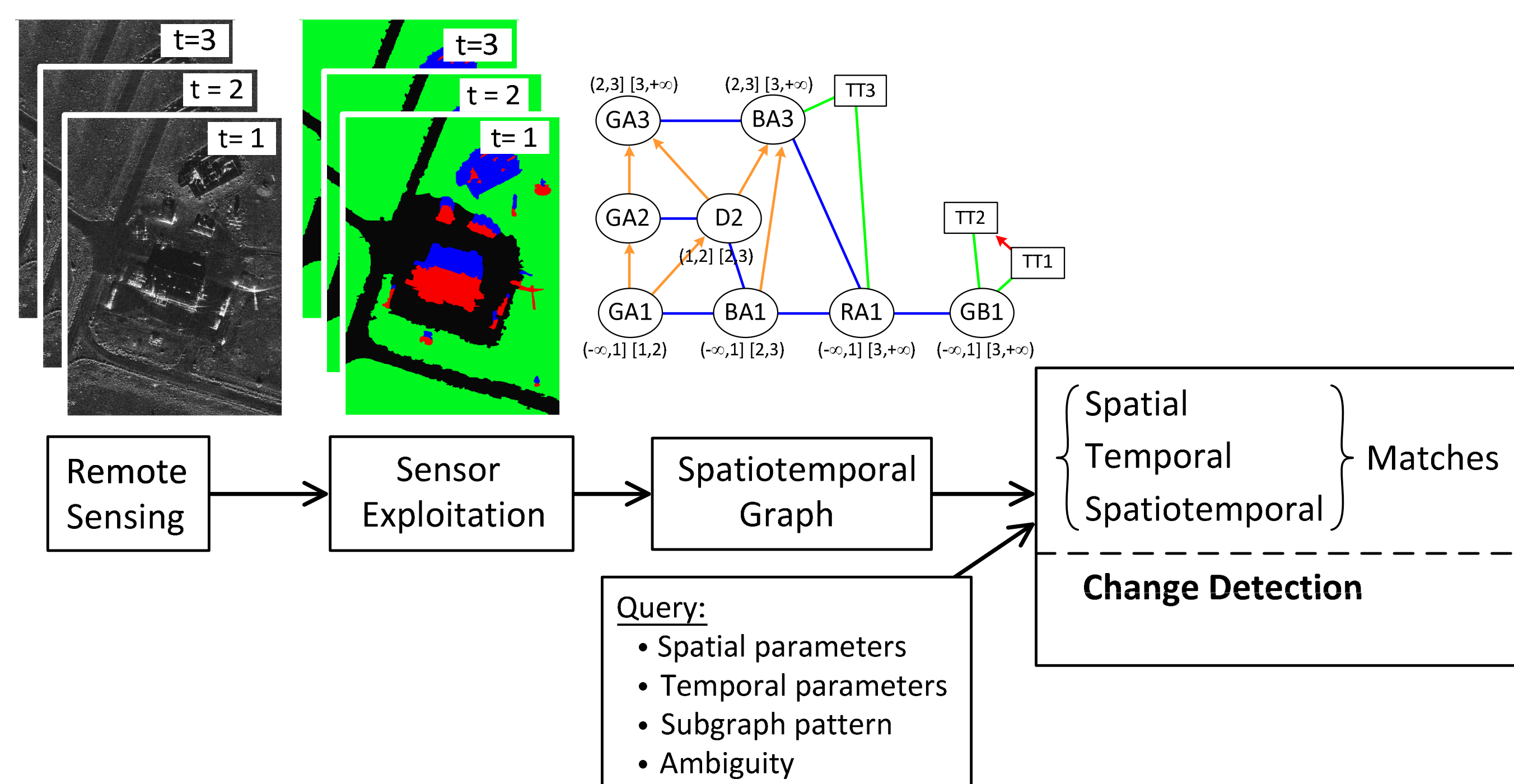


Sandia's unique role as an applied R&D lab gives us an opportunity to solve real "big data" problems and to develop solutions that push the boundaries of R&D.

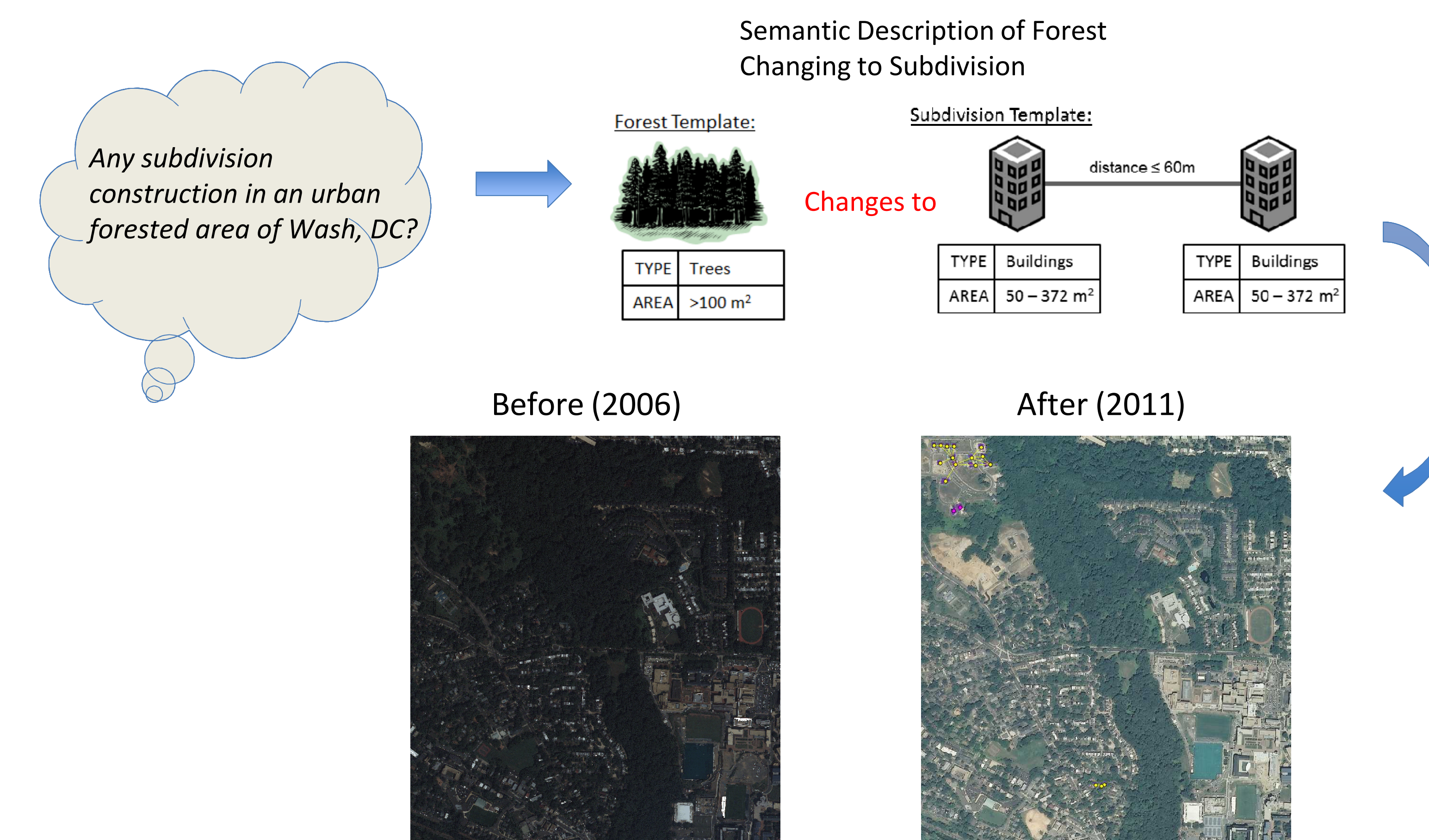
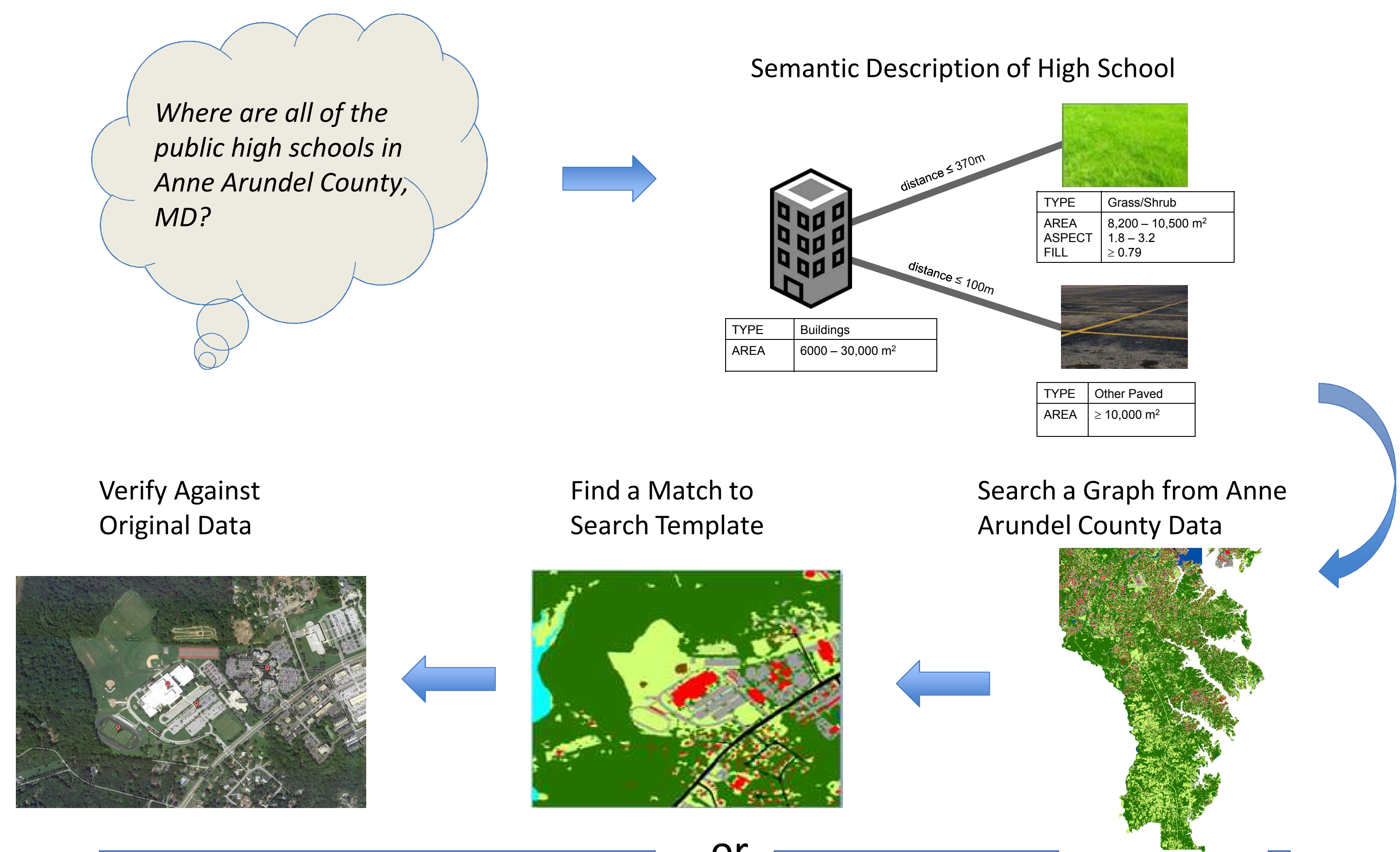


What is our innovation?

- Leverage and enhance existing sensor exploitation technology to identify fundamental patterns in images
- Store the items and their relationships in a *geospatial-temporal* semantic graph
- Incorporate analyst studies at all points in the process to develop appropriate presentation and querying techniques to maximize usefulness



What have we learned so far?



Why is this important for our nation?

- Allows for a much richer semantic querying of images
- Enables potential off-line search through mountains of historical data that would otherwise go untouched
- Is directly relevant to NNSA non-proliferation remote sensing activities
- Has broad national security importance due to the large amounts of data coming off of sensors that cannot be directly examined by analysts

Most importantly, this methodology is ultimately a significant and applied step on the path from data to information.