

PROJECT OVERVIEW REPORT

1. UTC Identifying Number
69A3551847102
2. Center Identifying Number
CAIT-UTC-REG56
3. Project Title
Interactive Decision Support System for Planning and Construction of Large-scale Tunneling Projects
4. Principal Investigator & Contact Information
Matthew J. Bandelt, Ph.D.
Assistant Professor
New Jersey Institute of Technology
University Heights
Newark, NJ 07102
5. Rutgers/CAIT Project Manager
Patrick Szary, Ph.D.
6. Customer Principal Program Manager
Benjamin Engle, Program Manager, Gateway Program
NYNJ Port Authority
4 World Trade Center
150 Greenwich Street, 15th Floor
New York, NY 10007
7. Project Description
The primary goal of this proposal is to increase safety and minimize the risks of building major underground infrastructure systems by enhancing existing methods for stochastic subsurface characterization, hazard and risk assessment and management. The specific goals of the project are to develop a framework calibrated for worldwide large-scale tunneling projects capable of: (1) 3D stochastic modeling of the subsurface to quantify the effects of subsurface uncertainties on tunnel construction (2) determining most likely hazards along a tunnel route for identification of 'risky' spots along tunnel alignment (3) performing quantitative risk assessment during the design and construction phases.

This methodology and resulting interactive decision support system will have the potential to be used in the design and construction of different tunnels in the US by local, regional and federal agencies, or by private companies.

8. Implementation of Research Outcomes (or why not implemented)

The intended outcome of the project is the development of a computer code (software), based on the DAT used as a basis for this research. This tool will be customized to be used in large-scale tunneling projects. The software could be further enhanced in the future based on the feedback provided by the stakeholders.

9. Impacts/Benefits of Implementation (actual, not anticipated)

To Be Determined

10. Dates and Budget

Start date: 7/1/2021

End date: 6/30/2022

UTC (CAIT) Dollars: \$70,000

Cost Sharing: \$70,000

Total Dollars: \$140,000

11. Keywords

Tunneling; Subsurface design and construction; Interactive decision-making system; DAT (Decision Aids for Tunnels); Stochastic GIS-based 3D geologic modeling; Geo-hazard characterization; Risk characterization; Quantitative risk assessment; Subsurface uncertainties

12. Web Links (Reports and Project Website)

<https://cait.rutgers.edu/research/interactive-decision-support-system-for-planning-and-construction-of-large-scale-tunneling-projects/>