

Decision making and problem solving are the most important aspects for any successful business or government venture. Data has always been an important input to those areas and has been spurred by the rapid growth of technology data currently being generated at an unprecedented rate.

"Every day, we create 2.5 quintillion bytes of data — so much that 90% of the data in the world today has been created in the last two years alone." [1]

This data is being generated across a variety of domains including aviation, healthcare, finance, advertising, crime prevention, logistics, and supply chain management.

The ability for leaders in both business and government to make effective use of massive amounts of data and the advanced analytical models being developed to analyze the data will be a key element leading to improvements in how decisions are made, how systems are operated and how complex problems get solved. CNA can be your trusted partner by helping you get the most of your data.

Our Approach: CNA's approach includes getting as close to the data, the people, and the problems as possible. This allows us to develop a thorough understanding of the problem domain and the implicit and explicit biases that may be present in the data. CNA does not market, sell, or distribute any specific tools or technologies and prides itself on being problem focused; providing relevant and actionable analytic solutions to our customers.

Selected Clients: United States Navy • Department of Homeland Security • Federal Emergency Management Agency • Department of Justice • Federal Aviation Administration • Department of Education

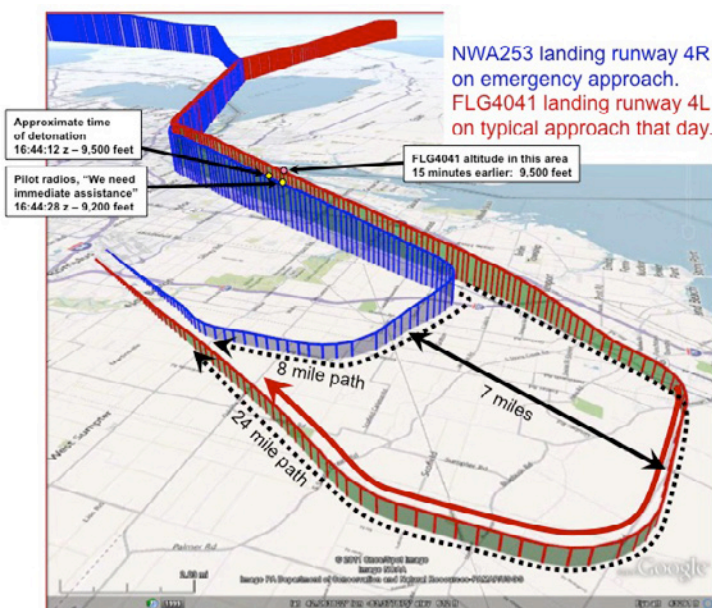
Our Services: CNA has expertise collecting, processing, exploring, analyzing, interpreting and visualizing data for clients across military and civilian departments. Our expertise includes geospatial analysis as well as modern approaches to statistical analysis and predictive analytics. Common methodologies and tools employed include:

Analytic approaches:

- Optimization (Linear, Integer, Nonlinear Programming)
- Discrete Event Stochastic Simulation
- Network Modeling
- Stochastic Modeling
- Statistical Analysis
- Machine Learning
- Data Mining
- Predictive Analytics
- Text Mining and Analytics
- Data Science
- Visualization
- Geospatial Analysis (GIS)

CNA's Field Program has been deploying analysts, embedded within the U.S. Navy fleet and Marine expeditionary forces, around the world for decades. It is a demonstration of our commitment to working with our customers to solve their most challenging problems no matter where they exist.

At CNA we analyze and solve problems by getting as close as possible to the people, the data, and the problems themselves in order to find the answers of greatest clarity and credibility — all to help government leaders choose the best course of action.



[1] <https://www.forbes.com/sites/christopherfrank/2012/03/25/improving-decision-making-in-the-world-of-big-data/#4b9fa98d1e85>

FEATURED EXPERIENCE

FEDERAL AVIATION ADMINISTRATION AIRSPACE CAPACITY

CNA developed a new methodology for improving the forecasting accuracy of future air traffic impacts on the National Airspace System. CNA analysts collected public data for future aircraft purchase plans by airlines, integrated the data, and built a model predicting future air traffic workloads based on planned industry capacity. Model results can be used for air traffic control workforce planning and to identify airports with future risk of increased congestion.

Flight Path Visualization

CNA developed GIS visualizations of the flight path and detonation location associated with the underwear bomber flight at the request of the FAA.

We turned radar data into graphics and animations showing the dangerous flight path the pilot had to take after the bombing. Analysis was provided to the U.S. Attorney's office to support the Federal Trial.

DEPARTMENT OF JUSTICE POLICE AMBUSH ANALYSIS

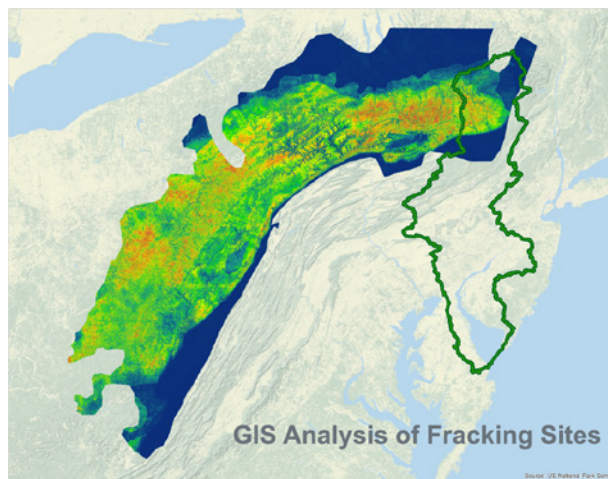
CNA conducted a mixed methods analysis for the Department of Justice that investigated ambushes of police officers. As part of the quantitative analysis, data was collected from multiple data sources that tracked assaults against police, crime rates, police agency organizational characteristics, and community characteristics. Analysts extracted data, cleaned the raw data, integrated it into a single dataset, and constructed a negative binomial regression model to identify effects of factors on police ambush attacks. Results were presented to the Department of Justice and the full report can be read at <https://ric-zai-inc.com/Publications/cops-p340-pub.pdf>.

ABOUT CNA CORPORATION

CNA is a not-for-profit research and analysis organization with 75 years of experience providing government agencies with data-driven insights and real-world, actionable solutions grounded in our direct experience with the operational environments where these solutions are applied. CNA developed the foundational techniques for operational analysis to address complex challenges facing government programs. We have applied these techniques successfully in areas ranging from defense to aviation, education, justice, and homeland security.

UNITED STATES NAVY SYSTEMS MAINTENANCE & MODERNIZATION

CNA applied machine learning techniques to improve the U.S. Navy amphibious system maintenance process. A random forest algorithm was created that predicts remaining system maintenance costs and percentage of time the system is in critical condition during deployment. Output from the model provides critical data to support leadership's assessment of system replacement versus modernization decisions. The model is being integrated into existing Navy tools to improve system life cycle assessments and planning.



STATE AND LOCAL GOVERNMENT FRACKING SITE ENVIRONMENTAL IMPACTS

CNA used data mining/machine learning algorithms, paired with geospatial analysis, to provide prospective investigation of the impacts of future fracking sites. Data was collected from multiple sources, integrated, and an analytic model was created predicting future fracking sites

based on historical data. Results were used to estimate land disturbances, forest loss, population effects, and impacts to air and water quality. CNA briefed the approach and impact results to the State Departments of Environment Protection (including each Secretary) for Pennsylvania, New York, and Delaware model results were to be used as input to future fracking regulations and site approvals.

For more information please contact:

Brad Ng, Vice President, Enterprise Systems & Data Analysis
703-862-4461
ngb@cna.org

Joseph Butcher, Vice President Business Development
703-824-2601
butcherj@cna.org