Booz Allen®

CLIMATE INTELLIGENCE ECOSYSTEM/DIGITAL TWIN

Using advanced technologies like digital twins to analyze and visualize climate mission datasets for end-to-end climate resilience planning and implementation.

Climate change is increasingly impacting people, infrastructure, and environments worldwide. Due to its global scale and complex multi-dimensional nature, climate change is an especially challenging problem to address. Given the volumes and complexities of climate datasets including Earth Observation data, one of the biggest challenges is the lack of understanding of our natural resources and extreme weather events, and the characterization and predictions for the impacts of climate change. Without tools that enable this "translation" from science to operations, linking real-world experiences—like a particularly strong hurricane—to increases in greenhouse gas emissions over the decades can feel like a conceptual exercise.

This is where Booz Allen's Digital Twin capability, powered by Unity, can help. A "digital twin" is an exact virtual replica of a physical object, process, or system "twinned" to its counterpart in the real world through data and information feeds. Digital twins pull together a variety of datasets called a digital thread to enable data-driven decision making. They provide a highly visual and contextual common operating picture from which users at all levels of technical ability—from scientists, to federal agencies, local leaders, and beyond—can virtually collaborate to predict impacts and test innovative approaches at speed and scale before implementing them in the real world.

AIR POLLUTION DIGITAL TWIN PROTOTYPE

Digital twins can be used to analyze environmental issues such as air quality and pollution. Most air pollution is not visible to the naked eye, and the air does not need to be heavy with smog to be dangerous to human health and the environment. To demonstrate this concept, Booz Allen developed a climate digital twin prototype which utilizes a gradient heatmap to visualize concentrations of the PM2.5 air pollutant (closely associated with diesel engine emissions) in a representative city. The digital twin showcases how pollutant concentrations are affected by seasonal changes, and allows users to assess the impact of various mitigation strategies such as introduction of electric vehicles over time. This construct can be extended to assess different climate threats and make them intuitive to decision makers at all levels of the government.

CLIMATE INTELLIGENCE ECOSYSTEM & DIGITAL TWIN

We envision integrating the Digital Twin capability into Booz Allen's Climate Intelligence Ecosystem—a solution that accelerates climate action by providing "as a service" features supporting an open data architecture, a community of data providers, and easy access to datasets for hyper-localized climate analyses.

Digital twins can quickly provide detailed and effective analysis and visualizations of features such as terrain, buildings, utilities, and infrastructure. They can use additional information from data sources as diverse as aerial LiDAR, AutoCAD drawings, GIS layers, and sensor data to develop accurate three-dimensional representations of complex climate and environmental threats and impacts. Digital twins can help analyze threats to at-risk populations and to understand how policy changes can improve related outcomes, such as public health. The use cases are practically limitless.

With the maturation of powerful technologies like digital twins, the future of climate resilience will be based on digital tools. Digital twins will empower government and community leaders with the information they need to make decisions at the speed of relevancy, improving outcomes for everyone.

FOR MORE INFORMATION, PLEASE CONTACT:

Prachi Sukhatankar
VP, Climate & Infrastructure

Trishna Lovley
Chief Technologist,
Chief Technology Office

About Booz Allen

Trusted to transform missions with the power of tomorrow's technologies, Booz Allen Hamilton advances the nation's most critical civil, defense, and national security priorities. We lead, invest, and invent where it's needed most—at the forefront of complex missions, using innovation to define the future. We combine our in-depth expertise in AI and cybersecurity with leading-edge technology and engineering practices to deliver impactful solutions. Combining more than 100 years of strategic consulting expertise with the perspectives of diverse talent, we ensure results by integrating technology with an enduring focus on our clients. We're first to the future—moving missions forward to realize our purpose: Empower People to Change