

Department of the Navy SBIR/STTR Transition Program

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ONR Approval #43-8756-21

Topic # N142-121

The Advanced Climate Analysis and Forecasting System - Decision Support System

Clear Science, Inc

WHO

SYSCOM: ONR

Sponsoring Program:

Transition Target: Fleet Numerical Meteorology and Oceanography Center (FNMOC)

TPOC:

Dr. Daniel Eleuterio

daniel.eleuterio@navy.mil

Other transition opportunities: The ACAF-DSS core technology can be expanded and adapted to create customized solutions for decision-makers, intelligence analysts, modelers/simulators by providing foreknowledge of the atmosphere, 2 weeks to 1 year in advance.

Notes: The ACAF-DSS displays information in many forms via the advanced user interface to assist users in making great decisions for resource planning and staging, risk mitigation, energy consumption and many other potential uses. The goal of the ACAF-DSS is to provide information in a form the warfighter can leverage. From a presentation-ready figure, to data suitable for importing into a tactical decision aid, to an API return for use by another application or cloud, the ACAF-DSS lives up to its billing of being the 'Swiss army knife' of climate information.

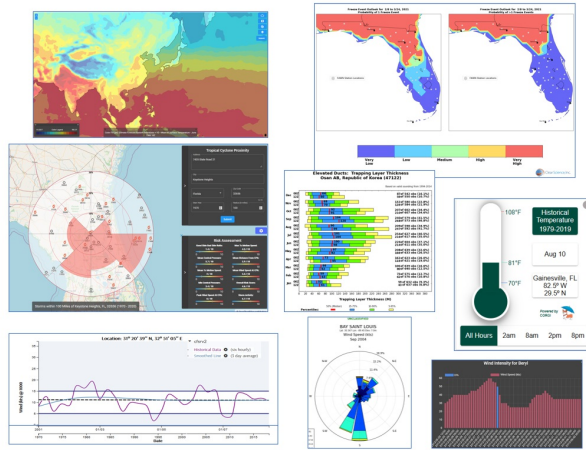


Image courtesy of Clear Science, Inc.

WHAT

Operational Need and Improvement: Decision-makers, intelligence analysts, modelers/simulators and others can gain a significant tactical or strategic advantage with foreknowledge of the atmosphere from two weeks to 1 year and beyond. Commonly available predictive models offer environmental predictions to about two weeks. Longer range models are improving, and when used, they must be understood within the context of the state of the climate and historical limits.

Specifications Required: This technology must leverage modern computing technology in terms of data storage, large dataset schema and rapid, asynchronous recall techniques. In addition, the application will deliver the information in the most value-added method possible be it an advanced user interface packed with analysis tools, or calculated data delivered via an API for use in outside applications or clouds. More importantly, the application will deliver the predictive environmental information in a form the decision-maker, analyst, modeler, planner or researcher can readily consume such as an intuitive chart, a probabilistic summary or even a stoplight diagram.

Technology Developed: The ACAF-DSS is an environmental decision support system. The ACAF-DSS accesses scores of historical datasets and long-range predictive models to provide the decision-maker with heretofore unavailable weather and oceanography information. The system applies an innovative approach to data recall coupled with a clustered computing power and an interactive user interface to make petabytes of data accessible and discernible. Based on the user's request the system recalls the necessary data, computes the requested solutions, and displays or sends it to the user within seconds. Within the user interface the user may layer multiple requests on a global, interactive map, create cross-sections in space and time, correlate regions/times, create vertical profiles within the ocean or atmosphere and more.

Warfighter Value: Planning for intelligence gathering, resource employment, unit movements, location selection, risk mitigation and other governmental activities typically takes place at timescales that are far longer than commonly available weather models predict. The ACAF-DSS offers the warfighter a means to understand the emerging environmental conditions far in advance of operations to make better decisions and plans. Access to this information continuously improves today's and tomorrow's decisions and plans cumulatively impacting strategic and tactical decisions and ultimately improving outcomes.

WHEN

Contract Number: N68335-20-C-0827 **Ending on:** March 31, 2022

Milestone	Risk Level	Measure of Success	Ending TRL	Date
Complete redesign of legacy ACAF using new technologies	N/A	Survey of candidate technologies	2	2nd QTR FY17
Common global/regional dataset schema invention and implementation	N/A	Data conversion per invention and integration	4	3rd QTR FY18
Data API + asynchronous data usage	N/A	Production of calculated answer grids	5	3rd QTR FY19
Breadboard complete	N/A	Demonstratable system available	6	1st QTR FY20
Transition of data and data API components to FNMOC	N/A	Transition to operational DOD systems	7	4th QTR FY21
Transition of UI component to FNMOC	Med	Updated system replaces previous	7	2nd QTR FY22

HOW

Projected Business Model: CSI will leverage the core, very broad ACAF-DSS technology to create custom solutions for government (e.g., long-range hurricane formation predictions, fire conditions early warning, freeze probability outlook, etc.). CSI will also license this technology to use as-is for use by institutions for operations or research

Company Objectives: CSI will continue to develop the ACAF-DSS technology and transition it to the DOD. In addition, CSI will continue to seek commercial and government partners that have specified and limited needs for which the technology can be leveraged. CSI's ACAF-DSS technology is unmatched in the marketplace and we intend to maintain our leadership in the area of providing access to a large set of climate/historical and predictive datasets from which instant analysis and computations can be completed. We will continue to invent technology and approaches for the exploitation and display of decision-supporting environmental information.

Potential Commercial Applications: Commercial application of this technology span many economic sectors. Business interests that have interest in predicting weather or ocean phenomena can benefit from this technology. For instance insurance/reinsurance would immediately enhance underwriting with a better understanding of their environmental hazard risk posture many months in advance. The finance and investing sector could time strategy better with an understanding of the future environment. Energy buyers are extremely environmentally sensitive in timing of purchases. Construction, logistics, shipping, etc. Nearly all economic sectors could capitalize and profit from accurate, advance knowledge of environmental conditions that impact them most, and lead times that favor their operations

Contact: Bruce Ford, President
bruce@clearscienceinc.com

352-478-8560