

**SBIR Topic Number:**  
AF05-069

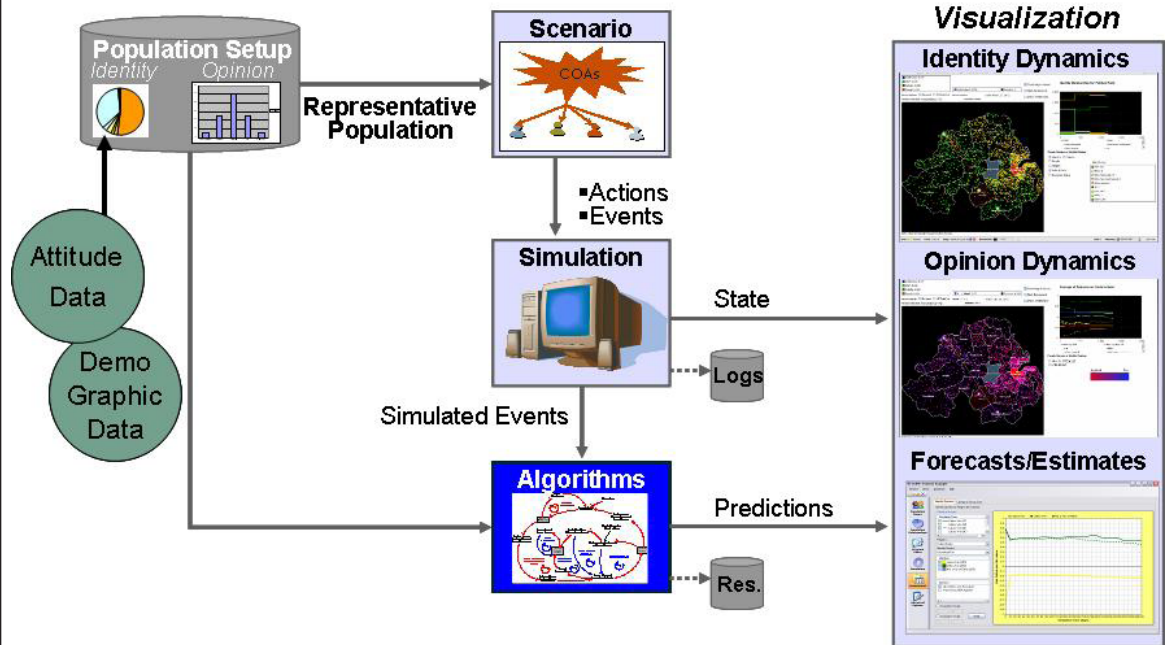
**SBIR Title:**  
The Impact of Cultural Factors on Human Performance Modeling and Simulation

**Contract Number:**  
FA8650-06-C-6634

**SBIR Company Name:**  
Aptima, Inc.  
Woburn, MA

**Technical Project Office:**  
AFRL Human Effectiveness Directorate, Wright-Patterson AFB, OH

This Air Force SBIR/STTR Innovation Story is an example of Air Force supported SBIR/STTR technology that met topic requirements and has outstanding potential for Air Force and DoD.



## Simulation of Cultural Identities for Prediction of Reactions (SCIPR)

- The U.S. armed services need a robust simulation tool to facilitate a better understanding of cultural identities and issues in order to more effectively interface with the populations and irregular forces of other nations
- SCIPR enables users to ask what-if questions in order to gauge the effects of alternative courses of action on the identities and belief systems of friends, foes, those in between, and those who are ambivalent
- Aptima developed the Simulation of Cultural Identities for Prediction of Reactions (SCIPR) to allow planners to predict how attitudes may change in response to certain events
- The SCIPR prototype is currently being evaluated by a Joint operational command

AFRL/RH OPSEC 154

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## Air Force Requirement

A central challenge for the U.S. armed services lies not only in fighting nation-state armed forces but in dealing with irregular forces. The glue that holds many of these forces together and motivates them to fight is a common belief system and shared cultural identity. However, cultural identities are neither monolithic nor static. Rather, cultural identities are multi-layered and dynamic. Each individual has multiple identities and these identities change over time.

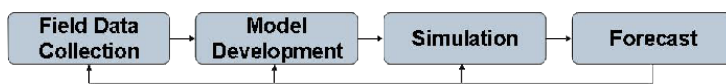
The Air Force needs a robust simulation tool to facilitate a better understanding of cultural identities and issues in order to more effectively interface with the populations and irregular forces of other nations

## SBIR Technology

Aptima developed the Simulation of Cultural Identities for Prediction of Reactions (SCIPR) to allow planners to predict how attitudes may change in response to certain events. SCIPR is an agent-based computer simulation that forecasts the effects of actions on peoples' opinions and cultural identities.

The reactions of various individuals to events are a result of multiple feedback loops that interact with one another. SCIPR models these complex feedback loops using both multi-agent and systems dynamics modeling. SCIPR utilizes a number of principles that are well substantiated by research. These principles include:

- People communicate more with people like them and near them
- People are more open to influence from people like them
- People are more open to influence when they are less certain or extreme in their own opinions
- Social identities are important drivers of sense making which can be used to predict population level changes in attitudes



SCIPR Guided Approach

SCIPR forecasts how attitudes of a certain section of a population will change in response to events that occur. While it does not predict the actual attitude, it does allow the user to identify the relative direction and change in attitude over a period of time in response to different sequences of events.

## Potential Air Force Application

SCIPR is a fully functioning prototype that accounts for the ways in which people interpret and react to events. It enables users to ask what-if questions in order to gauge the effects of alternative courses of action on the identities and belief systems of friends, foes, those in between, and those who are ambivalent.

Aptima has received SBIR Phase II enhancement funding for additional development of SCIPR and its application to operational domains. The SCIPR prototype is currently being evaluated by a Joint operational command.

## Company Impact

This Air Force SBIR project enabled Aptima to develop the core functionality of SCIPR. Participation in the Air Force SBIR Commercialization Pilot Program (CPP) will lead to multiple enhanced capabilities for SCIPR, such as improved uncertainty analysis and visualization.

Aptima specializes in solving the problems of human performance in today's complex sociotechnical systems. It is a market leader in the design of organizations, user-centered technology and training systems that make individuals and teams more effective. Aptima's unique approach – human-centered engineering – couples the principles of social science with quantitative, computational methods.



# SBIR/STTR

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