Air Force SBIR/STTR

Transition

Air Force SBIR/STTR Transition Story

SBIR Topic Number:
AF05-069

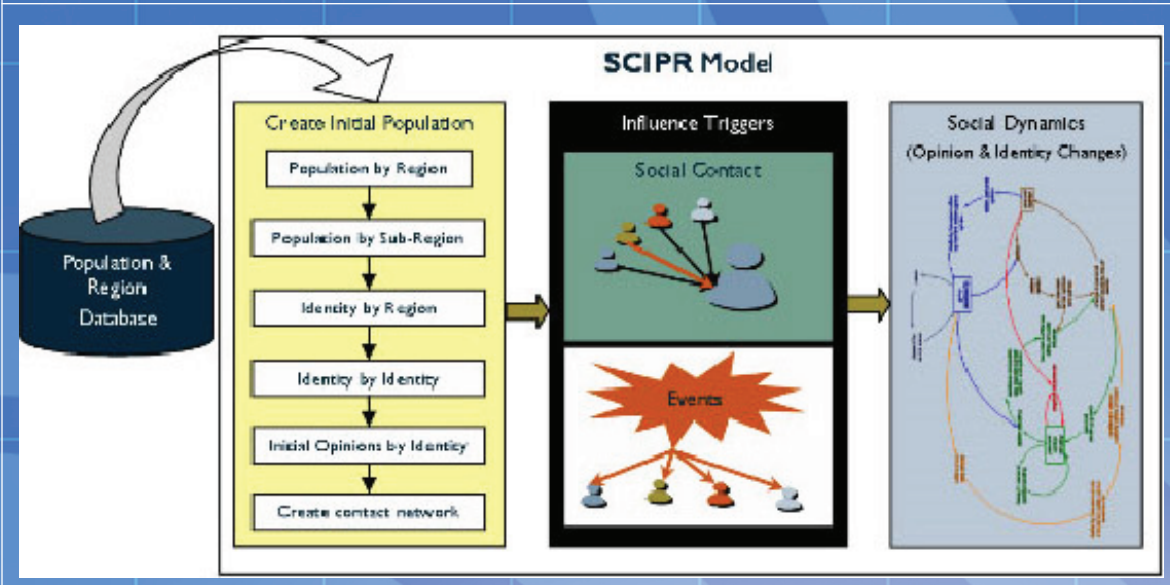
SBIR Title:
The Impact of Cultural Factorson Human Performance Modeling and Simulation

Contract Number:
FA8650-06-C-6634

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

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

An example of Air Force supported SBIR/STTR technology that has been transitioned into an Air Force or other DoD system or subsystem or used by Air Force test ranges and facilities or maintenance depots.



Simulation of Cultural Identities for Prediction of Reactions

- The Air Force has a requirement for innovative approaches to empirically determine, predict, or simulate the most relevant and influential cultural factors for a range of human behaviors and attitudes
- Aptima developed the Simulation of Cultural Identities for Prediction of Reactions (SCIPR) – an agent-based computer simulation that forecasts the effects of actions and events on peoples' opinions and cultural identities
- SCIPR is now being applied to operational domains, including the Office of the Secretary of Defense (OSD) Strategic Multilayer Assessment (SMA) Rich Contextual Understanding for Pakistan and Afghanistan (PAKAF) program
- SCIPR was Aptima's ground-breaking entry into the area of enhancing human performance in multi-cultural environments; Aptima has since received multiple contracts and subcontracts in this emerging field

Commercialization Pilot Program Series

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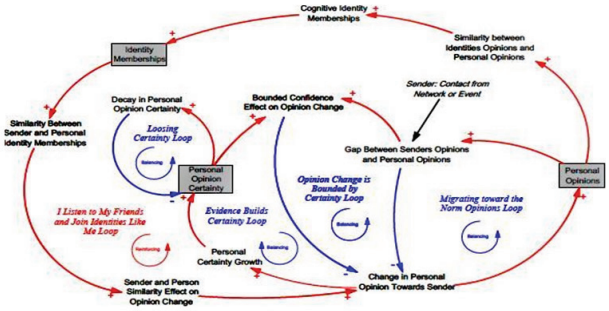
Air Force Requirement

A wealth of behavioral research describes normative differences between individuals from different cultures. Researchers report qualitative and quantitative differences in such areas as cognition, interpersonal processes and belief structure; several researchers have developed taxonomies of cultural differences. Innovative approaches are needed to empirically determine the most relevant and influential cultural factors for a range of human behaviors.

SBIR Technology

Aptima developed the Simulation of Cultural Identities for Prediction of Reactions (SCIPR) model, shown on the previous page, 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. As shown in this diagram, the reactions of various individuals to events result from multiple feedback loops that interact with one another. SCIPR models these complex feedback loops using both multi-agent and systems dynamics modeling.



Overview of interactions within SCIPR

SCIPR utilizes a number of principles that are well substantiated by research. These include:

- People communicate more with people like themselves and near to them physically
- People are more open to influence from people like themselves
- 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 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.

Addressing the root causes of state failure and instability requires the cooperation of local populations and governments. To win this cooperation, military decision makers need to predict changes in the opinions of local populations. Cultural identity is a critical factor in this process; however, cultural identities are multi-layered and dynamic. Each individual has multiple identities and these identities change over time. Attitudes also change based upon people's contact with other individuals. When attitudes change, people's participation in groups changes as well. Understanding and predicting these complex dynamics are extremely difficult, yet critical to success.

Transition Impact

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 has received a Phase II SBIR enhancement for additional development of SCIPR and its application to operational domains, including the initial phase of the Office of the Secretary of Defense (OSD) Strategic Multilayer Assessment (SMA) Rich Contextual Understanding for Pakistan and Afghanistan (PAKAF) program.

Company Impact

SCIPR was Aptima's ground-breaking entry into the area of enhancing human performance in multi-cultural environments. Since the start of SCIPR, the company has received multiple contracts and subcontracts in this emerging field. Aptima has since expanded its work in this area into three interrelated domains:

- Data & Annotation: Researching methods to capture quality data, as well as innovative display methods, to provide a foundation for all cultural literacy
- Analysis & Forecasting: Developing tools that facilitate the analysis of these data to enable interpretation, forecasting, and decision making
- Training & Expertise: Identifying and training the skills required to successfully lead and operate in multicultural environments

U.S. AIR FORCE

SBIR/STTR

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