

Interests (Position) Related to Spatial-Temporal Constraints on Social Networks

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Currently, I have three specific areas of interest related to the topic of spatial-temporal constraints on social (and other) networks. However, I work numerous other projects where an improved ability to analyze seamlessly across network and spatial-temporal context would be valuable.

Host Population Networks: The first of these specific areas is the geographic and temporal representation of “host populations” and the political, economic and social networks of these populations in locations where U.S. is interested in improved governance and stability, and increased local economic capability. In recent years, U.S. security policy has recognized the need to nurture and enhance governance in all nations across the globe, because of the global threats posed by individuals and groups operating in under-governed and ungoverned regions and nations. The U.S. and U.S. allies operating in these regions and nations need to better understand the motivations, perspectives, and alliances between individuals and groups in local populations, and to “model” the complex reactions of these communities. Specifically, we wish to better parse our understanding of how the various economic, social, religious and political networks at work in these host populations will each react to changes and potential actions within these regions (and external to these regions). Understanding these social networks are important for both populations and individuals that remain in their locations of origin, and those that are displaced to new “communities” but who maintain strong “network” ties across geographic and even temporal distances.

Understanding the social networks in local and displaced situations involves accurate and detailed spatial and temporal information about populations, but data available from census and published sources is often sparse in these regions. However, the desired information is resident in the local populations. Constraints in obtaining and accurately applying this “social networks” data include all the issues associated with crises and conflict areas – mistrust, access to individuals, safety, access to local data sources, language barriers, place name confusion, and the cultural “opaqueness” of important but hard to articulate network relationships.

Defense Sustainability Knowledge Network: The second specific area of interest has do with effectively growing a “network” of connections across the U.S. Department of Defense (and other related organizations) related to sustainability (the Defense Sustainable Knowledge Network).

Social networks facilitate building “culture” or shared behaviors and beliefs in spatially distant communities. Organizations, including large organizations like the U.S. Army,

advance the use of social networking tools to reduce costs in operations and to nurture cultural ties across the geographically dispersed soldiers, civilians and families that are part of the Army. The Army has units and personnel in essentially every time zone on the planet—in scores of locations, so capabilities that link those with common interests across these physical spaces are of great value for an organization that builds upon cultural cohesion among soldiers and the civilians and families supporting these soldiers.

A number of factors, however, limit the effectiveness of social networks in building and sustaining communities and an improved understanding of how these factors operate, including:

- Security constraints that limit the exchange between the “internal” and external elements of the community
- Access, bandwidth and security constraints that prohibit the use of some types of social media
- The complexity of a very hierarchical and vertical organization “facilitating” horizontal interactions across the community, and uncertainty about what communications are actionable.
- Concerns that social interactions are vulnerable to monitoring by adversaries
- Difficulty of “like minded” elements of the community finding one another and establishing common ground, because of the diversity of locations and organizational elements across a very large organization
- Ingrained behaviors of individuals—with limited exposure (and willingness to gain exposure) to social network resources.

There have been several efforts provide social network tools to members of this diverse community, most with limited success. So, this challenge related to: 1) examining current and changing interactions across this community to better understand if these constraints (or others) are limiting interactions, 2) identifying in spatial-temporal, organizational and functional dimensions as to how sustainability interactions are occurring and where they are constrained, and 3) modeling how various additional resources might improve this “defense sustainability knowledge network.

Protection and Projection Nodes for Global Networks: Historically, all military organizations locate their military assets in key locations that serve to protect vital proximate assets and/or to project military forces to where they are needed. US bases were first placed where there were threats – in the early years of the colonies along coastlines and key navigable rivers, then along the routes of wagons and trains as the nation grew westward. Finally, bases and troops were located where airports, railways and highways and seaports could facilitate rapid “projection” of power to wherever needed. Space and time are important considerations in these locational considerations—what is the range of protection from our military bases, and how long does it take to project forces to the perimeter of their ranges?

As modes of transportation and communication transform, as weapons systems project globally and in the space around the globe, and as known vulnerabilities to attacks multiply, there is a growing need to examine the range of networks, and the crossing nodes of these networks, where US military should allocate its limited protection and projection resources. These “networks” include multiple types of communications infrastructure, space infrastructure, power infrastructure, transportation infrastructure. Key spatial factors include space imagery surveillance, various infrastructures extent and range and key nodes, and the types of protection and projection needed for these infrastructures. All these factors also have a temporal dimension. A goal, related to this issue, is to dynamically identify ideal “nodes” from multiple network in terms of spatial, temporal and network characteristics.