



Collaboration for Common Operating Pictures (COP)

The idea of a *single* or *common* picture is almost a misnomer — it is neither simplistic nor static; rather, it is intended to support near real-time communications, dynamic shared views and systems interoperability. Military systems employed in joint mission planning and execution (involving multiple services), which produce common operating pictures are extremely large and complex. By definition, in the military context, a Common Operating Picture (COP) is comprised of the following:

- *Data model* (of all objects and properties);
- *Arbitration scheme* to resolve conflicts between the properties of the objects in the environment);
- *Information exchange*;
- *Arbitration agent*;
- *Intended scope*;
- *Definition types* (of data objects in the data model); and
- *Means to determine the properties of the objects* (in the data model).

Our research has shown that critical elements for systems control of sustainable and interoperable COP (for disaster events) are heavily reliant on:

- *Technology adaptation, manipulation and connectivity*;
- *Data model arbitration schemes*; and
- *Governance and co-ordination mechanisms*.

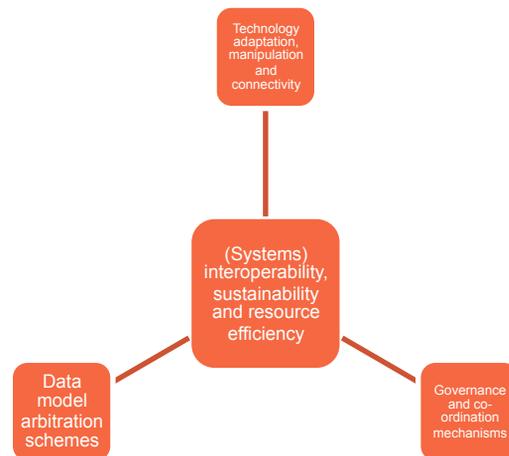


Fig 1 Critical Elements of System Control for COP

Additionally, in disaster response, agencies have requirements to view multiple representations of the same phenomenon and perhaps, other representations of associated phenomena. In the military context, a COP does not admit alternative views, i.e. it must pick a single state. In reality, all operating picture information must be gathered, processed and delivered via a multitude of technology channels including telephone, mobile phone, SMS, facsimile, email and web pages to ensure that the disaster can eventually be effectively managed. This information comes from many different sources such as sensor data, satellites, geospatial systems, operational systems, business systems, emergency responders and the general public. Evaluating and authenticating this information during a disaster is problematic in its own right, but disaster scenarios are also emergent and dynamic in nature, and so they often push existing information systems and channels to failure.

COP development of disaster scenarios

The development of a common picture (or pictures) of an event or activity is based on observational or sensory data for compilation and distribution to key event participants or other systems. Other requirements such as the nature of stakeholder collaboration, however, must also be taken into account. McCann (1983) maintains that negotiated processes are also needed by organizations in a shared problem domain to ensure a workable collaborative outcome. “The inability of stakeholders to negotiate needed roles and responsibilities and perform regulative functions will ultimately limit the viability of their problem domain” (p. 181). Five *Social Problem Solving-Negotiated Arrangements* (SPS--NA) can be used as a starting point from which to build a COP for extreme events where collaboration and cooperation is a priority. These are outlined as follows:

- a) Diverse stakeholder involvement – where the benefit of the COP is obvious to them as a result of their involvement in its development;
- b) Dealing with uncertainty and complexity – to effectively develop COP coordination and control mechanisms i.e. policies and programs;
- c) Development of economies of scale –for the efficient procurement and allocation of emergency management resources among stakeholders;
- d) Development of a sense of shared direction – by having all critical stakeholders identify with and contribute to the COP; and
- e) Development of an orderly process for adapting to change – by building the learning capacities and skills of critical stakeholders.

A new approach

We propose a new systems design approach for disaster management COP that achieves their objectives and captures their dynamic nature through a more collaborative stakeholder focus i.e. McCann’s (1983) SPS- NA. Approaches to collaboration and the negotiation of arrangements for the augmentation and extension of COP are

necessary for effective disaster management. McCann (1983) gives us a useful starting point to formulate approaches for negotiated arrangements to address differences in socio- organizational factors in order to facilitate collaboration between organizations.

Our approach (see Fig 2) focuses on decentralized stakeholders and negotiation for resources to manage a dynamic and emerging extreme event including those that encompass critical elements for systems control: technology adaptation, manipulation and connectivity; data model arbitration schemes; and governance and co-ordination mechanisms. By combining both of these perspectives we are then able to focus on the critical questions that event responders must ask in order to extend the range and reach of a COP through what we term “*repertoires of collaboration*” for government, agencies, businesses and the community. This would facilitate a shared view of the situation at hand by all stakeholders (situational awareness) and a common operating picture that effectively supports all possible responses to the disaster or crisis. The use of a negotiated arrangements approach to the creation of a COP is of course dependent on robust, resilient and flexible systems infrastructure and associated skill sets.

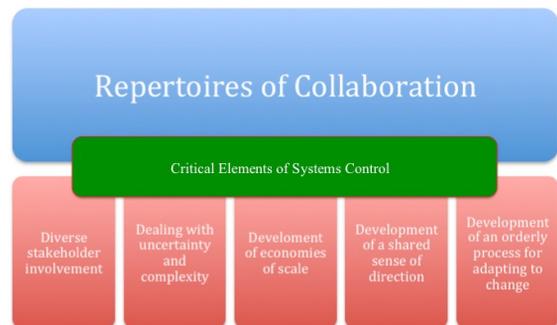


Fig 2 Repertoires of Collaboration

McCann, J.E. (1983) “Design guidelines for social problem-solving interventions,” *Journal of Applied Behavioural Science* (19:2), pp. 177---189.

This information sheet has been prepared for the IEERG by

Deborah Bunker & Linda Levine (The University of Sydney)

For more information

Interoperability for Extreme Events Research Group
sydney.edu.au/business/research/ieerg



THE UNIVERSITY OF
SYDNEY
—
Business School