The Situation Awareness Weighted Network (SAWN) Model

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Outline

- Context
- SA Models
- Our proposal: ‘SAWN’
- Methodology
- Example Results
- Conclusions
Context: a joint HQ
**Dominant SA models**

**Individual SA [1]** - knowing what is going on around you and recognising what is important for a given goal and decisions

**Distributed SA [2]** - a property of a network of interactions: humans (social network), humans and information artefacts / knowledge they are transacting from them (knowledge network), and tasks and the information they require for achieving a goal (task network)


Our proposal:
Situation Awareness Weighted Network (SAWN)
Overall Study Approach

Literature review:
- factors underpinning SA
- existing SA models
Observations of the study setting & informal discussions
Analysis of SOPs

Pilot & modification

Development of a ‘fit-for-purpose’ model SAWN

SAWN Base-line
Survey 1: administered electronically assessing ‘As is State’ snapshot
Watch-keepers + Analysts

SAWN Future Scenario
Survey 2: structured interview, assessing ‘Alert State’ snapshot
Watch-keepers + Analysts

Scenario workshop
(adapted ‘Future Backwards’ & CDM)
Military SMEs

Endorsed Scenario through consultation with the Client

Task Model

New C2 Structure
SAWN Survey Design

SAWN Survey Structure
Sense-making during a 72 hour battle-rhythm

12 Statements pertaining to PRODUCTS
- Use to benefit self
  - Statements P1a-P12a
- Produce to benefit others
  - Statements P1b-P12b

12 Statements pertaining to ORGANISATIONS
- Interaction to benefit self – formal, informal or both
  - Statements 01a-012a
- Interaction to benefit others – formal, informal or both
  - Statements 01b-012b

6 Statements pertaining to WORKLOAD

12 questions refining 3
Endsley levels

- Use/produce/interact to draw attention & identify
- Use/produce/interact to understand & authenticate
- Use/produce/interact to understand contacts’ history & determine action
- Use/produce/interact to understand risks & consequences on strategic picture
- Use/produce/interact to anticipate actions in next 36hrs
- Use/produce/interact to anticipate actions beyond next 36hrs
- Use/produce/interact to anticipate effect of physical environment
- Use/produce/interact to decide contact is no longer of consequence

Self rating scale reflecting individual experience
Crisis Scenario

- Scenario description to HQ Plans, Int, Ops, Single Service SMEs.

- Knowledge elicitation in OT&E facility.

- Future-Backwards (Cynefin): develop end state, determine Decisive Points (DPs) to reach it.

- Critical Decision Method (Klein): probes to elicit information requirements for DPs.

- Output summarised in QuadChart as input for SAWN Survey/Interview for Crisis Scenario.

Scenario Time-Line: 72 hours

Scenario a hypothetical conflation of two non-routine events with which subjects were separately familiar: build up to crisis trigger.

SimVision used to build task model in real time during elicitation activity.
SAWN for Steady-State activity: Pull
SAWN for Steady-State activity: Push

- Sampled Desks
- Desks/Roles
- Products
- Perception
- Comprehension
- Projection

Support Officers in J3 Watch

Senior Officers in J3 Watch

Junior Officers in J3 Watch

Support Officers in J2 Watch

Junior Officers in J2 Watch

Support Officers in J2

Analysts in J2

Senior Officers in J3

Analysts in J2

Support Officers in J2
SAWN for Crisis activity: Pull
SAWN for Crisis activity: Push
Numbers of links per SA level for steady state

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Consolidation of SA

TOT-IN-LINKS = 335; TOT-OUT-LINKS = 188
Numbers of links per SA level for crisis

Consolidation of SA
TOT-IN-LINKS = 484; TOT-OUT-LINKS = 303

Value-Add
Key relationship: J2-J3 Watch leaders – high SA nodes

Steady-State-Pull

Steady-State-Push

Crisis-Pull

Crisis-Push

High levels of SA mutually pushed

Change of expectation for crisis by J3W1 compared to steady-state

Perception
Comprehension
Projection
Conclusions

- **SAWN** – Situational Awareness Weighted Network which
  - Unifies two leading models of Situation Awareness
  - Contains a distributed, adding of SA value Network View

- **Key results:**
  - Confirmed SA flows consistent with intended C2 structure and mission
  - Identified and *quantified* the as-is relationship between two key nodes in different Branches for generation of high SA; recommended joint exercises to enhance this relationship.

- Well developed and tested data collection method that can be used within an operational context; time-consuming but faster than classic CDM.

- SAWN is flexible enough to be applied post-event, steady-state and hypothetical scenario situations; extension to simulated experiments or CPXs.