Australian Government
Department of Defence
Defence Science and
Technology Organisation

The Situation Awareness Weighted Network (SAWN) Model

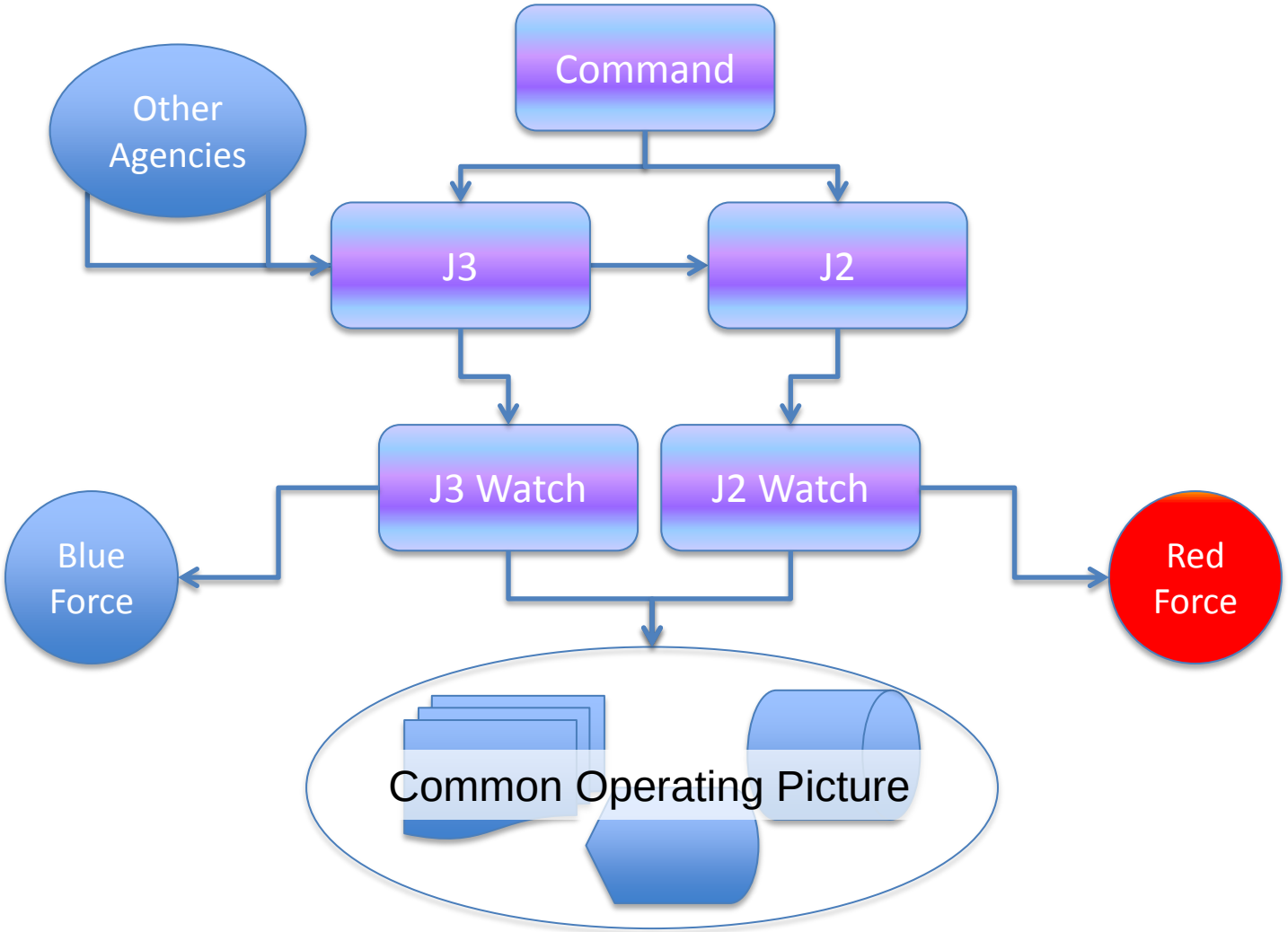
I. Ali, A. Kalloniatis, E. Kohn, P. La, T. Neville, I. Macleod, M. Zuparic

Joint & Operations Analysis Division

Outline

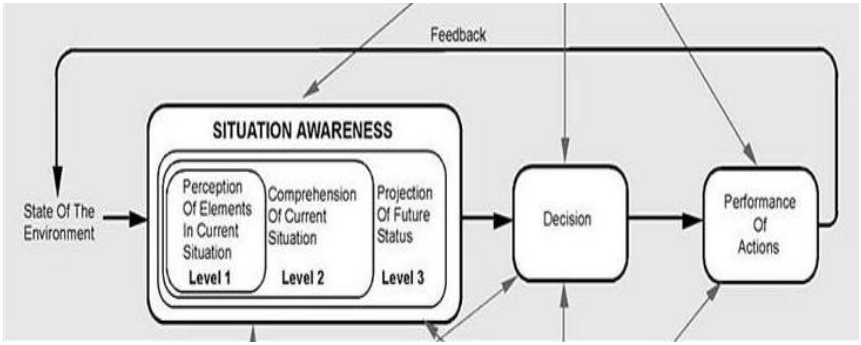
- Context
- SA Models
- Our proposal: ‘SAWN’
- Methodology
- Example Results
- Conclusions

Context: a joint HQ

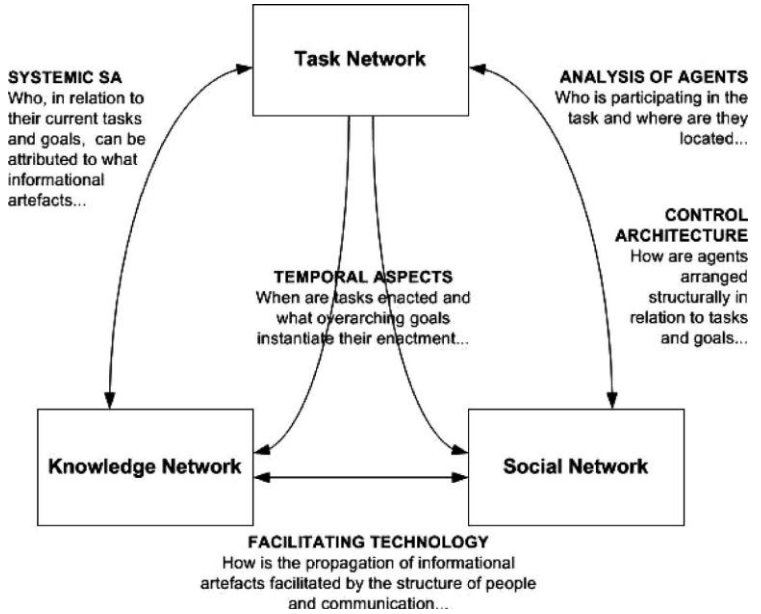


Dominant SA models

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

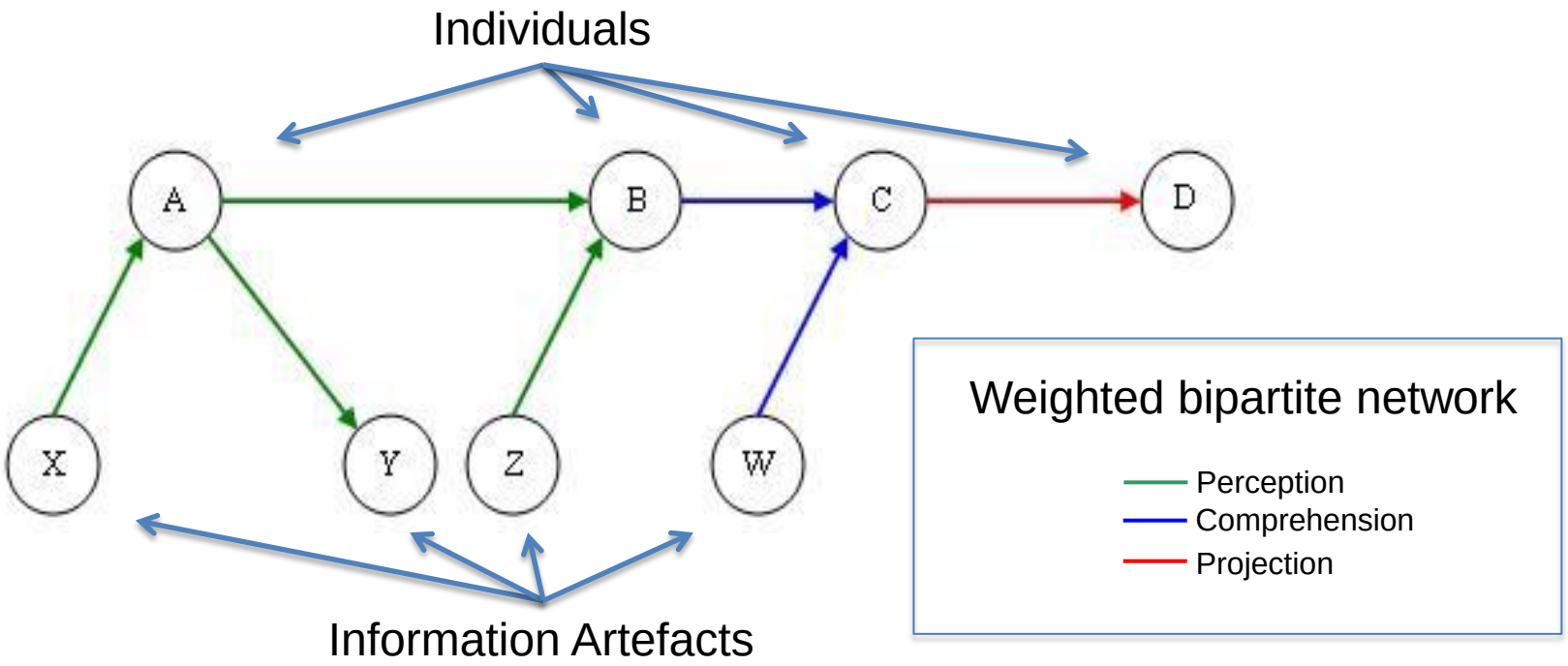


Distributed SA [2] - a property of a network of interactions: humans (social network), humans and information artefacts / knowledge they are transacting from them (knowledge network), and tasks and the information they require for achieving a goal (task network)

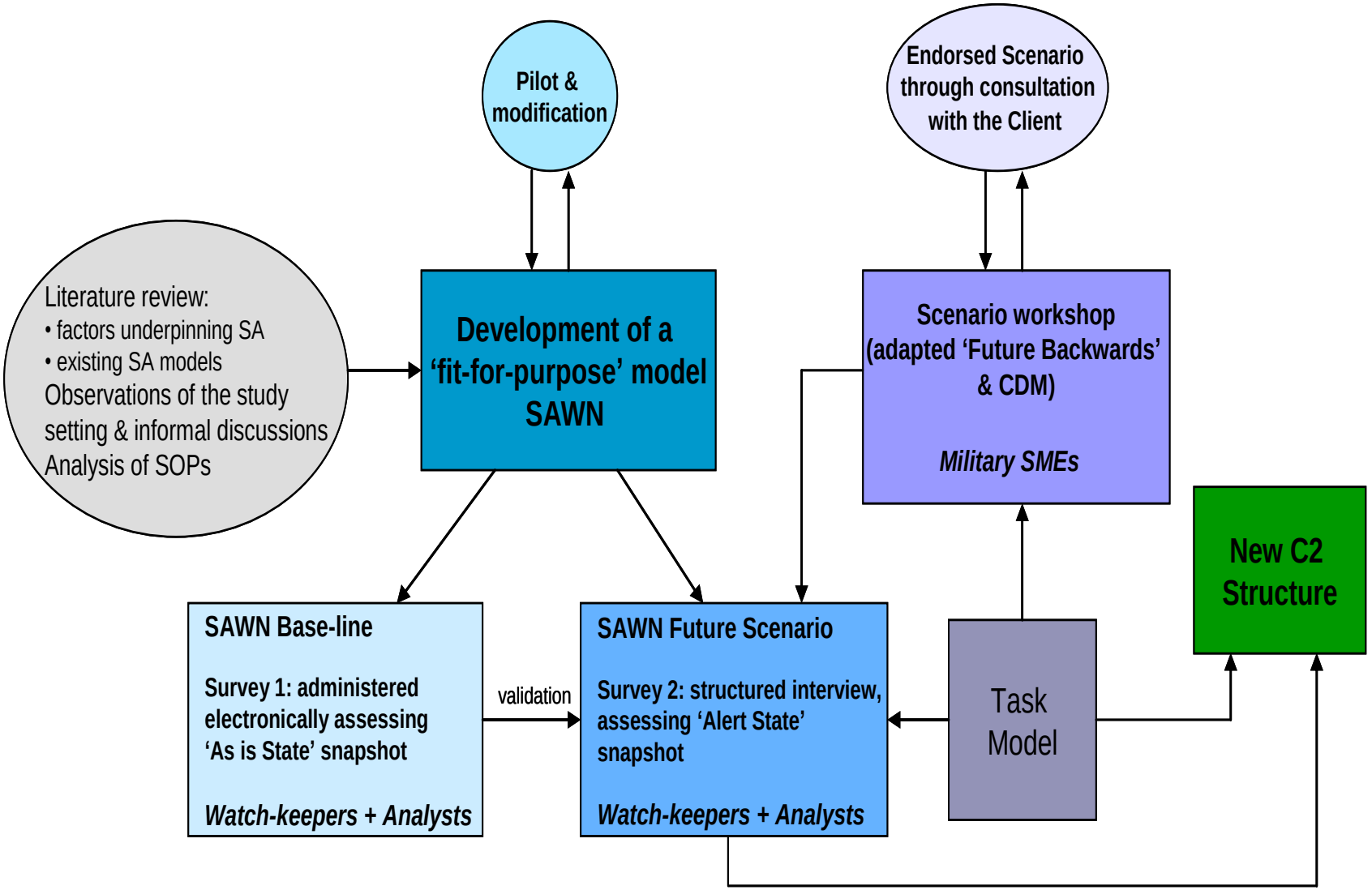


[1] 'Situation Awareness', Endsley, Ch.4. in 'Battle of Cognition', Ed. Kott, Praeger, 2008
[2] 'Distributed Situation Awareness', Salmon, Stanton, Walker, Jenkins, Ashgate, 2009

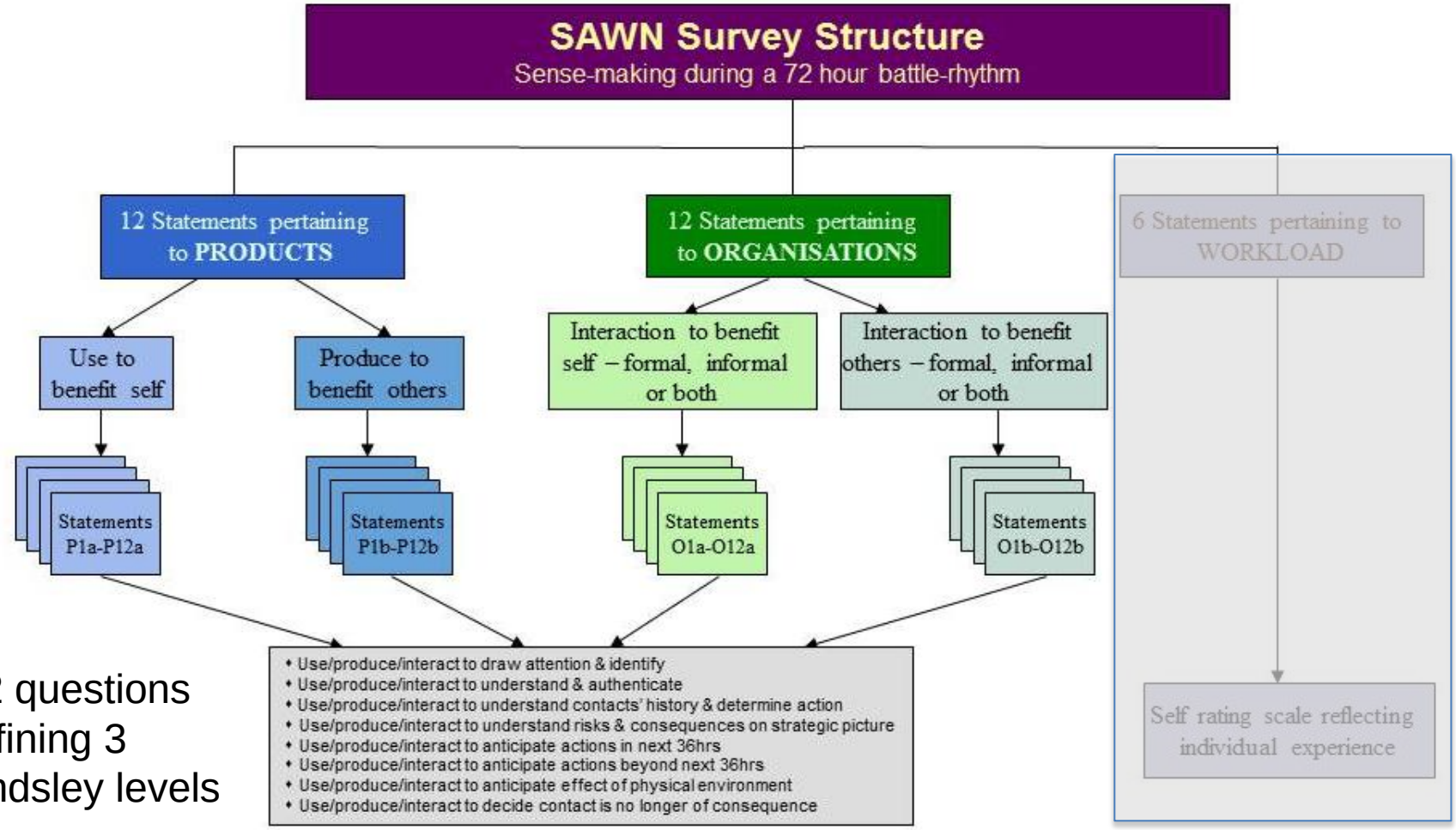
Our proposal:
Situation Awareness Weighted Network (SAWN)



Overall Study Approach



SAWN Survey Design

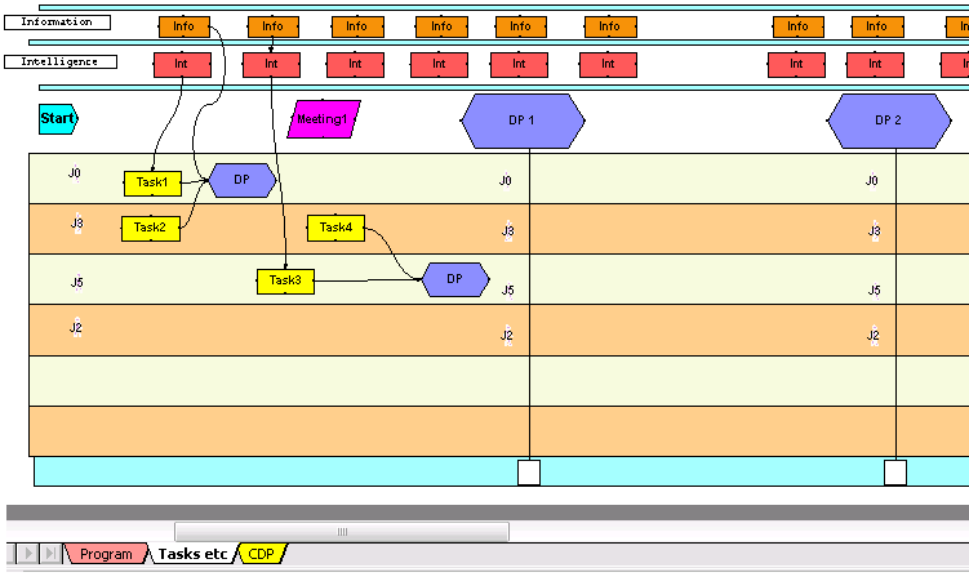


12 questions refining 3 Endsley levels

Crisis Scenario

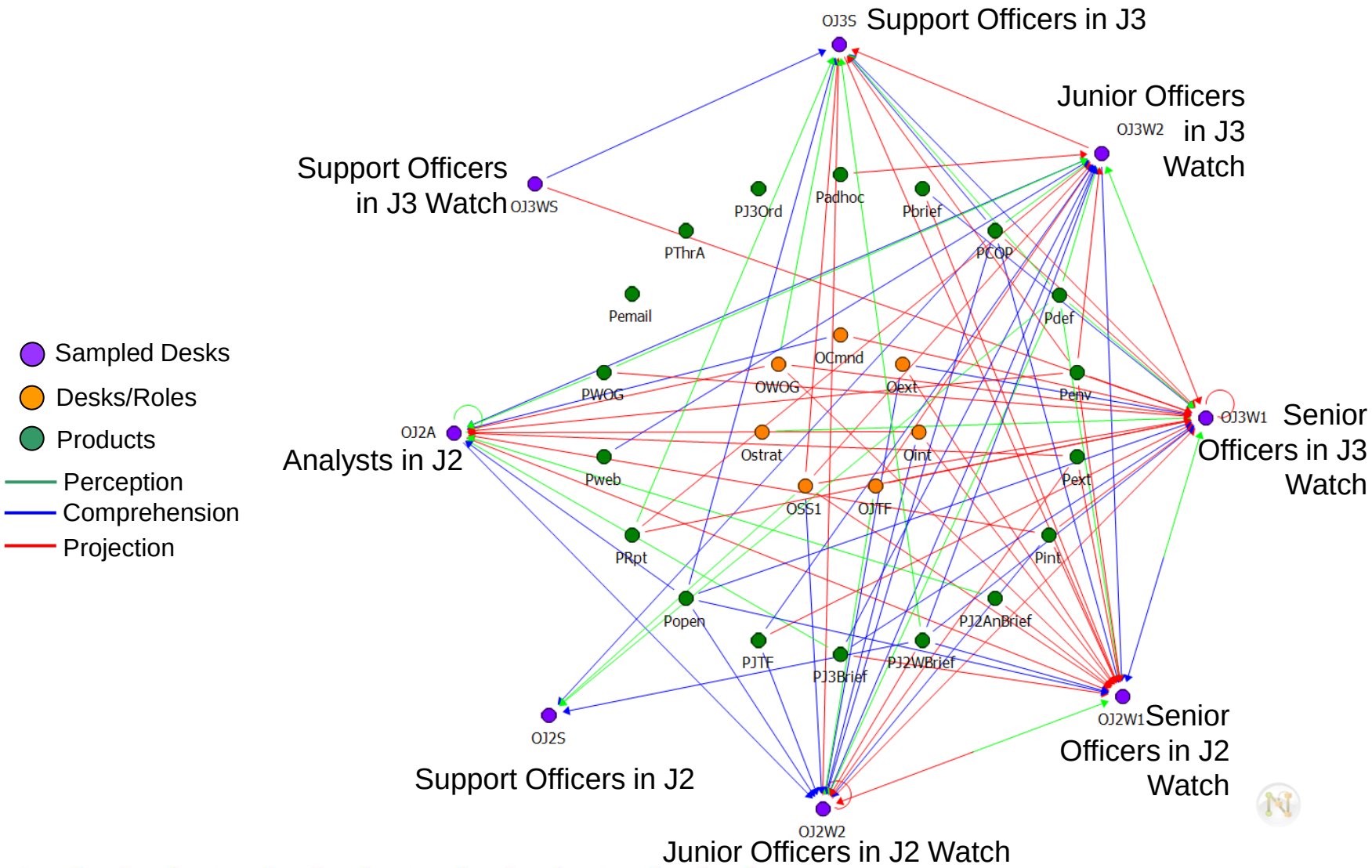
- Scenario description to HQ Plans, Int, Ops, Single Service SMEs.
- Knowledge elicitation in OT&E facility.
- *Future-Backwards* (Cynefin): develop end state, determine Decisive Points (DPs) to reach it.
- *Critical Decision Method* (Klein): probes to elicit information requirements for DPs.
- Output summarised in QuadChart as input for SAWN Survey/Interview for Crisis Scenario.

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

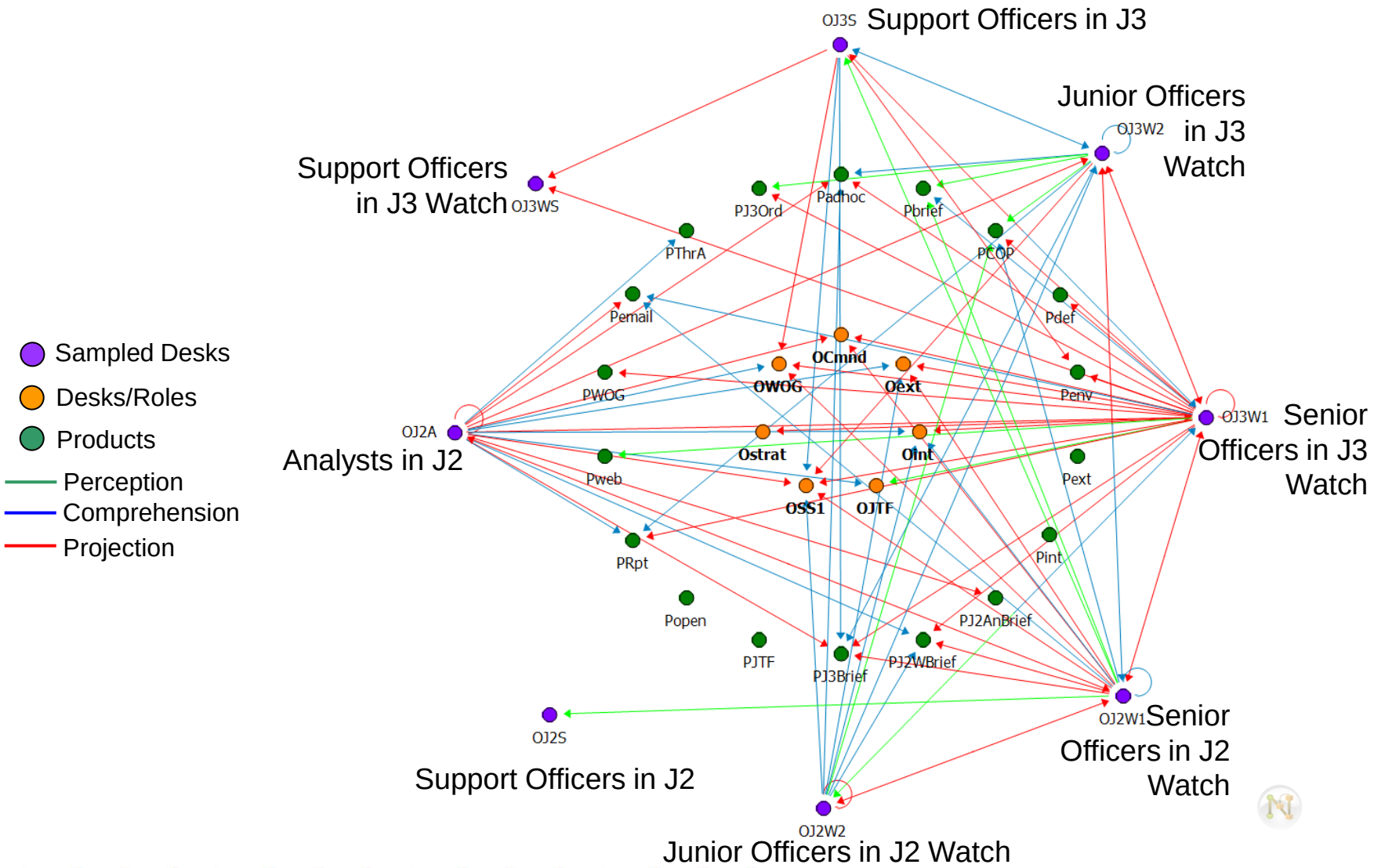


SimVision used to build task model in real time during elicitation activity.

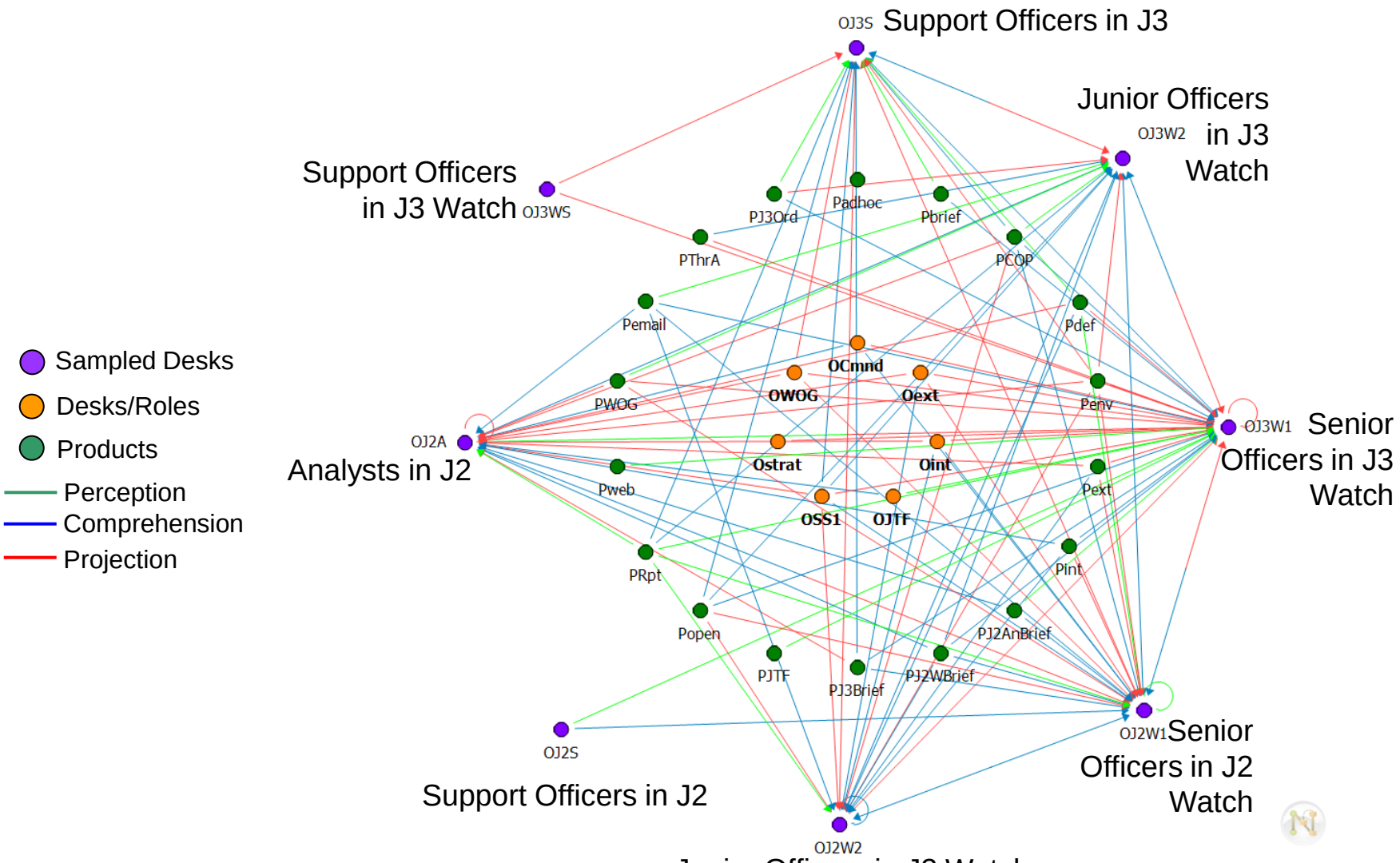
SAWN for Steady-State activity: Pull



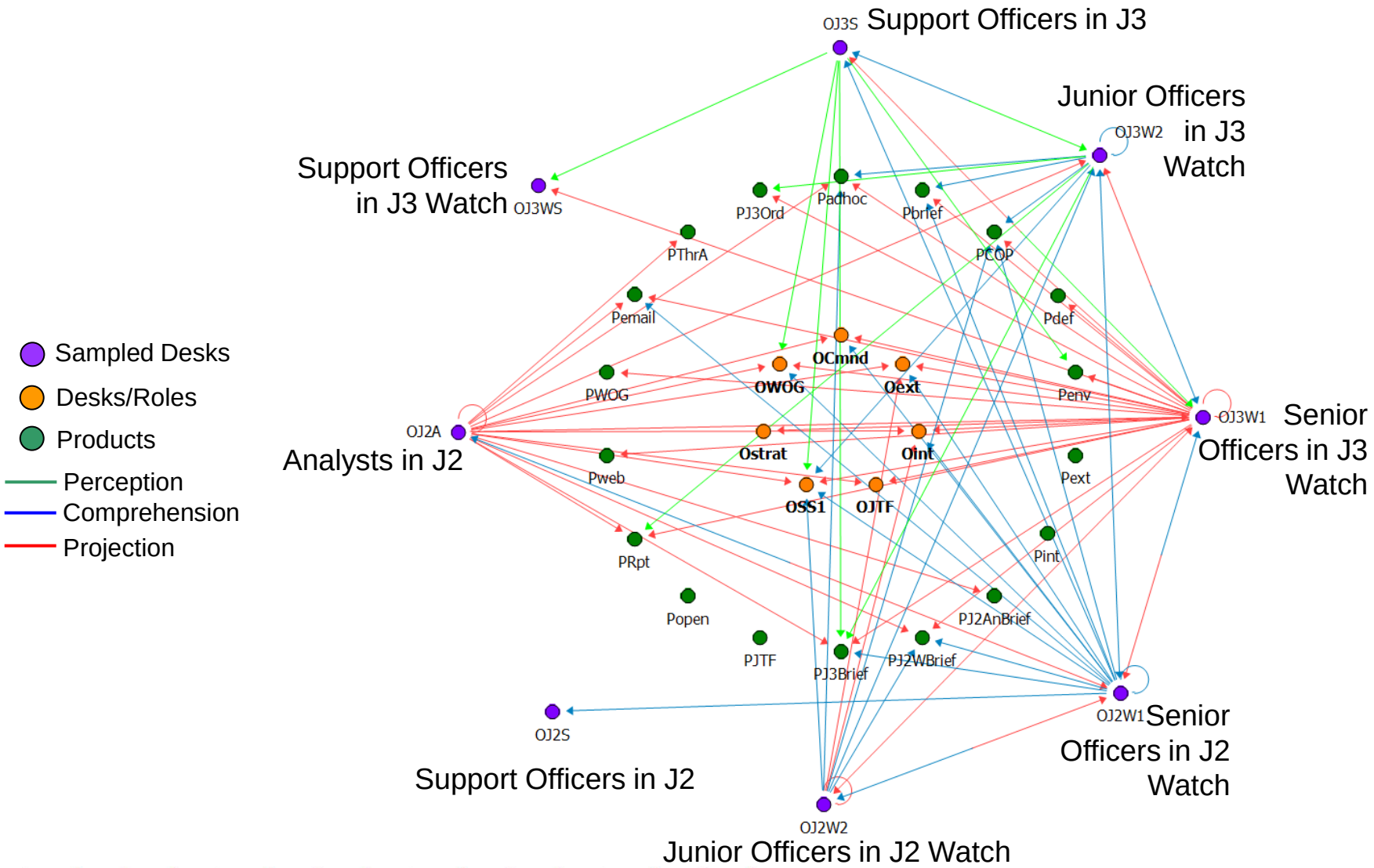
SAWN for Steady-State activity: Push



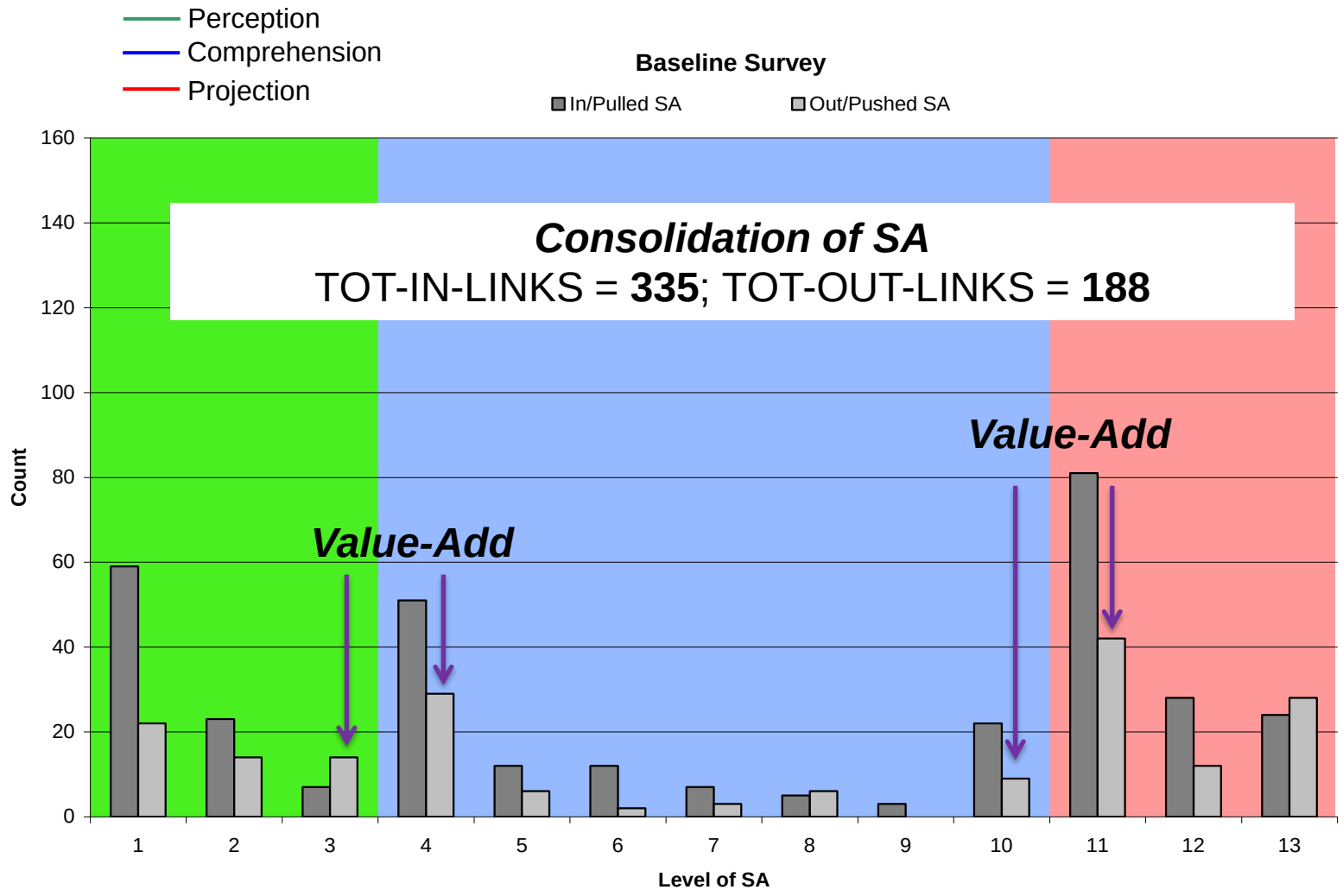
SAWN for Crisis activity: Pull



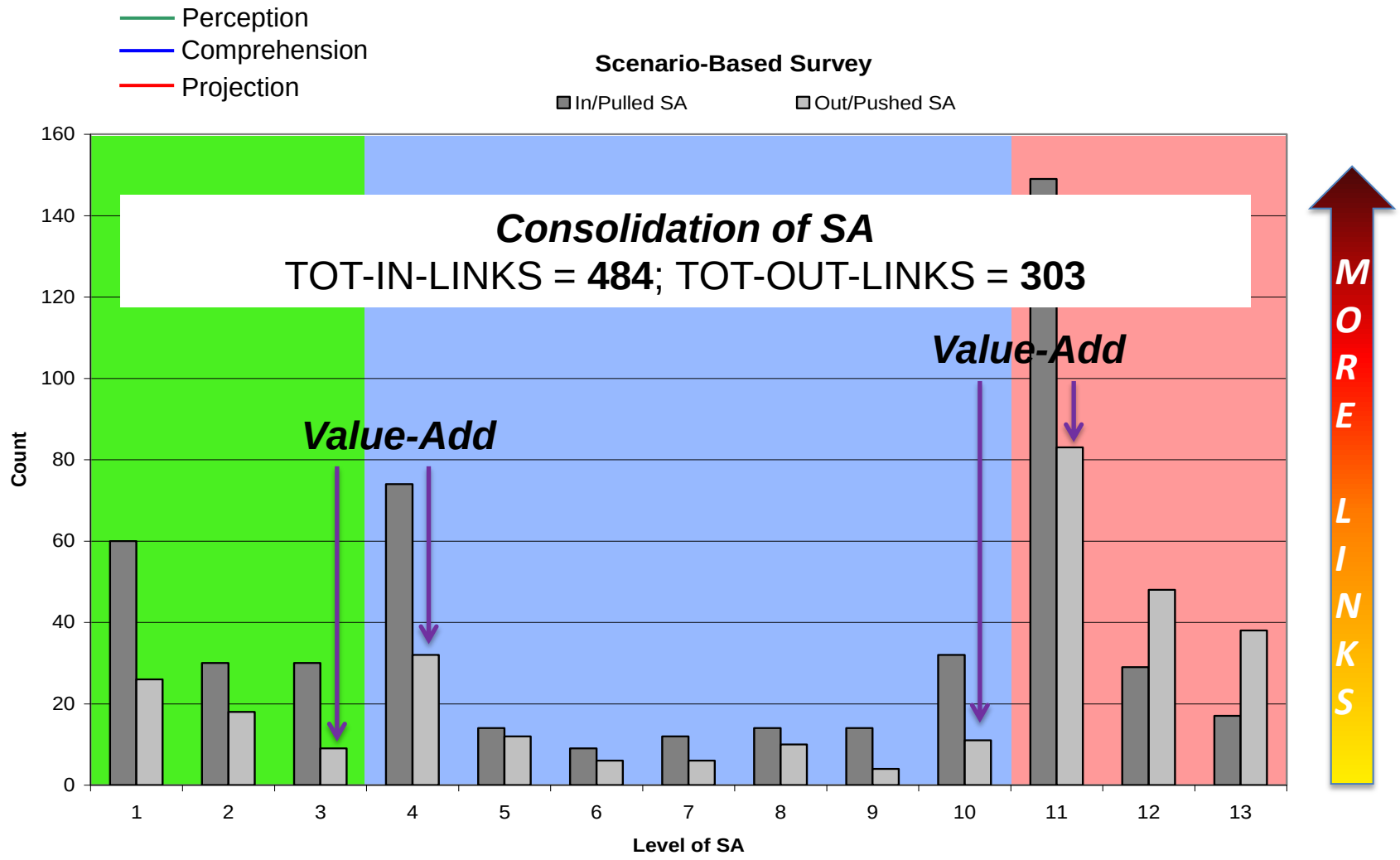
SAWN for Crisis activity: Push



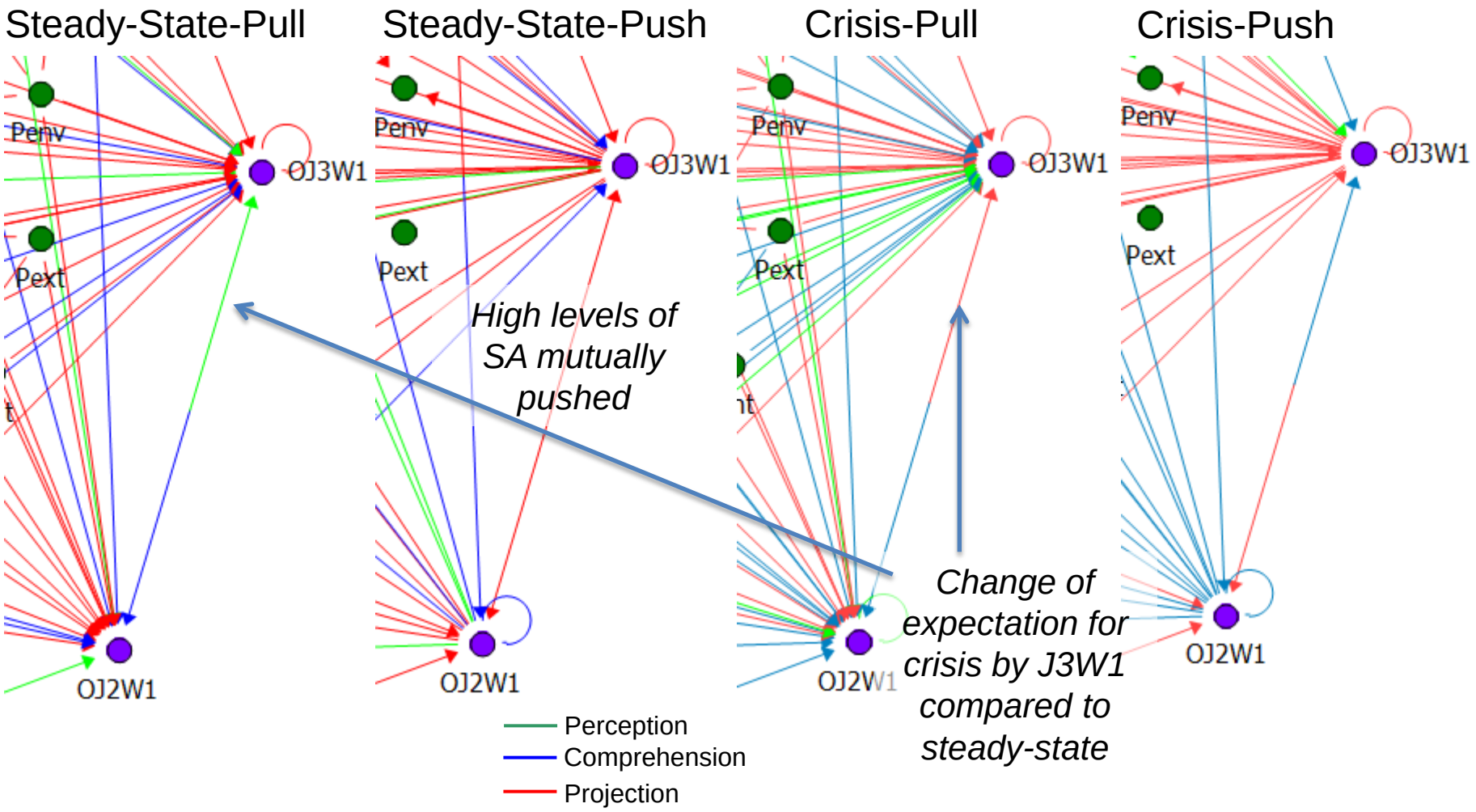
Numbers of links per SA level for steady state



Numbers of links per SA level for crisis



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



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.