



# KSCO

The KSCO Community

<http://ksco.info>

# KSCO Events

- ◆ **KSCO-1999** – International Workshop on Knowledge-Based Planning for Coalition Operations, May 1999, Edinburgh, Scotland.
  - ◆ Working parties proposed series of Coalition Experiments and Binni scenario adopted for community experimentation.
  - ◆ Working Group on KSCO formed and first meeting held to plan community activities.
- ◆ Coalition experiments and multi-national joint experimentation encouraged across community.
- ◆ **KSCO-2002** – Second Conference on Knowledge Systems for Coalition Operations, June 2002, Toulouse, France.
- ◆ **IEEE Intelligent Systems**, Special Issue on Knowledge Systems for Coalition Operations, Volume 17 Number 2, May/June 2002.
- ◆ **KSCO-2004** – Volume of Papers on Knowledge Systems for Coalition Operations, October 2004. Planned conference in Pensacola, Florida, USA cancelled during active hurricane season (Ivan in September 2004).
- ◆ **KSCO-2006** – Third Conference on Knowledge Systems for Coalition Operations, part of IEEE Workshop on Distributed Intelligent Systems (DIS-2006), June 2006, Prague, Czech Republic.
- ◆ **KSCO-2007** – Fourth Conference on Knowledge Systems for Coalition Operations, part of IEEE International Conference on Integration of Knowledge Intensive Multi-Agent Systems Modeling, Evolution and Engineering (KIMAS-2007), May 2007, Waltham, MA, USA.
- ◆ **KSCO-2009** – Fifth Conference on Knowledge Systems for Coalition Operations, March/April 2009, Southampton, UK.
- ◆ **KSCO-2010** – Sixth Conference on Knowledge Systems for Coalition Operations, September 2010, Vancouver, BC, Canada.
- ◆ **KSCO-2012** – Seventh Conference on Knowledge Systems for Coalition Operations, February 2012, Pensacola, Florida, USA

# KSCO Working Group

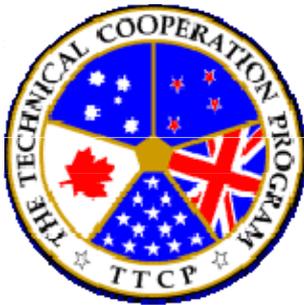
- ◆ Jean Berger (DRDC, Canada)
- ◆ Liz Bowman (ARL, USA)
- ◆ Jeff Bradshaw (IHMC, USA)
- ◆ David Brown (MITRE, USA)
- ◆ Richard Davis (DSTO, Australia)
- ◆ Susan Davies (Southampton University, UK)
- ◆ Roberto Desimone (QinetiQ, UK)
- ◆ Jerry Dussault (AFRL, USA; TTCP Representative)
- ◆ Roozbeh Farahbod (DRDC, Canada)
- ◆ Dan Fayette (AFRL, USA)
- ◆ Scott Fouse (IS, USA)
- ◆ Nort Fowler (AFRL, USA; now retired)
- ◆ Uwe Glaesser (Simon Fraser University, Vancouver, BC, Canada)
- ◆ Vladimir Gordoteski (St. Petersburg Inst. for Info. and Automation, Russia)
- ◆ Adel Guitouni (DRDC, Canada; TTCP Representative)
- ◆ Jim Hendler (University of Maryland, USA)
- ◆ Justin T Henley (Dstl, UK)
- ◆ Jan Jelínek (Honeywell, USA)
- ◆ Vijay Kowtha (ONR Global/London, USA)
- ◆ Dale Lambert (DSTO, Australia)
- ◆ James Lawton (AFRL, USA)
- ◆ Paul Losiewicz (EOARD/London, USA)
- ◆ Barry McKinney (EOARD/London, USA)
- ◆ Rick Metzger (AFRL, USA)
- ◆ Jitu Patel (Dstl, UK; TTCP Representative)
- ◆ Michal Pěchouček (Czech Technical University in Prague, Czech Republic)
- ◆ Martin Reháč (Czech Technical University in Prague, Czech Republic)
- ◆ Tony Rathmell (DSTL, UK)
- ◆ Akexander Smirnov (Russian Academy of Sciences, Russia)
- ◆ Dan Sofge (NRL, USA)
- ◆ Niranjana Suri (IHMC, USA)
- ◆ Austin Tate (AIAI, University of Edinburgh, UK)
- ◆ Gerhard Wickler (AIAI, University of Edinburgh, UK)

# KSCO Topics

- ◆ Innovative theory and techniques for formation of coalitions and similar “virtual organizations”
- ◆ Requirements for knowledge-based coalition planning and operations
- ◆ Knowledge-based approaches to command and control
- ◆ Knowledge-based approaches to coalition logistics
- ◆ Knowledge-based approaches to inter-agency and domestic operations
- ◆ Knowledge-based approaches to safety and security operations
- ◆ Knowledge-based decision support
- ◆ Coalition and inter-agencies modelling
- ◆ Applications and requirements for knowledge-based coalition planning
- ◆ Knowledge-based approaches to Operations-Other-Than-War
- ◆ Multi-agent systems and the concept of agency in coalitions
- ◆ Tools and techniques for knowledge-based simulation and modelling of coalition operations
- ◆ Security and maintenance of private information or knowledge in coalition operations
- ◆ Autonomous vs. centrally managed coalition operations
- ◆ Mobility, agile and autonomous computing in coalition operation
- ◆ Cyberspace issues for coalitions
- ◆ Complexity issues and scalability in coalition operations
- ◆ Cross-cultural issues in coalition operations
- ◆ Deployed systems, case studies

# TTCP

## The Technical Cooperation Program



- ◆ Australia, Canada, New Zealand, UK, USA
- ◆ TTCP C3I Group - Command, Control, Communication and Information Systems
- ◆ Technical Panel (TP4) – Dynamic Planning and Scheduling\*\*
- ◆ Created Binni Scenario
- ◆ Encouraged KSCO and Coalition Experiments
  
- ◆ <http://www.dtic.mil/ttcp/>

\*\* Previously Action Group (AG1) – Dynamic Planning and Execution.

# Binni - Gateway to the Golden Bowl of Africa

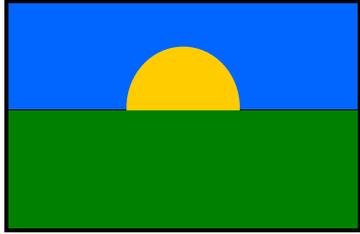


Rathmell, R.A. (1999) A Coalition Force Scenario 'Binni - Gateway to the Golden Bowl of Africa', in Proceedings of the International Workshop on Knowledge-Based Planning for Coalition Forces, (ed. Tate, A.) pp. 115-125, Edinburgh, Scotland, 10th-11th May 1999.



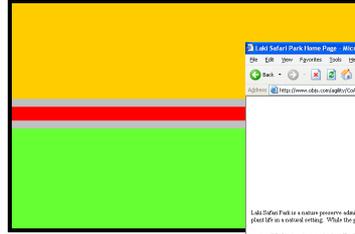
# Binni Maps, Flags & Web Sites

Binni

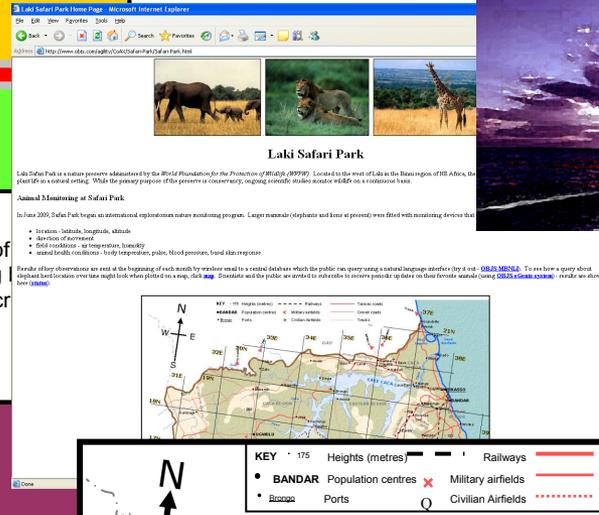


Represents the hopes of the Binni Founding Fathers that the Sun will rise and set in a cloudless sky over a lush and prosperous landscape.

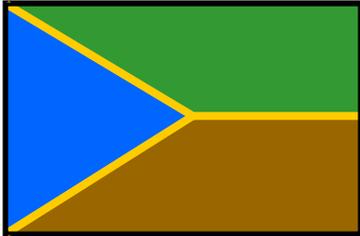
Gao



Reflects the anguish of with nature alternating plenty divided by the of tribal conflict.

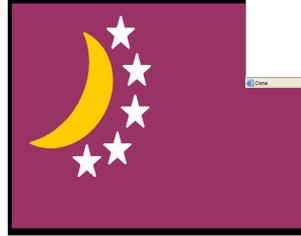


Agadez

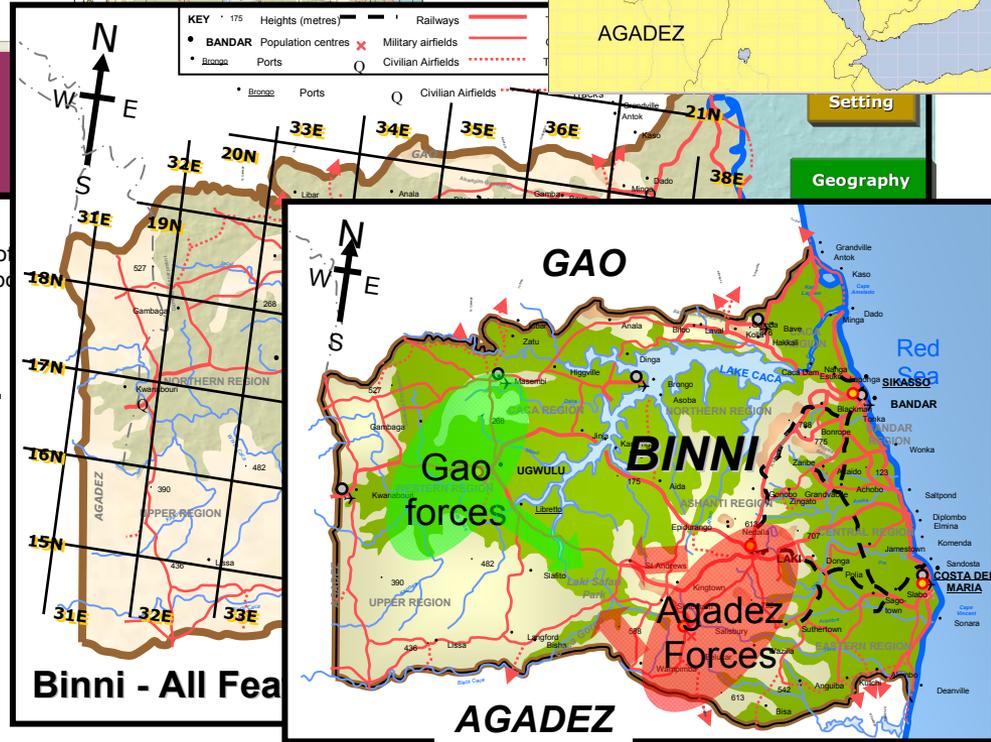


Represents the union of Mountain (blue), Upland (green) and Lowland (brown) peoples of Agadez each maintaining their independence yet united against all opponents.

Arabello



Represents the five fiefdoms of under a sultan of wealth and power.



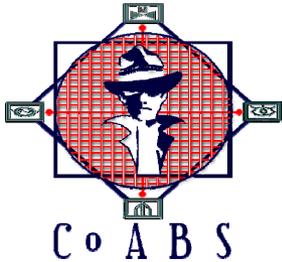
Binni Scenario Materials

**binni.org**

or via ksco.info

# Coalition Experiments

- ◆ Coalition Logistics 1, 2000 – San Diego, CA, US
- ◆ Coalition Logistics 2, 2000 – Malvern, UK
- ◆ CoAX Binni 2000 – Malvern, UK
- ◆ CoAX Binni 2001 – Malvern, UK
- ◆ CoAX Binni 2002 – Newport, RI, USA
- ◆ Coalition Search and Rescue, Binni, 2003-4
- ◆ Collaborative Operations for Personnel Recovery, Tunisia, 2004-2007



# CoAX – Coalition Agents eXperiment

**AIAI, BBN, CMU, Dartmouth, DSTO, GITI,  
Lockheed Martin ATL, NRL, Potomac Inst., U.Maryland,  
U.Michigan, QinetiQ, UT-Austin, UWF/IHMC**

**Support from AFRL, ARL, Boeing, DRDC, DSTL, ISX, MITRE,  
MIT Sloan, NWDC, OBJS, Schafer, Stanford, TTCP, USC/ISI, USPACOM**

**<http://www.aiai.ed.ac.uk/project/coax/>**



DEFENCE  
SCIENCE & TECHNOLOGY



MITRE

QinetiQ



[dstl]



BBN  
TECHNOLOGIES

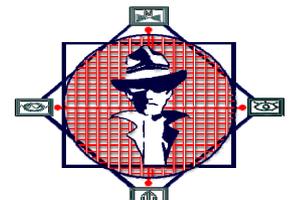
A Verizon Company



Global InfoTek, Inc.



Object Services and Consulting, Inc.



CoABS  
KSCO Community - 10

KSCO

Schafer

# CoAX Technology Contributions

- AIAI's I-X Task, Process and Event Panel Technology
- BBN Technologies MPS - Mixed-Initiative Planning and Interaction Agents, Dynamic Agent Information Coordination Protocols, Airlift Mission Planning System Agent.
- CMU's Retsina Grid Agent Communications Visualisation and DAML-S Matchmaker. See here for more details.
- DSTO's Future Operations Centre Analysis Laboratory (FOCAL) and Logistics Planning using the ATTITUDE multi-agent architecture.
- Dartmouth College's Field-observation System and Mobile Agents for Medical Monitoring
- GITI/ISX CoABS Program Grid Infrastructure
- Lockheed Martin ATL's EMAA mobile agent technology, CAST information management agents, and I2AT agent development toolkit
- Michigan's Multilevel Coordination Agent
- MIT's Robustness Service
- NRL's Intelligent Agents for GCCS-M
- OBJS's eGents E-mail Agents and AgentGram
- QinetiQ's Decision Desktop and Master Battle Planner
- Stanford's Market Mechanisms Technology
- UMD's IMPACT agents for reasoning with probabilistic temporal information
- UTexas at Austin's Sensible Agent technology - Trust Evaluation and Organization Adaptation
- USC/ISI's Ariadne Project
- UWF/IHMC and Boeing's KAoS Technology
- UWF/IHMC NOMADS Technology

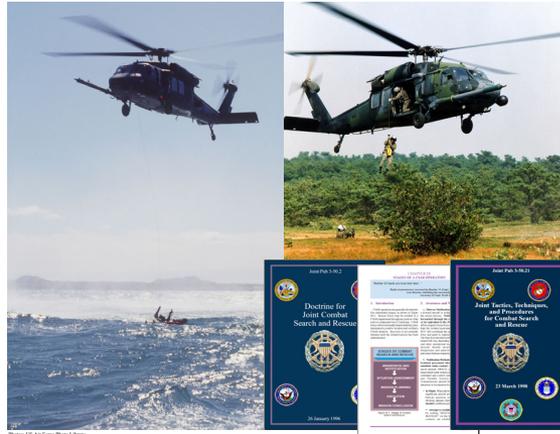


# Intelligent Agents for Coalition Search and Rescue

A.Tate, J.Dalton, C.Siebra & S.Aitken – AIAI, Edinburgh  
 J.Bradshaw & A.Uszok – IHMC, Pensacola, Florida

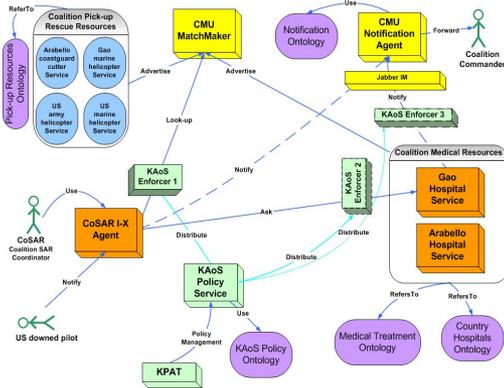
## Description

- To study and develop a demonstrator for Task Support in a realistic Coalition Search and Rescue scenario
- To show the value of linking research at AIAI work on I-X Task Support with IHMC work on KAOs Agent Policy and Domain Services - to develop the I-K-C tool - Workflow Planner utilizing Policy feedback
- OWL descriptions of country infrastructure
- OWL-S descriptions of agents and services
- Feedback to the OWL-S development community are being provided
- Input to standards efforts via W3C SWS-IG

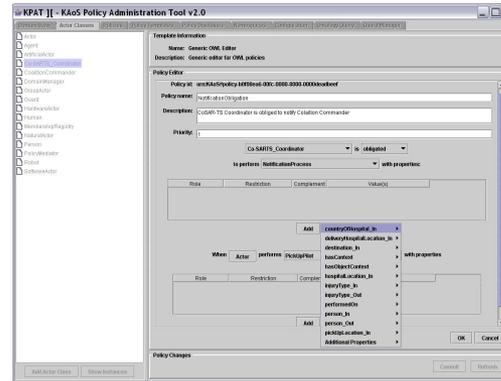


## Results

- Direct OWL file processing from I-X of BBN SONAT ENP database via HP Jena Toolkit
- SOAP access to SAR Resources described in OWL-S from KAOs and I-X via CMU Matchmaker
- Integration with CMU Intelligent Notification Agents
- Declarative representation and reasoning about all KAOs policy and domain information in OWL
- Complexities of coalition organization represented in KAOs domains
- KAOs policy-governed access to Semantic Web information and services
- Use of KAOs to dynamically determine I-X agent and human relationships (subordinates, superiors)



CoSAR-TS Demo Components



KAOs Policy and Domain Services



I-X Task Support Tools

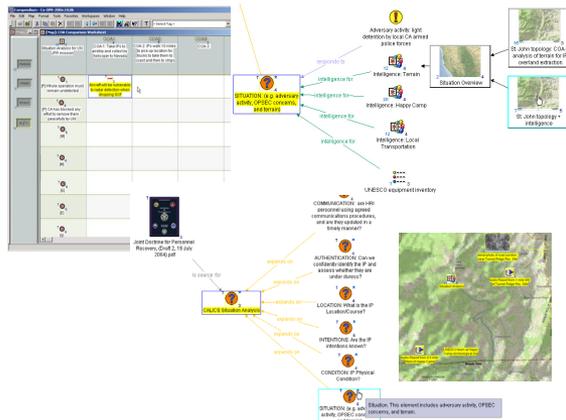
<http://www.aiai.ed.ac.uk/project/cosar-ts/>

# Co-OPR

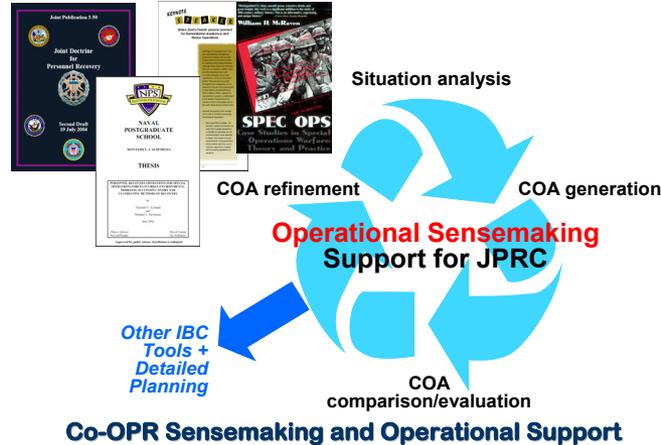
## Collaborative Operations for Personnel Recovery

### Compendium:

- Compendium supports working in known situations with semiformal templates, but in unforeseen situations still offers argument mapping and hypermedia linking
- Provide representational support in the form of linked, interactive COA wargame analysis and comparison worksheets based on the worksheets currently used
- Bring to bear JPR doctrinal issue templates for consideration, and capture discussions and decision rationale as dialogue maps
- Integrate input from wider Coalition Task Force members (e.g. PMESII analysts critiquing COA worksheets)
- Share data in the form of interactive visualization (in the form of Compendium "maps") published to the local web server
- All of the above are interlinked within Compendium, creating a coalition memory resource



Compendium Collaborative Sensemaking



Co-OPR Sensemaking and Operational Support

### Co-OPR Tools:

- Co-OPR provides collaborative sensemaking, planning and execution tools
- Sharing of issues, activity options, constraints and annotations via the <I-N-C-A> ontology
- Compendium and I-X are both *Issue-based*
  - Compendium can pass I-X issues for formal analysis (e.g. what are the available methods of transport under these conditions?)
  - I-X can pass back candidate options and fixes for inclusion in Compendium issue maps after validating them against the constraints of the problem
- We envisage their delivery to productive use via a Personnel Recovery (Experimental) Starter Pack

### I-X/I-Plan:

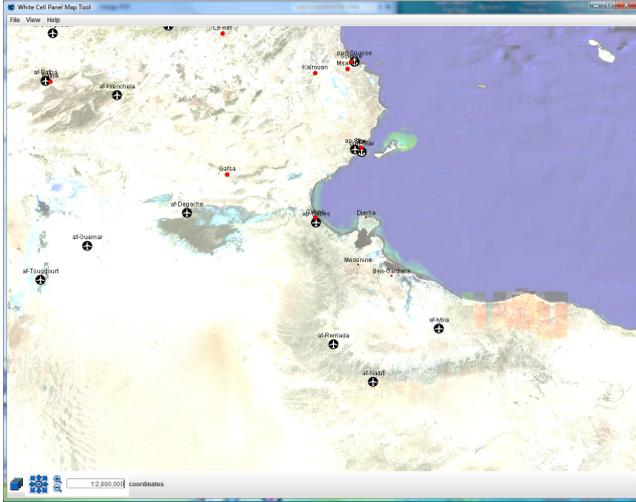
- I-X supports working with processes and plans when information needs overlap with more structured SOP knowledge
- Uses SOP knowledge base if available, but can provide status of issue, activities, constraints and reporting even with partial or little knowledge
- Works with informal messaging and/or policy-managed communications simultaneously
- Ability to deal with multiple options (COAs)
- Support for initial COA elaboration
- Support for issue handling and problem fixes at plan time in COAs
- Support for plan repair in the face of plan execution failures
- Share plans in simple text form published to the local web server



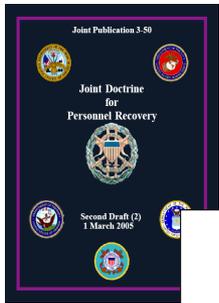
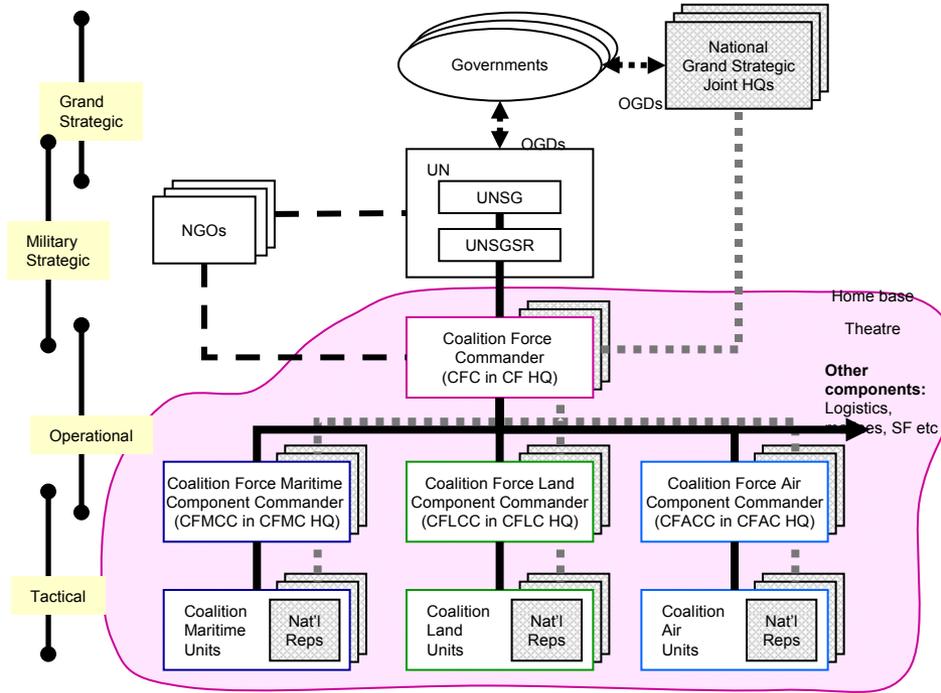
I-X/I-Plan Collaborative Operations Support

# Co-OPR2

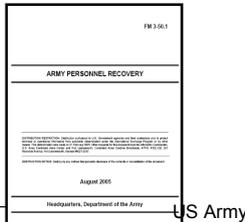
## Collaborative Operations for Personnel Recovery – Search and Rescue Training Exercise Support – Tunisia



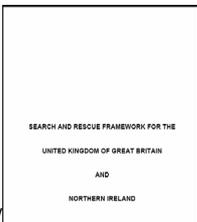
### Tunisia SAR Training Scenrio



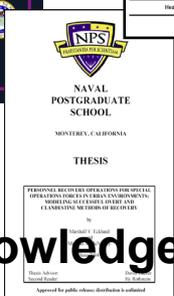
US JP



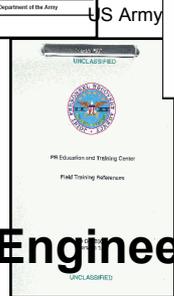
US Army



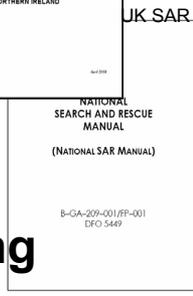
UK SAR



US Navy



US JPRA PRETC



Canada SAR

### SAR Knowledge Engineering

### Multinational and Multi-agency

# KSCO Virtual Collaboration Environment

<http://openvce.net/kSCO>

**OpenVCE**  
... open virtual collaboration environment

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**KSCO Group** View Edit Outline Revisions Track

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**KSCO Virtual Collaboration Environment**

- Wiki: <http://openvce.net/wiki/KSCO>
- Main Web Site: <http://kSCO.info/>
- Twitter Tag: #kSCO

Previous conference: 21-23 September 2010, Vancouver, BC, Canada. See <http://kSCO.info/kSCO-2010.html>

Next conference: 15-17 February 2012, Pensacola, Florida, USA. See <http://kSCO.info/kSCO-2012.html> (and <http://openvce.net/kSCO-2012>)

VW Platform	Location	URL	Launcher
Second Life	KSCO Expo Pavilion	<a href="http://slurl.com/secondlife/VCE/193/233/23/">http://slurl.com/secondlife/VCE/193/233/23/</a>	<a href="#">teleport now</a>

**KSCO-2010 Papers and Presentations Available Online**  
October 21, 2010 - 15:30 — Austin Tate  
All KSCO-2010 papers and presentations up now at <http://kSCO.info/kSCO-2010.html>

**KSCO Expo Area in Second Life**  
September 30, 2010 - 20:07 — Austin Tate

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KSCO Group

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- Create Group post
- Invite friend
- 97 members
- Manager: Austin Tate
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Event calendar

Month	Day	Event		
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6	7	8	9	10
11	12	13	14	15
16	17	18	19	20
21	22	23	24	25
26	27	28	29	30

Image gallery



# KSCO Further Information and Involvement

- ◆ KSCO, Binni, CoAX materials and documentation:
  - ◆ <http://binni.org>
  - ◆ <http://ksco.info>
  - ◆ <http://www.aiai.ed.ac.uk/project/coax/>
- ◆ KSCO Virtual Collaboration Environment
  - ◆ <http://openvce.net/ksco>
- ◆ We encourage your participation...
  - ◆ In addressing key coalition and technical drivers
  - ◆ In seeking operational opportunities
  - ◆ In creating collaborative projects
  - ◆ In future experiments and integrated technology demonstrations