<I-N-C-A> and the I-Room
Cut down Version of "Train for Success" Talk – 13-May-2010

An intelligent environment which acts as a knowledge aid to support collaborative operations rooms and team meeting or training spaces

OpenVCE and CoSAR Projects
**Open Virtual Collaboration Environment**

US Army Research Lab HRED
USJFCOM/JPRC
AIAI, University of Edinburgh
Carnegie Mellon University
University of Virginia
Open University
IHMC, University of West Florida
Perigean Technologies
EADS Innovation/Airbus Industries
Glenkier Distilleries
Metaforic/Slam Games

Austin Tate
AIAI, Informatics, University of Edinburgh

https://blog.inf.ed.ac.uk/atate/i-room/

Tate, A., Chen-Burger, Y-H., Dalton, J., Potter, S., Richardson, D., Stader, J., Wickler, G., Bankier, I., Walton, C. and Williams, P.G. (2010) I-Room: A Virtual Space for Intelligent Interaction, IEEE Intelligent Systems, Vol. 25, No. 4, pp 62-71, July-August 2010, IEEE Computer Society.

I-Room: A Virtual Space for Intelligent Interaction

Operations Centres, Brainstorming Spaces, Team Meeting Rooms, Training and Review Areas
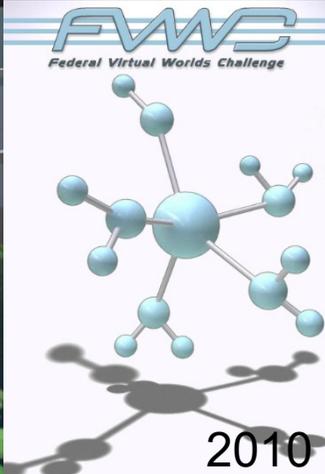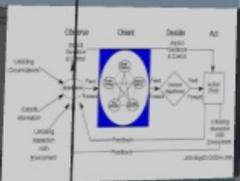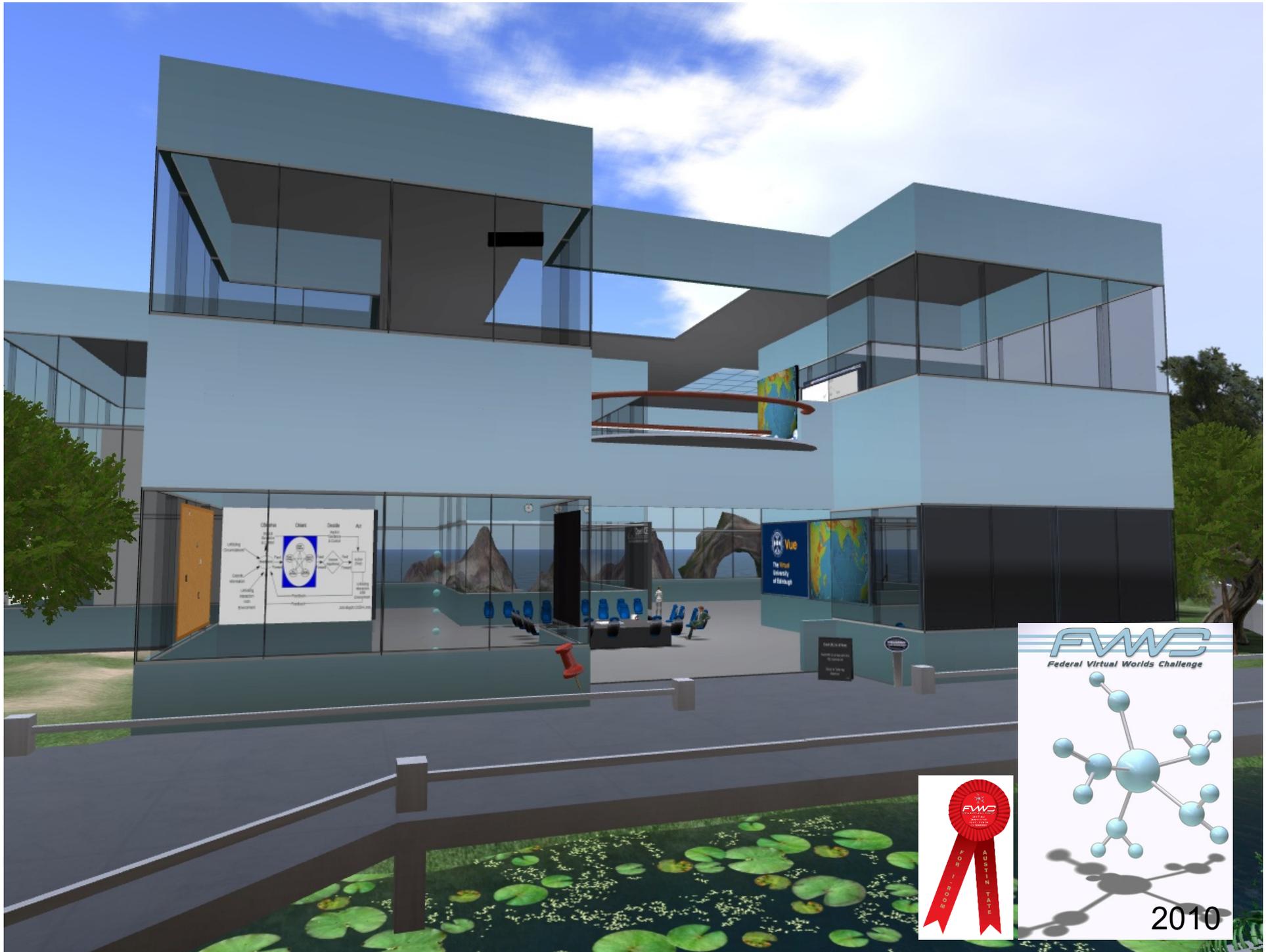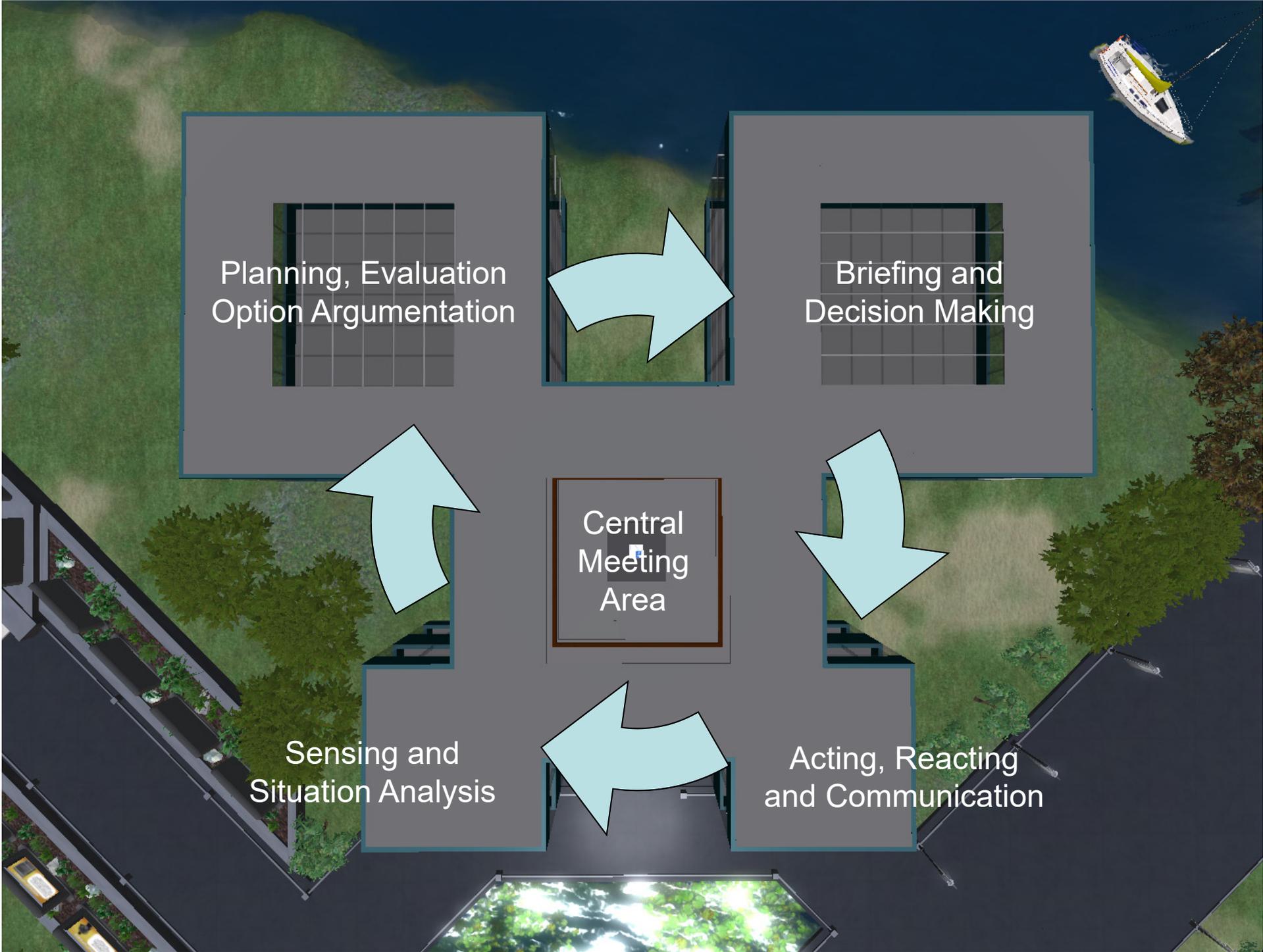
<I-N-C-A> Framework

- Common conceptual basis for sharing information on processes and process products
- Shared, intelligible to humans and machines, easily communicated, formal or informal and extendible
- Set of restrictions on things of interest:
  - I   Issues   e.g. what to do? How to do it?
  - N   Nodes   e.g. include activities or product parts
  - C   Constraints   e.g. state, time, spatial, resource, …
  - A   Annotations   e.g. rationale, provenance, reports, …
- Shared collaborative processes to manipulate these:
  - Issue-based sense-making (e.g. gIBIS, 7 issue types)
  - Activity Planning and Execution (e.g. mixed-initiative planning)
  - Constraint Satisfaction (e.g. AI and OR methods, simulation)
  - Note making, rationale capture (QOC), logging, reporting, etc.
- Maintain state of current status, models and knowledge
- I-X Process Panels (I-P^2) use representation and reasoning together with state to present current, context sensitive, options for action

Mixed-initiative collaboration model of "mutually constraining things"

I-P² aim is a Planning, Workflow and Task Messaging "Catch All"

- Can take ANY requirement to:
  - Handle an issue
  - Perform an activity
  - Respect a constraint
  - Note an annotation
- Deals with these via:
  - Manual activity
  - Internal capabilities
  - External capabilities
  - Reroute or delegate to other panels or agents
  - Plan and execute a composite of these capabilities (I-Plan)
- Receives reports and interprets them to:
  - Understand current status of issues, activities and constraints
  - Understand current world state, especially status of process products
  - Support the modification of the plan
  - Explain or help users control the situation
- Copes with partial knowledge of processes and organizations

I-Room: Mixed-initiative Collaboration

Truly distributed mixed initiative collaboration and task support is the focus of the I-Room, allowing for the following tasks:

- situation monitoring
- sense-making
- analysis and simulation
- planning
- option analysis
- briefing
- decision making
- responsive enactment

I-Room: Underlying Concepts for Effective Collaboration

Underlying the use of the I-Room for collaboration and its ability to link human participants to a range of computational services and intelligent systems support are the following concepts:

- A mixed-initiative collaborative model for refining and constraining processes and products;
- Principled communication based on sharing issues, activities/processes, state, event, agents, options, argumentation, rationale, presence information and reports through the <I-N-C-A> ontology;
- The use of the <I-N-C-A> ontology also for representing the products that are developed during meetings and through the collaborative process;
- The use of I-X Technology and its suite of tools to provide task support;
- The use of issue-based argumentation, through the use of the Questions-Options-Criteria (QOC) methodology and links to sense-making tools;
- The use of agent presence models as in instant messaging;
- The use of I-X "I-Space" to support awareness of agent context, status, relationships within an organisational framework, capabilities and authorities;
- The use of an "I-World" of discovery of relevant agents and services, along with their capabilities, authorities and availability;
- The use of the "Beliefs-Desires-Intentions" (BDI) model of agents and their relationship to world state, context and other agents.
- The use of external shared repositories of processes, products, media and other resources.
- These technologies, methodologies and ontologies will form the platform on which the research can be based.