User Driven Innovative Building Design

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CONTENT

- Background user driven innovative design

- Developing an innovative/creative building design system

- Virtual Innovation in Construction Method - VICMET

- Conclusions

PROJECT VIC   Virtual Innovation in Construction

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Project lead Aalborg University

http://www.vicspace.org

USER INVOLVEMENT

The *modern product end-user* is participative, creative, self organizing and community oriented.

There is a great need to investigate and develop *enhanced* methods and work processes for *end-user involvement* in the building process to meet the future *end-user needs* and to produce *better buildings*.

Buildings are *not ordinary products* like mobile phones or cars.

There are great *opportunities* for innovation in an open environment but also *challenges* caused by the *intra-organisational* setting.

The *virtual building* (VB) plays a central role when we simulate, test, evaluate and refine services during building design.

Advanced ICT tools enhance our possibilities for effective, efficient and user-friendly *collaboration* in both physical and virtual environments.

End-user become a *prosumer*, producer and consumer.

VIRTUAL INNOVATION IN CONSTRUCTION - VIC

The goal is to create an ICT supported methodology *VICMET* to involve building end user in a creative innovation process together with building designers, to capture and formulate end-user needs and requirements on *buildings* and their functionality. An open dynamic innovation space VIC-SPACE is created with access from WWW.

- 2 parallel designs -

VIC-SPACE - Virtual Innovation in Construction
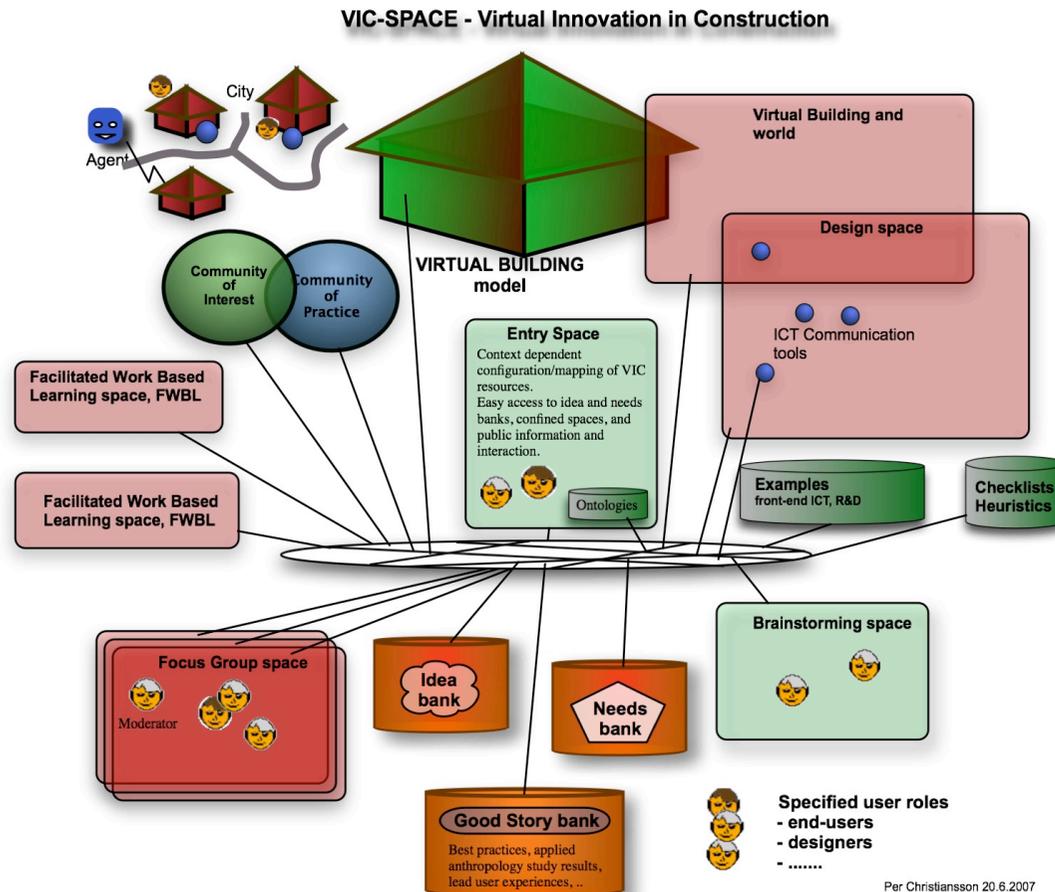
VICMET DEVELOPMENT
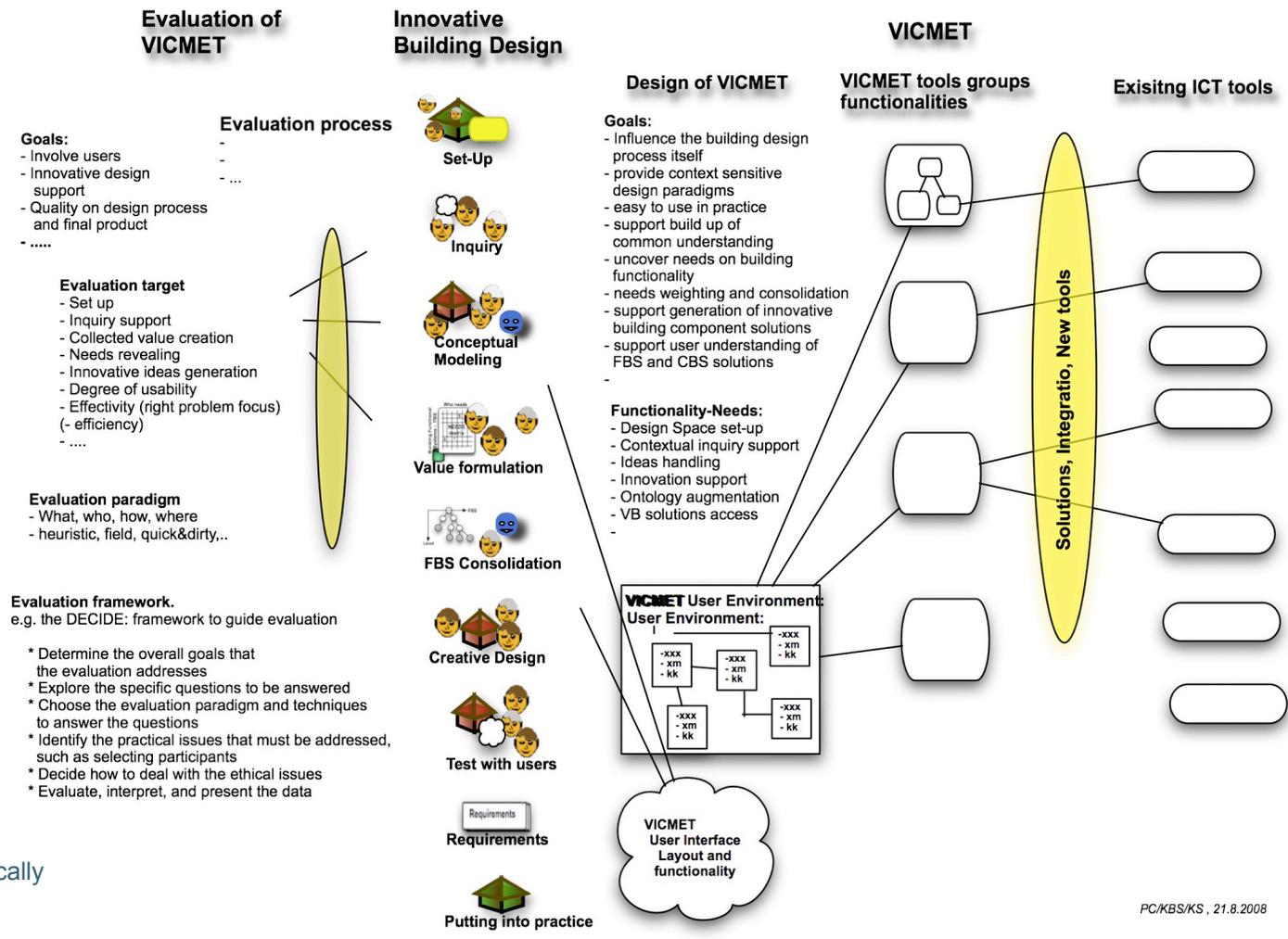
End users of VICMET are typically

- building inhabitants,
- external service providers,
- operation and maintenance personnel,
- building administration

Two parallel processes

VIC CONFLUENCE

The Confluence enterprise wiki is used for project collaboration support and documentation.
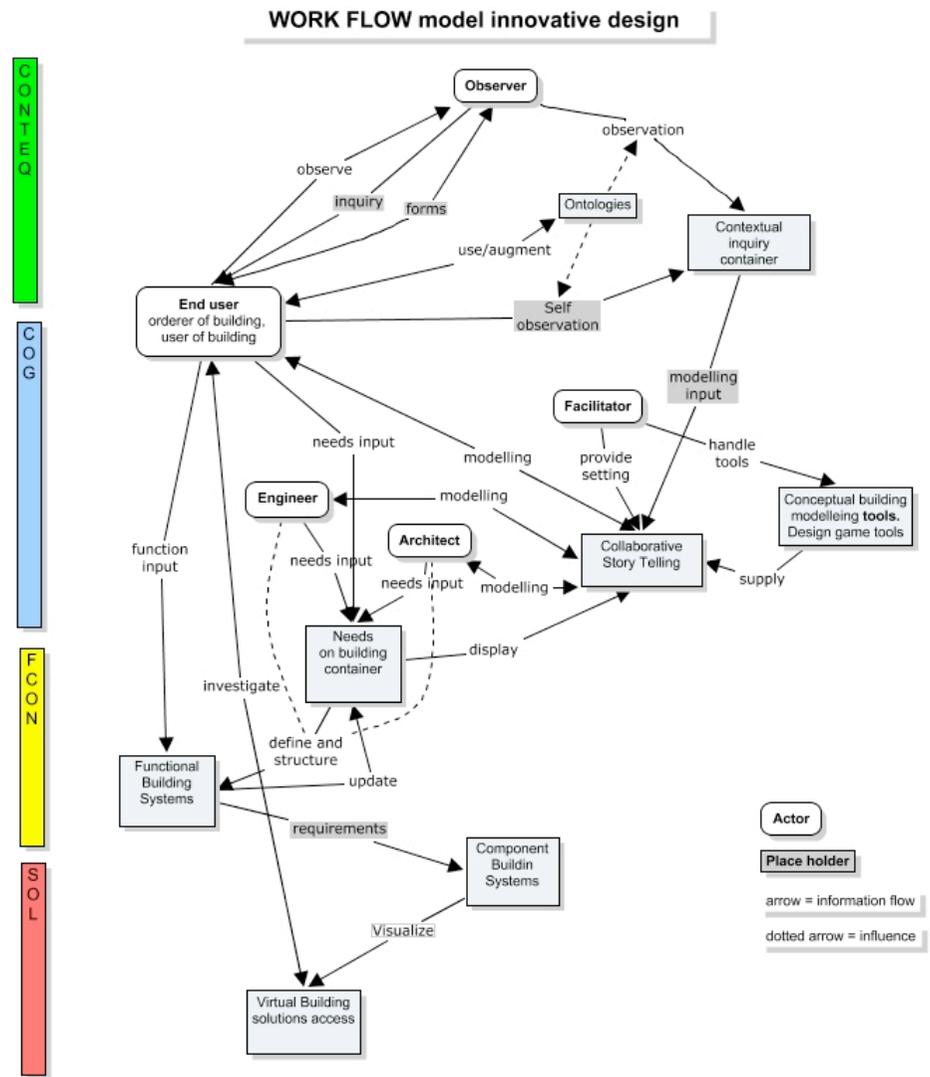
CONCEPTUAL MODELLING OF VICMET

An early work flow model of the VICMET with references to the
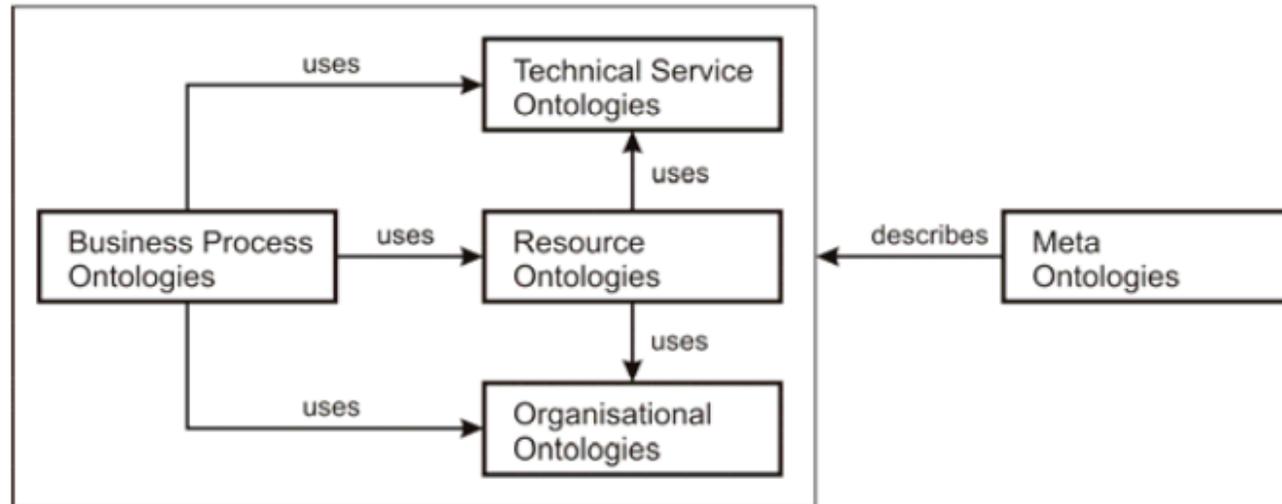
Contextual Inquiry Space (CONTEQ),

Conceptual Modeling and Game Space (COG),

FBS (Functional Building Systems) Consolidation Space (FCON).

SOL Solution Space (SOL),

WORK FLOW model innovative design

ONTOLOGIES

Business process ontologies (end-user needs, Functional Building Systems [FBS],…..)

Organizational ontologies (actor roles, company organizations and interrelations, design paradigms, building project organization….)

Resource Onotologies (VICMET tools, Component Building Systems [CBS], Virtual Building models…..)

Technical service ontologies (services enabling data communication through heterogeneous networks and also standardized use of hardware and software from different suppliers).

USER DRIVEN INNOVATION METHODS

We describe *user driven innovation* as a 'systematic approach to develop new products and services, building on investigation or adoption of users life, identity, praxis, and needs including unrevealed needs'

- Interviews and questionnaires
- Focus groups
- Self observation
- Story telling
- Scenario writing
- Lead user involvement
- Contextual inquiry
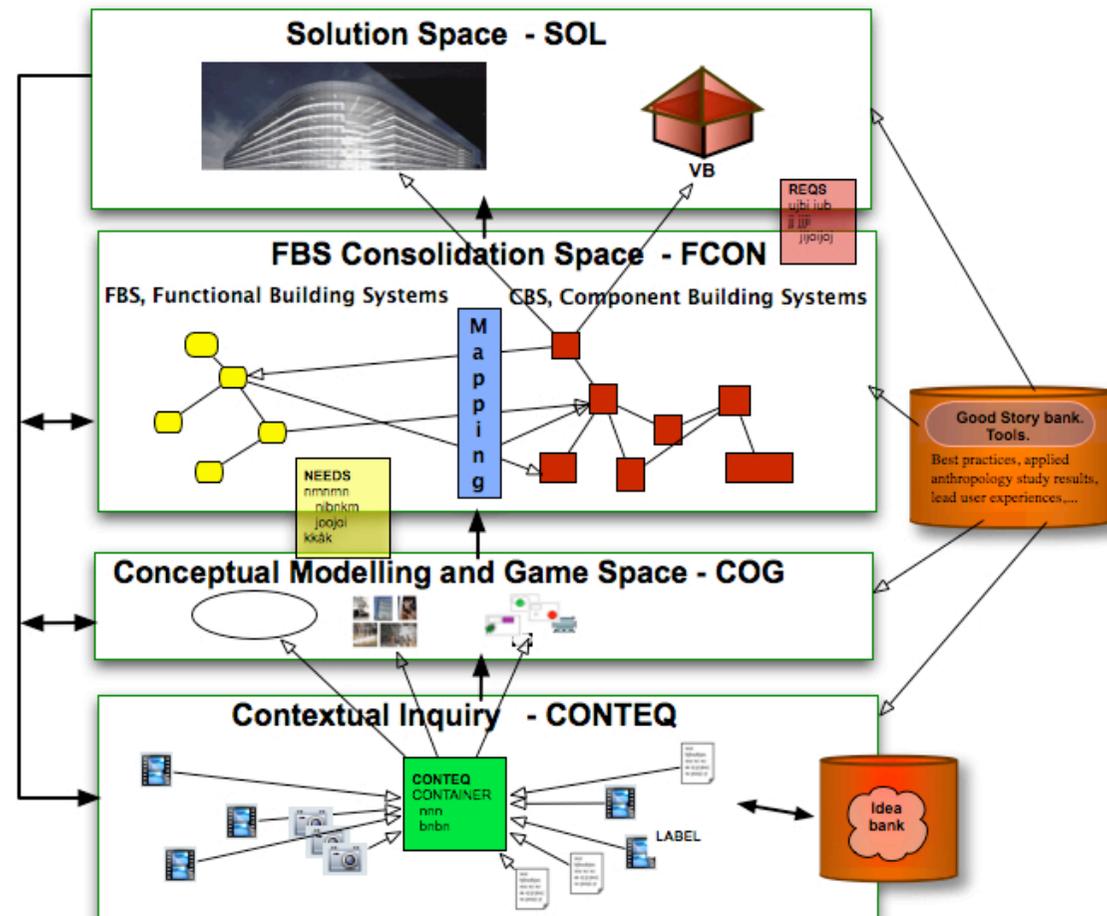- Commented VB model walkthroughs
- ....

Functional and Component Building Systems
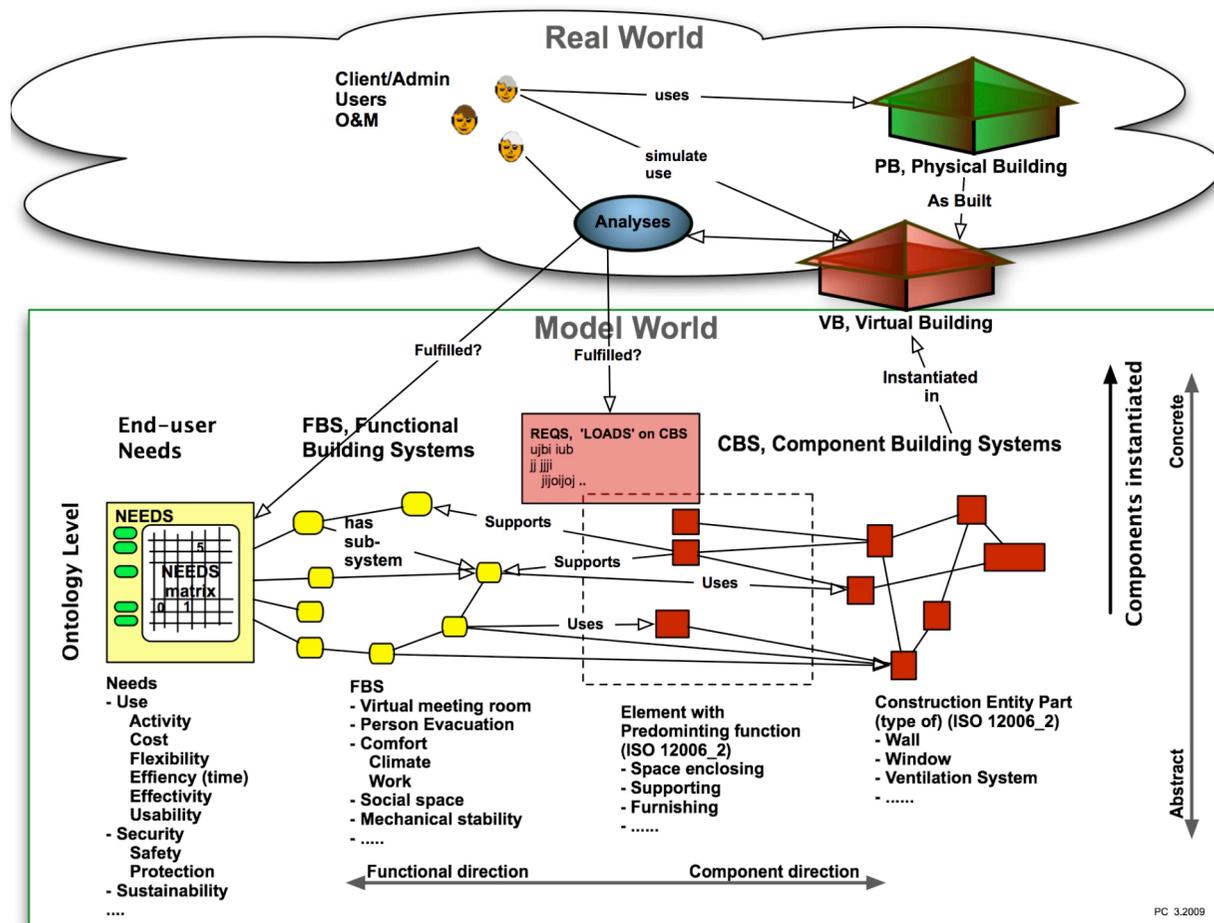
Formalisation of the building design process. From Christiansson P, Svidt K, Sørensen K (2009) "Future Integrated Design Environments", *ITcon Vol. 14, Special Issue Next Generation Construction IT:* Technology Foresight, Future Studies, Roadmapping, and Scenario Planning , pg. 445-460, http://www.itcon.org/2009/29

VICMET DESIGN SPACES

1. Formulate Design/Innovation *domain*
2. *Set up* design theme. Identify/allocate resources such as Idea bank, Best practice, Contextual Inquiry Bank
3. *Contextual Inquiry* (in **CONTEQ**) Where, how, who, when, methods support
4. *Conceptual Modeling* and Gaming (in **COG**) Modeling support (Contextual design methodology). Needs capture. Functional Building Systems specification. Creative/Innovative design.
5. *Consolidation and Value formulation* (in COG). Collaborative Story telling. *Needs* weighing and listing.
6. *Component Building System* (in **FCON**) CBS modeling. Functional Building Systems and Component Building Systems *mapping*.
7. *Solution* (in **SOL**). 3D virtual building modeling of (alternative) solutions.
8. *Evaluation* of solutions (in **SOL**)
9. goto 3

SELF OBSERVATION
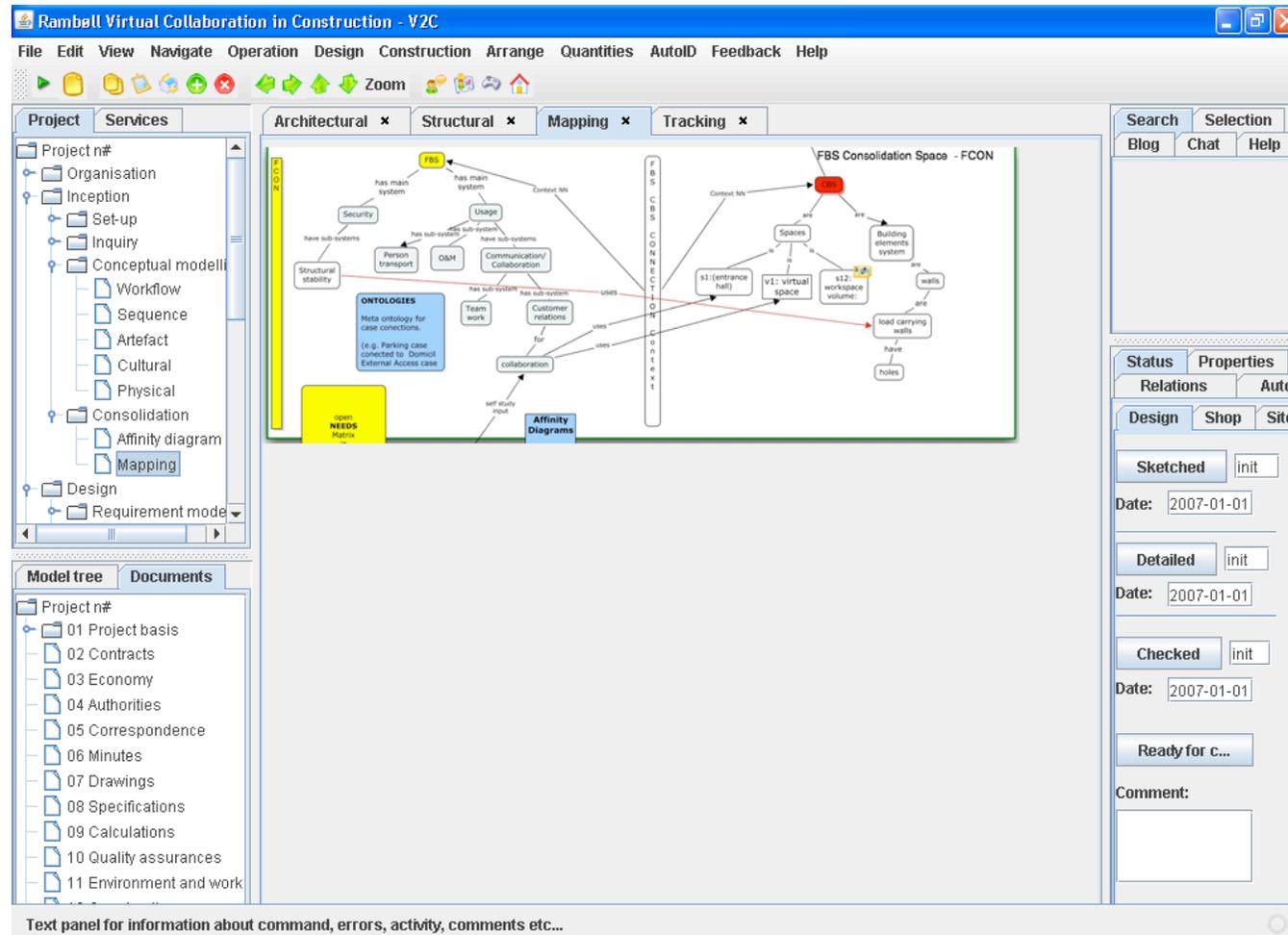

Example on used self-observation methodology. The self observations in this case are captured on an Apple iPhone where they are immediately meta-marked and then automatically uploaded and stored on flickr, http://www.flickr.com/, on the WWW.

PROTOTYPES

Prototype, where the mapping functionality from the Functional Building System to the Component Building System is illustrated in a virtual collaboration tool for construction. The prototype illustrates an implementation in a desktop application.

CONCLUSIONS

A sequential *methodology*, including better functionality on supporting ICT *tools*, to support a creative design with end-user involvement in an open innovation environment is *needed* (VICMET).

Client/end-user *needs capture* and *requirements formulation* and modeling must be further advanced.

We envision and contribute in the project to a *change of the design process*.

Ontologies and dictionaries have to be further developed especially on *business* and *meta* levels to secure effective systems interoperability, and information handling.

Functional Building Systems have to be categorized.

Great potentials to develop better products through higher ens user involvement.

END

http://it.civil.aau.dk

http://www.vicspace.org