

# APPENDIX G

## VISUAL TOOLS

## Visual tools

One initiative of the UIA has been to seek ways of providing visual tools to enable the organizational community to map the complex networked environment in which bodies function -- as a guide to coalition and partnership formation and improved decision-making. Diversitas would continue to work with third-parties to develop user-friendly, functional software embodying contextual meaning through “sustaining images to heal the .org community”.

In the on-line form of these databases (<http://www.uia.org/data.htm>), users already have access to several different kinds of on-going experiment that would be developed as a service to facilitate community building.

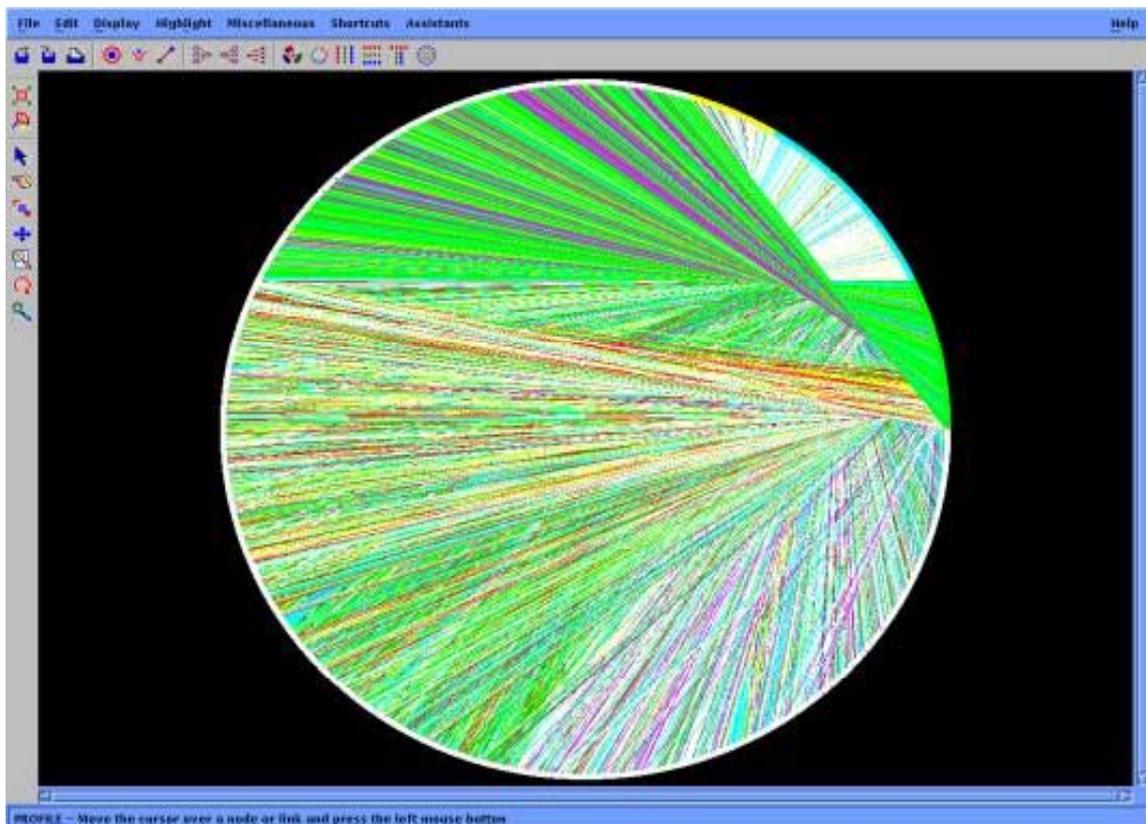
**Network mapping facility:** Relationships are presented as lines between nodes. The nodes provide hyperlink access to text profiles or further maps. All the displays are generated directly in response to user request and are self-organizing. The highly dynamic map displays can be radically manipulated and reconfigured by the user. The display technique is based on a Java applet developed by Gerald de Jong ([Beautiful Code BV](#)). A detailed explanation is available at (<http://www.uia.org/dyna/mapexp.htm>). See also:

- Selected generated network images (jpg, svg, and their database links)
- Gallery of [pre-made information maps](#).
- Selected [live examples](#) (logon required).
- [Multimedia products](#).

A number of the displays below are also clickable – bandwidth and plug-ins, permitting.

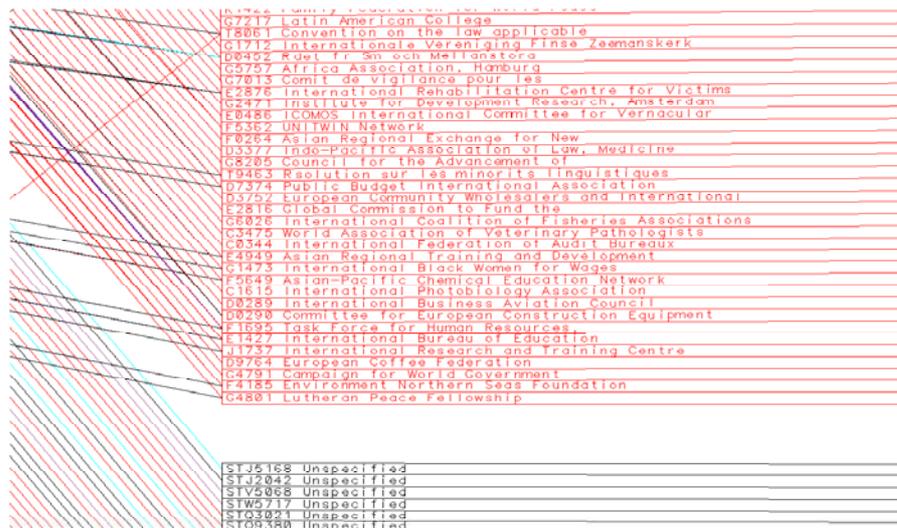
**NetMap:** Based on the assertion that humans respond to graphical patterns up to one thousand times faster than numeric or character sets, NetMap takes data from one or more sources, identifies any associations between data elements, and turns the entire data set into a colour coded graphical ‘map’ of data interrelationships across a circle. Each entity, like an organization, is a point on the circumference. This allows the user to analyse visual representations of the data relationships starting with a holistic, yet drillable view.

Netmap representation of links between all international organizations



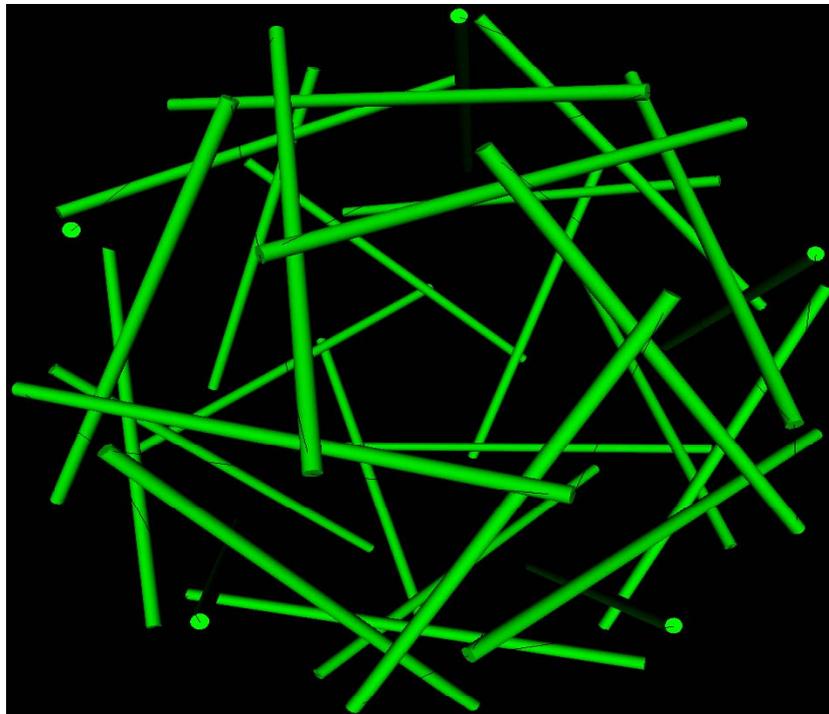
More information about this extraordinary tool is available at <http://www.netmapsolutions.com/>. Click [here](#) to see results of NetMap's work on some of the UIA's databases.

**Drill down version of Netmap representation of selected links between international organizations (on circumference)**

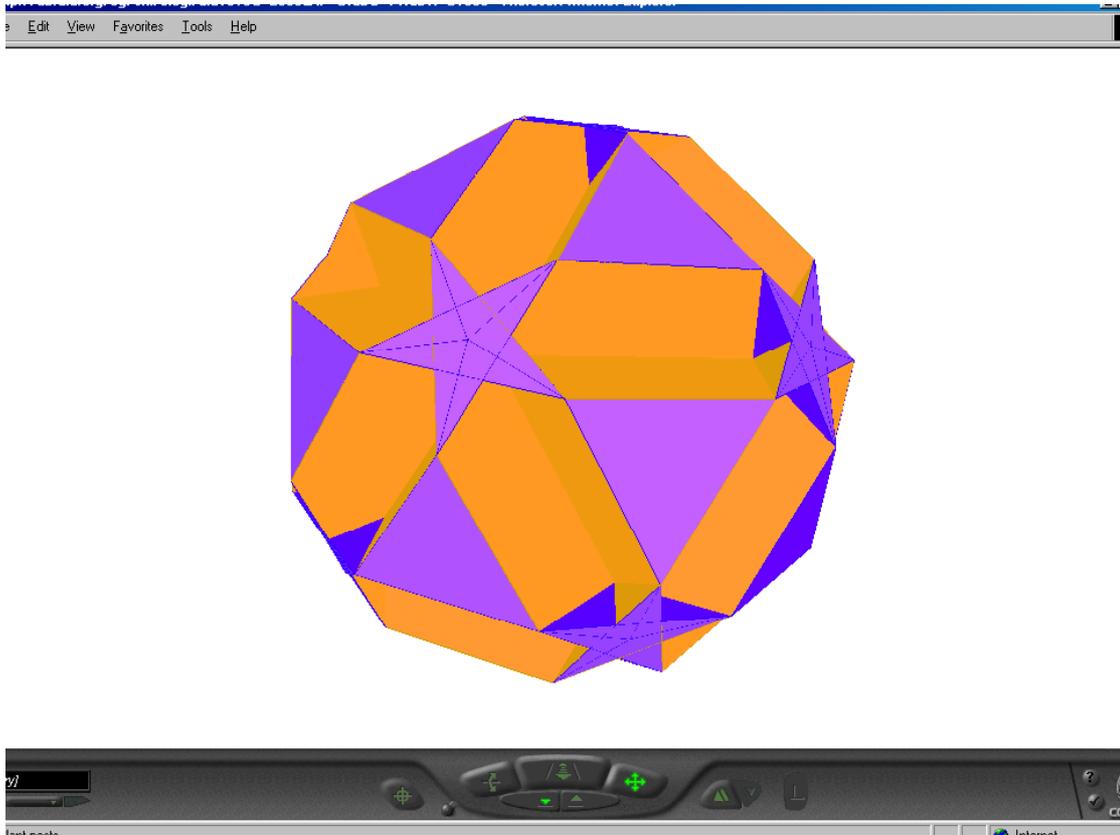


**Tensegrity:** This experiment is an effort to make use of a tensegrity structure displayed through virtual reality (viewable through freely available browser plug-ins). Individual entities (eg problems or strategies) are associated with the struts in such a structure. The aim is to produce a coherent configuration that a user can rotate and explore using the virtual reality plug-in navigational tools. The structure can be turned, zoomed into, etc. In principle clicking on an active strut with which a problem (say) is associated will bring up the corresponding text profile. A commentary on the value of this technique is given elsewhere under the title *Configuring strategic dilemmas in inter-sectoral dialogue* (<http://www.uia.org/transfor/a11.htm>)

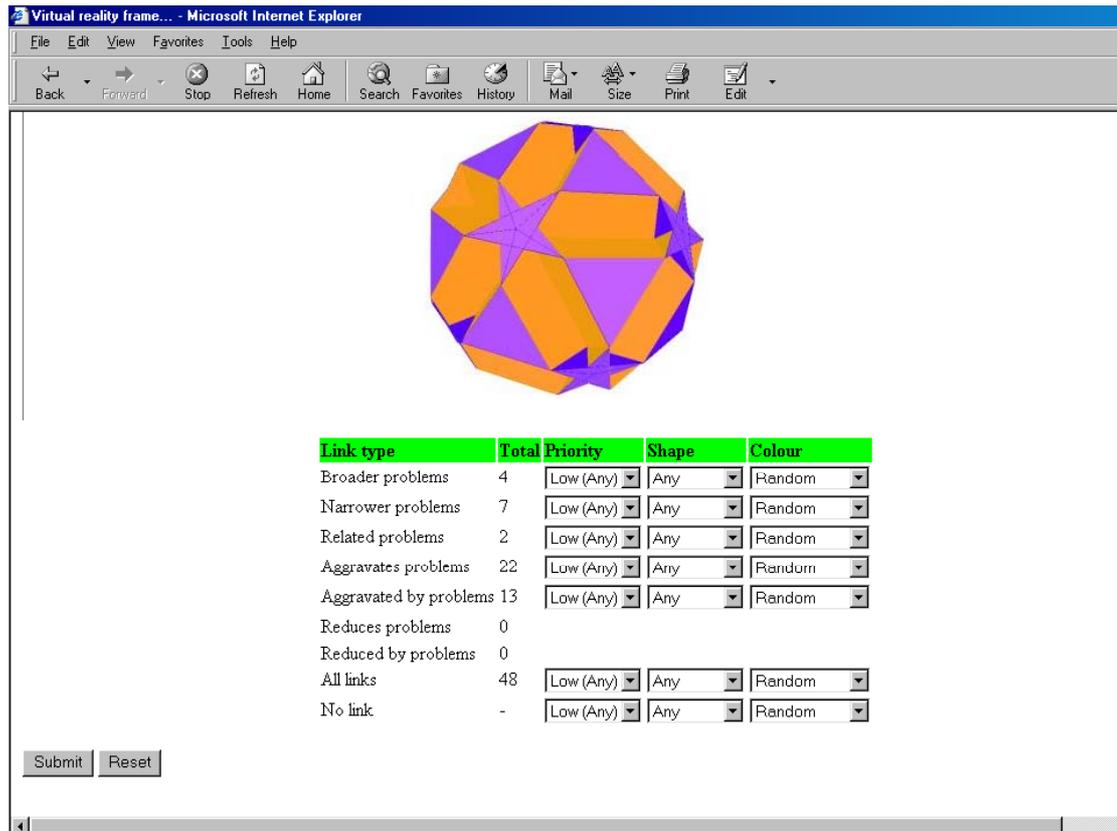
**Tensegrity VRML used as a generated template to configure organizations in collaboration and opposition within a larger community**



**Polyhedra-1:** Through this experiment, software selects a polyhedron onto which relationships from a problem (say) are projected. Each facet becomes the interface to another problem. The polyhedron as a whole is thus a configuration of facets representing the problem as it interfaces with related problems. Clicking on the facets should bring up the corresponding text profile. This experiment is based on a similar justification to that based on tensegrity. In the current version, the selection of polyhedron is crude and the colouring is random. The virtual reality browser enables the user to manipulate and explore the structure.



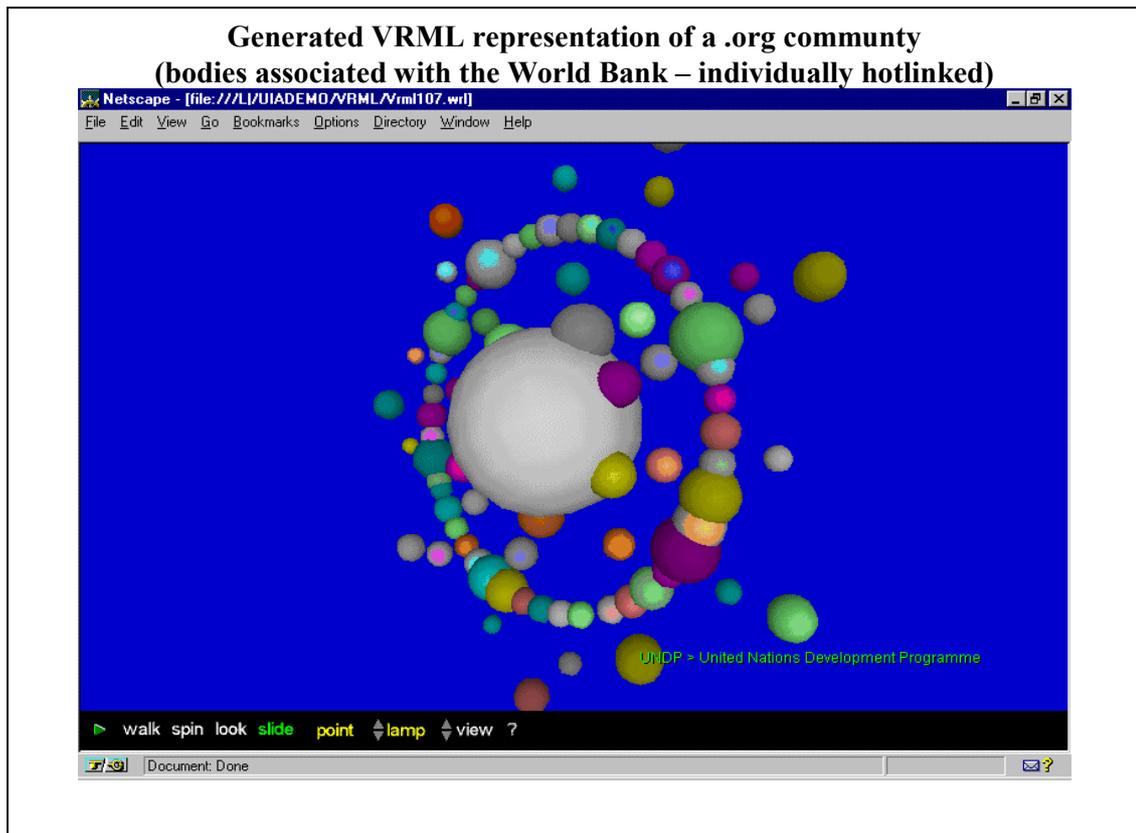
**Polyhedra-2:** A development of the previous experiment in which the user can endeavour to control the way in which the software selects and designs the polyhedron. The user is free to include or exclude particular types of relationship and to colour the corresponding facets differently, as well as selecting a preferred shape. Again clicking on a facet should bring up the text profile. The virtual reality browser enables the user to manipulate and explore the structure.



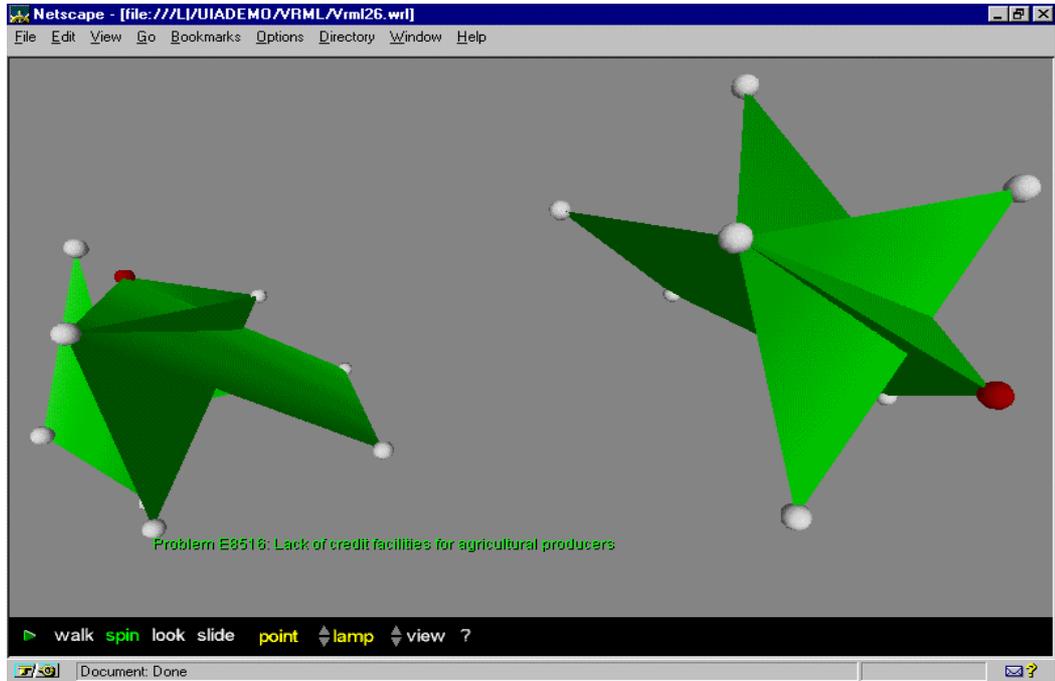
Link type	Total	Priority	Shape	Colour
Broader problems	4	Low (Any) ▾	Any ▾	Random ▾
Narrower problems	7	Low (Any) ▾	Any ▾	Random ▾
Related problems	2	Low (Any) ▾	Any ▾	Random ▾
Aggravates problems	22	Low (Any) ▾	Any ▾	Random ▾
Aggravated by problems	13	Low (Any) ▾	Any ▾	Random ▾
Reduces problems	0			
Reduced by problems	0			
All links	48	Low (Any) ▾	Any ▾	Random ▾
No link	-	Low (Any) ▾	Any ▾	Random ▾

Submit Reset

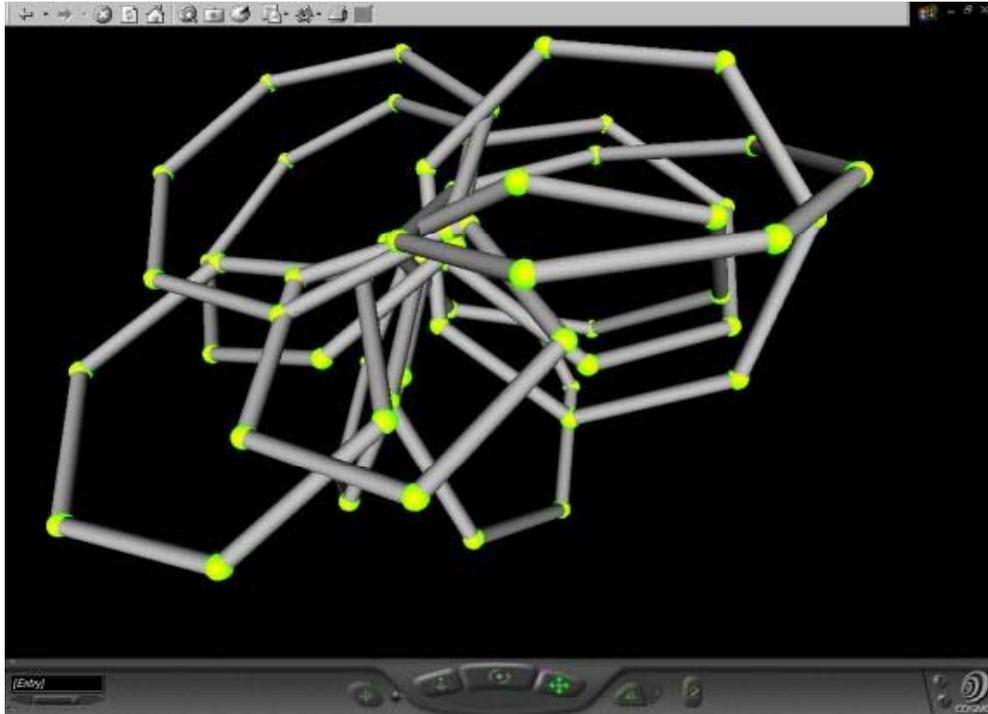
**Virtual reality:** A selection of earlier experiments using virtual reality to display complexes of problems and organizations is presented elsewhere (<http://www.uia.org/uiademo/vrml/vrml1demo.htm>). These structures were generated in 1997 as static pages (in contrast to the dynamic generation of structures above). Continued experiments with some of the visual metaphors are planned.



## Generated VRML representation of complexes of interlocking problems targetted by networks of organizations (individually hotlinked)



**Generated VRML representation of interrelated problem loops of concern to organizations (individually hotlinked)**





**Scalable vector graphics (SVG)** : This new display technology, currently integrated into the UIA registry service [[examples](#)], is likely to prove extremely valuable for generating, displaying, and navigating complex communities of organizations, problems and strategies -- as an aid to partnership and coalition formation, and community building. It is especially useful because detailed displays can be printed poster or billboard size without loss of quality, notably in support of international conference dialogue processes. (The current constraint on the use of this technology is bandwidth and the efficiency of browser plug-ins).

It must be stressed that these visual experiments made available over the web by the UIA as a registry services are designed to find ways of representing, comprehending and exploring complexity – as templates or scaffolding for new forms of coalition building. The purpose is to provide sophisticated techniques which generate structures that are visually interesting in their own right but raise interesting questions about what they are able to represent and how they might be developed. The user is deliberately given as much control as possible in exploring these structures creatively. The intention is also to make this process equally as interesting to academic researchers, students, the media, and to those concerned with formulating more appropriate policies in a complex society.

Progress in developing these facilities is described in a separate note: [Interactive Hyperlink Map: Auto-generated, Self-organizing Link Visualization](#) (<http://www.uia.org/dyna/mapexp.htm>). For further discussion see: *Envisaging the art of navigating conceptual complexity: in search of software combining artistic and conceptual insights* (<http://www.uia.org/uiadocs/artnavig.htm>). Current experiments are enabling users to generate many maps in SVG format for viewing over the web.

## Sonification

Other [experiments](#) explored the possibility of attaching simple sound files to nodes in generated maps, allowing the user to trigger them individually by mouse operations as a basis for developing an acoustic mnemonic code for structures.

An extensive [bibliography](#) (annotated) of items providing the rationale for this sonification approach is provided by the [International Community for Auditory Display](#). Selected items have been incorporated into the [references](#) to the UIA study on *Knowledge Gardening through Music: patterns of coherence for future African management as an alternative to Project Logic* (<http://www.uia.org/uiadocs/music.htm>)

The use of sound is seen as a way of enhancing the capacities of those more responsive to soundscapes than to visual or text displays. This is seen as a vital mechanism where the digital divide is compounded by illiteracy or language barriers.

### **Shifting the level of insight**

Registries tend to focus on organizational and other entities in isolation at a time when community building and initiatives depend on working with networks of bodies, using networks of strategies against networks of problems.

The UIA with funding from the European Commission, has explored methods of developing, refining and dynamically displaying the self-sustaining, interlocking loops of problems, issues and solutions as a means of shifting the level of analysis beyond seemingly isolated entities. Loop detection and other algorithms have been developed in support of visualization tools to assist mapping and navigation of complex organizational environments.

The significance of this work is that there has long been recognition of how one problem can aggravate another and of how several problems can reinforce each other. The UIA data registers many relationships between problems in complex networks. Clearly such relationships may form chains or pathways linking many problems. But hidden in the data as presented is also the existence of chains that loop back on themselves.

A loop represents a description of a chain of consequences that produces a dynamic outcome by feeding off itself (positive feedback = “vicious” or “virtuous” loops), or by controlling itself (negative feedback). Typically a feedback loop will be an important strategic issue in its own right. The purpose of detecting feedback loops is to raise the level of analysis of individual issues to a higher, systemic level – whether with respect to organizations, problems or strategies. It is a technique which has the potential to add extra meaning to basic data, particularly relevant for policy makers and others concerned with understanding the interrelationships and root causes of problems.

This initiative seeks to enhance the capacity of the organizational community in ways that are not possible by a focus on isolated organizations and their relationships.

### **Enhancing community imagination and vision**

The UIA has been actively exploring ways of integrating its registry and profiling functions with the kinds of virtual interactive environment in which imagination can be enhanced to enable the emergence of new styles of organization.

These possibilities are seen as potentially vital at a time when conventional structures have proven inadequate under many circumstances. As envisaged by Douglas Engelbart and Ivan Sutherland in the early 1970s, there is every possibility that radically different styles of virtual organization, configurations of concepts, and community may be possible with structural devices whose credibility, coherence and viability can exist only within a virtual environment.

There is much creative experiment with virtual environments. The challenge to date is that no databases are adapted to rapidly populate them to enable widespread access using web technology. The UIA data is held in ways that has already lent itself readily to such experiments with immediate payoffs for web users of its data. The significance of such work was recently acknowledged at an international symposium of AI specialists of the Global Brain Group (Brussels, 2000). Further experimentation over the web has been curtailed by lack of resources.

With the shift towards a “[semantic web](#)”, the question is whether the pathways through the .org community can be imaginatively reframed from the “information highway” metaphor into what has been termed in a UIA study as the “songlines of the noosphere” ([From information highways to songlines of the noosphere: global configuration of hypertext pathways as a prerequisite for meaningful collective transformation](#), 1998). Related possibilities envisaged by the UIA include the [Sacralization of hyperlink geometry](#) (1997). Diversitas proposes to catalyze further work in this direction with consequences in practice for the .org community