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## Appendix 3: Visualization and patterns

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### Displaying complexes of problems, strategies, values and organizations

The Union of International Associations is faced with a major challenge of how to enable people to obtain greater insight into complex networks of relationships amongst international organizations, world problems, strategies in response to them, human development and human values. The challenge is to compensate for the natural tendency to rely on focused information on urgent issues by enabling people to work with contextual information and configurations of related issues and responses to them.

New tools are required to this end. Since the 1970s the UIA has been exploring the visualization of international organization relationships – some of the early work is reprinted in Part B of this volume; more can be found at <http://laetusinpraesens.org/docs/visrel.php> – and the possibility of an *Atlas of International Relationships*. Investigation of the latter was supported for a time by the publisher of this Yearbook and by UNESCO in the early 1990s – but has only become feasible with recent software and hardware developments.

Some of the images in this volume are taken from online experiments towards enabling people to explore other ways of working with patterns of relationships of interest to them. Extensive databases are maintained on each of the sets of entities. There are (hyper)links between the entities in each set, and between entities in different sets.

In the on-line form of these databases (<http://www.uia.org/data.htm>), users have access to several different kinds of on-going experiment.

These are as follows:

**Spring network mapping facility:** In this case relationships are presented as lines between nodes. The nodes provide hyperlink access to text profiles or further maps. All the displays are generated online, in direct response to user requests, by clicking on the map logo, 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, <http://www.beautifulcode.nl>). A more extensive description is provided in Appendix 4 and at <http://www.uia.org/dyna/mapexp.htm>

**Decision Explorer:** This is a proven cognitive mapping software package for managing "soft" issues – the qualitative information that surrounds complex or uncertain situations. It allows users to capture in detail thoughts and ideas, to explore them, and gain new understanding and insight. The product was developed by academics at the universities of Bath and Strathclyde and currently by Banxia Software (<http://www.banxia.com>), in conjunction with major organizations. It now has hundreds of major international users. Previous editions of this volume have Decision Explorer images.

**NetMap:** Based on the assertion that humans respond to graphical patterns up to one thousand times faster than numeric or character sets, the NetMap software package 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. This allows the user to analyse visual representations of the data relationships starting with a holistic, yet drillable view. Previous editions of this volume have NetMap images. More information about this extraordinary visualization tool is available at <http://www.netmapsolutions.com/>

**Tensegrity:** This experiment is an effort to make use of a somewhat unique 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 being to produce a coherent configuration that a user can rotate and explore using the virtual reality plug-in navigational tools. So 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/trapproaches/trappcom.php>). A strong case for an approach based on this structure has been made by cybernetician Stafford Beer (*Beyond Dispute*, 1994).

**Polyhedra-1:** Through this experiment, software selects a polyhedron onto which relationships from a problem (say) are projected. Each facet thus 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.

In an online development of the previous experiment, 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.

A selection of earlier experiments, using virtual reality to display complexes of problems and organizations, is presented at <http://www.uia.org/altermedia/vrml/>. These structures were generated in 1997 as static pages (in contrast to the dynamic generation of structures above).

**Sonorification:** There is a rapid development of techniques to derive meaning from complex data sets through the use of sound (as described in Appendix 5). Early online experiments are in operation with UIA data (in association with the online spring network mapping facility).

### Comment

It must be stressed that these visual experiments are designed to find ways of representing, comprehending and exploring complexity. The purpose is to provide sophisticated techniques that 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. It is a deliberate intention to give the user as much control as possible in exploring these structures creatively. The intention is also to make this process as interesting to academic researchers, students, the media, and to those concerned with formulating more appropriate policies in a complex society.

For further discussion see: *Envisaging the art of navigating conceptual complexity: in search of software combining artistic and conceptual insights* (<http://laetusinpraesens.org/docs/artnavig.php>).