laetus in praesens

1st November 2006 | Draft

Preliminary NetMap Studies

of Databases on Questions, World Problems, Global Strategies, and Values

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Full size images of those presented below can be accessed by clicking on the image
Also published in modified form in *Statistics, Visualizations and Patterns* (Vol 5 of the
Yearbook of International Organizations, K G Saur Verlag, 6th edition, 2006/2007, as section 10.1.4)

Visualizations (problems and strategies): Energy strategies | Water problems | Water strategies | Strategies against violence
Visualizations (questions): Peace-related questions | Faith/Prosperity-related questions
Visualitzations (patterns): Pattern language
Visualizations (values): Human values
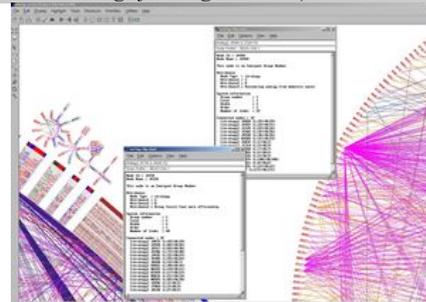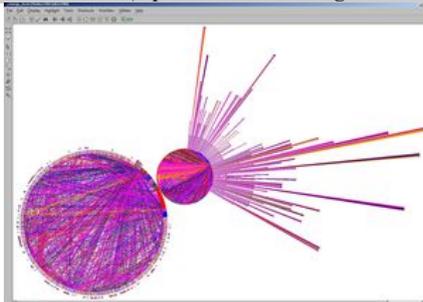NetMap application introduction
Reservations
Analysis and visualization
Comments on visualization and their future possibilities
Stimulus to imaginative exploration

Network maps

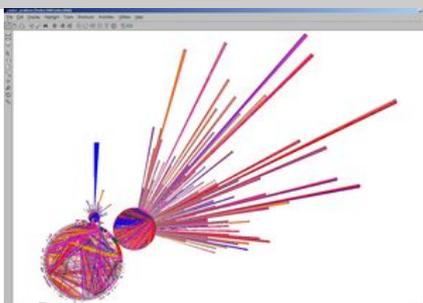**Study of Energy Strategies** (emergent groups and detail)
(represents 1472 strategies and 4790 links; click on image for larger version)

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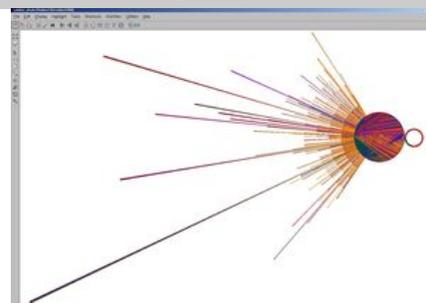**Study of Water-related Problems**
(emergent groups and detail)
(represents 1690 problems and 4115 links; click on image for larger version)
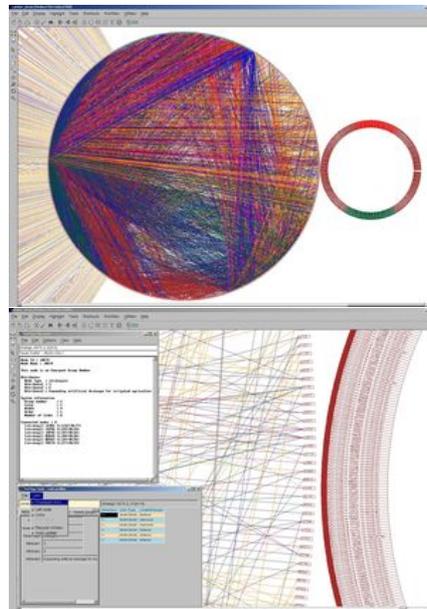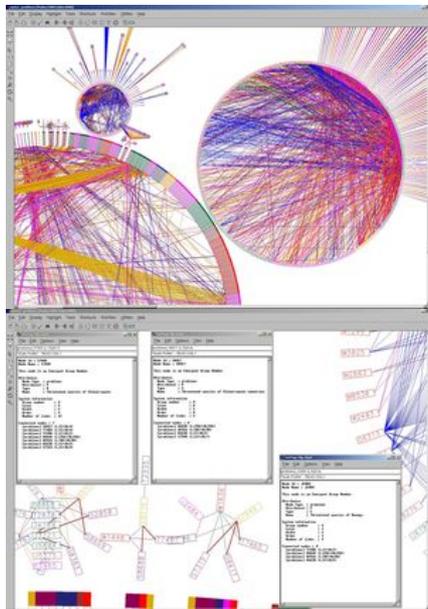
Study of Water-related Strategies
(emergent groups and detail)
(represents 1506 and 5730 links; click on image for larger version))

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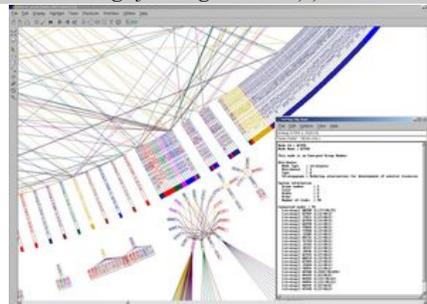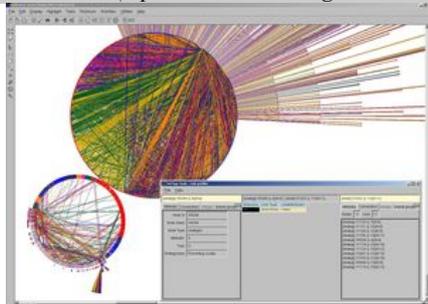
**Two Studies of potential *Where, When, What, Which, How, Who and Why*-Questions
to be asked about the relationship between Faith and Prosperity** (emergent groups and detail)
(represents 2980 Questions and 4804 links; click on image for larger version))

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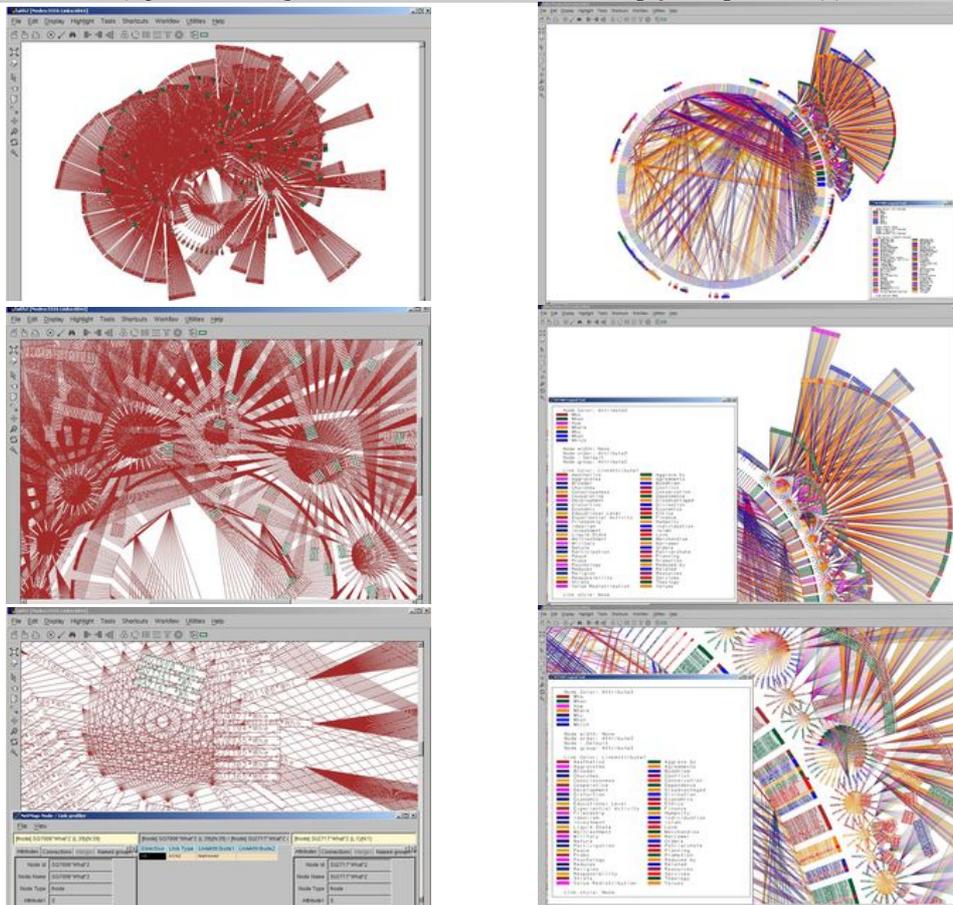
Study of a set of Patterns elaborated from a socio-architectural design template
developed by Christopher Alexander, *A Pattern Language*, 1977)
(represents 253 patterns and 3486 links; click on image for larger version)

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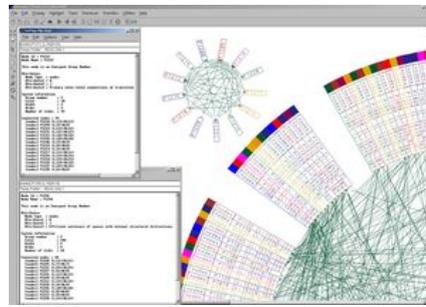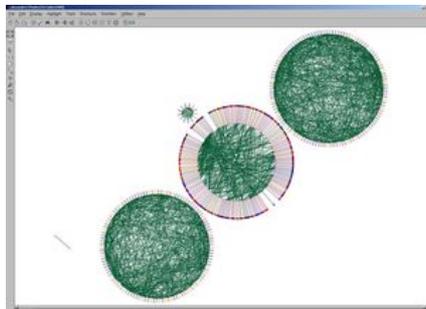
Study of Human Values (emergent groups and detail)
(represents a set of values: 960 constructive, 1040 destructive and 225 polarities; *click on image for larger version*)
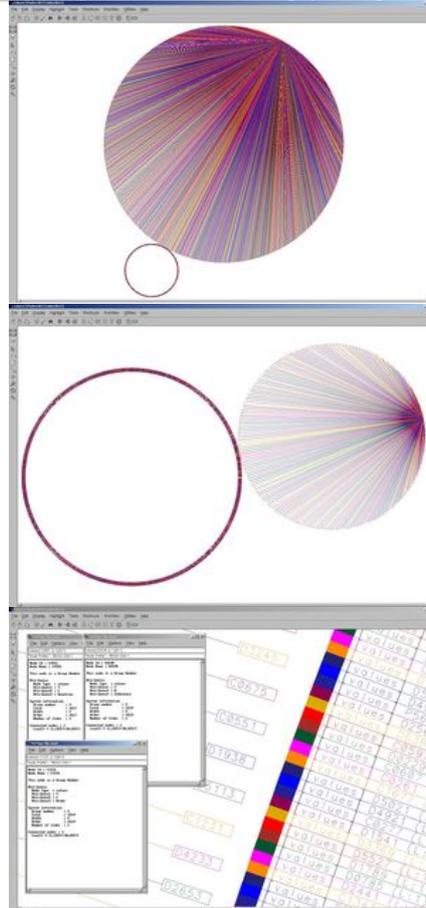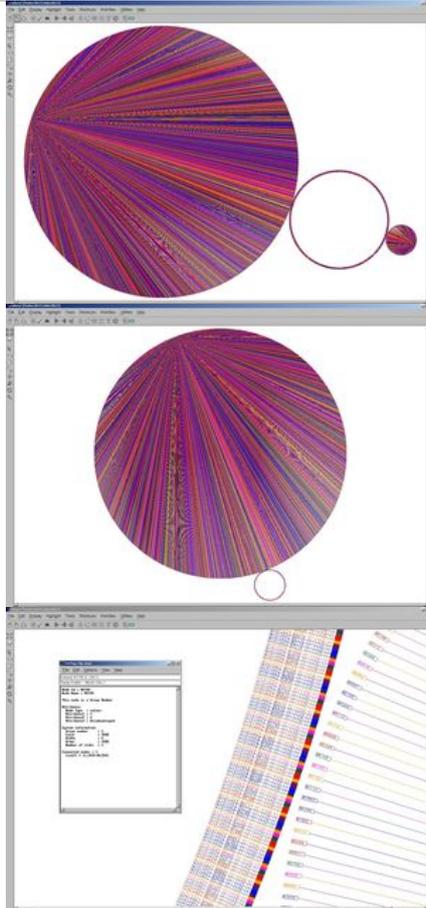
NetMap application introduction

The *NetMap* system can be described as a sophisticated suite of computer programs designed to help identify and analyze formal and informal networks. These networks may consist of people, telephone numbers, fax machines - or any possibly connected entities. These entities are referred to as 'nodes' and the connections between them as 'links.' In the studies above, the nodes are typically problems, strategies, values or questions (namely the contents of the large data sets maintained online by the Union of International Associations). The link may be hierarchical relationships between the nodes, or functional relationships (Node A "aggravates" Node B, etc), or relationships between Nodes of different types (such as a problem and a strategy, or a strategy and a value).

The primary output of the NetMap system is a series of graphic displays, or NetMaps (as shown above). These NetMaps are created by the program's analysis of the networks. NetMaps allow the user to easily examine the data from a variety of viewpoints and to focus on specific areas of interest.

NetMap was initially developed by an Australian, Dr. John Galloway, during his doctoral studies in Communications at Michigan State University. Dr. Galloway became interested in communication patterns and the development of informal networks of individuals in organizations. The studies presented above are extremely preliminary based on tentative explorations of the possibilities using a simplified version of NetMap kindly loaned to the Union of International Associations through the good offices of John Galloway.

Reservations

It is especially important to understand that NetMap is typically used in an interactive face-to-face situation, with a client formulating questions, enabling a consultant, skilled in the application, to find meaningful ways of analyzing and displaying it. The above results were not derived under those circumstances and it is highly probable that more in-depth study would be appropriate in each case. Some of the

interesting visual effects may, under such circumstances, be based on limited capacity in using the NetMap application. To the extent that they are interesting however, this is an indication of how much can now be achieved under such circumstances.

Furthermore, although the datasets studied have long been maintained by the Union of International Associations, it is probable that more useful ways of importing the data into NetMap could be developed in order to enable more interesting detailed analyses. The above results are therefore intended primarily to point to possibilities.

The development of the datasets used here was initially enabled through the support of the foundation Mankind 2000 in 1972-6, leading to various edtions of what is now named the *Encyclopedia of World Problems and Human Potential*. This complements other online databases of the Union of International Associations (notably the *Yearbook of International Organizations*, *International Congress Calendar*, *Who's Who in International Organizations*). The study above of Christopher Alexander's *Pattern Language*, is based on one the smaller related datasets (see *5-fold Pattern Language*, 1984).

An important issue is the relationship between a presentation that is visually interesting, especially from an aesthetic point of view, and its significance (if any) beyond such aesthetic value. This is of course a question that is fundamental to communication processes where trivia may acquire artificial importance because of the sophistication of the multi-media effects through which they are presented. The reverse may also be true where results of fundamental significance are effectively meaningless in a communication process because of the alienating modes of presentation. At what stage do studies such as those above give rise to significant results -- beyond aesthetic effects?

Analysis and visualization

NetMap has numerous features offering many possibilities of analysis. The feature basic to the above visualizations is that of "grouping". The specific variant used here is the detection of "emergent groups"

The detection of emergent groups depends on which nodes are included by the users for analysis. Typically isolated pairs of nodes and detached nodes (not directly linked to any other nodes) would be excluded. These types of nodes are seen only when using Emergent, and can consist of isolates and isolated pairs, and are usually located at the bottom of the screen (as can be seen in some examples above).

An emergent group is a group of nodes (usually people, but in the case problems, or strategies, or values) who, together, share more linkage with each other than they do with nodes outside the group. Each group is relatively cohesive because of the characteristic that most linkage is shared. The concept of emergent groups is probably more meaningful in a relationship sense when people nodes are being considered, although when a non-person node (e.g., vehicle or telephone number) features in a group, the question must be asked, 'Why is this node here?' and 'Who is the person behind/associated with this node?'

Those groups 'emerge' from the linkage data. They are not based on any pre-defined criteria, such as family, investigation connection, etc., or any other node attributes characterizing that node. A pattern recognition routine examines the links in the relevant network and classifies nodes into one of four categories: isolates, attached isolates, liaisons, and group members.

Each part of an emergent chart has meaning as to why it exists on the emergent chart. Emergent group members together share more linkage with each other than they do with nodes outside the group. The NetMap program uses the following criteria to select its emergent group members:

- There are three or more nodes in a group
- Each node has links to two or more nodes within the group
- Each node has at least half of its links to others within the group

Liaisons are single-member node groups that have sufficient linkage to two or more groups, but insufficient linkage to become a group member. Attached isolates have minimal or indirect linkage to a network through a group member. Tree nodes are non-emergent group members that have links with two or more nodes that must be isolates (can be either detached or attached isolates). Isolates are thoroughly detached, with no links to the network, but may be linked to one another. There is a toggle button that can be used to stop these types of nodes from being displayed.

Comments on visualization and their future possibilities

The studies above are focused on particular themes from particular databases, except in the case of Human Values, where the whole dataset is used. In each case the first images give an overview in the emergent group mode. Subsequent images, obtained through zooming into the detail of the first image, indicate how that detail can be explored -- bringing up profiles and special menus as required.

Clearly each theme could be the subject of very extensive exploration with the production of a range of images on the different emergent groups identified -- with commentary on their possible significance. As typically used by banks and police forces to detect fraudulent transactions and criminal liaisons, NetMap highlights unexpected groups about which questions can be usefully asked. Rather than the current crime and security applications of NetMap, the above studies suggest the possibility of analogous analyses contributing to the detection of patterns relevant to global or planetary security. Criminal liaisons and fraudulent transactions may be considered as analogues to poorly recognized processes undermining global governance and the effective response to the range of social and environmental challenges on the planet. It might even be argued, to the extent that financial transactions are tokens of confidence and trust, that there is as much need to identify fraudulent patterns of abuse of confidence and trust as there is to identify financial fraud -- as well as the possibility of detecting "crimes against the planet".

The above studies point to the possibility of focusing on:

- World problem networks: to detect unrecognized clusters of problems and how they are nested within, and supported by, more complex patterns of relationship
- Global strategy networks: to detect clusters of strategies, and especially relatively isolated strategies, in order to determine their complementarity or the dangerous dysfunctionality of any relative isolation. Here importance lies in the links within the dataset from specific strategies to specific problems
- Human value networks: to detect the ways in which values cluster, or are relatively isolated. In this case it is the link, or absence of a link within the dataset, to specific strategies or problems that may be of significance
- Potential questions: this dataset, generated from those on problems, strategies and values (cf *Generating a Million Questions from UIA Databases: Problems, Strategies, Values*, 2006), offers a means of challenging assumptions. Here the emergent groups may prove especially interesting in relation to the phenomenon of groupthink

The visualization exercises can notably be of assistance with respect to:

- specific themes, along the lines indicated above --this was in fact the case with respect to the brief exploration of the relationship between faith and prosperity
- detection of inadequacies in the datasets

Stimulus to imaginative exploration

At this stage the main purpose of the explorations presented above is to point to the possibility of another way of framing intractable complexes of issues with which society is confronted. They might be considered "teasers" to evoke a response from the curious as to whether they offered a new way of understanding such complexity. What might configurations, such as those above, offer to those who are deeply committed to implementing new strategies in response to old problems, or to questioning conventional understandings of the "problematique" (as advocated by the Club of Rome).

NetMap might be considered as a device for constructing windows on this complexity -- possibly tinted "rose windows" or even "mandalas" -- through which a very large diversity of elements may be held in relationship and explored at whatever detail is felt to be appropriate.

Of particular interest is the possibility that the interactive use of NetMap might be employed as a focusing device for creative groups -- and even large conferences -- to ensure the appropriate interrelationship between themes that are more readily explored in dangerous isolation from each other. Such uses have been developed in relation to a similar product, *Decision Explorer*, with far less analytic or visualizing capacity (John M Bryson, *et al*, *Visible Thinking: Unlocking causal mapping for practical business results*, 2004; Colin Eden and Fran Ackermann, Making Strategy: *The Journey of Strategic Management*, 1998).

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