

In the process of evaluating environmental constraints on activities undertaken in the global commons, USACERL has accumulated an extensive digital global dataset, with potential users for many applications. For further information contact: Robert C. Lozar, USACERL, (217) 373-6739, ext. 739.

(*Grassclippings* 3:3, Fall 1989)

DMA/ESRI GLOBAL DATABASE

The Defense Mapping Agency (DMA) announced that it has awarded ESRI with a \$10 million contract to develop a 'digital chart of the world.' The project will begin immediately and is scheduled to be completed by December 1991.

The project will involve putting a 'complete' digital map of the world (utilizing the Operational Navigational Charts developed by the DMA as a source material) onto CD ROM. The final product will allow users to access the data using personal computers.

The project is composed of two stages: a prototype stage and a production stage. During the prototype stage, ESRI will research and develop data structure tools, building on the knowledge and experience ESRI has put into its ARC/INFO GIS software. The second stage of the project will be the full-scale production of the world database. ESRI will scan and process the entire ONC series (270 charts) maintained by the DMA.

For more information contact: Karen Hunter, Environmental Systems Research Institute, (714) 793-2853 ext. 582.

LOUISIANA COASTAL GIS NETWORK

The Louisiana State University (LSU) has received a \$200,000 award from the U.S. Geological Survey to develop a computer

network that will allow various universities and agencies to share information on Louisiana's coastal land loss.

The Louisiana Geological Survey and both LSU's Department of Geography and Anthropology and Computer-Aided Design and Geographical Information System (CADGIS) Research Laboratory are cooperating on the project. LSU officials expect the one-year award to be continued for four more years, for a total award of more than \$1 million.

Louisiana accounts for 80 percent of the nation's lost wetlands and is being looked at carefully by coastal planners around the world, said Don Davis, project coordinator with the Louisiana Geological Survey at LSU. "Louisiana's problem will be the nation's problem and the world's problem," said Davis.

The five-year cooperative project, known as the Louisiana Coastal Geographic Information System Network (LCGISN), is part of an ongoing U.S. Geological Survey study of coastal erosion and wetland loss throughout the country. Major projects are also underway in the Great Lakes region, along both the east and west coasts and along the Mississippi-Alabama coast.

Goals for the network include:
— Improving communication among coastal researchers, planners, universities and local, state, and federal agencies;
— Identifying where coastal information is available, simplifying the way the data are organized, incorporating it into the new system and sharing data among system; and
— Eliminating duplication of research efforts.

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(*LSU News Service*)

FUTURE NAUTICAL CHARTS TO BE METRIC

The National Ocean Service (NOS) is planning to produce future nautical charts referenced to metric rather than English units. This is due in part to the Omnibus Trade Act of 1988 which establishes the metric system as the preferred system of measurement in U.S. trade and commerce. The act gives federal agencies until 1992 to adopt the metric system in their business dealings.

The offshore and coastal charts now published in fathoms will be converted to meters first, and those in feet and fathoms will be retained until total conversion is complete. No dual publications of feet and meters will be possible. At present no definite timetable for the conversion has been established. During the conversion period, NOS will make an effort to educate users on the advantages and use of the metric system.

*S.C. Cartographic Information Center
Bulletin (Summary 1989)*

fugitive cartographic literature

Interesting articles about cartographic information often appear in unexpected outlets. The goal of this section is to bring those publications to the attention of our readership. We invite synopses of papers appearing in journals other than those devoted to cartography, geography, and map librarianship.

Rossano, Matt J. and Warren, David H. (1989) Misaligned maps lead to predictable errors.
Perception, 18:2, pp. 215-229.
reviewed by Pat Gilmartin, University of South Carolina

The authors of this article conducted three experiments to investigate subjects' abilities to judge direction when using misaligned maps; that is, maps on which the top, or "up," does not correspond with forward, or

straight ahead, in the map user's environment. Previous studies have shown that map readers experience difficulty using misaligned maps for wayfinding, regardless of whether the spatial data are encoded tactually, visually, or motorically. In the research summarized here, two further questions were addressed: is the map orientation effect just a function of the response mode used in previous studies, rather than being inherent to mental representations of spatial relations; and do directional errors reflect the cognitive operations which people use to deal with misaligned maps?

In connection with the latter question, the authors hypothesized that responses to contra-aligned maps (maps rotated 180° to the reader's orientation) would fall into three categories, reflecting the cognitive strategies used to formulate the answers. Correct responses would indicate that the subject had mentally rotated the image through two dimensions to bring it into alignment with his or her environment. Incorrect answers which are 180° off (so-called "alignment errors") would reflect a failure to make any correction at all in the map image. Angular judgments which are relatively accurate but are on the opposite side of the correct response would suggest that the subject had mentally "flipped" the map image through the third dimension, creating a mirror image.

The "maps" used in the study were three-sided rectilinear figures (an unsymmetrical "U"-shape, in essence, with corners and endpoints numbered one through four) which represented a path to be followed. The maps were either "aligned" (the top of the map representing straight ahead for the subject) or "contra-aligned," a 180° rotation of the aligned version. Subjects studied each of nine maps

for 30 seconds. The map then was removed from view, and the subject was told to imagine that he or she was standing at point "n" facing toward or away from point "m" on the map and to indicate the direction of point "j."

Responses were made in one of two modes: locomotor or manual pointing. The locomotor subjects were blindfolded and asked to step in the direction of the designated point, while the pointer subjects rotated a metal arm on a table-top pointer to indicate direction. Zero degrees was always straight ahead of the subjects. Accuracy (the absolute angular difference between a subject's response and the correct angle) and reaction time were recorded as dependent variables. Independent variables were gender, response condition (locomotion or pointer) and alignment of the map (aligned or contra-aligned).

In the first experiment, only the map alignment had a significant effect on performance. Mean angular errors and response times were much higher for the contra-aligned maps than for the aligned maps in both response modes. The distribution of angular errors was not random but tended to cluster around values reflecting inappropriate cognitive strategies used by the subjects, as the authors had hypothesized. However the distribution was different for the locomotor and the pointer conditions: in the locomotor condition, mirror-image type errors predominated, while in the pointer condition, misalignment errors were more common. This difference in the pattern of responses led to Experiment Two.

Experiment Two was designed to investigate further the variation between the locomotor and pointer conditions. In the first test, the locomotor subjects had been blindfolded, while the pointer subjects were not, which might have affected their responses in

some way. Experiment Two was conducted with the same materials and methods as before except that the new subjects were not blindfolded. Results were very similar to those of the first experiment, indicating that differences in the patterns of responses between locomotor and pointer response conditions were not due to subjects' eyes being open or closed but to some other phenomenon.

Experiment Three examined the generality of the cognitive strategies found in the preceding tests on maps aligned at intermediate angles of 45°, 90°, and 135°. The authors hypothesized that mirror-image errors would not occur in intermediate alignment conditions because flipping such a mental image does not bring reference points into alignment as it does with an image rotated to 180°. And the number of mirror image errors on a 180°-rotated figure should decrease because the intermediate rotations would encourage a greater use of a mental rotation strategy. Results were as hypothesized: 1) performance on aligned maps was excellent; 2) alignment errors were the predominant type for both the locomotor and pointer conditions at all degrees of misalignment except 180°; 3) the proportion of mirror-image errors at 180° was less than in the preceding studies. Response times were found to increase as the degree of misalignment increased.

Results of the research show that the map orientation effect does reflect people's mental conception of space and is not just an artifact of experimental procedures. Further, it appears that lawful, though not necessarily appropriate, cognitive processes underlie people's use of misaligned maps.