DIGITAL TERRAIN MODELS

There were two Digital Terrain Model sessions. Both of these sessions were chaired by Raymond J. Helmering of the Defense Mapping Agency.

Thomas K. Peucker, Robert J. Fowler and James J. Little of Simon Fraser University and David M. Mark of the University of Western Ontario presented the paper "The Triangulated Irregular Network". Digital terrain models are generally developed on the basis of regular grids. The problem with this technique is the necessity for large data volumes and difficulty in the accurate determination of structural points and lines on the surface. The triangulated network has been developed over the past five years as a response to these problems. The authors describe their triangulation algorithm and some of the kinds of maps they are able to make with it.

Christopher M. Gold of the University of Alberta presented the paper "Triangulation-Based-Modelling - Where Are We Now". The focus of this paper is similar to the one by Peucker and associates, described above. Gold reviews the merits of both the triangle and square techniques and he describes some of the techniques and properties of triangulations. He indicates the appropriate model to use will depend, in part, on the nature of the data.

Gerald M. Elphingstone of the Defense Mapping Agency, presented the paper "Interactive Graphics Editing for IPIN". The IPIN system is used to edit elevation data instead of the conventional cartographic application of editing lineal strings of xy positions and intersections. The paper describes the general concepts of the system and how these concepts will be implemented into a production system.

Stanley Collins and George C. Moon of the University of Guelph presented the paper, "A Unified System for Terrain Analysis and Mapping from DEM to DTM". This paper describes the approach that is being used by the authors to analyze large amounts of terrain data, typically involving models with more than 10^6 points.

Their programs have been developed for producing thematic and engineering maps and data from the most useful data sources, polygons and grid structures.

Richard J. Heil of W.E. Gates and Associates presented the paper "The Digital Terrain Model as a Data Base for Hydrological and Geomorphological Analyses". Heil describes the advantage of the irregular triangular grid for providing a computer-compatible representation of terrain in a continuous three-dimensional surface. Using this concept enables one to perform a variety of analyses including automatic stream and basin delineation, calculation of tributary area characteristics; area, aspect, and slope.

Dennis L. White of the U.S.G.S. presented the paper "GPM-2 Digital Terrain Data Base". (Paper not included in proceedings.) This paper described the establishment of a data base for Gestalt PhotoMapper-II (GPM-2) digital elevation model data in the National Mapping Program. So far, elevation data has been processed from more than 1,100, 7.5 minute quadrangles. These data are being made available on magnetic tape and can be ordered from the National Cartographic Information Center.