APPLICATIONS OF 3D VISUALIZATION——TAKING MINES AS EXAMPLES

DU Pei-Jun TANG Hong

Institute of Surveying and Spatial Information Engineering,

China University of Mining & Technology,

Xuzhou City, Jiangsu Province, P.R.China, 221008

86-516-3885462, dupj@cumt.edu.cn

One of the hot issues in computer cartography and GIS is visualization, especially three dimensional (3D) visualization has got more and more attention. Visualization involves two aspects. One is visualization in software development, which can be realized by GUI, programming language for visualization such as Visual C++, Visual Basic, Visual Foxpro. Another is to display original data, medium procedure and processing results by means of computer graph and image techniques and algorithms, and the latter is current hotspot for research. 2D visualization has popularized. However it could not express and audio visualize information sufficiently. For this case 3D visualization would be the way to go. The results to be made shows that 3D visualization can improve the human cognizant ability. Virtual Reality(VR) appear to be a frontier of Visual techniques, and a new field——Virtual GIS(VGIS) integrated VR with GIS. Many achievements have been made about visualization of 3D data. As for as mine is concerned, it is well known that mining is a 3-dimendional, dynamic and continuous process. After underground mineral is exploited, the rock and ground surface would subside and bring some environmental problems and geological disaster to mining areas. With the proposal of Digital Mine and implementation of sustainable development in mining areas, new advanced thoughts and techniques should be used to mine. We think 3D visualization would play more and more important roles in production, management and development. In this paper, the features of mine and mining area are introduced at first, especially emphasizing its inherent properties in 3D space and importance of 3D visualization in mine. Following that, a framework of 3D visualization in mine is proposed and relative key techniques are discussed. In Section IV some typical cases are analyzed, including 3D data structure in mining applications, visualization of 3D landscape in mine, 3D simulation of mining activities, 3D representation of mining maps, applications of VR technique to mine, digital mine and 3D visualization, 3D MGIS and others. And then we give some examples of 3D visualization to mine, which proves effective and convenient to mining applications. Finally we give some conclusions and propose following work to do in section VI.