

Mobile Mapping Technology with Two Spherical Cameras and Its Applications

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Abstract: Mobile mapping system is one of the best automatic methods for acquiring and updating geospatial data, and has strong and wide appliance potential in many fields. Therefore, its research and development has been paid high attention in geographic information field. Mobile Mapping System has many features and innovative applications compared with the mobile mapping systems using laser and inertial measurement unit (IMU). The Configuration and mechanism of Mobile Mapping System specially using two spherical cameras (IMS3) and its applications are introduced separately in this paper.

IMS3 is a compact unit with simple composition and robust configuration, which consists of two spherical cameras, a vertical sensor, a GPS, a PC for acquiring data and a HDD for storing data. IMS3 is easy to be mounted on any type of vehicles and acquire high-resolution 360 degree full spherical geo-referenced imageries on the move.

Without using inertial measurement unit (IMU), relative position and angle of cameras when shooting with 16 frames per second can be analyzed based on imagery processing. Thousands of motionless feature points in imageries can be extracted automatically. As the result of that, the absolute position of camera can be compensated

by geographic coordinate information received by high precision GNSS. By analyzing and processing the above data, the 360 degree full spherical video becomes available for three-dimensional measurements. Through the comparison of accuracy between IMS3 and GPS, the result shows accuracy of IMS3 is high enough for accurate measurements.

IMS3 is being applied to many fields related to urban planning. By connecting with GIS software, IMS3 is being applied to many different types of simulations. By mounting IMS3 on other moving vehicles, many prospective applications can be realized.

360 degree full spherical video of IMS3 and its colorful applications are going to be developed widely in the near future.

Keyword: Mobile Mapping System, Camera Vector, 3D Mapping Technology, GNSS, Applications of 360 Degree Full Spherical Video