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INTEGATED RS, GIS AND GPS APPROACHES TO ARCHAEOLOGICAL PROSPECTING IN THE HEXI CORRIDOR, NW CHINA: A CASE STUDY OF THE ROYAL ROAD TO ANCIENT DUNHUANG

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ABSTRACT:

According to historic records, the wasteland northeast of modern Dunhuang oasis still contains remarkable, undiscovered monuments of medieval courier stations of the Silk Road. This study makes use of a statistical analysis of historical records census data; satellite image processing and interpretation; Geographical Information Systems analysis; and in-situ field surveys. All this data was used in order to enable the discovery of courier stations and the reconstruction of the medieval royal road system from Guazhou to Shazhou (today called Dunhuang). In order to obtain the potential places for courier stations, historical records and census data was analyzed, digitized and introduced into a GIS system. Ancient dried river channels and traces of the Great Wall were extracted from the satellite images. GIS buffer and overlay analyses were applied to the creation of prospective sub-areas. Prospective sub-areas were mapped from very high resolution WorldView-2 satellite images, and suspected courier stations sites were found through human photo interpretation. The sites were checked with the GPS-based archaeological survey, and were confirmed as two courier stations based on the remains of Han-Tang period observed at sites' surface. Finally using remote sensing and in-situ data, we were able to reconstruct the road to ancient Dunhuang, which is one of the most important sections of the royal road system in the Hexi Corridor. This research was awarded among the top ten best remote sensing research applications for the period 2012-2013 by the China Association of Remote Sensing Applications.

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