REMOTE SENSING AND GEOGRAPHICAL INFORMATION SYSTEMS

FOR ARCHAEOLOGICAL AND HERITAGE APPLICATIONS

ASSIR PROJECT, SAUDI ARABIA

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1.1 Assir Province Geographical Background

Assir Province is located in the South Western region of Saudi Arabia. Its costal plain extends along the Red Sea and most of Assir province is a mountainous area, which exceeds 2000m.s.l in average (see figure 3). Assir occupies an area of about 85,000 square km, which equivalent to 4% of the total area of Saudi Arabia. The Province consists of 20 major towns; however, the most important of these cities are Khamis Mushait, Bisha, Al Namas, Mahayel, Dhahran AlJanoob and Ahadrofadah and Abha, which is also the capital of Assir Province. There are fiftynine administrative centres in the province. Assir has a population of   about 1.64 million people (CDS, 2000).

1.2 Project Aims

The project aims of achieving the following:

- Employing the fundamental Remote Sensing and GIS operations such as major processing of satellite digital mapping and overlay of different geo-spatial data sets (i.e., streets, roads, landscape and other geo-features; Burrough, 1986) to map archaeological and heritage sites.
- Establishing a better geo-linking (i.e., geo-location and position) of about 600 hundred sites of whom each individual archaeological and heritage sites (of different categories) of Assir Province will be linked (Al-khathami, 2003).
- Building a compatible and intractable geo-digital database that will make each archaeological and heritage sites of the area stands among other sites of the same category using all possible and available resources and literature.
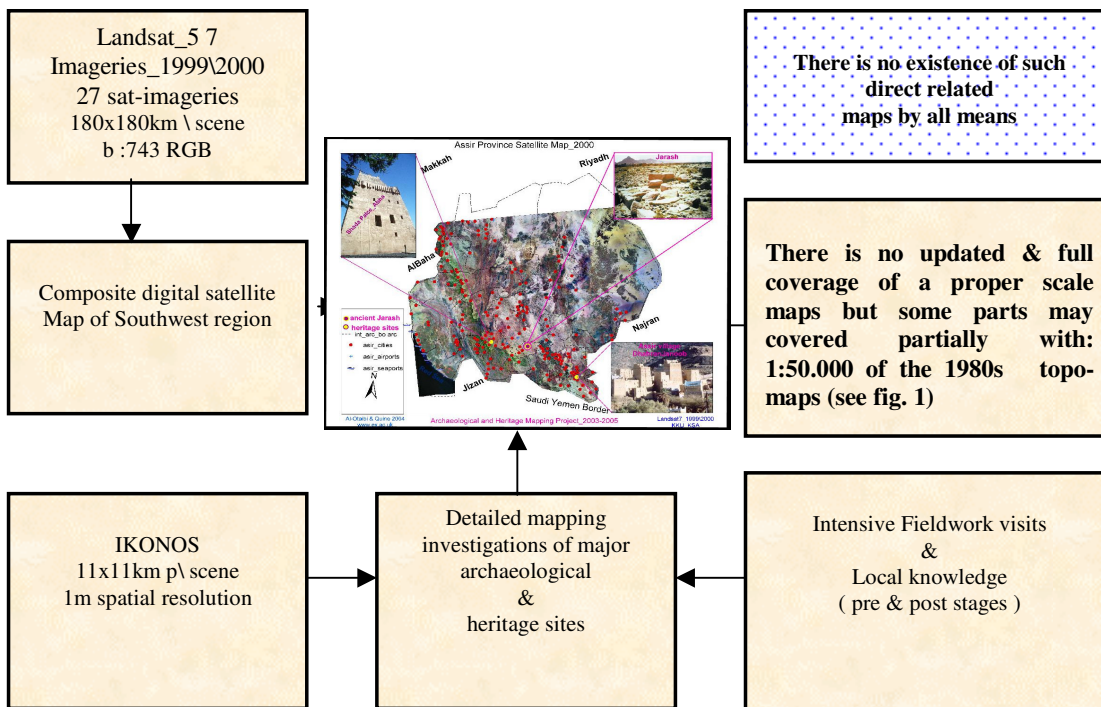
1.3 Current Stage of Assir Project

In current stage (see figures 1and 2) the major aim is to produce the main frame of geo-spatial data of archaeological and heritage sites of Assir by producing digital sat- maps of the whole Assir Province and linking almost any kind of data available by all

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Landsat seven contains, regional and national grid reference of an area of about 85.000 sq km. These maps can be both more complex and more flexible than the traditional paper mapping that we are more used to if not exist at all as it is the case of Saudi Arabia. Given, for example, building a GIS data-Info-base about the locations where each archaeological or heritage categories of the Assir Province and of each individual site to a mean that will allow interpreting their geo-zone to disclose more than what such data-Info-base can tell and opening a new era of discussion about the culture past and future of south-western region in general Assir province will be considered sensibly.

This project will also intends to address the importance of standardization issue because in archaeology and heritage, as elsewhere, standardization is important both for the consistent internal recording of data-info-base and ensuring a degree of interoperability between systems, purporting to record similar forms of archaeology and heritage resources. A concept such as this is another key to the Saudi Supreme Tourism Committee (such as id, code and format etc.) therefore; a kind of link has to be established with SSTC at some stages of this project. Moreover, this project also, will take into its account recent alterations to the sweeping boundary reforms that took place in the south-western region in 2003, however, much of archaeological and heritage recording work is still based on an even older set of boundaries mainly between Assir, Makkah and Jizan Provinces. In 1997, Murray has discussed the important pilot project such as this to serve as an important demonstrator, both of what is possible, and of the issues involved in integrating multiple datasets none of which were designed for RS and GIS applications (see the following diagram for more).

The overall aim of this project is to map and document Assir Province archaeological and heritage sites in an interacted way that has not been existed, at least in the region. The aimed integration of raster and vector data analyses of a single GIS database will provide a more comprehensive spatial model than a GIS of either the vector or raster format alone. For this project, vectors will serve to abstract and emphasize archaeological and heritage features while the raster pixels capture and display the intervening spatial detail important to any analysis of these sites. The ability to overlay vector information, such as boundary definitions, onto digital images will provide this project with a powerful capability for archaeological data extraction, verification, correction and visualization. It will also allow upgrading the quality of vector-based maps using raster pictures (from satellite images of both LANDSAT and IKONOS) to update, refine vector data and to create new and compatible vector elements (see figures 1,2 and 4).

FIGURE 2 *DATA TYPE, SEQUENCE AND AVAILABILITY*

FOR MAPPING ASSIR ARCHAEOLOGICAL AND HERITAGE SITES

Landsat_5 7
Imageries_1999\2000
27 sat-imageries
180x180km \ scene
b :743 RGB

There is no existence of such
direct related
maps by all means

Composite digital satellite
Map of Southwest region

There is no updated & full
coverage of a proper scale
maps but some parts may
covered   partially   with:
1:50.000 of the 1980s   topo-
maps (see fig. 1)

IKONOS
11x11km p\ scene
1m spatial resolution

Detailed mapping
investigations of major
archaeological
&
heritage sites

Intensive Fieldwork visits
&
Local knowledge
(pre & post stages)

(Al-Otaibi & Quine2004)

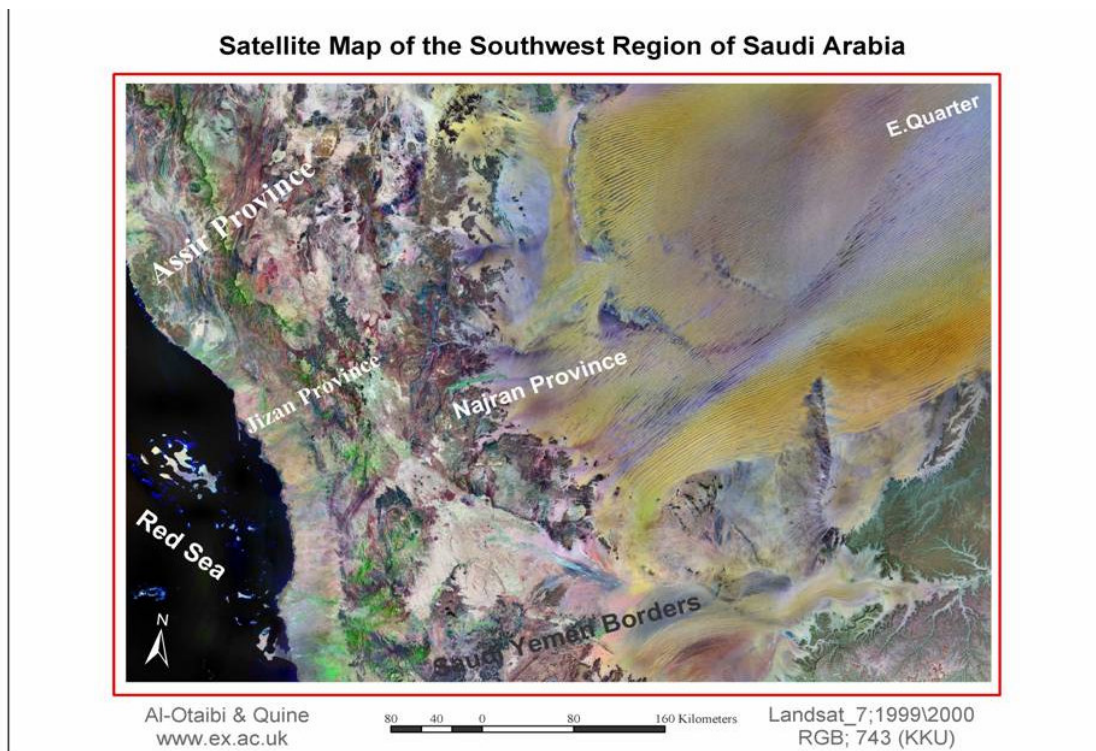*Figure 3* Research Area within the SW Region of Saudi Arabia

Figure 4

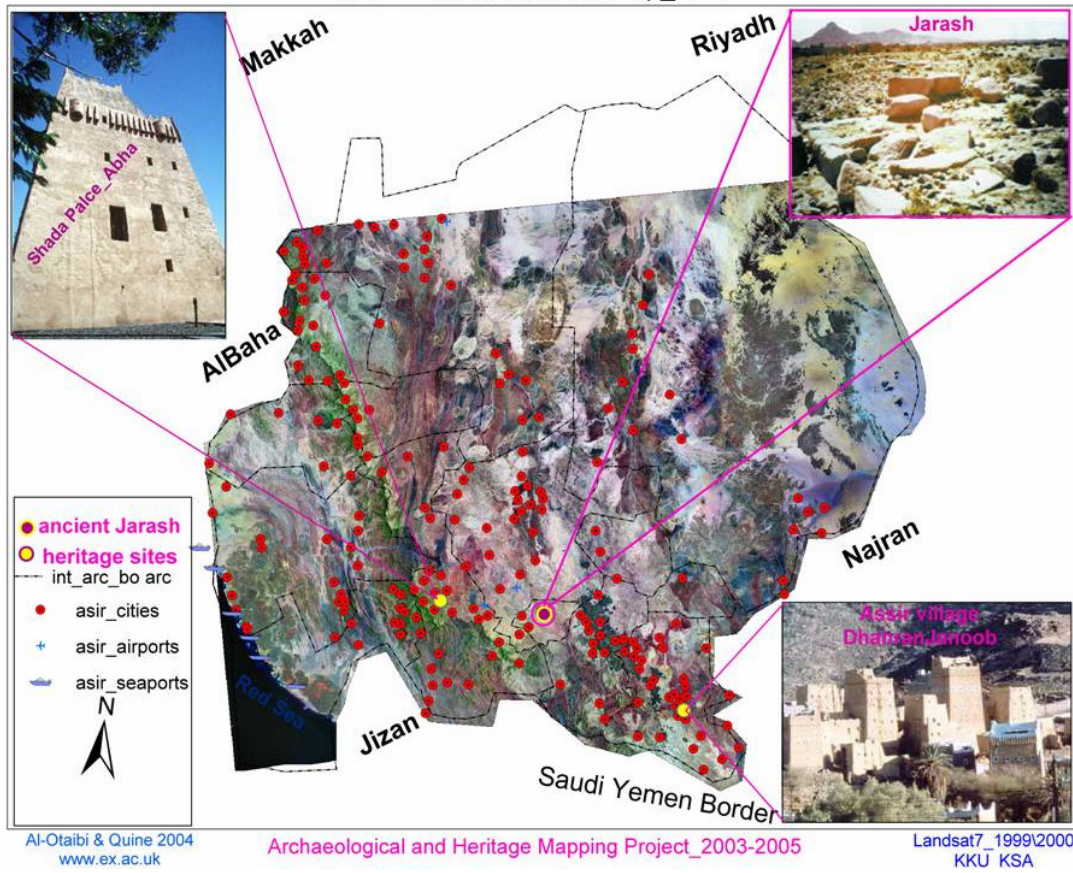Assir Province Satellite Map_2000

Figure 5
Assir Traditional Houses from Ahadrofadah City_ near ancient Jurush archaeological site