Gis non-government facilities. (wheatley, 2005) in the 70’s,

Business, Management

GIS stands for Geographic Information Systems, it’s a computer systemwhich, in a very simpler manner of explanation, provides key instruments for Spatialtechnology and analysis.

The first GIS system was created in 1964 by theCanadian government’s regional planning information systems division and it wascalled CGIS – Canadian Geographic Information System, this happened because theDivision was under a lot of pressure due to all of the things they had to monitorand do an inventory on all the resources while also evaluating how theresources were being exploited and its availability in the coming years, whichwould end up leading to a final plan on how to manage all the resources overtime. The CGIS was strictly for governmentpurposes never being shared with non-government facilities. (WHEATLEY, 2005) In the 70’s, various US agencies and some Universitiesstarted to improve the software due to the need for redevelopment that camepost-war which created a problem for many cartographers and surveyors for theirmaps became obsolete in a matter of months or less. In the early 70’s ESRI a Californianbased company took interest in commercializing a GIS program for the public andstarted selling one, being one of the firsts to do so, changing the stereotype ofit being a government based program, this made it possible for the program tobe available for more people. Over the years GIS as become an indispensable programfor diverse studies, including of course, Archaeology.

(WHEATLEY, 2005) At first being considered an obsolete tool, GIS had along way until it was even used properly much less accepted in the field, but

nowadaysthere isn’t a single archaeologist who doesn’t claim to have used it in hiswork. Even before Archaeology was considered a “ science”, archaeologists were already aware of the importance of spatial informationthere even existing records of highly precise excavation ground-plans. The importance of the spatial information comes fromthe dual nature of information for archaeologists, for every piece ofinformation gathered is part of a specific space and time.” Artefacts, features, structures and sites, whether monumentcomplexes, chance finds of individual objects, scatters of plough soil materialor rigorously excavated structural and artefactual remains, are all found somewhere. As well as the position of the feature or artefact itself there may also be aseries of relationships between the locations of features and artefacts, revealed by significant patterns and arrangements relative to other featuresand things.” (WHEATLEY, 2005) This means that the context inwhich an artefact or any other archaeological data is found has an inherentassociation with it’s history and without which, some scientists even believethe field of Archaeology would be lost.

For without being able to locate anydata in space and time what would archaeologists do to study it? And this is wherethe importance of GIS becomes even more clearer, for with its help, the fieldof Archaeology can manage to do this without losing as much time as it wouldhave to, specially when considering how fast people live their lives nowadaysand how no one wants to wait for an archaeological find to be studied for the “ highwayconstruction” to proceed for e. g. The first applications of GIS were

seen mostly inNorth America during the 1980’s and discussed mainly the modeling of surfacesrelated to materials of archaeological interest, using several types ofpolynomial functions, and the production of DEMs and digital thematic maps ofarchaeological sites or excavation areas. It wasn’t until the 1990’s thoughthat we saw this expansion flourish across Europe. This proliferation was seenmostly in the CMR – Cultural Resource Management sector mainly because of thedevelopment of new and improved technologies capable of acquiring and georeferencingdata of the excavation area. These technologies were a high-performancecomputer and topographic instruments such as a laser scanner. The data gatheredin Archaeological contexts tends to have a dual essence to it since they areboth placed in space and time.

That is why GIS becomes probably one of the bestand most complete systems for analyzing the spatial context of the data found, for this program has the capacity of managing multi-layer and multi-scaled georeferencedgeographic data. GIS has had manydifferent approaches each different in the field they are being used in, forArchaeology it is focused more on the explanation of past events rather thanthe planning of future situations in a determined place. This meant that byusing different approaches we would get as well different results in thedevelopment of the program over time. All the differentviews existing over time have created the perfect environment for the existenceof many different applications of the program such as Temporal GIS (TGIS) whichadds time as a fourth variable, the Object-Oriented GIS (OOGIS) or the VirtualGIS (VGIS) which uses virtual

reality techniques aiming at the creation of a nontraditionalconservation of the archaeological data. Nowadays we cansee a different application of the GIS in smartphones and palmtop computers forexample, which are essential to the recollection of on-site data and just provehow much the program is adjustable to the times. Additionally, GIS also despite all the efforts of theinternational scientific community has not yet been capable to resolve theproblem of a unique standard format permitting a full data interoperability.

1. GISapplications in CMR The main use ofGIS in this sector has to do with the need to manage massive quantities ofgraphic data which leads us to the first step taken by GIS: turning the analogdata into digital one allowing a much faster operation of tasks. The capacity GIS mustanalyze, manipulate and record vast amounts of geographical and environmentalvariables has proven to be of substantial importance to this sector, even ifthe program isn’t able to consider the cultural variables and only thegeographic ones it still plays a very important role in the creation of newmethods of conservation. 2. SpatialAnalysis Archaeology is dependent greatly on surveys and theprospection of sites, for without this much of the data is completely lost tothe world. More recently there have been made efforts to create a predictiveadvanced model which could with the use of data related to the favorability ofsome environments over others can predict where an archaeological site might befound. This would prevent many archaeological places from being completely lostsince nowadays many archaeological sites perish over new construction to makeway for our modern way of life. So, one

of the most common approaches as been used byKvamme and many other archaeologists, which consists in using GIS to generateand process substantial amounts of data with logistic regression providing uswith the ability of predicting if a site might exist in a certain area.

The main potential of GIScience tools is made of thecapability of extracting information from data, and in performing spatialanalyses and projective models. 3. WEBGIS The use of theInternet and other multimedia platforms have been used more for their didactic potentialrather than as an actual research tool, this would come to change when thefirst publications of specialized databases and GIS projects appeared online. WebGIS is mostlyused in the sector of CRM and it usually succeeds in both the methodologicalview and the technological one, one of the notable examples of this would beDigital Crete project which is an international project about the Island ofCrete, that as is common knowledge holds some of the greatest archaeologicalfinds. Nowadays thegeospatial data is mostly shared trough the Internet due to the generalized webservices projected by the Open Geospatial Consortium.

4. VirtualReality The main objectiveof researchers is to recreate historical/archaeological sites in 3D form wherethe spatial component is maintained, this provides yet another application ofGIS in archaeology. The uses of Virtual Reality differ alsofrom which part of the sector decides to use but usually each monument and itslandscape are accurately reproduced from survey and geographical data. Thesetechniques have been used in museums more recently providing the visitor with aunique experience, in

some cases, the visitor is even able to interact with themodel of the monument or even the complete site itself.

The most used in thissector are VRML, X3D, Java 3D and QuickTime. In VR the data to be able to construct such modelsusually require a substantial amount of computer memory and they obtain better results when 3D data is used by the web. Inthe future it is expected that the VR models shall grow in numbers and bepresent in most part of museums and even archaeological databases. It’s worth mentioning, Google Earth project that hassince its “ birth” been aiming towards something like this and, also two virtualreconstruction projects applied to archaeology that were developed in Italy: TheVirtual Museum of the Ancient Via Flaminia project and the Virtual Rome project. 5.

GISand mobile applications With theimprovement of mobile phones and laptops there’s also been a new type of GISapplication appearance, this development expctations went beyond anythingimaginable. Thelast fifteen years there’s been an immense progress in the transfer ofarchaeological information using increasingly more reliable, complex andintegrated GISand digital databases. A few years ago, the geographical data extracted from onsitesituations was minimal and had reached a stale period, until we saw the arrivalof GPS and the integration of GIS in PDA devices.

This made it possible to filla gap existing between the field and laboratory activities, helping to minimizethe mistakes and enhancing the quality and quantity of information available. This provides mobility, availability onsite

andcombined with the internet servers also provided an immense and completedatabase that revolutionized the way archaeologists work.

6. 3DGIS Three DimensionalGIS might be the best option for the future given that most archaeological datais actually three dimensional this will facilitate its visualization andcomprehension. On an internationallevel there have been many proposals of advanced 3D numeric cartography withcapacity to support both the 3D component and other substancial details. Therehave been many international attempts and studies aimed at identifying a 3Dtopological structure of cartographic data.

Even though thisarea is not as common in every country and it still receives a bit of apushback from some of the old generation of archaeologists it is the future oftechnological archaeology and the more it’ll evolve the better.