



GIS systems – plotting the way ahead for CLASP

1. Aims and Objectives

CLASP’s GIS-based mapping work to date has used MapInfo exclusively, for chiefly historical reasons. This has left us in an awkward situation, in which our present legacy software is not all legally paid-for, and is also several generations out of date by comparison with the current market offering. This raises both commercial and legal and potential technical problems, all of which we need to address.

The purpose of this document is to review the choice of available GIS software, to compare the costs and technical issues involved in each offering, and also to build a table showing which professional bodies are using which of the available software tools – because the issue of transportability of data between different organisations will become increasingly important as we continue to widen the remit of work that we carry out in liaison with other professional bodies.

2. Availability and pricing of GIS software

2.1 MapInfo

MapInfo Pro v16.0 English Standard Edition

Single seat node-locked license only. One year Support Package £1,495.00

Starting at £1,794.00

MapInfo Pro v16.0 English Premium Services Edition

Premium Services Edition brings the power of Bing™ into data visualisation and location intelligence. Single seat node-locked license only. One year Support Package £1,795.00

Starting at £2,154.00

MiPro v15.0/15.2 (32-bit/64-bit) Standard Edition (English)

Single seat node-locked license only. One year Support Package £1,495.00

Starting at £1,794.00

MiPro v15.0/15.2 (32-bit/64-bit) Premium Services Edition (English)

Premium Services Edition brings the power of Bing™ into data visualisation and location intelligence. 32-bit and 64-bit installation options.

Single seat node-locked license only. One year Support Package £1,795.00

Starting at £2,154.00

Technical Issues

- a) Does not support the universal GEOTIFF format, making it needlessly difficult to interchange data with other GIS software systems. However, can import ESRI shapefile format (ArcGIS).
- b) Not used by Cotswold, Wessex, ULAS, or most other major commercial archaeological companies. This puts it out on a limb, and its revenue stream is probably dwindling.

2.2 ArcGIS, from ESRI

2.2.1 ArcGIS for Desktop

Beyond showing your data on a map, ArcGIS for Desktop allows you to manage your data, perform advanced analysis, model and automate workflows, and display your results on professional-quality maps. **Applications included** ArcMap, ArcGIS Pro.

From: £1,747



2.2.2 ArcGIS for Personal Use

ArcGIS for Desktop Advanced (ArcMap and ArcGIS Pro)

The most popular ArcGIS for Desktop extensions

ArcGIS for Desktop software updates

ArcGIS Online Named User Account

100 service credits for data storage, premium data access, and geocoding and analysis

Suite of ready-to-use apps for use anywhere, on any device

Living Atlas of the World with maps and data, including access to foundation content from Esri UK on thousands of topics

Installation support

We just ask that you use ArcGIS for Personal Use for personal, non-commercial projects.

Single license, £120 inc. VAT, (£144 including Backup Media)

Caution – this £120/£144 appears to be an annual charge! The vendor ESRI states “Customers in the UK can purchase a Single Use license of ArcGIS for Personal Use for £120 inc. VAT **per year**. In addition, a Single Use license of ArcGIS for Personal Use including backup media can be purchased for £144 inc. VAT **per year**.” But perhaps this comment applies merely to the ongoing support? Need to clarify by discussion if this option is felt to be worth pursuing.

2.2.3 ArcGIS for non-profit charities

Qualified nonprofits involved in humanitarian, conservation, and community services efforts can use ESRI ArcGIS technology to provide services and support for their operations and program management. **If you are approved as a member, ESRI will donate the same technology that is used in more than 350,000 organizations worldwide to help you meet your mission. While the software is free, there is a minimal annual administrative fee to cover processing and support.**

2.3 QGIS – open source freeware

QGIS (previously known as Quantum GIS)

A cross-platform free and open source desktop geographic information system (GIS) application that provides data viewing, editing, and analysis.

Functionality

Similar to other software GIS systems, QGIS allows users to create maps with many layers using different map projections. Maps can be assembled in different formats and for different uses. QGIS allows maps to be composed of raster or vector layers. Typical for this kind of software, the vector data is stored either as point, line, or polygon-feature. Different kinds of raster images are supported, and the software can georeference images.

Advanced functions

QGIS integrates with other open-source GIS s/ware, including PostGIS, GRASS GIS and MapServer to give users extensive functionality. Plugins written in Python or C++ extend QGIS's capabilities. Plugins can geocode using the Google Geocoding API, perform geoprocessing using fTools, which are similar to standard tools in ArcGIS, and interface with PostgreSQL/PostGIS, SpatialLite and MySQL databases.

Cost to download and use £0

Technical Issues

- a) Interfaces well with ArcGIS.
- b) Can import MapInfo *.TAB file format but cannot create *.TAB files for export back into MapInfo (it uses a different system for creating and storing georeferencing data). Therefore exporting georeferenced raster files from QGIS to MapInfo in *.TAB format requires a manual workaround



each time (time-consuming). The better alternative for CLASP will be to export from QGIS to MapInfo in ESRI Shapefile format, which MapInfo can now read (MapInfo v8 and after).

- c) This problem is not the fault of QGIS but of the restrictive design of MapInfo, because MapInfo uses its proprietary *.TAB format instead of other worldwide georeferencing standards such as GeoTIFF and ESRI Shapefile. MapInfo offer their Universal Translator s/w to tackle problems of this type – but you need to buy MapInfo in order access this. Alternatively, MapInfo now accepts import of ESRI shapefiles, which QGIS can create and export – this is CLASP’s best way forward.
 - d) More about the MapInfo and ESRI Shapefile formats:
 - ESRI Shapefile format: defines the geometry and attributes of geographically referenced features in three or more files with specific file extensions that should be stored in the same project workspace. They are:
 - .shp—The main file that stores the feature geometry; required.
 - .shx—The index file that stores the index of the feature geometry; required.
 - .dbf—The dBASE table that stores the attribute information of features; required
 - MapInfo data files. These are the files that you directly work with in MapInfo. A dataset consists of multiple files and comprises at least a *.TAB and *.DAT file, but usually a *.TAB, *.DAT, *.MAP and *.ID file. This format is also called the MapInfo TAB format.
 - Alternatively MapInfo data can come in MapInfo Interchange Format. This is data that has been explicitly exported by MapInfo. Data in this format comes as a single *.MIF file (containing the data), or as a set of a *.MIF and *.MID file (the first containing the data, the second the symbology). This format is also called the MapInfo MIF format.
 - So the scenarios are:
 - MapInfo TAB file >> Shapefile
 - MapInfo MIF file >> Shapefile
 - Shapefile >> MapInfo MIF file
- There is a software package that can handle ALL of these conversions ... it is QGIS!

2.4 Global Mapper

Although CLASP is mainly using this software at present exclusively for LiDAR-related studies, it is in fact a fully-fledged GIS-software package, with graphic display and database features, that is potentially capable of competing equally against MapInfo and ArcGIS and QGIS and being used as CLASP’s future platform for GIS work.

It is therefore necessary to include it in this list of options, for completeness’ sake, and we should keep it in mind as a possible contender to replace our current usage of MapInfo – however, our preferred migration route might be to migrate from MapInfo to QGIS, reserving Global Mapper for LiDAR-related specialist studies.

We should continue reviewing this opinion in the light of further discussions...

Basic freeware unlicensed version, with limited (but still powerful) features

£0, install and use on as many terminals as required

Single-user USB-dongle-protected license, enabling us to install the freeware unlicensed version on as many terminals as we require, and unlock the full features on any specific terminal as and when needed, simply by shifting the USB dongle to the terminal in question (e.g. work in the field on a laptop, work at home or in CLASP’s central base on a desktop machine, etc).

US\$ 840 + p&p, currently approx. equivalent to £670-700

We believe there are no additional annual costs (other than for such aspects as annual service support, which is an option that we do not need to pursue), this is being confirmed with the vendors.

**3. Interoperability comparison – who uses which GIS package(s)?**

Organisation	MapInfo	ESRI ArcGIS	QGIS	Global Mapper	Other	Comment
HER network	HER Northants X (v8)	(X) Some HERs use this (eg Cheshire)	(X) HER Northants may adopt this			May remain wedded to MapInfo, owing to huge investment in licenses & data-input.
ADS York	(X) (MI format is accepted but not preferred)	X (ESRI shapefile from ArcGIS etc is the preferred format)				
Cotswold Archaeology		X	X	Interested in learning more, discussions with CLASP ongoing.	CorelDraw (NOT GIS-enabled)	Use manual work-around to transfer data from QGIS to MapInfo in TAB form.
ULAS (Univ of Leicester Arch'logical Services)		X	X			Use Leics Uni licences for ArcGIS, encourage use of QGIS for work with other groups.
MOLA(N)	X (v12-16) (because they were NCC-owned)	X (can also use this if working with others)		Interested in learning more, discussions with CLASP ongoing.	AutoCAD	Use MapInfo Univ'sal Translator s/w to help with migrating data between applications.
MOLA (HQ)						
Oxford Archaeology		X (their best s/w for LiDAR and 3D work)	X			Do not use MapInfo. Export data to HER via ESRI shape-files which MapInf can now read
Archaeology War'kshire	X (v10) (they are still WCC-owned)					Tied into MapInfo because they are local govt-operated.
Wessex Archaeology		X	X			Strong proponents of QGIS
CLASP	X (v6)		(X)	X	CorelDraw (NOT GIS-enabled)	CLASP has also experimented with QGIS and explored some technical issues.

Geomatics and IT contacts in other organisations:

HER: Charlotte Walker, HER manager, tel. 01604-362513
NCC Archive: Still to be appointed
ADS York: Tel. 01904-323954
MOLA(N): Amir Bashir, James Ladocha, tel. 01604-809800
MOLA HQ: tel. 02074-102200
ULAS (Leics): Vicki Score, IT and Geomatics, tel. 01162-523827
Cotswold Arch.: Jake Streatfeild-James, Geomatics Officer, tel. 01908-564660, mobile 07840-959851
Wessex Arch.: Chris Breedon, Geomatics Officer, Wessex Northern Office, tel. 01142-559774
Oxford Arch.: Alan Lupton, Operations Manager, tel. 01524-880222
Jamie Quartermaine, IT/Geomatics, tel. 01524-880203
Arch. Works: Stuart Palmer, fieldarchaeology@warwickshire.gov.uk, tel: 01926-412278



4. Observations and conclusions

All the major modern commercial archaeological companies have standardised on using ESRI ArcGIS as their main GIS software package.

Usage of MapInfo is confined solely to the national HER network and to those archaeological outfits who are still operated by local government (or were so until recently, as with MOLA[N]). This is the result of historical decisions made 15 years or more ago, at a time when MapInfo was probably the best technical choice – but ESRI ArcGIS is now universally regarded as being superior.

It should be noted that HER Northants is considering switching to QGIS, both in terms of future compatibility and as a cost-saving move. They already work with the ESRI shapefile format, so they see no overwhelming problem in switching platforms away from MapInfo.

ADS York also standardises on input from ESRI ArcGIS as their single preferred standard, but they will accept MapInfo-format files as a non-preferred option.

Most of the professional companies who use ESRI ArcGIS also use QGIS freeware, because it interoperates very well with ArcGIS and also allows them to work with smaller groups and amateurs.

Freeware open-source software QGIS is well thought of by ALL the professional companies, and provides an easy means of interworking with ArcGIS. A major advantage of QGIS to groups such as CLASP is that it is absolutely free, and can be downloaded and installed and operated on any number of terminals with no costs or licensing issues.

MapInfo's development has tended to go its own way and ignore the evolution of worldwide data-exchange standards, preferring to develop its own proprietary *.TAB data format; however, v8 and later of MapInfo supports import of ESRI shapefiles. This provides a migration route for CLASP – viz., by changing to QGIS, working with ESRI shapefiles instead of MapInfo *.TAB files, and exporting in ESRI shapefile format to HER. Such a route would actually be more compliant with ADS preferred standards than if we stick with MapInfo file format.

Few of the organisations approached, either local government or commercial archaeological companies, had heard of Global Mapper. However, ULAS and MOLA(N) and Cotswold have all now expressed interest in learning more about this package. The availability of a basic freeware version of Global Mapper that accepts and visualises data from all currently available GIS packages including MapInfo and ArcGIS is seen as potentially attractive.

Global Mapper is particularly good at handling LiDAR and 3D information. ArcGIS is the best current commercial GIS software for LiDAR and 3D work. QGIS does support these advanced features, but it is not yet quite as powerful or user-friendly as Global Mapper. Therefore for CLASP it makes sense to pursue Global Mapper for specialist LiDAR and 3D work – it is not a huge-cost item, and we only need to buy a single dongle-protected license that can be shifted from one computer to another.

5. Recommendation

The unavoidable conclusion is that CLASP should migrate from MapInfo to using QGIS. This will avoid any further costs, legalise our position, and bring us into line with the ESRI shapefile standards that are now the common standard for HER, ADS and all major commercial archaeological companies.

There are two associated major issues for CLASP:

- The need to do further experiment with QGIS, to ensure that we know how to operate this tool – and the need to document our findings in simple reference guides for our members.
- The need to retrain and re-skill our members – and there may be significant effort involved, plus significant opposition to overcome and consequent difficulty in achieving this.