

A SYSTEM FOR THE INTEGRATION OF GEOGRAPHICAL DATA IN THE KINGDOM OF SAUDI ARABIA

D. Hermsmeyer ^{a,*}, M. Guretzki ^a, C. Freckmann ^a, G. Konecny ^b, M. Alrajhi ^c, F. Pizzuti ^c

^a Phoenics GmbH, 30171 Hannover, Germany - (dhermsmeyer, mguretzki)@phoenics.de

^b Inst. of Photogrammetry and Geo-Information, Univ. of Hannover, Nienburger Str. 1, 30167 Hannover, Germany - konecny@ipi.uni-hannover.de

^c General Directorate for Surveying and Mapping, Ministry of Municipal and Rural Affairs (MOMRA), P.O. Box 89936, 11692 Riyadh, Kingdom of Saudi Arabia - surveying@momra.gov.sa

Commission I, Working Group I/4

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ABSTRACT: (MAX 250 WORDS)

In Saudi Arabia MOMRA'S General Directorate for Surveying and Mapping (GDSM) is responsible for mapping and geographical data acquisition. Large amounts of data have been measured based on aerial photography. Line mapping is carried out in three dimensions. Map sheets are stored in the *Computer Aided Design (CAD) data model* (Microstation *.dgn file format); plotted line maps are the final product. An extensive feature code list is used. Maps are difficult to update and often cannot be finished before the air photos are several years old. Because CAD data does not imply map topology, information implicitly contained in the data cannot be fully exploited. This study was conducted by PHOENICS GmbH to design a seamless geographic database to better fulfil GDSM requirements in capturing, storing, analysing and displaying geographical data. The database is hosted inside a relational Database Management System (DBMS), following the *geodatabase data model*. Unified Modelling Language (UML) was used to develop the geodatabase, which was implemented in ESRI'S ArcGIS. Geographical data covering a test area in southern Riyadh was transferred from the CAD into the GIS data model at two levels of data processing. At "level 1", data import was followed by automated closing of polygons and allocation of polygon attributes. At "level 2" these steps were carried out manually. A DEM was generated from elevation information. At level 2, land use was interpreted from digital orthophotos. A cartographic model was developed to print maps from ArcGIS following the visual appearance of original Microstation plots. Data transfer from CAD to GIS was without loss or limitation. Map topology is implicit in the GIS, opening access to full data analysis capacity. Finally, data conversion offers a possibility for quality control.

1. MANUSCRIPT

1.1 General Instructions

Maximum paper length is restricted to 6 printed pages. Invited papers can be increased to 12 pages. The paper should have the following structure:

1. Title of the paper
2. Authors and affiliation
3. Keywords (6-8 words)
4. Abstract (at least 100 words)
5. Introduction - including motivation, aims (and for long papers structure of the paper), overview and references to related work (in separate section)
6. Main body - explanation of methods, algorithms, data used, instrumentation (sensors, systems, etc.), results and discussion
7. Conclusions
8. References
9. Acknowledgements
10. Appendix

All papers should be sent to the meeting organisers in digital form. However, if in exceptional circumstances, the paper

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Setting	A4 size paper	
	mm	inches
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Column Width	82	3.2
Column Spacing	6	0.25

Table 1. Margin settings for A4 size paper

* Corresponding author.

1.3 Preparation in Electronic Form

To assist authors in preparing their papers, styleguides for preparing digital versions of papers are provided in Word and/or LaTeX on the *Archives* page at the ISPRS Home Page. <http://www.isprs.org/documents/orangebook/appb2.html> The size of the paper in PDF format should not exceed the limit in Mb specified by the organizer of the meeting.

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If the paper is transmitted to the meeting organisers in hardcopy version only, it must conform in appearance to these guidelines for authors. Each page must be output on a high quality computer printer. Avoid dot-matrix printer, but if you have no better choice, please make sure to set it for near-letter quality, so that the dots overlap. Simple dot-matrix printing, where the dots are separated from one another, does not reproduce in an acceptable fashion. Write the author's last name and the page number on the back of each page. Do not type the page number on the manuscript sheet.

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All manuscripts, except Invited Papers, submitted in hard copy or electronically are limited to a size of no more than six (6) single-spaced pages (A4 size) in the printed version of the *Archives*, including abstracts, figures, tables and references. ISPRS Invited Papers are limited to 12 pages. For any additional page, the extra expenses must be paid for by the author(s) according to the price-list set by the meeting organisers. For the printed version of the *Archives*, the font type Times New Roman with a size of nine (9) points is to be used.

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For those authors affiliated with a specific Commission and/or Working Group of ISPRS, a separate title may be entered. The title should be centered in bold type after one blank line below the title affiliation, i.e. Commission #, Working Group #. The Commission number shall be Roman and the Working Group number should be the Commission Roman number, slash, WG Arabic number, e.g.

Commission VI, Working Group VI/3

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Leave two blank lines under the Title. Type "**KEY WORDS:**" in bold capital letters, followed by 5-8 key words, according to

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Leave two blank lines under the key words. Type "**ABSTRACT:**" flush left in bold Capitals followed by one blank line. Start now with a concise Abstract (limited to 250 words) which presents briefly the content and very importantly, the news and results of the paper in words understandable also to non-specialists. Type text single-spaced, **without** blank lines between paragraphs, as shown at the beginning of these Guidelines under ABSTRACT. Start paragraphs flush with left margin. After the English abstract follows - whenever possible - a translation of it to one or two of the other two official languages of ISPRS: to French (RÉSUMÉ) and/or to German (KURZFASSUNG).

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Type text single-spaced, **with** one blank line between paragraphs and following headings. Start paragraphs flush with left margin.

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Major headings or section headings are to be centered, in bold capitals without underlining, after a triple line space (two blank lines) and followed by a double line space (one blank line). Latter is done automatically when using the provided Word template file.

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Type subheadings flush with the left margin in bold upper case and lower case letters. Subheadings are on a separate line between two single blank lines. The blank line after is added automatically when using the provided Word template file.

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Decimal numbering of all sections is recommended (with the exception of the sections "ACKNOWLEDGEMENTS" and "REFERENCES"). If bold printing is not available to you, use underlining, instead, but only for subheadings and subsubheadings, not for Major Headings.

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Avoid footnotes, but if you need them, mark footnotes in the text with an asterisk (*); use a double asterisk (**) for a second footnote on the same page. Place footnotes at the bottom of the page, separated from the text above it by a horizontal line.

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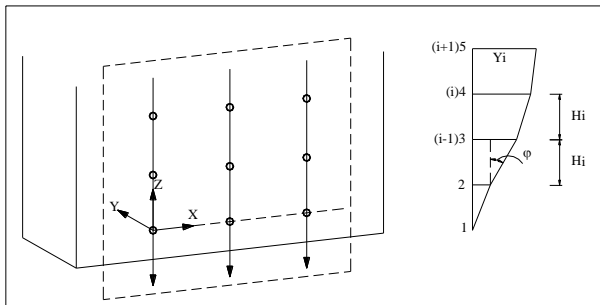


Figure 1. Figure placement and numbering

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3.4.1 Equations: Equations should be numbered consecutively throughout the paper. The equation number is enclosed in parentheses and placed flush right. Leave two blank lines before and after equations. E.g.

$$x = x_0 - c \frac{X - X_0}{Z - Z_0} \quad (1)$$

$$y = y_0 - c \frac{Y - Y_0}{Z - Z_0}$$

where c = focal length
 x, y = image coordinates
 X_0, Y_0, Z_0 = coordinates of projection center
 X', Y', Z' = object coordinates in ground coordinate system

3.4.2 Symbols and Units: Use the SI (Systeme Internationale) Units and Symbols. Unusual characters or symbols should be explained in a list of nomenclature.

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References shall enable a librarian to supply the quoted paper/book to the reader. References should be cited in the text, thus (Smith, 1987b; Moons, 1997), and listed in alphabetical order in the reference section, leaving a blank line between references (this is done automatically when using the provided Word template file). The following arrangements should be used:

References from Journals:

Smith, J., 1987a. Close range photogrammetry for analyzing distressed trees. *Photogrammetria*, 42(1), pp. 47-56.

Names of journals can be abbreviated according to the "International List of Periodical Title Word Abbreviations". In case of doubt, write names in full.

References from Books:

Smith, J., 1989. *Space Data from Earth Sciences*. Elsevier, Amsterdam, pp. 321-332.

References from Other Literature:

Smith, J., 1987b. Economic printing of color orthophotos. Report KRL-01234, Kennedy Research Laboratories, Arlington, VA, USA.

Smith, J., 2000. Remote sensing to predict volcano outbursts. In: *The International Archives of the Photogrammetry, Remote Sensing and Spatial Information Sciences*, Kyoto, Japan, Vol. XXVII, Part B1, pp. 456-469.

References from websites:

Moons, T., 1997. Report on the Joint ISPRS Commission III/IV Workshop "3D Reconstruction and Modeling of

Topographic Objects”, Stuttgart, Germany.
<http://www.radi.informatik.tu-muenchen.de/ISPRS/WG-III4-IV2-Report.html> (accessed 28 Sep. 1999)

3.6 Acknowledgements and Appendix (optional)

Acknowledgements of support for the project/paper/author are welcome. Any additional supporting data may be appended, provided the paper does not exceed the limits given in 1.5 above. The title of the appendix should be as for major headings but with alphanumerical numbering, e.g. APPENDIX A. TITLE 1, APPENDIX B. TITLE 2 etc.

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L. W. Fritz, 10 August 1989
P. Waldhaeusl, 23 August 1993
J. C. Trinder, November 1999
O. Altan August 2001