

## 2 Included software and data

### 2.1

#### Hardware requirements, operating system

If you want to use the software included on the CD-ROM and work with the example data or even use your own materials, it is necessary to have an adequate PC supplied with sufficient main memory (RAM), storage capacity (hard disk) and high resolution graphics. In particular, you need:

	Minimum	Recommended
Processor frequency	400 MHz	>> 1 GHz
Main memory (RAM)	256 MB	>> 512 MB
Hard disk	1 GB	>> 10 GB
Graphics resolution	1024 x 768 pixels	1280 x 1024 pixels
Screen size	17"	21"
Mouse	3 (!) buttons	central wheel

Furthermore, to handle (aerial) photos on paper or film material, you need a scanner (see chapter 3). For stereoscopic viewing you need red-green glasses, a simple example is included in this book. You need a mouse with 3 buttons or with a central wheel which, when pressed down, also serves as middle mouse button.

It is urgently recommended to use a professional operating system like MS Windows NT (with service pack 6), 2000, XP or Vista. Nevertheless, you may also use MS Windows 95, 98, ME and other MicroSoft Windows 32 bit systems, but then no guarantee can be given for full functionality! In particular, older operating systems like Windows 95 and 98 didn't support the FREEIMAGE library used in some parts of the software (for instance, see chapter 7.6.4).

## 2.2

### Image material

In the first tutorials we will process aerial photos which were taken by an analogue aerial camera (see chapter 1.3) in the usual format of 23 by 23 cm (9 by 9") which must be converted into a digital format using a scanner. Nevertheless, also images from non-metric, réseau or digital cameras, and not only aerial but also terrestrial photos can be handled.

From a practical point of view, for the following tutorials all image material is prepared in digital representation on the CD-ROM. To help you handle your own examples, chapter 3 will discuss the basic principles of scanning paper or film photos. Beside this, you may of course use images taken with a digital camera.

The aerial photos used in chapter 4 and 5 are owned by the Corporación Autónoma del Valle del Cauca (CVC), Cali, Colombia. Thanks to Ing. Carlos Duque from the CVC who managed everything to give me the rights using these photos here.

The photos used in chapter 6 are owned by the Institute of Photogrammetry and GeoInformation (IPI) of the University of Hannover, Germany. Thanks to Dr.-Ing. Folke Santel for her patience and help.

A new chapter in the 3<sup>rd</sup> edition, 6.6, deals with high resolution satellite images. For our tutorial we will use images from the Cartosat-1 satellite, showing an area south-west of Warszawa, Poland. Thanks to the Space Application Centre ISRO, Ahmedabad, India, and to GEOSYSTEMS Polska, Warszawa, for the courtesy to use the data (images and control points) in this book!

## 2.3

### Overview of the software

On the CD-ROM delivered with this book you find a small but really useful digital photogrammetric software package with which you can make everything described in the following chapters and much more. In particular, the software is *not* limited to the example data but can be used for a wide range of photogrammetric tasks. The package is divided into three parts:

**LISA BASIC:** A raster GIS software with a lot of possibilities in image processing, terrain modelling and more. A complete programme description will be copied onto your PC during the installation (see c:\lisa\text). You can choose between the English, German or Spanish language version. Copyright by the author.

LISA FOTO: Extension of LISA BASIC, digital photogrammetric workstation. This is the main software used in the following chapters. The programme description is given in chapter 7 of this book but will also be copied onto your PC during the installation (see c:\lisa\text). You can choose between the English, German or Spanish language version. Copyright by the author.

LISA FFSAT: Digital photogrammetry for stereo satellite data. Developed by the author in cooperation with Dr.-Ing. Karsten Jacobsen, University of Hannover.

The LISA programmes delivered with this book are special versions with slightly reduced functionality: The maximum size per image is limited to 10 MB, only grey scale (not colour) images can be processed, and the tools to create and handle a data base for geocoded images are not available. See chapter 2.7 for information about the complete software.

BLUH: A professional bundle block adjustment software optimised for aerial triangulation. A “light” version including the central five modules of this programme system with reduced functionality will be installed on your computer. Only available in English but with manuals also in German and Spanish (see c:\lisa\text). Copyright by Dr.-Ing. Karsten Jacobsen from the Institute of Photogrammetry and GeoInformation, University of Hannover, Germany.

According to HEIPKE (1995) and SCHENK (1999), the following functionality of a digital photogrammetric workstation (DPW) is provided:

- Stereo DPW: Interactive stereo plotting, optional elevations from a DTM
- Mono DPW: Planimetric plotting, optional elevations from a DTM
- Aerial triangulation DPW: Manual and automatic aerial triangulation measurement, block adjustment with BLUH
- DTM DPW: Automatic derivation of terrain models, contours etc.
- Ortho image DPW: Creation of ortho images and mosaics

All programmes are mostly written in Fortran 95, few parts in C++. Using inline code programming and other functions of the powerful FTN95 Fortran compiler, real-time zooming and roaming was realised and an easy-to-use design could be created.

If you still like to use the software after reading this book, may be for your own applications, it is a good idea to look onto my homepage and to download actual software versions from time to time (<http://www.lisa-geosoftware.de>).

## 2.4

### Installation

Important: If you use a professional operating system like MS Windows NT, 2000, XP or Vista, it might be necessary to log in with full rights, usually select user = administrator!

Put the CD-ROM into your PC. Start a file manager like MS Windows Explorer, Norton Commander or similar, and go to the CD drive. Now click onto SETUP. The rest is standard and self-explanatory. The default values given by the installation software should be used if possible. *For consistency with the data on the CD-ROM it is urgently recommended to use the proposed installation path c:\lisa!* Now all of the software we need is ready-for-use, and all directories for the tutorial data are created. Finally we have to copy the data which normally will be done by the setup; if not, simply click onto SET\_DATA.

Now click successively onto Start, Settings, System control, then onto the icon Display and again onto Settings. Control / set the following parameters:

- *Colours*: 65536 colours ("high colour", 16 bit) or higher.
- *Resolution*: At least 1024 x 768 pixels.
- *Fonts*: "Small fonts".

Now click above onto Representation. Within windows (active or inactive) as well as the dialogue box the following parameters may not be exceeded:

- *Pixel*: Size 18
- *Text*: Size 10

In case you have less than 512 Mbytes main memory (RAM) available on your computer and/or you want to process large raster images a certain part of the hard disk capacity can be made available in addition. Therefore a correspondingly large paging file is to be defined within the Windows system control: successively click Start, Settings, System controls, then onto the icon System and there onto Performance data. In the menu Virtual storage you can define the size of the paging file using the button Modify. For more details, please refer to the Windows manual.

After the installation has finished, you will find the following additional directories on your PC:

c:\lisa	LISA and BLUH programme files, fonts, runtime libraries etc.
c:\lisa\text	LISA and BLUH manuals, PDF format
c:\lisa\common\pal	directory for palettes
c:\lisa\common\sig	directory for area symbols
c:\lisa\common\cam	directory for cameras

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c:\lisa\cameras	some standard aerial camera definitions
c:\lisa\tutorial_1	data prepared for tutorial 1
c:\lisa\tutorial_2	data prepared for tutorial 2
c:\lisa\tutorial_3	data prepared for tutorial 3
c:\lisa\tutorial_4	data prepared for tutorial 4
c:\lisa\tutorial_5	data prepared for tutorial 5

If you prefer to use the German or Spanish programme versions of LISA, just copy the executables (\*.EXE) and the descriptions (\*.PDF) from the CD-ROM into the respective directories on your PC (c:\lisa, c:\lisa\text).

## 2.5

### Additional programmes, copyright, data

Beside the software mentioned before, some further programmes are used:

- For the development of the LISA programmes: Products from the Salford Software Ltd. company, England, now purchased by SilverFrost Ltd. (compilers FTN95, CPP and SCC, editor SIDE, ClearWin+ library etc.). See also <http://www.silverfrost.com/>
- For the installation of the software: InstallUs from Schellhorn media productions, Germany. See also <http://www.media21.de/>
- For the import and export of some raster image formats, the FREEIMAGE library is used. See also <http://freeimage.sourceforge.net/>
- For the real-time display of 3D data, my friend Dr. Michael Braitmeier wrote a plug-in called IMA3D.
- This book was written using MS Word, all graphics have been created using MS PowerPoint from MicroSoft, USA. See also <http://www.microsoft.com/>

*All software used for the tutorials or mentioned in this book, including the brand names, are under copyright of the respective authors and/or companies!*

## 2.6

### General remarks

During the standard installation process, you have only those data files copied onto your hard disk which are used as input files in the following tutorials (see chapter 2.4). Besides, many of the intermediate and final results are also prepared on the CD-ROM (sub directory data\tutorial\_x\output, see below) and can be used

for control purposes or, if you would like to skip some steps and go on later, to get intermediate results necessary for the following steps. Therefore, at the end of any tutorial chapter all created files are listed.

For consistency it is a really good idea to use the file names proposed in the tutorials. In general, it is of course possible to choose any output name.

The CD-ROM has the following directory structure:

deutsch	(... if you prefer to work with the German
espanol	or the Spanish LISA versions)
data\tutorial_x\input	(... directory with input data, x = 1 ... 5)
data\tutorial_x\output	(... directory with some intermediate and final results for control purposes, x = 1 ... 5)
figures	all figures of this book, stored as MS PowerPoint files

To make the work a bit clearer in the following tutorials, special fonts are used:

- Options and parameters: For instance, Image No. refers to the corresponding text in an input window.
- Menu entries: Separated by ">", for example: Processing > Stereo measurement means that you first have to click onto Processing, then onto Stereo measurement.
- *Definitions* or *key words* are printed in italics.
- Any results stored in a file and listed here for control purposes are printed in this font.
- File names are always printed in UPPERCASE letters.
- Units are printed in [square brackets], example: [µm].
- Vectors are also printed in square brackets with an arrow showing the direction like [start point → ending point].

See also chapter 7.4 for some remarks about the programme handling.

## 2.7

### Software versions, support

The software presented here is distributed by LISA Geo-Software, Germany, and by the Institute of Photogrammetry and GeoInformation (IPI), University of Hannover, Germany. For details about unlimited or student programme versions, update downloads, news and prices please look at our homepage (<http://www.lisa-geosoftware.de>). If you have questions or need support don't hesitate to mail to [info@lisa-geosoftware.de](mailto:info@lisa-geosoftware.de).

Note: To purchase an unlimited version you must use the Registration button right-hand in the main window, fill out the form and send us the file t2v\_reg.txt (see the LISA BASIC programme description). Students also may purchase a “student version”.

Within LISA BASIC, FOTO or FFSAT you can use the buttons Info and then Homepage or E-Mail to contact these addresses from within the software.

<http://www.springer.com/978-3-540-92724-2>

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