

6 IIMS DESIGN

6.1 System Design

The IIMS comprises hardware, software, GIS data and applications supported by basic modules of the GIS software. This Chapter presents the required specifications for hardware and basic software and the rationale for selection of such specifications, which will enable realization of the objectives of IIMS for Dakar while taking into account the existing GIS situation.

It is very important for system design to consider the current GIS system environment, according to the GIS inventory and the data condition for data exchange, alongside the current GIS users who mainly use the software of GeoConcept, MapInfo, AutoCAD, ArcInfo.

6.1.1 System Requirement

The IIMS should function so that each agency can independently deal with data input and data utilization.

(1) General Conditions

The following conditions were considered a prerequisite for the introduction of the IIMS considering the existing situation of GIS preparation and utilization as revealed by the GIS inventory survey. These conditions were agreed upon by DTGC and DUA during the meetings with the Study Team:

- Operating system environment must be in French;
- Operating system must be Windows NT to deal with a large number of records;
- The GIS software can be dealt with a large number of users;
- Confusion due to the parallel utilization of existing and new software must be kept at minimum;
- The GIS software must have general application;
- The GIS software must come with user-friendly manuals;
- The most advanced hardware must be introduced;
- The system must be adaptable to future network environment;
- Technical support for hardware and software must be available in Dakar;
- Consumables must be easily available in Dakar; and
- A simple image processing software should be installed.

(2) Required Functions

Functions required for IIMS include:

- 1) data input and editing function;
- 2) data display and search function;

- 3) analytic functions such as overlay analysis and buffer analysis; and
- 4) output function such as maps and reports.

The software currently in use, GeoConcept, satisfies these requirements. The system should be able to overlay various urban planning data attributes, to analyze distribution of properties and phenomena, and generally to support urban planning process.

(3) GIS Software

The following factors were considered for the selection of software for DTGC:

- Powerful figure processing functions with capabilities of map information input and output;
- Capability of analysis utilizing thematic maps and preparation of evaluation maps;
- Capability of developing application software;
- Capability of data import and export to and from other agencies;
- Capability of geographic contour analysis (not in the existing system); and
- Utilizing data media such as CD-ROM and ZIP for data distribution.

The following factors were considered for the selection of software for DUA:

- Powerful functions for preparing thematic maps, display, analysis and map output;
- Capability of information search needed for urban planning;
- Easy management of layers for thematic maps;
- Capability of data processing such as cross tabulation and graphic display;
- Capability of overlay of thematic maps;
- Capability of developing application software; and
- Utilizing data media such as CD-ROM and ZIP for data distribution.

(4) GIS Hardware

Specifications of the hardware were determined through discussions with DTGC and DUA are as follows:

- PC: CPU Pentium 400 MHz or over, RAM 128 MB or over;
- Hard Disk 20 GB,
- Boards: network board and SCSI board for peripherals;
- Monitor: 21-inch color monitor;
- Peripherals: CD-R, ZIP drive; and
- Printer: Black and white laser printer for A3 size, color ink-jet printer for A4 size;

- Plotter: A0 size;
- Digitizer: A0 size;
- Color Scanner: A0 size;

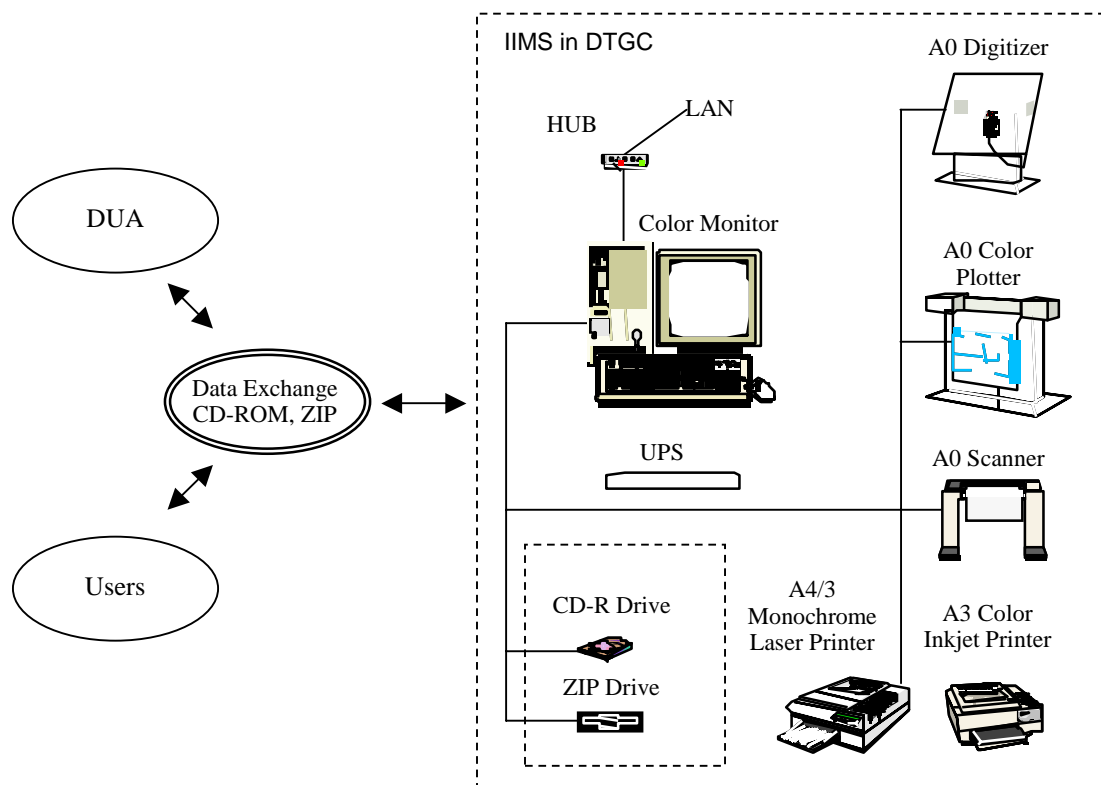
6.1.2 System Structure

(1) DTGC

As the system for DTGC, the Arc Info NT is recommended for the purposes of strengthening figure processing function and enabling three dimensional information processing. It is proposed that the figure data input will be done by tablet digitizer and scanner.

Figure 6.1.1 illustrates the recommended system including data input, thematic map preparation, evaluation map preparation, and map output functions. As its current version sufficiently handles map management, the existing Geo Concept software is also proposed to support the new system in display, analysis, and output functions.

Figure 6.1.1 Infrastructure Information Management System for DTGC



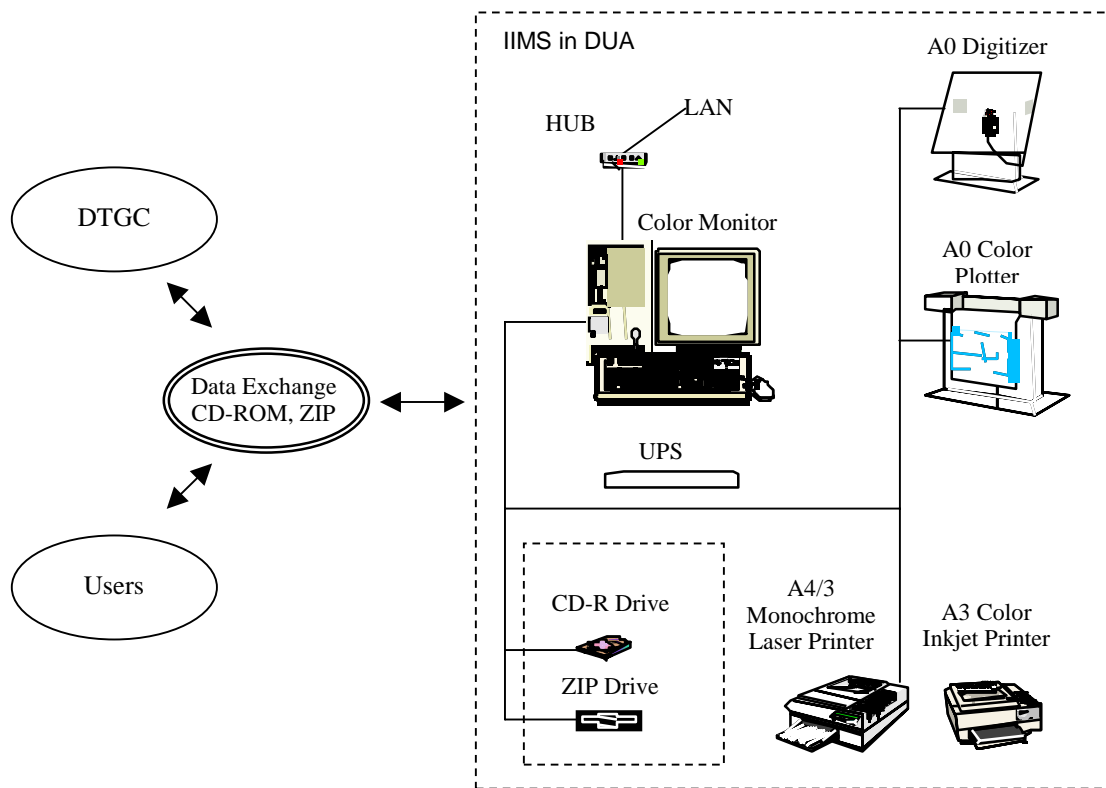
Source: JICA Study Team

(2) DUA

As the system for DUA, a version-up of the existing Geo Concept software is proposed in order not to cause confusion by introduction of a new software. Geo Concept is judged to have adequate functions for analysis support in layer management, statistics, graphic display, and map output functions.

The existing data input method by tablet digitizer is proposed to be continued. Figure 6.1.2 illustrates the whole system including data input, preparation of evaluation map, and map output functions.

Figure 6.1.2 Infrastructure Information Management System for DUA



Source: JICA Study Team

6.2 Equipment Specification

6.2.1 Hardware

Hardware specification recommended for the IIMS is as follows:

(1) DTGC

- a) PC: Pre-Installed model of Windows NT 4.0
Pentium 550 MHz, 512 MB RAM, 512 KB cash memory, 36 GB Hard disk drive, CD-ROM drive (IDE), 1.4 MB diskette drive (FD), Keyboard, Mouse, Network board (PCI interface)
- b) SCSI board (PCI interface), SCSI terminator, SCSI cable
- c) CD-R drive unit (SCSI interface or IDE interface)
- d) ZIP drive unit (100 MB or 250 MB, IDE interface)
- e) Monitor: 21-inch color monitor 16 Bit 1,600x1,280
- f) A0-size tablet digitizer including digitizer cable, 16 button cursor and tool kit, mechanical stand
- g) A0-size color scanner including cable and tool kit, floor stand
- h) A0-size color inkjet plotter including Ethernet board and printer cable, Additional memory 32 MB
- i) A3-size color inkjet printer including Ethernet board and printer cable
- j) A4/A3-size monochrome laser printer including Ethernet board and printer cable
- k) Hub (8 port)
- l) Network cable (10/100Base-T, direct cable)
- m) UPS (750 VA)

(2) DUA

- a) PC: Pre-Installed model of Windows NT 4.0
Pentium 550 MHz, 256 MB RAM, 512 KB cash memory, 18 GB Hard disk drive, CD-ROM drive (IDE), 1.4 MB diskette drive (FD), Keyboard, Mouse
- b) Network board (PCI interface)
- c) SCSI board (PCI interface), SCSI terminator, SCSI cable
- d) CD-R drive unit (SCSI interface or IDE interface)
- e) ZIP drive unit (100 MB or 250 MB, IDE interface)
- f) Monitor: 21-inch color monitor (16 Bit, 1,600x1,280)
- g) A0-size tablet digitizer including digitizer cable, 16 button cursor and tool kit, mechanical stand
- h) A0-size color inkjet plotter including Ethernet board and printer cable, Additional memory 32MB
- i) A3-size color inkjet printer including Ethernet board and printer cable

- j) A4/A3-size monochrome laser printer including Ethernet board and printer cable
- k) Hub (8 port)
- l) Network cable (10/100 Base-T, direct cable)
- m) UPS (750 VA)

6.2.2 Software

Software recommended for the IIMS is as follows:

(1) DTGC

- a) Arc Info for Windows NT (ESRI Corporation)
- b) TIN module of additional topographic module of Arc Info
- c) Carta Linx (Clark University)
- d) IDRISI 32 (Clark University)
- e) Microsoft Office 97 (Access 97, Excel 97)
- f) SCSI drivers and utilities
- g) Scanning utility software
- h) Photo Shop (ADOBE Corporation)
- i) Windows NT 4.0 Service Pack 3 (Microsoft Corporation)

(2) DUA

- a) Geo Concept 4.1 expert (Geo Concept Corporation)
- b) Kit Geo Concept (Geo Concept Corporation)
- c) Carta Linx (Clark university)
- d) IDRISI 32 (Clark University)
- e) Microsoft Office 97 (Access 97, Excel 97)
- f) SCSI driver and utility