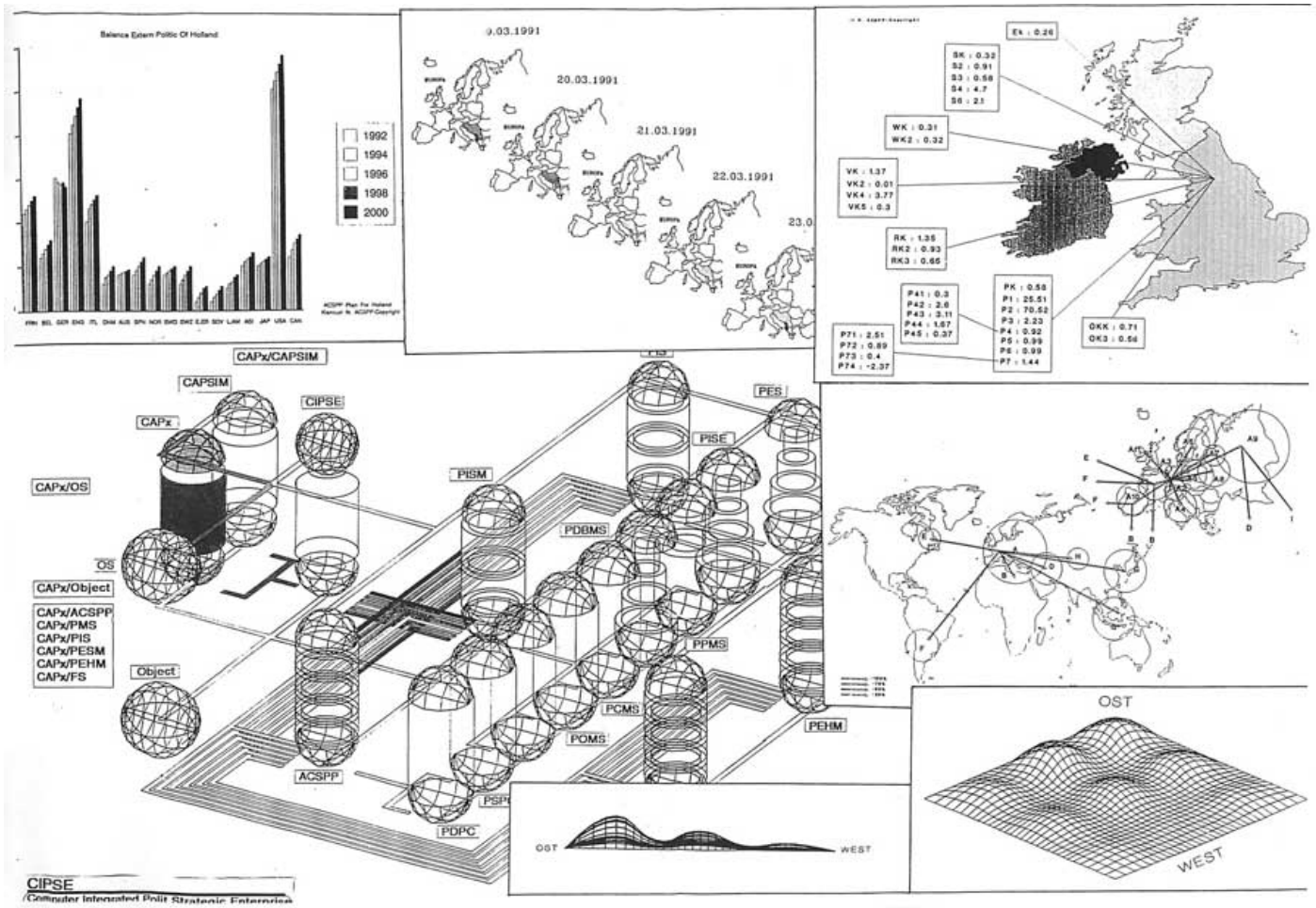
Chapter 2

Computer Aided Political Solution Complex – (CAPS x)

2- Computer Aided (Political solution] x (CAPSx)

2.1- Prologue - Computer graphics technology includes the hardware and software involved in generating graphic representations of objects and data on a display device. When used for a graphics application, the computer provides the user with several different functions. It performs computations, stores data, and serves as a design tool.

Computer graphic system has become the principal user interface to computer-aided engineering (CAE) systems which drive automated design and enterprising processes. The hardware and software of a graphics system permit the user to interact with the computer that maintains the central database which serves both the computer-aided design (CAD) and computer-automated enterprising (CAE) operations. The graphics system is the basic tool that is used to create, analyze, and change designs and processes; it replaces the drawing board and slide rule of the past.



THE PICTURE IS A REPRESENTATION OF CAPSx STATION BETWEEN CIPSE STATIONS, ALSO HIS INTERFACES AND EXAMPLES OF FUNCTIONS, SUCH AS:

1- POLITICAL GEOGRAPHIC REPRESENTATION AND GRAPHIC

2 - FINITE POLITICAL ISOMETRIC ANALYSIS AND REPRESENTATION

3- DIFFERENT GRAPHIC TYPES FOR DEMONSTARTION OF POLITICALICAL PROCESSES

4 - POLITICAL SITEMAP

5- INTERFACES WITH OTHER MODULE OF CIPSE PROGRAM.

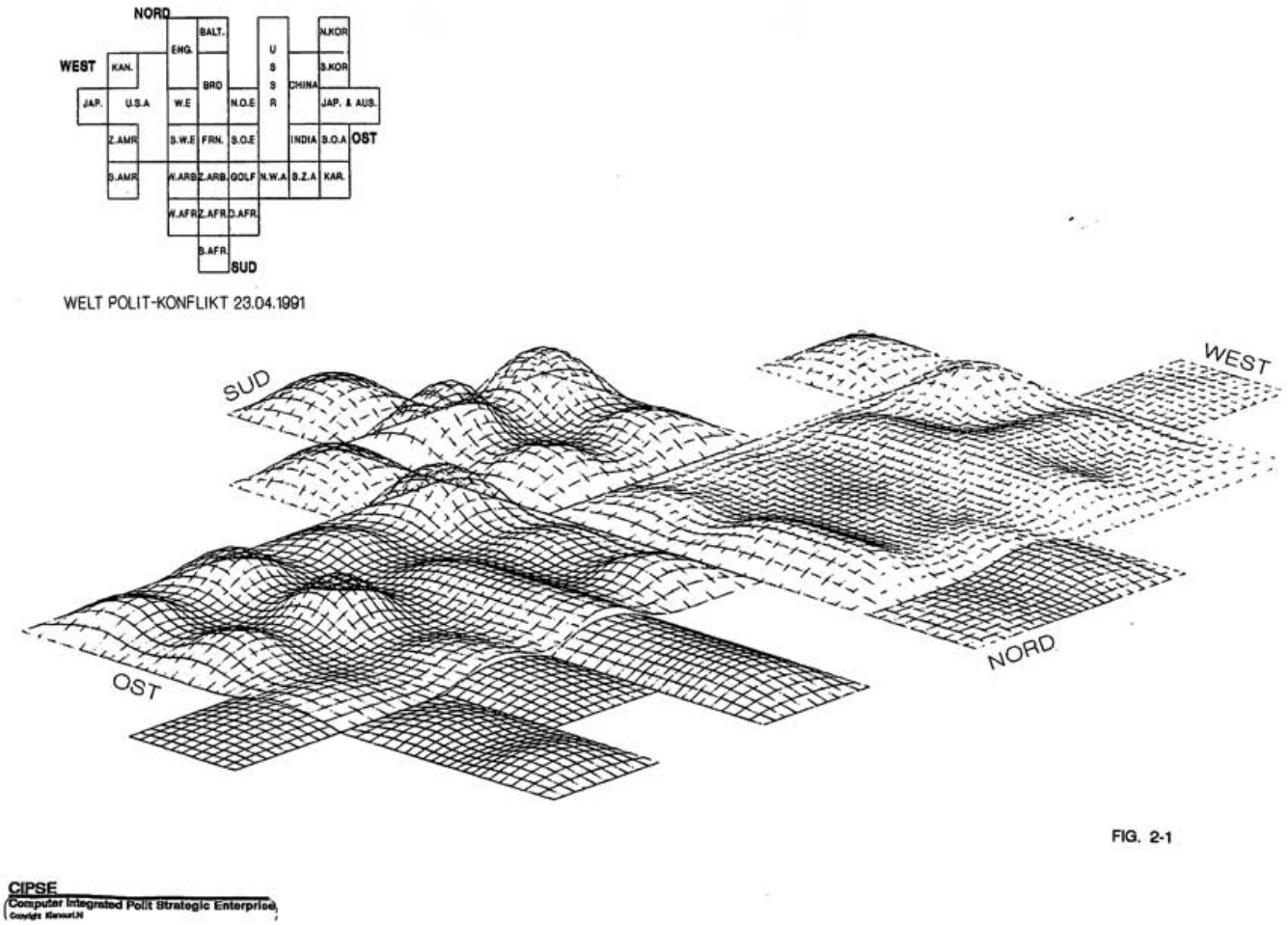


FIG 2-1 IS A POLITICAL-GEOGRAPHIC ISOMETRIC REPRESENTATION FROM WORLD POLITICALICAL PROCESSES. WORLD HAS DEVIDED IN 32 MOST IMPORTANT REGION/.· THE HIGH OF LINES IN I SOHETRIC DEMONSTRATION RELATED 1UTH THE DEGREE OF POLITICAL CONFLICT. THE GRAPHIC IS NOT SHOW THE KINEMATIC E¥J.'ECT OF BEHAVIOUR OF POLITICAL OBJECT. THE DEGREE OF CONFLICT IN GRAPHIC CAN ALSO REPRESENT WITH THE HELP OF COLOURS.

Capabilities of analyses typically support decision making for specific projects and/or limited geographic areas. The map database characteristics are typically appropriate for small-scale map output. Vector and raster data interfaces may be available. However, topology is usually the sole underlying data structure for spatial elements.

Computer Aided Design (CAD) systems store spatial data as graphic information. These maps as drawings with little or no data continuity across map sheets. Many CAD capabilities are important in mapping. For example, flexible and high-quality cartographic displays and output may be created with capabilities typically found in CAD systems. However, this technology does not incorporate spatial analysis or geographic data management functions. These systems are designed for drafting and design/modeling and are primarily used in this industry for data capture and map publishing.

The enterprising process starts with the design of the political solution. Computerized design systems are sometimes referred to as computer-aided [political Solution] design (CA[PS]D) or computer-aided [political solution] engineering (CA[PS]E). The use of computers for design applications started with numerically controlled plotters and automated drafting systems. This technology developed into systems that could design two-dimensional (2D) mechanical drawings very efficiently. To this was added surface-geometry graphics capability, in the form of three-dimensional (3D) shapes. They can include additional features such as high resolution, zoom, and visualization/transformation -that is, moving views.

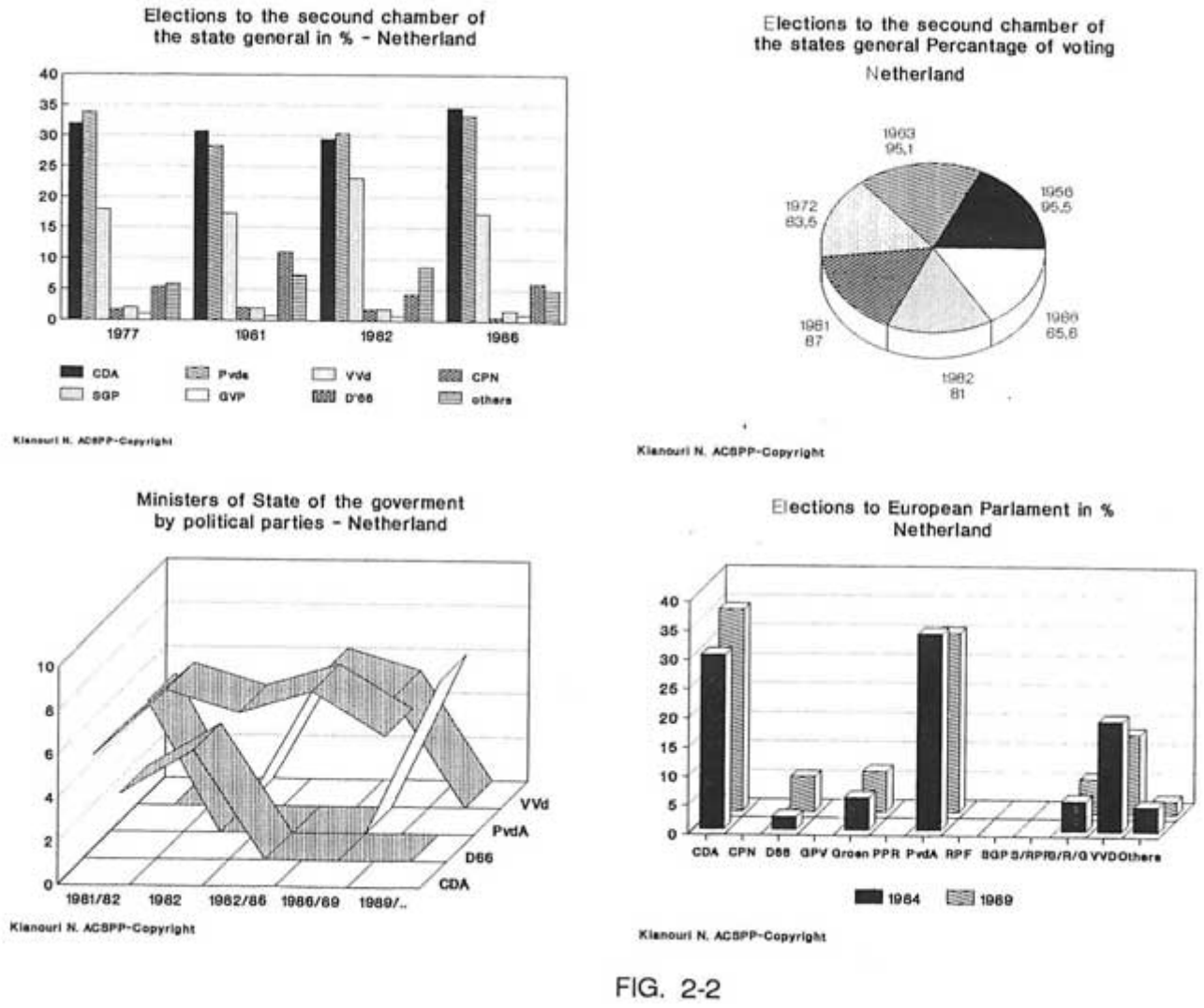


FIG. 2-2

FIG. 2 - 2 SHOWS THE DIFFERENT POSSIBILITIES OF POLITICAL GRAPHIC DEMONSTARTION.

2.2- List of Functions of Computer Aided [Political Solution] x (CAPSx or CA[PS]x) :

2.2.1- List of Computer Aided [Political solution] Design (CAPSD or CA[PS]D) :

- Generation of drawings
- Calculations
- Political-solution specification
- Simulation in graphic aspect
- Generation and maintenance of design parts lists 6- Estimates
- Political-solution amendment
- Define fundamental ideas of political graphic
- Two dimensional political-geographic procedures and library
- Three dimensional political-geographic procedures and library
- Define 4D Geometrical transmit ion of political geographic object.

2.2.2- List of Computer \ Automated [Political solution] Enterprising (CAE or CA[PS]E):

- Capture/recording of personnel hours
- Set-up enterprising times

- Set-up and enterprising interruptions
- Reasons for interruptions
- Political-facts tracking
- Order progress
- Quality assurance.

2.2.3- List of Computer Aided [Political Solution] Planning (CAPS or CA[PS]P) :

- Process planning
- Management process plans
- Assembly planning
- Test planning
- Produce planning
- Simulation of enterprising and assembly procedures
- Standardization and standards control
- Planning of the political-solution schedule
- Political-facts requirements planning
- Bill of Political facts
- Capacity requirements planning (due-date and capacity planning, broad-brush planning)
- Order entry
- Statistical analyzes.

2.3- Basic Definitions of Computer Aided [Political Solution] x (CA[PS]x):

Automated Mapping Technology - The automated mapping tools in an urban geographic information system provide flexibility in manipulating map information.

Data-base Management - Database management tools in an urban geographic information system provide flexibility in managing attribute data.

Land Records Information - Land records information provides the cartographic and attributes data needed by an urban geographic information system to accurately and completely record maps and location related attribute data.

Topological Data Structure - Topological data structure provided explicit definitions of the spatial relationships among points, lines, and polygons.

Spatial Analysis Capabilities - Spatial analysis tools provide the capability to retrieve, manipulate, and display map and location related attribute data.

AM/FH - Automated mapping/facilities management (AM/FM) systems combine a subset of the CAD system capabilities for interactive graphics, entry, and storage techniques with a database capability.

AM/LIS - Automated mapping/land information system: An AM/LIS refers to an LIS that uses computers to produce, edit, archive, and analyze the pictorial of the overall system.

CADD - Computer-aided drafting and design: Process wherein the user interacts with a visual image on a computer screen to create, modify, or manipulate drawings. The mathematical integrity of components within the resulting graphic model is adequate to support legal survey and engineering design processes essential in an AM/LIS.

2.4 - Types and use of Graphic Systems in Politic - There are a number of different types of computer graphics systems; differentiated in terms of the functions they can perform.

The area of functions and applications basically are three types, as follow:

- **Automated drafting**; this was the earliest application for computer graphics.
- **Design system;** these are the basic computer-aided design systems used to create, change, and store complex designs. This can include mechanical, electrical, and architectural design systems.
- **Engineering system;** this is the more powerful class of computer-aided engineering systems, which include engineering analysis, modeling, and simulation capabilities, in addition to the basic design functions. Computer graphics systems can perform many useful functions, including:

    1- Replacing paper as the medium used for drawing

    2- Presenting large amounts of polit-information rapidly

    3- Communicating visually instead of with political-text

    4- Enhancing the interpretation of political-data

    5- Displaying the results of computations as they occur

    6- Making and observing changes

    7- Simulating and verifying political-processes

    8- Representing theoretical results graphically.

These functions can be applied to many activities throughout the political-enterprising process, from the initial design of the solution to the control of the tools and process which produce it. Typical graphics applications include:

- Creating conceptual designs
- Generating drawings and documentation
- Modeling designs of political-solution and processes
- Changing or modifying designs
- Conducting engineering analyses
- Reviewing and evaluating designs
- Establishing a enterprising database
- Classifying and coding parts
- Political-planning processes
- Controlling tools and processes
- Generating management reports.

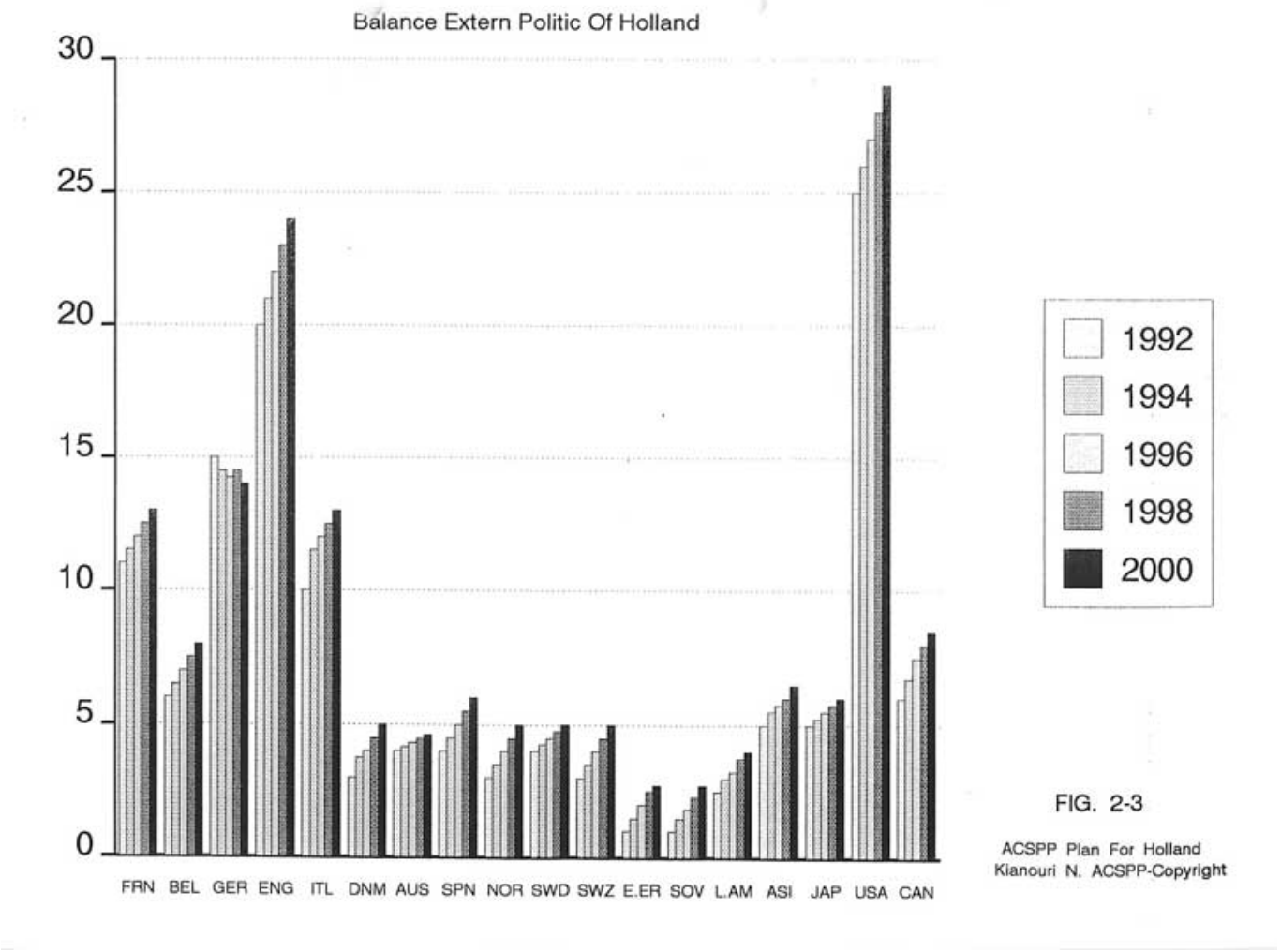


FIG.2.3. IS A GRAPHICAL DEMONSTRATION OF PROGNOSIS OF CHANGES IN FOREIGN POLICY OF HOLLAND FROM 1992 TO 2000 YEAR.

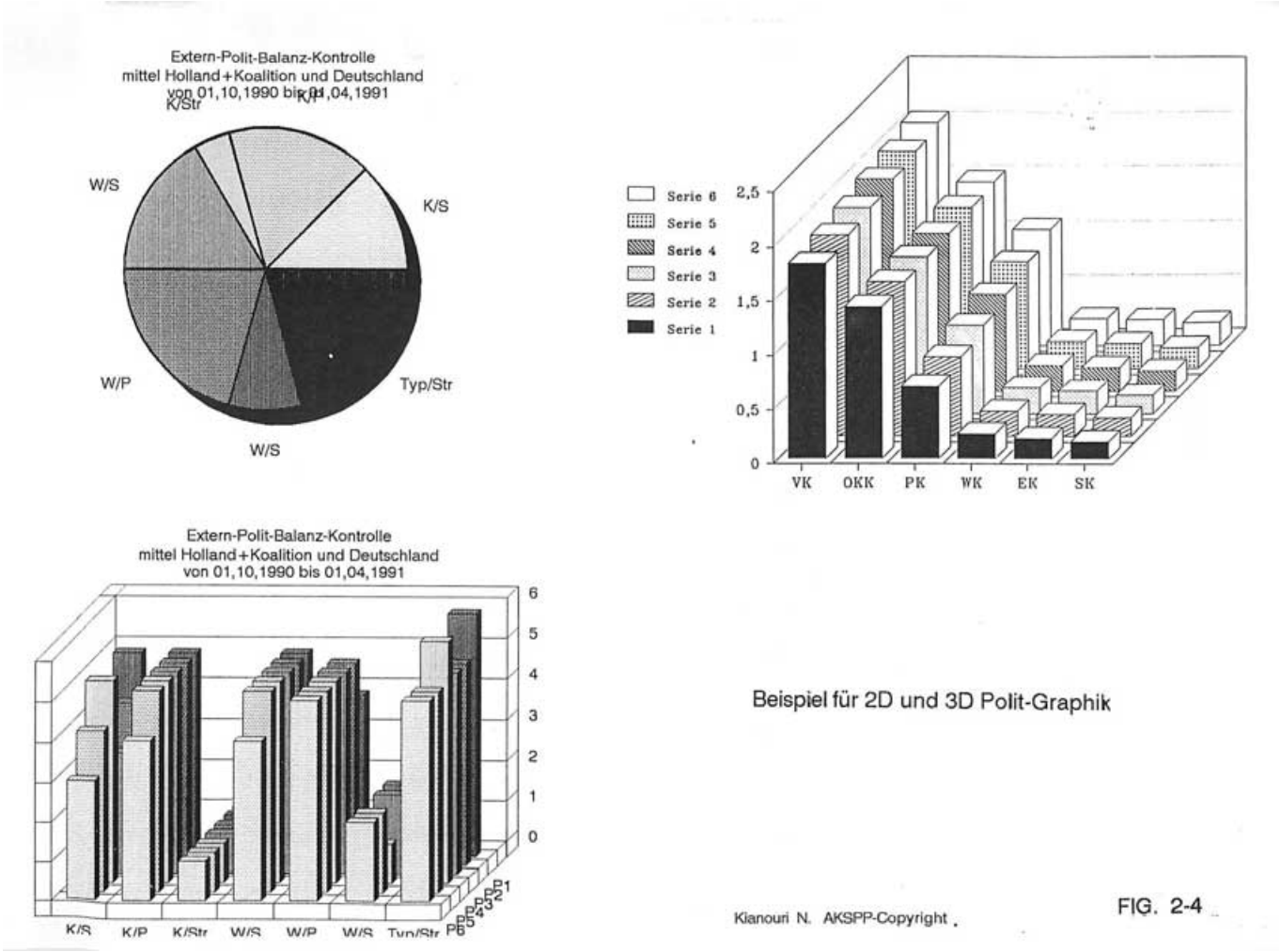


FIG.2.4. IS SHOWING THE DIFFERENT POLITICAL GRAPHIC TYPES. (FROM THE PLAN OF AUTOMATION CONTROL SYSTEM FOR POLITICALICAL PROCESS OF HOLLAND AS A POLITICAL OBJECT.)

Using a graphics system to create or change a design involves several basic operations, including:

- Drawing an political-geographic-object
- Changing an political-geographic-object
- Attaching political-geographic-objects to each other
- Translating objects (e.g., rotation or zoom)
- Magnifying or scaling objects
- Clipping objects
- Animating objects (i.e., making them appear to move).

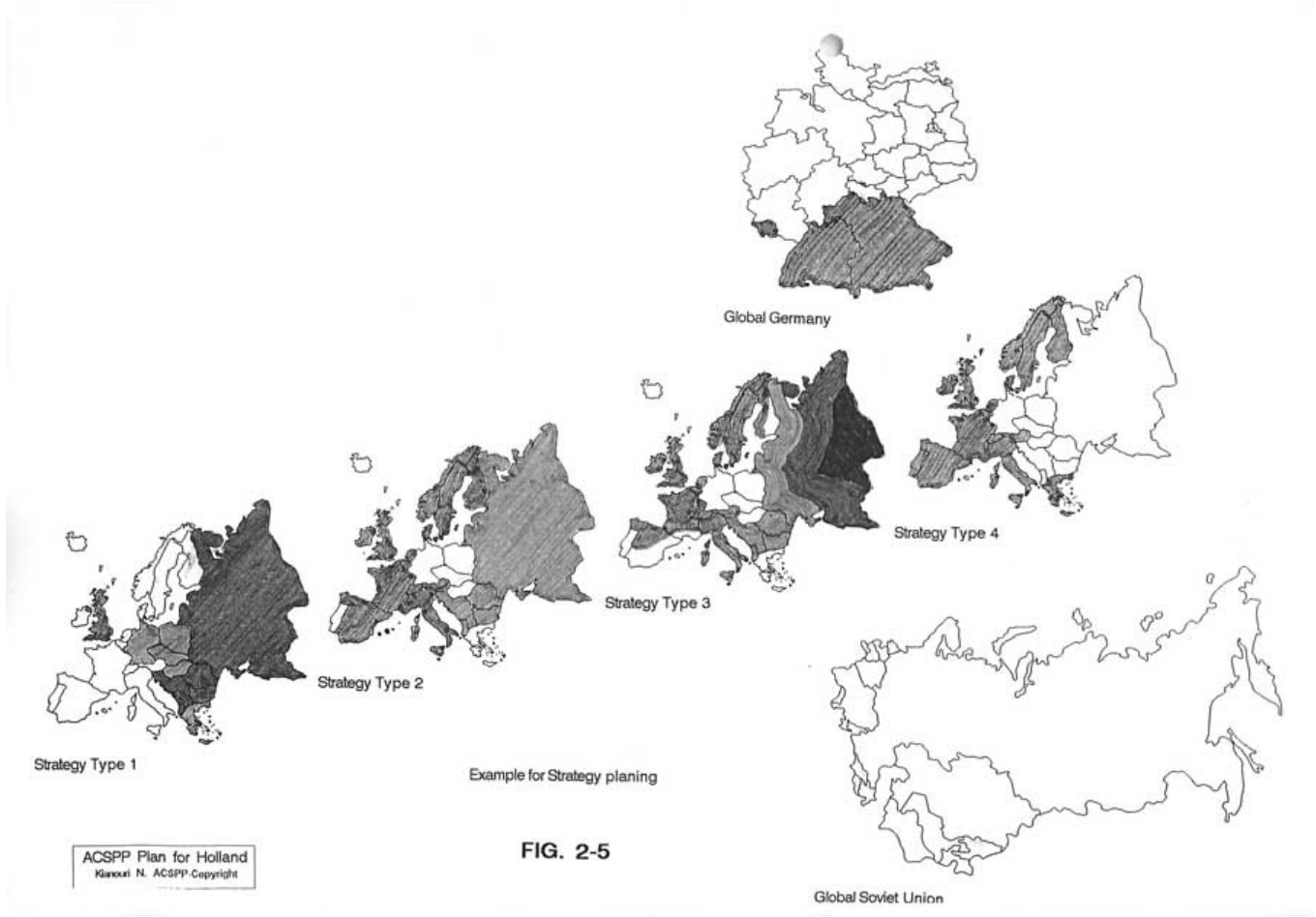


FIG. 2- 5 SHOWS THE FOUR DIFFERENT POLITICAL STRATEGIES ABOUT EUROPA. THE LEGEND OF COLOURS SHOWS THE DEGREE OF INTEGRATION IN BASE OF THE DEMOCRACY. BUT HERE HIJST MORE SAY THAT THESE FOUR TYPES ARE NOT ALL OF POLITICAL STRATEGIES ABOUT EUROPA.

Drawings an object itself can involve a number of operations for the graphics system, such as creating lines, symbols, letters, and geometric shapes.

Use of Computer Graphic in Policy is concerned with all aspects of using a computer to generate images. Under this definition, computer graphics includes the design of hardware such as displays, the algorithms that are necessary to generate political solution process on these displays, the software that is used by the graphics-system programmer and the application programmer, and the applications of computer-generated images.

We can classify applications of computer graphics in use of Politic into four main areas:

- Display of polit-information
- Design
- Simulation
- Political user interface.

Computer Graphic Allow political-users to enter political-data values in a spreadsheet format and to transform these data into bar, column, line, pie, and similar charts. Presentations programs include tools for creating data-driven charts and object-oriented graphics as well as features for arranging this information into full-fledged political presentations. Political-data analysis and visualization programs are used to make graphical sense out of large quantities of numerical data.

2.5- Dynamic Object-Oriented Graphics - The continued improvement and ·proliferation of graphics hardware for workstations and personal computers has brought increasing prominence to a newer style of software application program. This style relies on fast, high quality graphics displays coupled with

expressive input devices to achieve real-time animation and direct-manipulation interaction metaphors. The application program can be though of increasingly as a virtual machine, with a tangible two- or three-dimensional appearance, behavior and tactile response. The term dynamic graphics use to refer to this new style of program, which encompasses not only the now familiar mouse-based windowing applications but also real-time animation, interactive 3D, and virtual reality software.

As dynamic graphics applications become larger, more sophisticated, and move increasingly into the 3D realm, their software engineering problems have become acute. It is increasingly evident that software design must make more use of assemblies containing standard components that can be reused and extended from project to project.

2.5.1- Use of Desktop Publishing Software in Policy - Tools offering advanced capabilities that allow users to do page design at a level used in publications such as newsletters, magazines, and books. we can use Hardware Graphic, GEM, Word 5.5 or any other text, graphic and desktop publishing packages for better demonstration and show of political process or interview.

2.5.2- Hypermedia - Hypermedia refers to a set of technologies that deals with a new way of organizing and providing associations between related pieces of information. Al though many systems that claimed to be hypermedia have been developed, the concept of hypermedia is still constantly being defined and revised.

Hypermedia is a technology recently evolved to tackle the problem of organizations and access of multimedia information. Instead of organizing information as a continuous sequential flow of data, hypermedia encodes information into small self-contained units called nodes.

With the excitement generated by hypermedia presentation and the accompanying commercial interest, many current efforts are concentrated on the interface aspects of hypermedia. While interface is an important and integral part of the hypermedia system, much work is needed on the underlying layers of the system. A model and the architecture of a dynamic hypermedia system have also been described. It is believed that progress in this direction will lead to a more usable hypermedia system.

2.6- Computer Aided [Political solution] Design - CA[PS]D - This is an approach to using computers and computer graphics to automate engineering design tasks. There are several basic reasons for using CAD systems:

- To increase the political-solution ability and creativity of designers.
- To improve the quality of the design.
- To improve the efficiency of communications (in term of documentation, accessibility, speed, and standardization).
- To create a database for political-engineering and enterprising.
- To make the design of large, complex solution and systems practical and economical.

Designing political-solution for enterprising involves several basic stages of activity:

- Specification; defining the requirements for the political-solution which is to be designed.
- Design Strategy; selecting the approach to be taken for the design political-solution.
- Design political-solution; the actual detailed design work.
- Formalization; Final and documentation of the design.
- Implementation; translating the design into political enterprising processes.

The actual design and drafting work is usually the most visible part of the design process and has been the stage generally automated first. Some of the detailed activities involved during this stage include:

- Geometric construction
- Line work

- Symbol creation
- Dimensioning
- Cross-hatching
- Drawing manipulation
- Checking and correcting
- Modifying and changing.

An automated design system must be capable of handling all these activities. A variety of tools and techniques are used in CAD systems to make the design job easier and faster. CAD systems provide tools for the analysis and checking of design. They can also provide capabilities which are not practical or even feasible with manual methods. It would not be practical, or in some cases even possible.

Computer Aided [Political Solution] Design (CA[PS]D) means the usage of computer hardware and software for the design of solution that are needed by policy. CA[PS]D means the integration of computer science methods and engineering sciences in a computer-based system, providing a data base, a program library, and a communication sub system. We can consider CA[PS]D as a discipline that provides the required know how in computer hardware and software, in systems analysis and in engineering methodology for specifying, designing, implementing, introducing, and using computer-based systems for design purposes.

Generally, it can be said that today there are already very good and self-computing partial solutions available in the policy, predominantly in the CA[PS]D area. Considerable rationalization is possible with special solutions; thus, for example, in the graphic interactive generation of drawings (2D-CAD). To increase the effectiveness the application of automated design systems, advances are required in the following areas.

- User-friendly interfaces and more automated design tools can minimize the skills and training required to use CAD systems.
- Solid models can serve as a common database for both development and enterprising.
- Central libraries and Atlas of standard instructions for common design features can serve as a source for automating programs for enterprising tools.
- Integrated CAD systems can permit complete control over the design and enterprising process (e.g., logical and physical design).
- High-level tools for logic design will permit the designer to describe the functions required in behavioral terms which the system can convert to primitive circuits.
- More efficient handling of batch operations can significantly reduce design time.
- Common interfaces between different design tools (software) and devices (hardware) can promote the exchange of design data the integration of computer-aided political solution design and computer-aided political solution enterprising (CAPD/CAPE) systems.
- The integration of more support functions with CAD systems, such as word processing and electronic mail, can improve documentation and communication during design process.
- The use of CAD systems will migrate from the expert part designers to the designers of the end political solution (e. g., equipment designers) as the design tools become more automated. CAD systems will require less detailed knowledge and less interaction at the part design level.

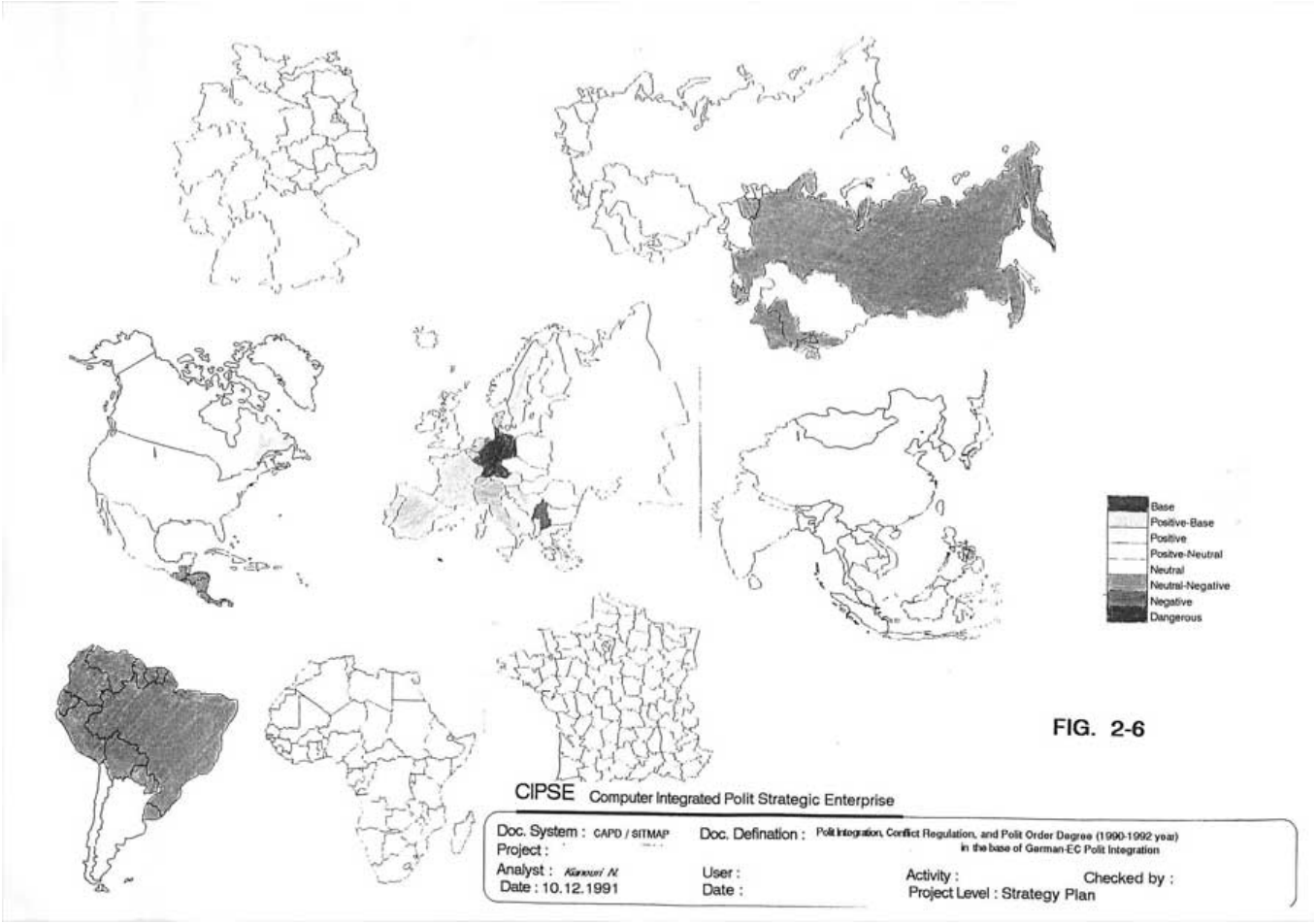


FIG.2.6. IS A PART OF "RH" PLAN. THE GRAPHICS ARE A GEOGRAPHIC DEMONSTRATION OF AMERICAN POLITICALICAL STARTEGY. THE CHANGES OF POLITICAL REGULATION POSSIBILITY AGAINST A CIVILIZE STRATEGY AND THE ALTERNATIVE STRATEGY.

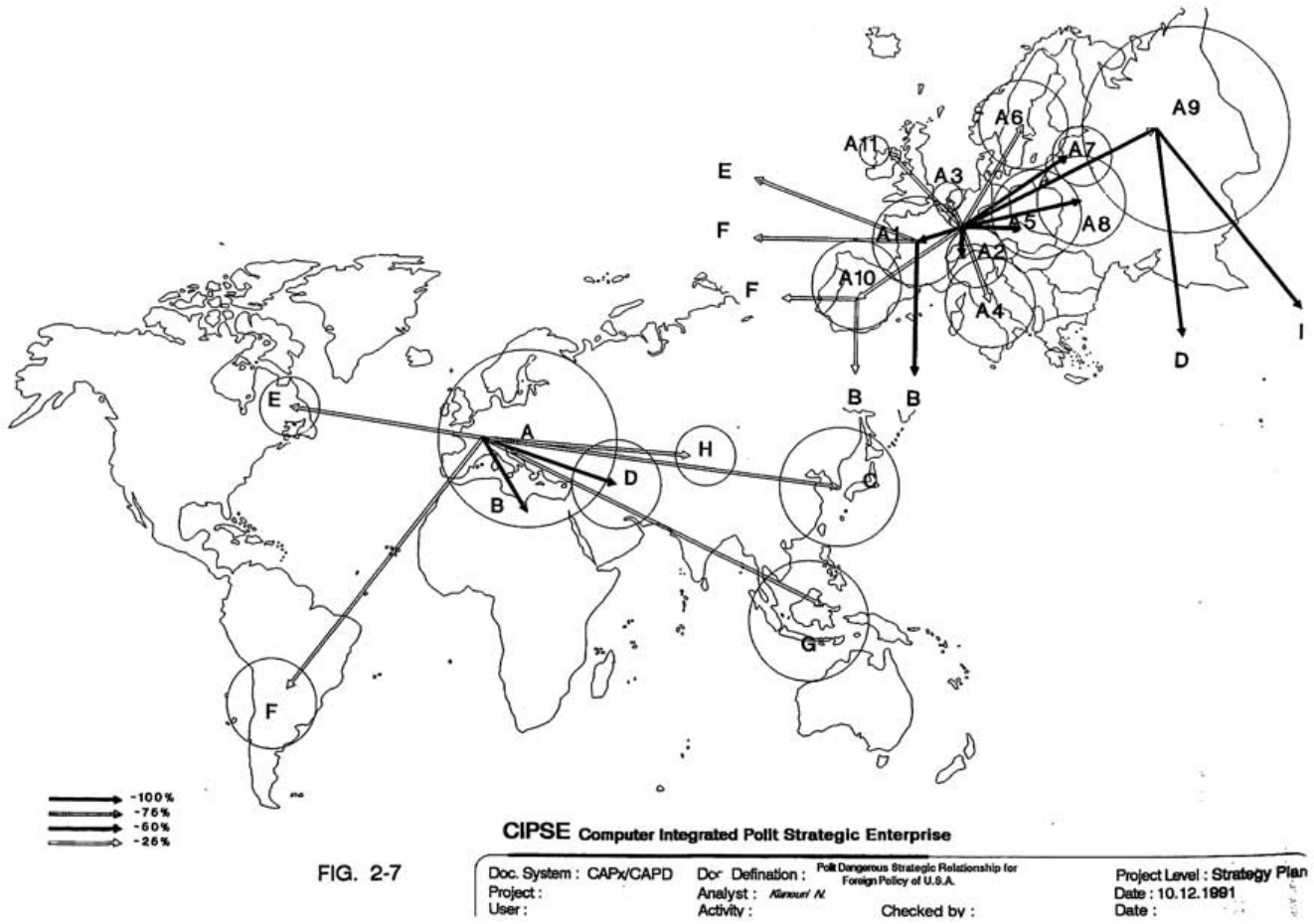


FIG.2.7. IS A PART OF “RH” PLAN. THE GRAPHICS ARE A GEOGRAPHIC DEMONSTRATION OF AN EXAMPLE POLITICALICAL STARTEGY. THE MOST IMPORTANT POLITICAL RELATIONSHIPS IN CONTEX OF A POLITICAL STRATEGY.

The enterprising process starts with the design of the solution. Computerized design systems are sometimes referred to as computer aided design (CAD) or computer-aided engineering (CAE). The use of computers for design applications started with numerically controlled plotters and automated drafting systems. This technology developed into systems that could design two-dimensional (2D) political - geographic drawings very efficiently. To this was added surface geometry graphics capability, in the form of (3D) shapes.

Computer graphics technology provides the base for Computer Automated Design (CAD) applications, which have made the automation of the design process possible. CAD systems increase the solution ability of designers and speed up the process of solution development. They are used throughout the design process, analysis, documentation, and enterprising process programming. CAD permits changes to be made quickly and complex designs to be implemented without errors.

The principle difference between an automated design system and a drafting system is the modeling and analysis capabilities of the automated system. The major activities involved in the operation of a CAD system are building a model, viewing the model, and handling data. CAD is a data-intensive process. Much more computer power is required for computation and data handling than for generating graphics output. CAD systems establish a database which can be shared by other organizations in development and enterprising to perform engineering tasks. They procedure outputs for enterprising in addition to the design itself.

A variety of tools and techniques are used in CAD systems to make the design job easier and faster. CAD systems provide tools for the analysis and checking of designs. They can also provide capabilities which are not practical or even feasible with manual methods (e.g., animation, zooming).

Geometric Modeling Geometric model is a mathematical representation of the geometry of objects. Using mathematical models to represent political-real-world objects permits computers to display and manipulate images as data. Such models can be used not only to create images for display but for

engineering analyses. In an engineering design application, geometric models can be used for several purposes:

- Creating modifying engineering drawings.
- Creating a model for engineering analyses, such as finite element analysis (FEA).
- Geographic edge representation, represent objects using points and contours. This representation is primarily suited to two-dimensional geometries. Although edge models can be used to generate spatial representations, these tend to be unclear. It is also impossible to show sections or shadowing.
- Surface representation; the surface have boundaries which are defined by two neighboring, touching or intersecting surfaces. Points are the result of the intersection of three surfaces, or constitute definitions for establishing the location of contour elements.
- Volume representation is constructed from set-theoretic assembly of various volume-oriented basic forms.

2.7- Political Geographic Information System - The substantial improvement in computer systems during the last two decades has made it much easier to apply computer technology to the problem of storing, manipulating and analyzing large volumes of data. These geographic information systems comprise some quite sophisticated computer software, but they all contain the following major components:

- A data input subsystem which collects and/or processes spatial data derived from existing maps, remote sensors, etc.
- A data storage and retrieval subsystem which organizes the spatial data in a form which permits it to be quickly retrieved by the user for subsequent analysis, as well as permitting rapid and updates and corrections to be made to the spatial database.
- A data manipulation and analysis subsystem which performs a variety of tasks such as changing the form of the data through user defined aggregation rules or producing estimates of parameters and constraints for various space-time optimization or simulation models.
- A data reporting subsystem which is capable of displaying all or part of the models database as well as manipulated data and the output from spatial models in tabular or map form. The creation of these map displays involves what is called digital or computer cartography. This is an area which represents a considerable conceptual extension of traditional cartographic approaches as well as a substantial change in the tools utilized in creating the cartographic displays.

At present, there are several categories of information technology which tend to be associated with vendor or government developed hardware/software systems. They generally fall into the following categories:

- Engineering mapping systems (typically a microcomputer CAPD/CAPE system for applications such as photogrammetry, topographic base maps, road engineering, utilizes, facility management, tax and land cadastral information, geodetic data, etc.);
- Property or parcel information systems (typically a mainframe based DBMS system to handle attributes associated with the land parcel) ;
- Generalized thematic and Statistical mapping systems (typically on both mini and mainframe computers and being used for natural resource management, forest inventories, vegetation, geology, soils, census mapping, environmental planning and assessment, etc);
- Bibliographic systems which catalog a variety of bibliographic data sets about geographic documents;
- Geographic base file systems associated with street networks and aerial units which they define (most common of these is the GBF /DIME-File system developed by the U. S. Bur-eau of the Census); and
- Image processing systems (typically associated with processing of land satellite and related

satellite image data).

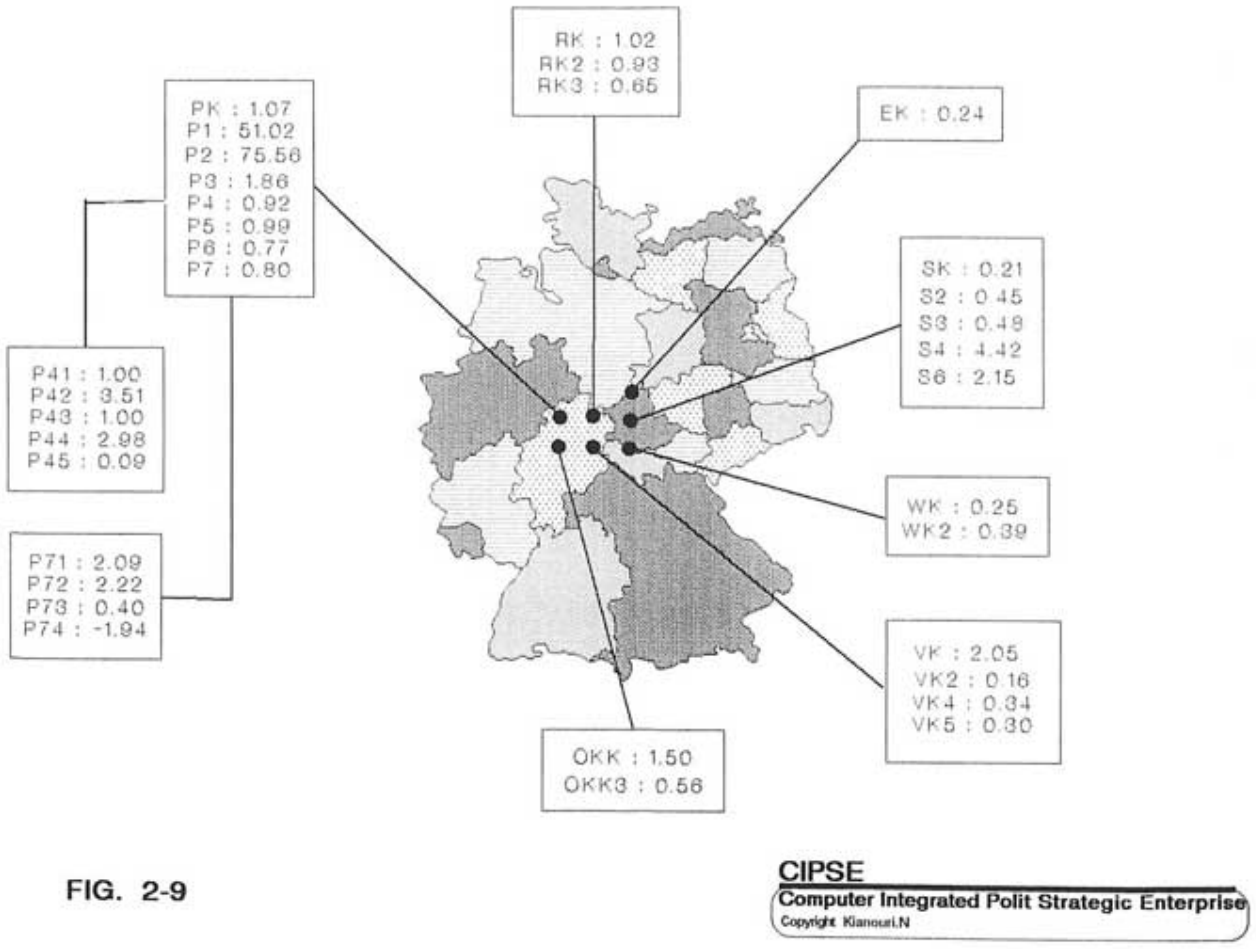


FIG.2.9. SHOW POLITICAL SITEMAP OF GERMANY THE VARIABLES ARE ABOUT POLITICAL, POLITICALECONOKIC DEFENCE, POLITICAL LAWL, AND OTHER SUBSYSTEMS OF POLICY, AND VALUES OF THEM IN TIME POINT OF 01. 01.1995.

Identifying Local Government Functions for Graphic Atlas All functions that contribute to the goals of the organization must be reviewed to determine how a geographic information system can be used to assist in their improvement. This functions, or tasks, are usually defined in the mission statements of the various departments, bureaus, divisions, sections, or other offices within the organizational structure of the government. Each one can be associated with a goal, otherwise it would not be performed.

For building these Graphic libraries we can use CAPD package, or we can make the pictures with use scanner technique, designer terminal and designing dialog process. The following list is example for political geographic computer atlas:

Foreign Computer Graphic Atlas consists of:

- Demographic Atlas
- Political communications Atlas
- Political situation Atlas
- Political economic Atlas (Cereals, Fruits, Beverages, Tobacco, Sugar and forest product, Vegetable oils, Livestock and products, Fibers and Textiles, Fuel and powers, iron, steel, and ferroalloys, Non ferrous metal, Minerals, Industries, ...)
- Political social Atlas
- Political defense and offence Atlas
- Political Geographic Atlas

- Environment Atlas.

Intern Computer Political Graphic Atlas consists of:

- Topography and cartography
- Geology, Geophysics, Mineral Resources
- Geomorphology
- Climate
- Vegetation and Biography
- Water management
- Historical Geography
- Settlements
- Dialects and Regional Ethnology
- Population
- Public Utilities
- Agriculture
- Fisheries
- Manufacturing Industries
- Commerce and Transportation
- Physical Planning
- Other Political, Political-social, -economic, -defense, -law, -communication, -organization, -science, -geographic Atlas.

CIPSE Computer Work-Atlas:

- Country Atlas
- Continent Atlas
- Regional Atlas
- Sub regional Atlas
- Bloc Atlas.

2.8- Computer-Automated [Political Solution] Enterprising (CA[PS]E)

CAPE is a concept that will be used to describe the general category of advanced approaches to enterprising which use the power of the computer to automate the handling of data as well as the operations in the process. CAPSE employs many modern political enterprising technologies. Some of the topics are computer-aided design CAD, distributed processing, computer modeling and simulation, and data communications.

CAPSE evolved from relatively simple stand-alone applications, such as tool control, to completely integrated enterprising systems.

The major trend for the future in the use of computers in enterprising is to integrate all the functions of creating political solution operations into a computer-controlled system. Many people see such "enterprise of the future" as the key to the next industrial revolution. It is sometimes thought that computers displace people in enterprising jobs. The trend of future seems to be automated, "people less“ factories where computers and programs will do all the work.

Computer-automated political-enterprising (CAPE) is the result of an evolution of computer applications in the political-enterprise. Today's complex solution or output require· sophisticated enterprising processes that need computers to control them. Since computers are basically machines that can

manipulate and store data efficiently, they are used to handle the large amounts of data efficiently; they are used to handle the large amounts of data that drive modern enterprising operations. The computer system in enterprising manages the flow of information between the organizations and operations involved in making a political-solution. There are several types of data which together describe what solution is to be enterprise, when, and how. The amount and nature of this data will vary for different types of enterprising operations.

There are a number of different technologies involved in CAE. Each is developing rapidly, and together they are making complex processes and computer-controlled enterprise possible.

2.9- Automated Political Geographic System - The description of a political geographic information system presented by two significant factors that influence its definition. First, there are as many definitions as there are disciplines involved in using geographic information systems: geography, urban planning, engineering, data processing, environmental science, and others. Second, a geographic information system consists of a set of tools that professionals in these disciplines use to improve the way they work. Just as telephones, calculators, and word processors are tools for making work easier, faster, and more meaningful, a ·geographic information system provides tools to professionals to improve their efficiency and effectiveness in working with map information and nongraphics attribute data.

Proponents of the automated geographic system technology point out a whole series of advantages which are enumerated in the literature. they include the following:

- Data are maintained in a physically compact format (i. e., the magnetic file).
- Data can be maintained and extracted at lower cost per unit of data handled.
- Data can be retrieved with much greater speed.
- Various computerized tools allow for a variety of types of manipulation including map measurement, map overlay, transformation, graphic design, and database manipulation.
- Graphic and nongraphic (i.e., attribute information) can be merged and manipulated simultaneously in a 'related' manner.
- Rapid and repeated analytic testing of conceptual models about geography can be performed (i.e., land suitability/capability). This facilities the evaluation of both scientific and policy criteria over large areas in short periods of time.
- Changes analysis can be efficiently performed for two or more different time periods.
- Interactive graphic design and automated drafting tools can be applied to cartographic design and political solution.
- Certain forms of analysis can be performed cost-effectively that simply could not be done efficiently if performed manually (i.e., digital terrain analysis, calculations such as slope aspect, sun intensity, watershed, overlay analysis of multiple sets of complex polygon map sheets, etc.)
- There is a resultant tendency to integrate data collect ins , spatial analysis, and decision-making processes into a common information flow context. This has great advantages in terms of efficiency and accountability.

2.9.1- Computer-Automated Engineering (CAE) - Computer-automated engineering (CAE) is a tool for a wide variety of engineering tasks in both development and enterprising. It can be used for more than just graphics design. The entire engineering implementation can be automated. Creating a geometric model is the key to making this possible.

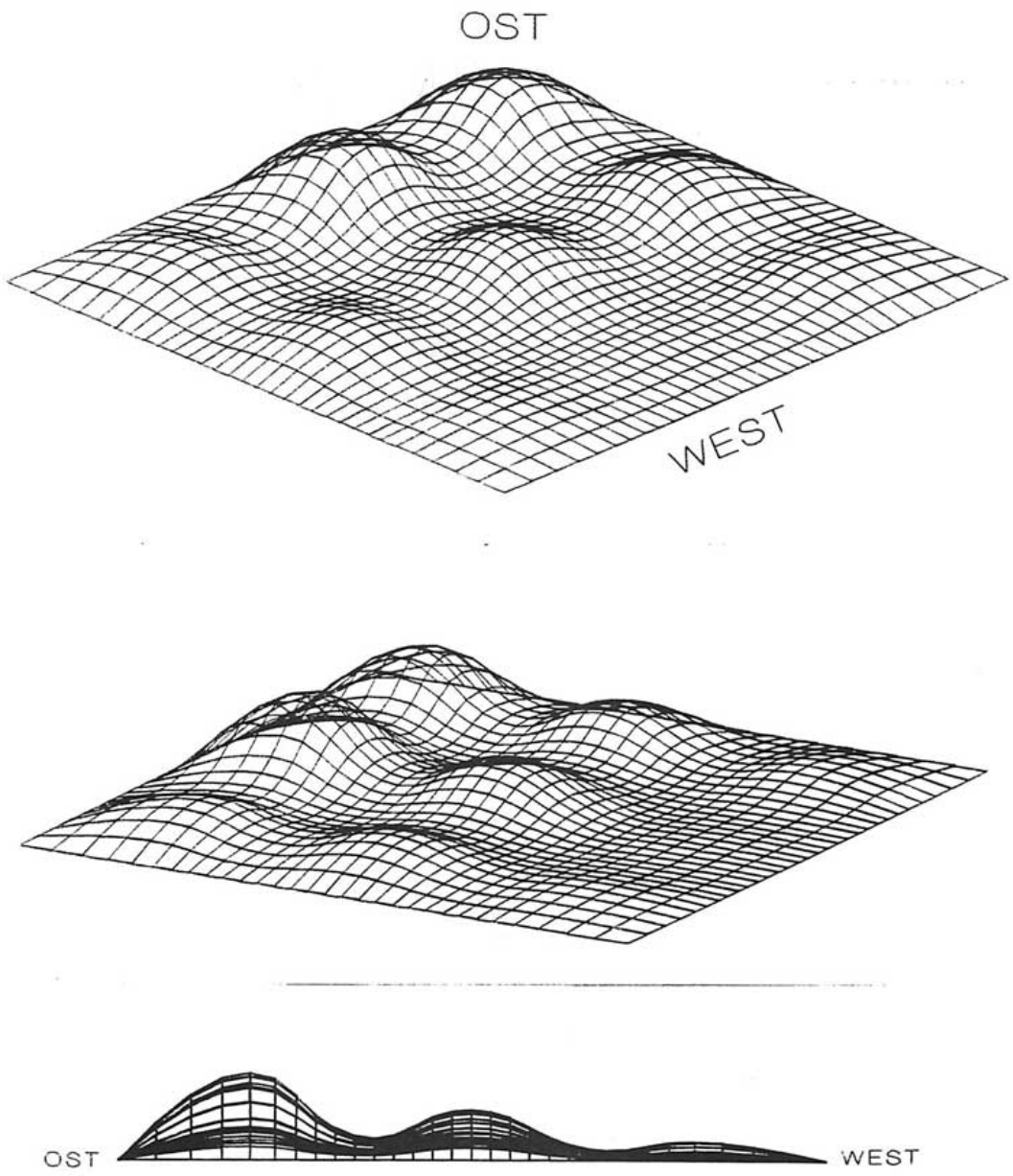
In the design process, CAE tools can be used for analyzing physical properties, stresses, and kinematics. the availability of advanced CAE tools makes it possible to perform finite element analysis (FEA) and kinematics analysis that would not have been practical or economical in the past. These techniques permit the designer to detect potential problems and optimize the design without having to build and test prototypes.

In enterprising, engineering tasks such as process planning, group technology (GT), tool design, and test data generation can be performed on a CAE system. Traditionally, these tasks required a number of

different people with special skills.

Enterprising operations can be simulated on a CAE system to debug a new process or optimize the operation of an existing one. Simulations can be conducted on individual machines, the layout of solution operations, or the flow of an entire process. Computer graphics technology permits the user to visualize for decision making. Integrated CAE systems make it possible to establish a common database for development and enterprising and to accelerate the introduction of new designs into political solution.

2.9.2- Finite Political Geographic Analysis - Is a mathematical technique that is used to calculate stresses in political behavior structures. The technique involves separating an object into many small uniform pieces or elements, then using stress and deflection equations to describe the behavior of each one when forces are exerted on the entire structure.



PolitischerKonflikt- Euroupa 23.03.1991

FIG. 2-8

CIPSE
Computer Integrated Polit Strategic Enterprise
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IN **FIG.2.8.** YOU CAN SEE THE EUROPEAN REGION AS A 3D ISOMETRIC GRAPHICAL REPRESENTATION. THE PRICTURE REPRESENT A KINEMATICAL SLOHOTION OF POLITICAL CONFLICT TRANSFORM FROM EAST EUROPA TO 1IEST EUROPA IN THE DATE OF 23.03.1991.

IN **FIG.1.6**. (CHAPTER 1) YOU CAN SEE THE EXAMPLES FOR POLITICAL-GEOGRAPHIC IN 2D / 3D DB 4 D (KINAMATIC REPRESENTATION)

The basic method used for FEA involves the following steps:

- **Building the model;** this is usually an interactive process. The geometric model of the object is then divided into simple elements, such as cubes, or shells. These create the finite element model or mesh which is used for analysis.
- **Data entry and computation;** the elements of the model are assigned real political properties on the basis of their political-factor. Forces are identified which are to affect the entire structure in the particular application involved. The coordinates of each of the elements, together with their political real properties and the forces applied, are feed to the FEA program. The computer program then calculates the deflection and distribution of "stress throughout the structure by solving all the equations simultaneously.
- **Output;** The results of the calculations involve large amounts of data which must be condensed into a meaning form to be useful for design analysis. Contour plot can identify lines of constant strain; color codes can indicate the areas of highest stress. Graphics output allows the designer to see deformations and patterns of stress without having to analyze large volumes of data.

2.9.3- Political-Kinematics Analysis - Political-kinematics analysis, which is sometimes also referred to as dynamic analysis, is the simulation of the behavior of political objects when they are in change. Kinematics programs use geometric models and FEA models to create animated images of the movements of political-system behavior and complex structures. They can also determine the velocities, accelerations, and loads involved. This can give a designer the ability to see how a design will behave when it is actually used. Slow-motion animation can reveal potential problems, such as unwanted vibrations and dangerous deflections. By rotating 3D models, parts can be tested for political system behaviors that undergo cyclical, repetitive motion can be traced. Computer simulation can give a designer a view of events that occur too rapidly or fast to see in real life. Kinematics analysis also makes it possible to test political-objects that would not be practical or even feasible to test in real life.

Model testing is a form of kinematics analysis that is used to predict the behavior of large, complex structures. It combines the analytical data from a finite political geographic analysis model with experimental data collected from testing real political-area models.

2.9.4- Computer-automated engineering (CAE) tools - These use computer graphics technologies to perform engineering graphic technologies to perform engineering tasks. They include Computer Aided Design (CAD) techniques such as geometric modeling and finite element analysis (FEA). Also included are simulation tools for kinematics analysis and line modeling.

2.10- CAPSx Interfaces with other CIPSE Stations:

2.10.1- CAPSx / CAPSSIM (using of Computer Aided Political system SIMulation in CAPSx Station) - Graphic output means information displayed on the screen, such as a visual display of the layout of the system being modeled, on which the movement of entities might be shown. It would be text or numerical information, as well as histograms, graphs or plots, displayed on the screen rather than sent to a printer.

Thanks to the improvements in computers, especially in personal computers, in recent years, virtually every simulation package now provides some facility graphical output, permitting the animation of simulation models. With these facilities a visual picture of the system being modeled can be displayed on the screen. As entities move through the system a character or icon can be moved on the screen to mimic the status of the model. The complexity of the system can make it difficult for Political users and management to appreciate the interaction between system elements. Numerical output isn't always enough. The best way to describe a system often is whit pictures. Moving pictures show the dynamic operation of a political real system.

Two areas that are currently of interest across the entire of computer-aided engineering are progressively more sophisticated graphics and expert systems. Many general-purpose simulation languages now include dynamic graphics, and they are becoming more common with generalized simulators.

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more common with generalized simulators.

2.10.2- CAPSx / MPIS - After funds are finally approved to implement the geographic information system, the project takes a different focus. Instead of studying throughout the organization and promoting the value of GIS technology throughout the organization, GIS advocates find themselves responsible for the successful implementation and management of the system. This means that they must begin to create the digital base map that will be used for the many different applications to be implemented, and they must assemble the appropriate staff and organizational support structures to ensure the successful operation of the system on a long-term basis.

Some of the principle advantages of computer-aided design systems include:

- Reduced design time
- Fewer errors
- Improved functionality
- More standardization
- Improved control of engineering changes
- Higher designer solution ability
- Lower costs.

2.10.3- CAPSx / PISE - The design process can be broken down into the following phases:

- Conception (specification analysis, compilation of political-solution variants, assessment of the political-solution),
- Development (specification of the political solution concept, scale design, model construction, assessment of the political-solutions),
- Detail (representation of individual parts, assessment of the political solutions). Large political design systems also incorporate libraries of standard symbols, dimensioning systems, political geographic Atlas formats, and data bases for the storage and retrieval of designs.

2.10.4- CAPSx / PDBHS (Use of Political Database Management System in CAPSx Station) - With the progress in the development of practical toward three-dimensional CAPSx systems, design databases (CAPSx databases; have been recognized by researchers as a key facility for the integration of a variety of political-solution and enterprising design activities. Database technologies have also become the subject of renewed interest as an important factor in the realization of corporate information management system.

Conventional database technologies intended for applications in policy fields have come of age. Database architecture concepts, such as ANSI/PARK, data models such as the hierarchical data model, the network data model, the relational data model, the semantic net model, etc., and database management systems have all been developed.

An appropriate commercial database management system can readily be selected. Currently, the main research in database fields is in knowledge-based models and multimedia databases. However, there are some inherent problems involved in meeting design activity environments.

- A CAPSx database has to manage various kinds of data, such as picture image data, next data, coded data, fixed-and varible-lenght data, and so on, i.e. it must be a multimedia database.
- An extremely large database must be processed. The size of the CAPSx database will probably become of the order of several tens of gigabytes.
- Many designers work jointly to design a political-solution.
- A designer is a domain user.
- A design process is a tentative and iterative one, and is executed in conversational mode.

The object design results, which model a real political object in the real world, are transferred between many designers and different departments, such as political solution design, enterprising design, and enterprising planning and control.

By mapping these particular CAPSx features into database functions, the following important requirements for database functions have been identified.

- A large-volume database management facility with high-speed response time.
- A concurrency control mechanism.
- A handling mechanism for non-structured data, such as texts and pictures.
- Data independency.
- A designer-system communication facility with high-level terms.
- Data model reflected data semantics and geometric model.

In CAPSx systems, applications communicate with each other by means of database. CAPSx databases have been recognized as a key facility for the integration of a variety of political-solution and enterprising activities, and for the realization of a corporate information management system.

In contrast computational geometry, theoretical and practical work on systems for managing large volumes of data has occupied the attention of a substantial number of academic and commercial researches in computer science. Although a number of these systems have been applied to simple forms of spatial data (e.g., point data), their development emphasis on one-dimensional data has limited their utility for general spatial data handling. Current approaches tend to make use of a general database management system (DBMS) for handling the spatial attribute information and specialized software for storage, retrieval and manipulation of the spatial data.

The inability of existing DBMS to efficiently handle volumes of spatial data represents a real obstacle in the development of global databases. Similar are found in the image processing field where picture data management is also of serious concern.

2.10.5- CAPSx / PPMS (Use of Political Projecting Management in CAPSx) - A complete understanding of how the organization uses geographic information in performing its functions is necessary in order to identify the potential benefits of a GIS and ensure that its USE will be consistent with the long-term goals of the organization. This effort is most valuable when the analysis includes all aspects of the organization so that information-sharing opportunities can be investigated and so future expansion in later phases of the project can be properly planned.

A comprehensive long-term plan that analyzes the needs of the organization over 5-10 year time period will ensure that the use of the CAPGIS will be consistent with the goals of political organization and thus prevent unrealized expectations and disappointment. The long range plan allows decision-makers to evaluate the applicability of the system to the appropriate resources are available at the time they are needed during the course of its development.

A good long-range plan meets the following objectives:

- **Obtain high-level support;** Not only does the long-range plan bring opportunities for improving government to the attention of decision makers, but it also gives them confidence that those who advocate the new CAPGIS technology are competent and can make the project succeed.
- **Identify all potential applications;** A comprehensive long-range plan considers all of the geographic information needs of the organization and thus ensures that no improvement opportunities are omitted from consideration. This is especially important with geographic information systems because many local government officials are not aware of the full capabilities of the technology and may tend to assume that their needs cannot be satisfied by using a CAPGIS.
- **Prioritize applications for orderly implementation;** If a long range plan is successful at identifying all potential applications and is related to the strategic and tactical plans of the city or country as a whole, then it is possible to schedule or prioritize the implementation of applications in the order that will be most beneficial to the political organization. It also ensures that those applications or data bases that are needed to be in place prior to others

that need them are, in fact, completed prior to continuing development or expansion.

- **Obtain maximum benefits political organization-wide;** since one of the major features of a GIS is its ability to integrate information from a number of different sources, the long range plan can identify information-sharing opportunities that had never before been known, or had never been possible without a CAPGIS. Separate functions that had never shared information before can realize improvements through geographic data integration. This assures a city- or country-wide benefit analysis and prevents specialized interests from impending full benefit realization.
- Identify resource requirements;

Above all, a long-range plan for a geographic information system must relate directly to the long-range plans of the local government it serves.

2.10.6- CAPSx / PECMS (Use of Communication in CAPSx) - is related with graphic data communication between users in or between political enterprises. These multi-user applications involve precisely synchronized control and scheduling on multicast networks, with some technologies as:

- Window systems
- Adequately proportioned bandwidth
- Video graphic boards
- Other special purpose video and graphics utilities such a chroma, alpha and external keys.

2.10.7- CAPSx / POMS (Use of Political Organization Management in CAPSx) with a potential of millions dollars to be invested in a multi-user geographic information system, the most important resources needed to ensure that the funds are appropriately used are the people responsible for implementing and operating the system.

The general roles that people in· a CAPGIS can list as: manager, analyst, system administrator, Programmer, processor, data-base administrator, cartographer, drafter, digitizer, end-user:

Manager; The GIS Manage is responsible for managing both the GIS project team and the system itself after it is implemented. This person understands how the GIS can improve the organization and communicates with the managers in user departments to ensure that the GIS can meet their needs.

Analyst; This person utilizes technical knowledge and experience in applying GIS technology to solve particular user problems and satisfy their information needs.

System Administrator; Once the system is installed and operating correctly, the GIS project team must ensure that the hardware and software continues is responsible for maintaining the system in a continuous operational mode, responding to and solving problems as they occur.

Programmer; The GIS programming translates the application specifications prepared by the GIS Analyst into programs, user menus, an macro-level commands to perform specific functions needed by the users of the GIS.

2.10.8- CAPSx / PIS (Use of Political Intelligent System in CAPSx Station) Artificial intelligence (AI) technology and expert systems in particular, are finding some applications in CAD. AI languages and logic programming also lend themselves to many of the IC design tasks (e.g., placement, analysis, test generation). They are relatively easy to use, can deal with symbolic programming techniques, and allow frequent modification.

The ability of an object-oriented database to contain active rules embodying various forms of design knowledge allows the possibility of automatic inferences being performed about the current state of the design, and thus gives rise to the possibility of the evolution of a new generation of intelligent CAD systems. These types of system would be classified as knowledge-based decision support systems in that their intent is not fully automate the design process, but to provide intelligent assistance to the human designer at a much higher level than is provided by purely geometric modeling systems.

2.10.9- CAPSx/PES (Use of Political Expert system in CAPSx Station) - As political solution become more complex, the design process must be automated to minimize the time, cost, and errors involved.

Expert systems offer the potential to provide additional tools to the designer beyond the highly structured design systems that existed previously. The use of logic programming and knowledge-based rules can add automated reasoning and deduction to a complex design problem. This could crease flexibility in design constraints, try out alternatives, and optimize the design.

2.10.10- CAPSx / PESK (Use of political Software Management in CAPSx Station) - Some of the major functions performed by the graphics software are:

- Converting user commands and data inputs into structured geometric data
- Generating primitive graphic elements from the data, which are used to build a geometric model
- Converting user editing commands into modifications
- Describing the geometric model to the graphics system in the form of commands for displaying the image
- Converting user commands for changing the displayed image into geometric transformations (e.g., scaling zoom, rotation)
- Controlling the display (e. g., updating the image, windowing, clipping the image)
- Providing utility functions (e.g., measurements).

Packages are essentially drawings programs, but they offer additional features specially required by architects and engineers, for whom they were created. like all drawing programs, CAD programs use objects to create complex drawings, but they allow a degree of precision unavailable in the lower-level packages. They automatically calculated and display dimensions. These programs also allow a library of symbols to be stored on disk so that you can insert, scale, and rotate them as needed. Many CAD packages drawings programs require more planning, and skill than painting programs. We can name CAD packages that use in simple level of CIPSE as:

Auto CAD; A three dimensional computer aided drafting program which runs on 8-bit and 16-bit microcomputers. AutoCAD acts like a word processor for drawings. It lets the user make drawings from simple components such as lines (of any width), circles, arcs, and solid filled areas. Drawings may be annotated with text of any size, inserted at any point and at any orientation. The drawings can be stored on disc and in turn used as components in other drawings. The ability to define parts libraries simply by drawing them, and to write custom menus, allow specialized systems to be easily developed under AutoCAD.

AutoSHADE and AutoFLIX; Enables Users to create perspective and full color hard copy output of drawings. Created using the three-dimensional capabilities of AutoCAD. Users the color elements of AutoCAD as a basis for color in the finished output and also supports the monochrome and color implementations of PostScript.

Attention was given in the GIS area to problems of system design and selection at an early date and it is interesting to note that many of the notions contained in these early design models parallel concepts found in modern software engineering practice (e.g., structured functional requirements analysis).

Structured design approaches are becoming more common in the spatial data handling area and initial attempts are being made to contrast the types of engineering cost estimation functions which are found today for less specialized, large software systems. The tools of software engineering are also being applied to developing more efficient structures within individual segments of GIS operation (e.g., manual digitizing).

Automated mapping software consists of interactive computer graphics programs that can create, edit, manipulate, and display cartographic data. These programs are similar to those found in computer-aided design and drafting systems because they allow the user to interact with a visual image of a drawing by creating, editing, and manipulating lines, symbols, and text. Automated mapping software generally has the same functions as CADD software; however, CADD systems are normally used for architectural and engineering drawings, while automated mapping is used for mapping. Functional specific to mapping include: coordinate transformation, amp scale conversion, coordinate geometry (COGO), edge matching, and other related geometric operations. Examples for CIPSE/CAD-GIS package can describe as:

MAGI; the Maryland Geographical Information Systems (MAGI). This system is typical of the classic gridbased systems that were developed in the early days of geographic information systems. The grid

cell format permits seemingly easy encoding of map data, although experiments have demonstrated that significant error levels are often present. The grid cell format has also allowed development of simple computational solutions to some difficult processing problems such as the overlay of multiple map layers. Some systems, including MAGI, have grown and evolved over time; others, such as the LUNR system of New York State, have fallen into complete disuse. A critical factor appears to have been the design decision wi th respect to the grid cell size, with smaller cells providing more useful information decision with useful information to a wider community of users.

ARC/IRFO; This is a more recently developed, vector-based GIS. ARC/INFO is typical of modern vector-based GIS. It is sold and supported commercially and is enjoying widespread popularity worldwide for a variety of applications at urban and regional scales.

The application programmer's interface is usually represented by a subroutine or function package implemented in a higher level programming language, e.g., FORTRAN, C, BASIC or PASCAL. The user interface is usually written using the application programmer's interface subroutines and functions. The application programmer's interface is currently represented by four major standards efforts: the Graphical Kernel System (GKS), GKS-3D, the programmer's Hierarchical Interactive Graphics Systems (PHIGS) and PHIGS+.

2.10.11- CAPSx / PEHH (Use of Hardware Management in CAPSx Station) Hardware of Computer Graphic - The hardware of a computer graphics system provides the input, computation, storage, and output functions. The software includes an operating system, an application program, and an application database. In graphics systems the data structure describes objects in terms of:

- **Geometric coordinates;** To define the location and shape of objects
- **Attributes;** such as color, style, or texture
- **Connectivity;** to identify relationships between shapes of objects

The interactive process between the user and the system creating designs can typically be described in four basic steps:

- **Design construction;** where a computer model of the object is created in a geometric database
- **Information handling;** where computational tasks are performed (e.g., measurements, dimensioning, or views)
- **Modification;** where changes, updates, transformations, or moves are made to the design
- **Analysis;** including engineering analyses for stress, motion, and political-real properties.

To build a political-geographic-graphics model, data is entered into the system by using a variety of input devices, such as a standard keyboard, special function keys, a light pen, or a cursor (e.g., mouse). The computer processes this data by using analytical geometry to represent shapes in terms of mathematical expressions.

Graphical I/O devices cannot be treated absolutely separate form each other. They are not just pieces of hardware giving system information to the user and user information to the system. they must be observed in their role as one link each in the closed chain of interaction. This chain contains more than the devices themselves. Let us describe it, with a system's input to the user. We find the following links in the interaction loop:

- User's sense (mainly eyes, but possibly also ears, touch, etc.);
- User's brain;
- User's means of action (mainly hands, but possibly also feet, voice, eye and head movements, etc.);
- The hardware of the graphical input device (possibly containing firmware and software);
- The input oriented hardware of the workstation's processing unit;
- The workstation's operating system including input drivers and input sections of the basic

graphics software; - Typically the application software;

- The output sections of the basic graphics software and output drivers interfacing with the workstation's operating system again;
- The hardware of the graphical output device with its means of visualization (possibly supported by sound, movement, etc.).

Each link above gets it’s input from its predecessor and gives its output to its successor.

The term "graphical output" is used in two different senses: as a presentation of a picture and as a pictorial reflection of an application situation. These different meanings result in varying demands on the output devices.

The term "graphical input device" is mainly used for those peripherals designed for interaction between user and graphical workstation.

CAD workstations in the context of hardware equipment are no longer simply sets of modules specialized for CAD requirements. Graphics workstations of today are able to calculate and present complex schematic pictures in a very small amount of time. They are also far from the point of presenting true-to-nature scenes in real time

2.11- Project of CIPSE-CAPSx Package - The CAPSx system will automate the mapping and related geographic acti vi ties required to support the census and survey programs of the CIPSE project. The CAPSx functions defined as:

Topologically; Topology is the scientific explanation of how points and lines on a map relate to each other to define a geographic area. The design of the CAPSx system computer database adapts the theories of topology, graph theory, and associated fields of mathematics to provide a disciplined, mathematical description for the geographic structure.

Integrated; The CAPSx file is the computer database at the core of the CAPSx system that relates, or integrates, the automatic description of the earth's surface and boundary features. The topological structure of the CAPSx file defines the location and relationship of streets, rivers, and railroads to each other and to the numerous geographic area for which the Census Bureau tabulates data· from its censuses and surveys. This essential geographic information no longer will exist only on separate, independent maps and lists; rather, it will be a single computer database.

Geographic; The CAPSx file is the repository for storing the automated description of the geographic structure the Census Bureau uses to conduct its censuses and surveys. This computer database will include all census-relevant information regarding the earth's Surface as described above. A major goal of the CAPSx system is to assure no duplication or mission of these features or areas.

Encoding; Encoding is the process of representing the essential United States geographic information in computer-readable form. The process of building the CAPSx file involve adapting a variety of encoding techniques such as automated map scanning, manual map 'digitizing,' standard data keying, and sophisticated computer file matching.

Referencing; Both the CIPSE project benefit from the effort involved in developing the CAPSx system. Having automated access to and retrieval of the census-relevant geographic information about the United States and World assures consistency of results and will prevent much of the confusion that CIPSE project staff and data users experienced in dealing with maps and geographic classification in the 1990s Decennial Census.

At this point in the development of the CAPSx system much remains to be done, especially in the area of design for the map products the CIPSE project will prepare for use by its data collection staff and census data users. Current plans call for using computer-driven electroStatistical plotters to produce the one or two map copies required for each of the expected field assignment areas.

For the data user, the formats of the map products are less well defined. Certainly, there is a strong demand for maps showing only the boundaries for selected key geographic areas, such as the cenusu tract outline maps, country/minor civil division/place boundary outline maps, and urbanized area outline maps included in past Census Bureau reports. In addition, there appears to be a continuing need for maps showing the full set of detailed features (street, rivers, rail roads) that form the boundaries for the data collection and presentation processes. Data users also are requesting more 'custom area' map

products.

The new CAPSx system technology will permit including more 'background' information, such as major highway and rivers, along with boundaries for reference and orientation purposes. It certainly will permit developing political solution that are custom-tailored to polit-data user needs, but at a cost. Recent technology, such as video disks and laser optical disks, offers potential new methods for distributing the microfilm, and standard printed paper maps offer potential for the various boundary outline maps where the data volumes are significantly lower. The CIPSE project will explore all of these options and media during the coming years so that it can offer political-data users the most versatile and dependable mix of geographic data political-solutions possible.

The maps will be readable, the Geo-coding will be consistent with the maps, and the lists of geographic areas will be complete and up-to-date. Put simply, the CAPSx system will help the CIPSE project complete a consistent, efficient, cost-effective, and useful 1990s census, and on time.