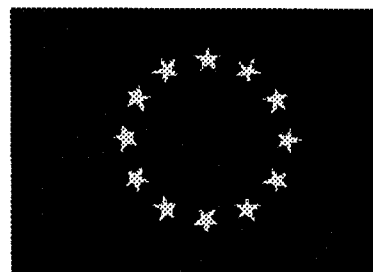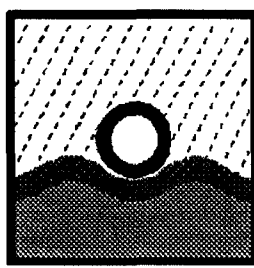# HYDROSCOPE

The new Greek National Database System for Meteorological, Hydrological and Hydrogeological Information

STRIDE HELLAS PROGRAMME 1992-1993

A EC STRIDE research programme of 1st phase value of 1.6 MEcus.

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ABSTRACT

The HYDROSCOPE is a Greek national wide research programme, co-financed by the European Community, as a STRIDE programme, aiming to the constitution of a Greek National Database System for Meteorological, Hydrological and Hydrogeological Information. The HYDROSCOPE Database design and functional characteristics are carefully chosen among the front line of the contemporary state of the art in the domain of Database design and development, and the whole undertaking constitute by its originality an advanced applied research programme. This database would represent by its technical characteristics the state of the art in database system, by means of modern electronic database technology and conceptual design. All the major hydrometeorological data collecting Services and supervising Ministries, University Divisions and Research Institutes, as well as the most important users of these data in Greece are participating in this programme.

INTRODUCTION

The HYDROSCOPE is a Greek national wide research programme, co-financed by the European Community, as a STRIDE programme, aiming to the constitution of a Greek National Database System for Meteoro logical, Hydrological and Hydrogeological Information (Figs. e & f).

All the major hydrometeorological data collecting Services and supervising Ministries, University Divisions and Research Institutes, as well as the most important users of these data in Greece are participating in this programme. (Figs. a & b)

OBJECTIVES

The leading objective is the establishment of the Greek National Database System for all over Greece collected Meteorological, Hydrological and Hydrogeological Information. This database would represent by its technical characteristics the state of the art in database system, by means of modern electronic database technology and conceptual design :

1. Relational   2. Distributed   3. Multilevel   4. Multitype data storage and retrieval

5. Expandable   6. Operating cost optimised   7. User friendly interface

BENEFITS

- Systematic collection, organisation, validation, processing and publication of long measured data records, that possess the data collection responsible services, generally underexploited until now.

- Contribution in the reliable planning and management of the water resources of the country.

- Contribution in the efforts to cope with floods and drought

- Hydroclimatic parameters estimation and natural and biological environment impacts assessment

- Contribution in the global climate change research

- Development of a single network for co-operation, information exchange and action co-ordination of all the services with activities concerning the hydrological cycle.

- Network planning and operation standardisation of the national hydrometeorological networks.

ORGANISATION - ADMINISTRATION

The National Technical University (NTU, Athens) has the Central Project Management

The **Direction Committee** of the project, formed by D. Tolikas, professor AUT, Project Director, D. Koutsogiannis, Lecturer NTU, Project Director, Th. Xanthopoulos, professor NTU, Advisor, assumes the scientific administration of the project.

The project development co-ordination is secured by the **Co-ordination Secretariat** and the **Sectional Scientific Committees.**

UNIVERSITIES	METEOROLOGICAL & HYDROLOGICAL SERVICES	MINISTERIES	OPERATIONAL & RESEARCHE ORGANIZATIONS
National Technical University of Athens, Division of Water Resources, Hydraulic and Maritime Engineering (NTUA/DWRHME)	National Meteorological Service (NMS)	Ministry of Industry, Energy and Technology, Division of Water and Natural Resources (MIET/DWRNR)	Water Supply and Sewage Corporation of Athens (WSSCA)
School of Technology, Aristotle University of Thessaloniki, Division of Hydraulics and Environmental Engineering (STAUT/DHEE)	Public Power Corporation Directorate for the Development of Hydroelectric Works (PPC/DDHW)	Ministry of Agriculture General Directorate of Land Reclamation Works and Agricultural Strucures (MA/GDLRWAS)	National Centre for Scientific Research "Demokritos" (NCSR "D")
University of Athens, Division of Applied Physics (UA/DAP)	National Observatory of Athens, Institute of Meteorology and Physics of the Atmospheric Environment (NOA/IMPAE)	Ministry of Environment, Physical Planning and Public Works General Directorate of Land Reclamation Works (MEPPPW/GDLRW)	Center for Renewable Energy Sources (CRES)
School of Technology, Aristotle University of Thessaloniki, Division of Power Engineering (STAUT/DHEE))			Hellenic Agency for Local Development and Local Government (HALDLG)

Between the columns: ⇔ (between UNIVERSITIES and METEOROLOGICAL & HYDROLOGICAL SERVICES), ⇔ (between METEOROLOGICAL & HYDROLOGICAL SERVICES and MINISTERIES), ⇔ (between MINISTERIES and OPERATIONAL & RESEARCHE ORGANIZATIONS).

Fig. a. Horizontal Plan of the Coordination Network in HYDROSCOPE.

INFORMATICIANS
⇕
METEOROLOGISTS
⇕
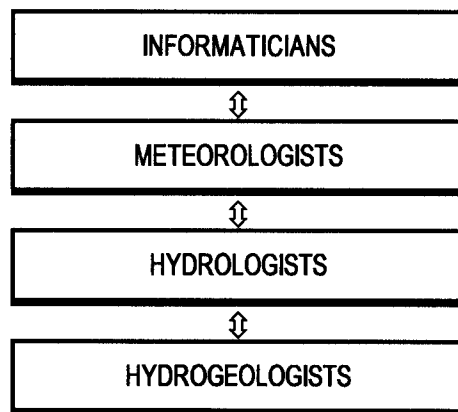HYDROLOGISTS
⇕
HYDROGEOLOGISTS

Fig. b. Vertical Plan of the Coordination Network in HYDROSCOPE.

Functional Components of HYDROSCOPE

The HYDROSCOPE Database design and functional characteristics are carefully chosen among the front line of the contemporary state of the art in the domain of Database design and development, and the whole undertaking constitute by its originality an advanced applied research programme (Fig. c & d).

Application Programms of Meteorological branch	Application Programms of Surface Hydrology branch	Application Programms of Underground Hydrology and Hydrogeology branch
System for Data Input, Storage and Management	System for Data Circulation Security and Billing Subsystems	User communication Interface

HYDROSCOPE SOFTWARE

Programming Languages (C, Prolog, Windows 4GL, etc.)	Application Development Graphical Tools (Windows 4GL)	Basic Commercial Software of Integrated User Applications (MS-Excel, MS-Word, etc.)
Operational Systems (UNIX, DOS, WINDOWS, etc.)	Communications Protocols (TCP/IP, PPP, etc.)	Distributed Relational Database Management System (INGRES)

BASE SOFTWARE

Routers	Modems	Leased Telecommunication Lines
RISC Technology Workstations	Personnal Computers (PC)	Peripherals (Disks, Printers, Scanners Digitizers etc.)

HARDWARE

Fig. c

AUT/DHEE

AUT/ED

STAUT
TPT

NCSR"D"

NCSR"D"
CC

ARIADnet

CRES

UA

WSSCA

NTUA
DI
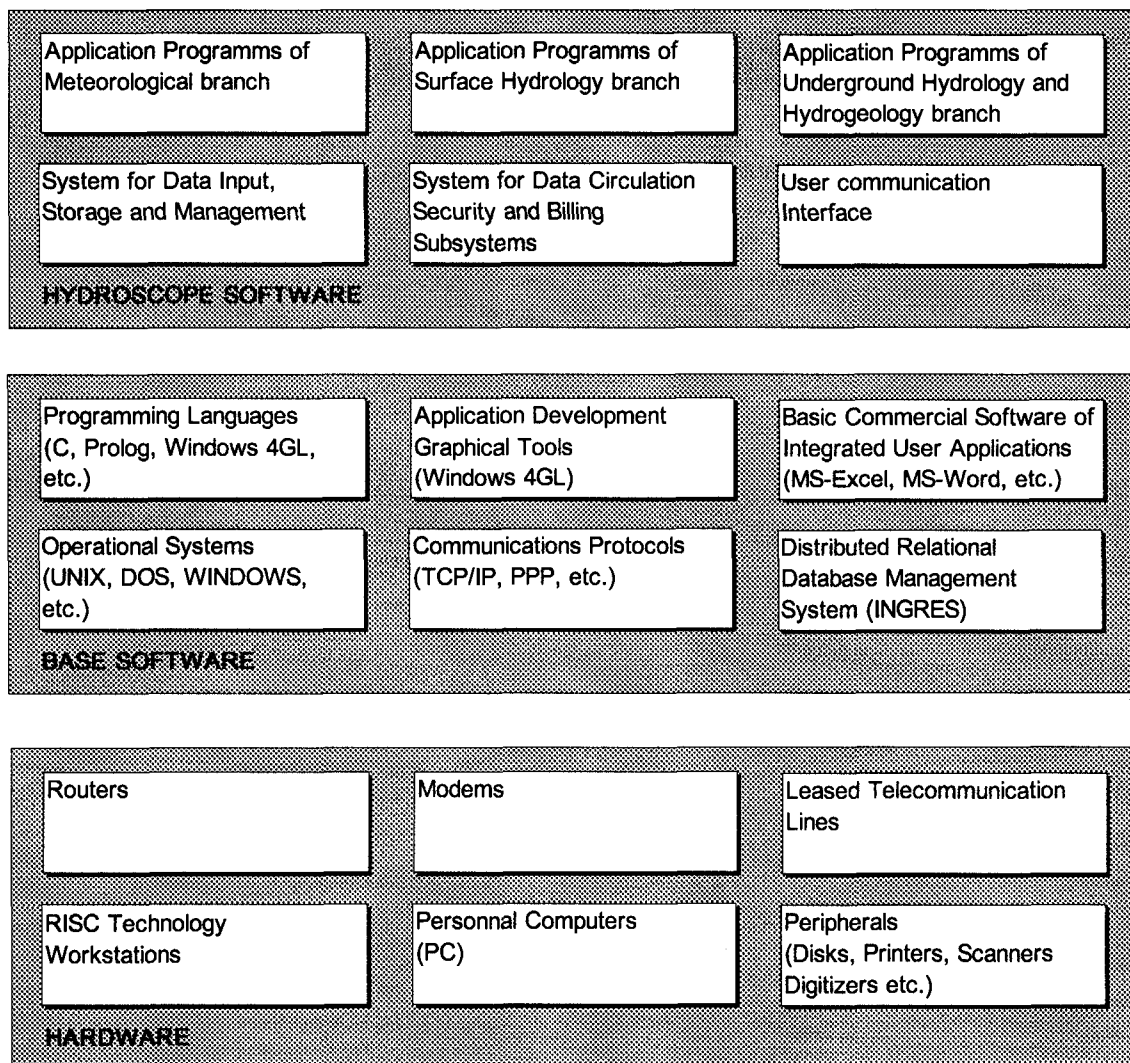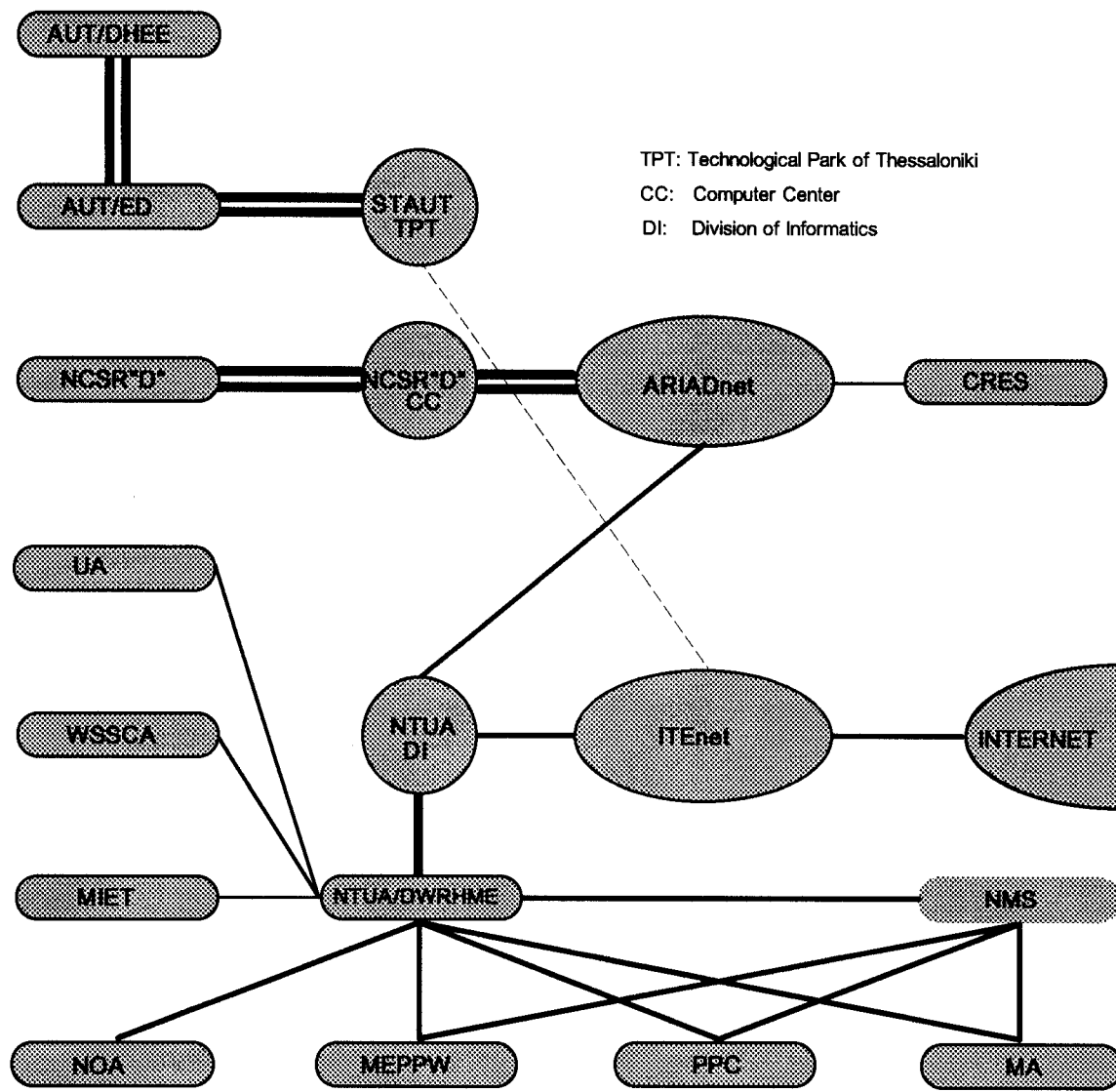
ITEnet

INTERNET

MIET

NTUA/DWRHME

NMS

NOA

MEPPW

PPC

MA

TPT: Technological Park of Thessaloniki
CC: Computer Center
DI: Division of Informatics

LEGEND

— — — —   ANALOG LEASED LINE 9.6 kbits/s

—————————   ANALOG LEASED LINE 14.4 kbits/s

————————   DIGITAL LEASED LINE 64 kbits/s

━━━━━━   PRIVATE LINE 144 kbits/s

≡≡≡≡≡   ETHERNET LINE

    HYDROSCOPE NODE

    OTHER NETWORK NODE

    ACADEMIC DATA NETWORK

Fig. d. WIDE AREA NETWORK TOPOLOGY IN HYDROSCOPE

STATIC DATA	TIMESERIES	APPLICATION INFORMATION	DATABASE DEVELOPMENT INFORMATION
Station Register, River Cross Sections, Hydraulic Characteristics Geological Sections, etc.		Information concerning the use of the Database	Information concerning the Evolution in Time of the Database Tables

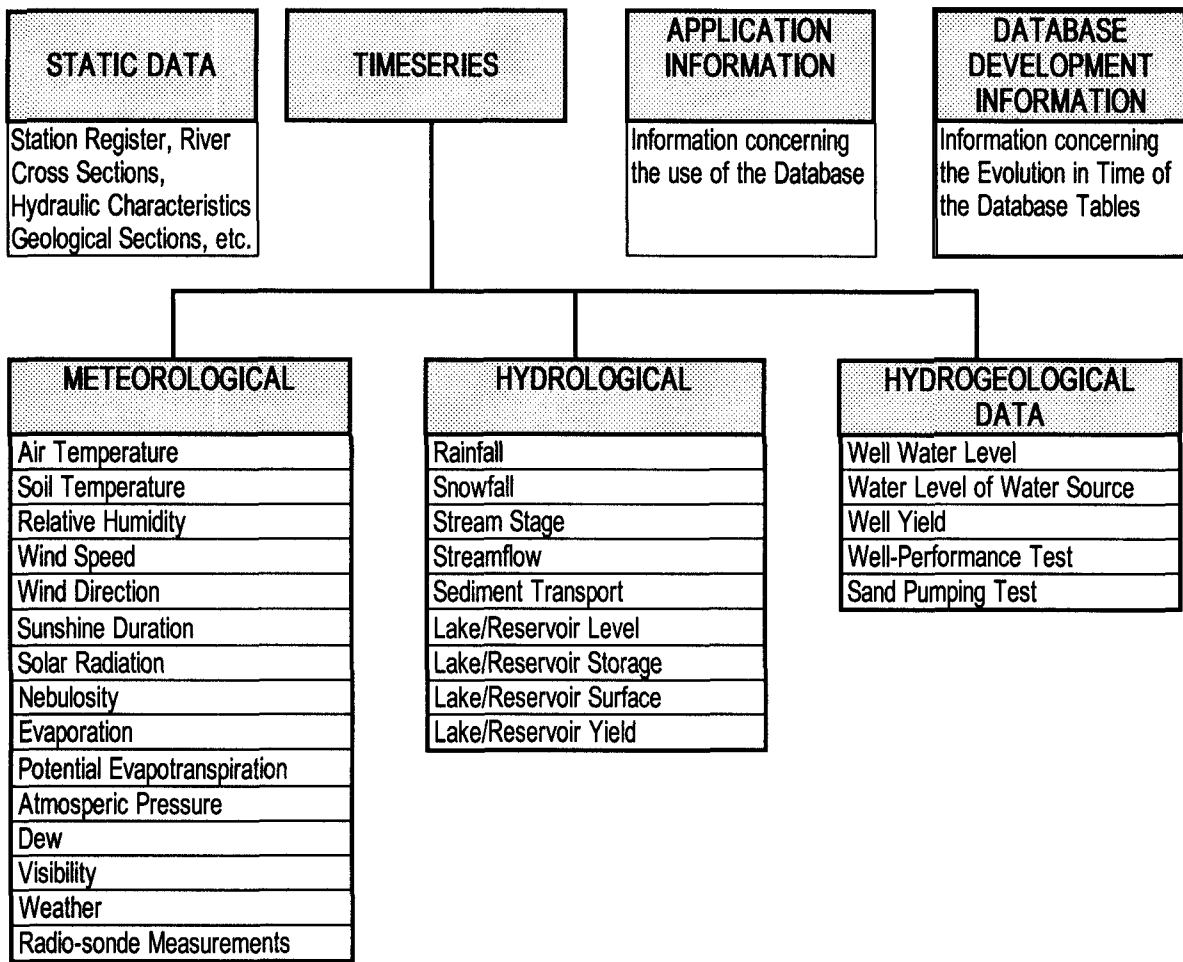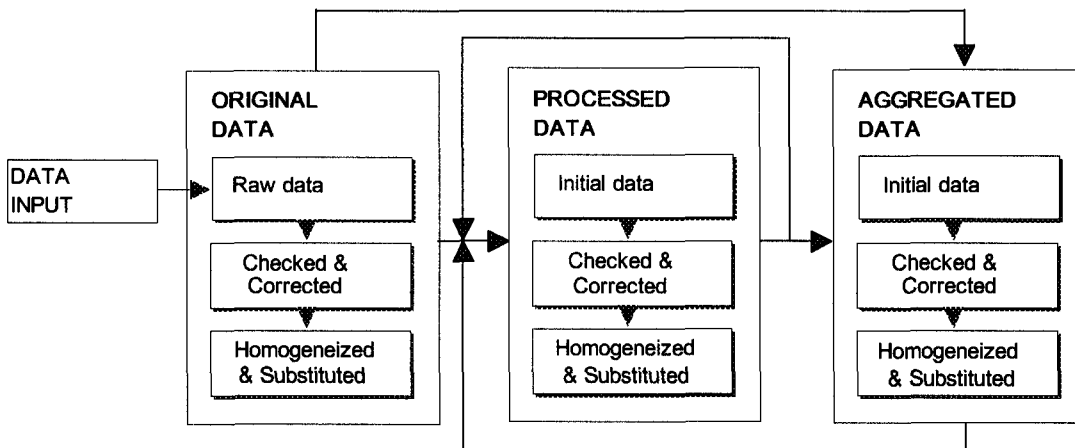| METEOROLOGICAL	HYDROLOGICAL	HYDROGEOLOGICAL DATA
Air Temperature	Rainfall	Well Water Level
Soil Temperature	Snowfall	Water Level of Water Source
Relative Humidity	Stream Stage	Well Yield
Wind Speed	Streamflow	Well-Performance Test
Wind Direction	Sediment Transport	Sand Pumping Test
Sunshine Duration	Lake/Reservoir Level	
Solar Radiation	Lake/Reservoir Storage	
Nebulosity	Lake/Reservoir Surface	
Evaporation	Lake/Reservoir Yield	
Potential Evapotranspiration		
Atmosperic Pressure		
Dew		
Visibility		
Weather		
Radio-sonde Measurements		

Fig. e. HYDROSCOPE Data Types

Fig.f. Typical Data Processing Forms