

MOPT

MINISTRY OF
PUBLIC WORKS
AND TRANSPORTATION

SECRETARY OF STATE FOR WATER AND
ENVIRONMENTAL POLICIES

GENERAL DIRECTORATE OF HYDRAULIC WORKS

**SEGURA HYDROGRAPHIC
CONFEDERATION**



S. A. I. H.

AUTOMATIC HYDROLOGIC INFORMATION SYSTEM

The General Directorate for Hydraulic Works of the Ministry of Public Works and Transportation is carrying out, through the Segura Hydrographic Confederation, the construction and bringing on line of an Automatic Hydrologic Information System (S. A. I. H.) in the 18,900 km² region served by the Segura Hydrographic Confederation.

The system permits:

- Data collection, by sensors installed at various control points located throughout the basin.
- The transmission of these data from the control points to data concentration points, by way of a radio based communication network.
- The storage, processing and computer monitoring of these local data at the concentration points.
- The transmission of these data from the concentration points to the final reception center.
- The storage, processing and numeric and graphic monitoring of all the data from the river basin at the Murcia data processing center, where headquarters are located.
- The complete process of data collection, transmission, reception and storage in the computer at the headquarters of Murcia is automatically updated every five minutes, and the central operator can change this period for every point.

A system of these characteristics will be of great aid for the decision making both in day to day operation and under flood conditions, when the availability of real-time hydrological data can be critical.



Control point.

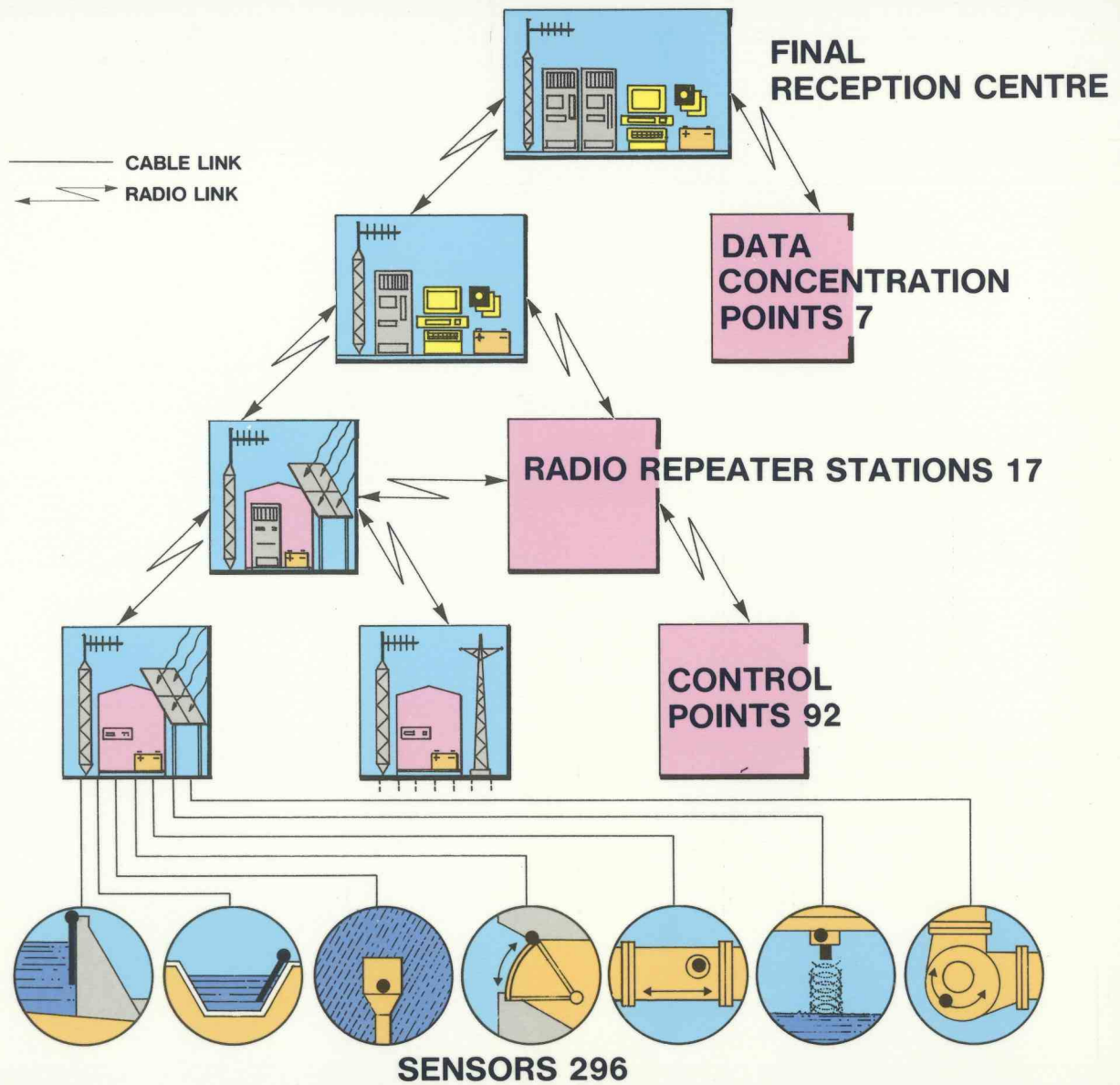
Moreover, it will permit an efficient way for the storage of hydrological data bases in the basin, and the maintenance of hydrological records.



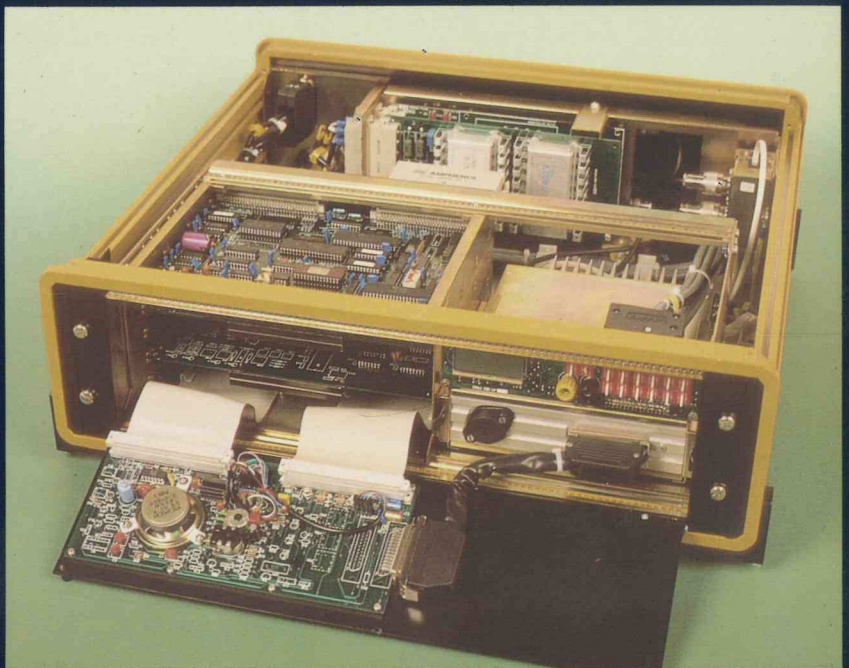
Close-up view of an elevated instrument shed.



Canal structure for flow measurement.



Ultrasonic sensor

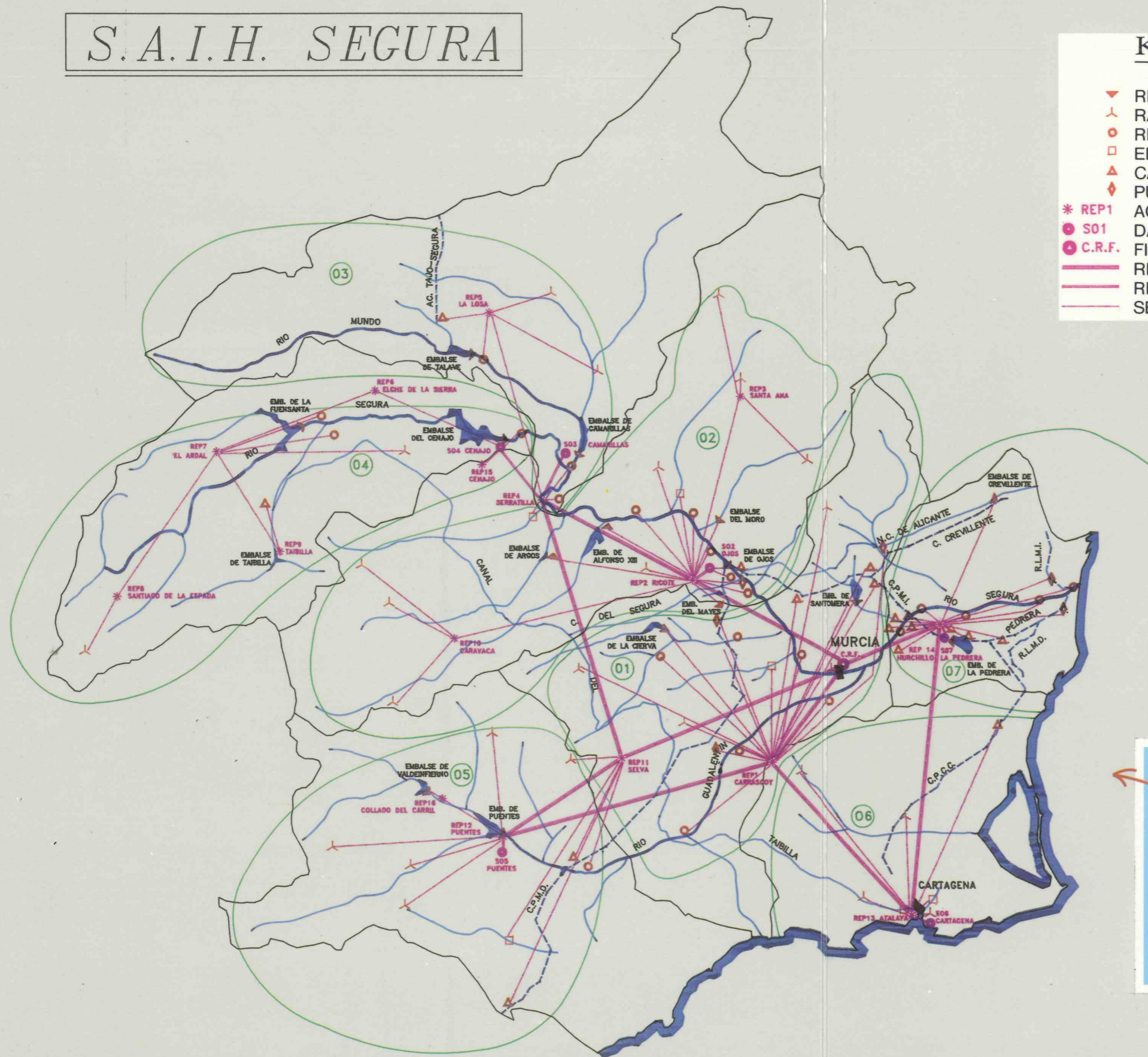


Microprocessor and radio set

S.A.I.H. SEGURA

KEY

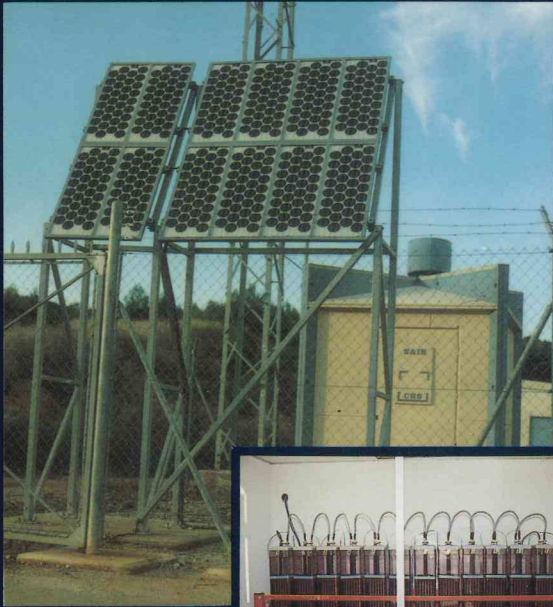
- ▼ RESERVOIR CONTROL
- ⋈ RAIN GAGE / RAIN AND SNOW GAGE
- RIVER FLOW GAGING
- EPHEMERAL STREAM FLOW GAGING CONSTRUCTION
- ▲ CANAL FLOW MEASUREMENT
- ◆ PUMPS
- * REP1 ACTIVE RADIO REPEATER STATION
- S01 DATA CONCENTRATION POINTS
- C.R.F. FINAL RECEPTION CENTER
- REDUNDANT RINGED, DOUBLE ROUTE NETWORK
- REDUNDANT RING, DUPLICATE EQUIPMENT
- SECONDARY NETWORK



POWER SUPPLY

The network's electronic systems are powered by batteries capable of functioning autonomously and without recharging for 10 days.

These batteries are recharged by photovoltaic panels where commercial power line is not available. In other zones, they are hooked up to the electrical power supply network.



Photovoltaic panels and batteries



Construction of a canal measurement station

CIVIL WORKS

Besides the installation of electronic and computer equipment, many civil works have been carried out throughout the basin both to house or support equipment and to create structures where hydraulic flow measurements can be taken.

The electromechanic equipment as well as data receivers and transmitters have been housed in prefabricated sheds designed especially for the project.

These sheds are equipped with a security door with intruder alarm, and the entire installation is surrounded by a metal fence. Where necessary, the sheds have been elevated above potential extraordinary flood levels.

Concrete frames, adapted to the topography and characteristics of the area, have been built along certain sections of rivers, gullies and canals. These, along with periodical updating of rating curves with flowmeters, permit the obtention of sufficiently accurate, reliable flow and water level data.

Already existing hydraulic installations, modified to meet the system's objectives, have been used in some cases.

Likewise, service roads have been built or already-existing roads improved to permit access to outlying, isolated areas.

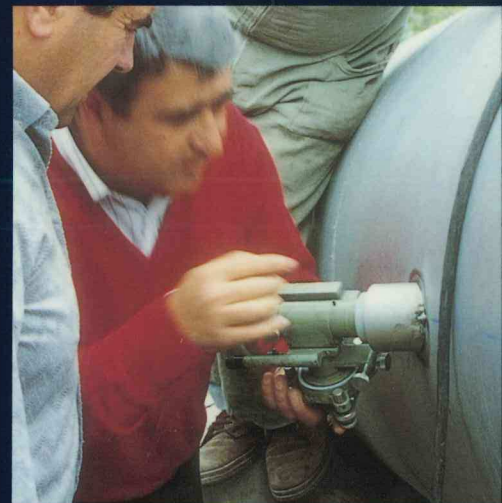
CONTROL POINTS	Number
Reservoirs	15
Isolated Rain gages and Rain and Snow Gages	25
River flow gages	23
Canal flow gages	17
Gully flow gages	6
Pump gages	6
	92



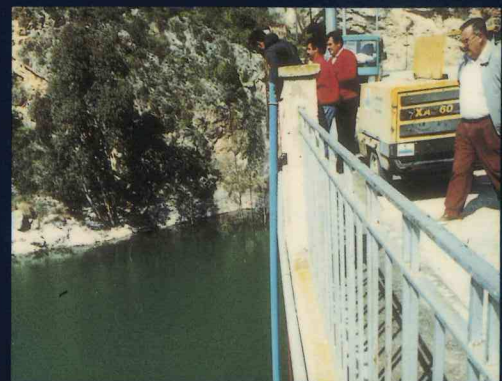
Measurement in pipe



Canal level meter and alarm



Mounting a flow meter



Reservoir water level measurement

REPEATER STATIONS

Murcia - Hurchillo - Serratilla - Atalaya
 - Ricote - Selva - Puentes - Carrascoy
 Taibilla - Santiago de la Espada
 Elche de la Sierra - La Losa
 Santa Ana - Cenajo - Collado del Carril
 Caravaca - El Ardal

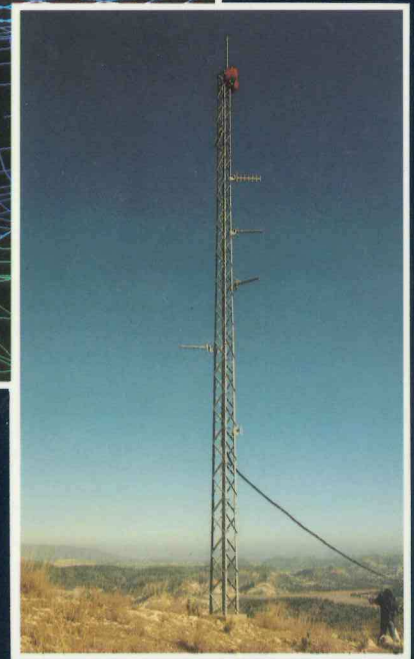
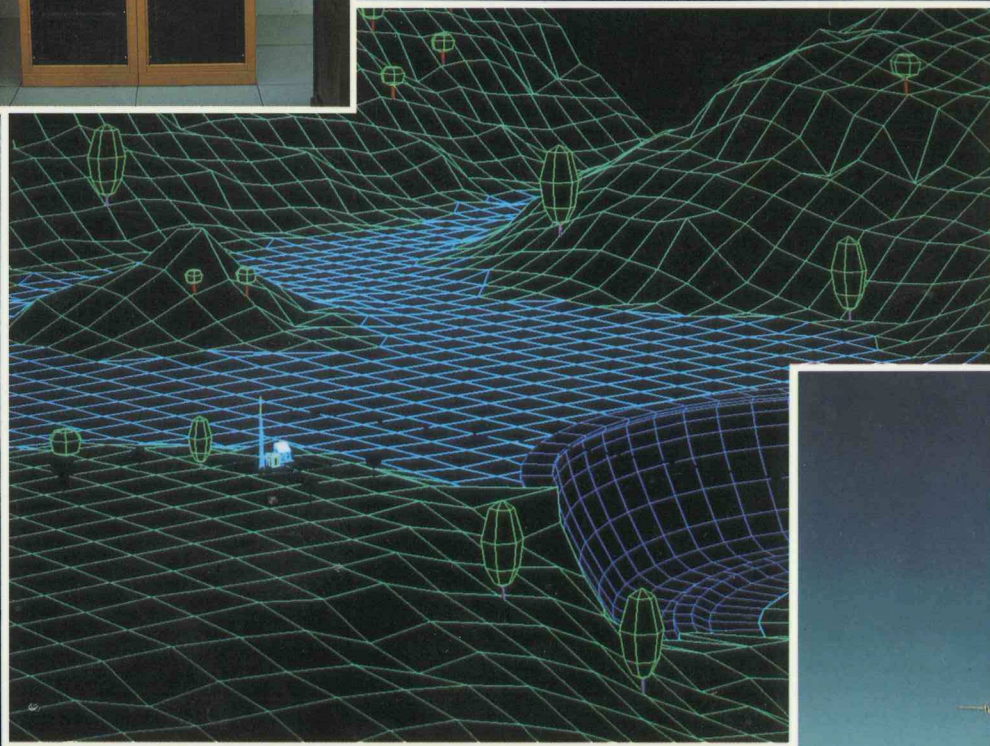
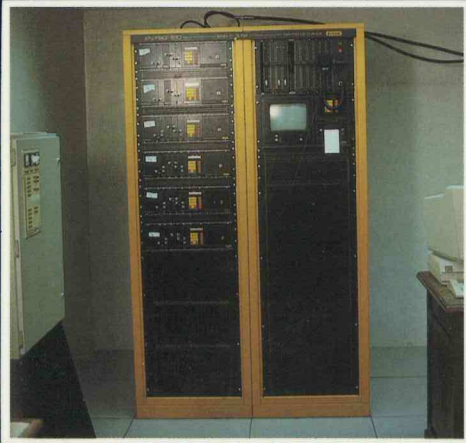
TYPE OF SENSORS	Number
Rain Gages	64
Rain and Snow Gages	3
Reservoir Water Level	15
Pipe Flow Meters	14
Fixed Flow Meters at Gates	38
Level Alarms	48
Pressure Gage Level Meters	35
Ultrasonic Level Meters	55
Open flow level and velocity meters	4
Open gate detectors	16
Pumping circulation detectors	4
	296

DATA CONCENTRATION POINTS

- 01 Murcia
- 02 Ojós
- 03 Camarillas
- 04 Cenajo
- 05 Puentes
- 06 Cartagena
- 07 La Pedrera



SEGURA HYDROGRAPHIC CONFEDERATION



Contractor: DYCENSA

DRAGADOS Y CONSTRUCCIONES, S. A. and ELECTRONICA ENSA, S. A.
(In temporary Union of Companies)