

AUTOMATED CARTOGRAPHY IN THE
NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION

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Automated cartography is currently in operational use in four areas and under development in three additional areas in the National Oceanic and Atmospheric Administration (NOAA) of the Department of Commerce. These are briefly outlined below.

NATIONAL ENVIRONMENTAL SATELLITE SERVICE

Two types of environmental monitoring satellites are flown by NOAA: the polar orbiting satellite, which scans a swath of the earth's surface from pole-to-pole during each orbit until the entire earth is viewed; and the geostationary satellite, which by orbiting synchronously with the rotation rate of the earth maintains a nearly fixed earth position, from which it views the entire earth's disk. One widely distributed product is the T.V. Weather Report's U. S. Daily Cloud Cover satellite pictures with basic map overlay.

POLAR ORBITING SATELLITES

Approximately 500 to 1000 maps are produced each day. Automated mapping of geographic and political boundaries and latitude and longitude grids are computed for each satellite frame of the earth's surface and inserted in real-time in the processed data stream between the Down-link and Up-link communications with the satellite. Thus, the second Down-link transmission contains an accurate earth mapping overlay together with the vidicon pictures.

GEOSTATIONARY SATELLITE

About 90 maps per day are produced. As each of the two NOAA geostationary satellites orbits synchronously with the earth, differences between the earth rotation and the satellite orbit result in the satellite sub-point circumscribing approximately a figure-eight. Predicted positions of the sub-point are calculated for each earth disk time frame, and appropriate adjustments to the automated mapping program for each picture frame are calculated and transmitted by landline from Suitland, Maryland, to the Synchronizer Data Buffer at the Wallops Island receiving station. Output consists of geographic and political boundaries and latitude and longitude grids superimposed electronically on each earth frame (45 per satellite per day). Time-lapse movies are prepared for analysis of daily atmospheric changes.

NATIONAL WEATHER SERVICE

Nearly 1000 maps are produced daily. Automated output (about 400/day) of weather maps is in either Mercator or Polar Sterographic projection, with meteorological data plotted and isopleth contours drawn. About 300 maps per day are produced for local use at the National Meteorological Center on an electrostatic plotter, continuous feed paper 20" wide. Output generation software has the capability to split the map into northern and southern halves, 20"x72", for combination as a single map, 40"x72".

ENVIRONMENTAL DATA SERVICE

Many types of environmental data are stored in digitally mapped form and output on request. These include data on climate, sea surface temperatures, and snow cover for flood prediction.

NATIONAL OCEAN SURVEY

There are three automated cartographic systems under development in the National Ocean Survey (NOS): U.S. Nautical Charts; U. S. Aeronautical Charts; and U. S. Horizontal and Vertical Geodetic Control Maps.

NAUTICAL CHARTS

The NOS conducts hydrographic surveys, stereophotogrammetric aerial surveys and tidal measurements from which the 960 U. S. nautical charts are compiled and updated periodically.

Automated hydroplot survey systems have been developed and placed aboard all NOAA ships and surveys launched. Automated data processors and plotters for survey sheets have been installed at the Atlantic and Pacific Marine Centers at Norfolk, Virginia, and Seattle, Washington.

A nautical charting automated compilation system, currently under procurement, will provide the capacity for interactive compilation and update by the professional cartographers. High speed vector plotters and a laser raster plotter have been procured and are in operation. The output of the automated compilation system will be separation and/or color overlays ready for the reproduction process.

AERONAUTICAL CHARTS

NOS produces over 5000 different charts required for the safe and efficient use of the Federal Aviation Administration's National Aviation System by commercial airline, business, military and private pilots. Availability of appropriate current charts is mandatory for all flights under instrument flight rules. These charts are currently updated on 56 day cycles, and distributed to FAA controllers and pilots throughout the country. NOS is undertaking the development of an automated cartographic system for aeronautical charts with completion planned for 1982.

GEODETTIC CONTROL MAPS

The National Geodetic Survey (NGS) has under development a master data base for horizontal and vertical geodetic control throughout the U. S. The data base will support the NGS field parties through remote data terminals, and also provide data on request to State and local surveyors.

Development of an automated cartographic system for production of geodetic control maps for the U. S., based on the current data in the National Geodetic Data Base, is planned for completion in 1981.