

## STANDARD INDEXING SYSTEM FOR AERIAL PHOTOGRAPHY\*

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ALMOST everyone is familiar with the fact that aerial photography is utilized for cartographic and illustrative purposes, but not all people are familiar with the use of aerial photography for military purposes. So before I inform you about what we in the military service call the Standard Indexing System for Aerial Photography, I will briefly outline the background of the problem of handling aerial photography in the Air Force, which led to the development of the indexing system.

Aerial photography is not new. Almost one hundred years ago, a photograph was made of Boston, from a balloon.

Accurate aerial reconnaissance, or aerial observation for military intelligence purposes, has always been a goal of the military services in time of war. The first American effort to effect such reconnaissance was made during the Civil War when Professor T. S. C. Lowe launched a balloon during the Battle of Fair Oaks, from which was obtained information that enemy troops were approaching the bridge over which the Union Forces were expecting reinforcements. This timely observation was credited officially with saving the Union Army at this battle.

The first aerial reconnaissance sketch ever made was of the reports of observations made from Professor Lowe's balloon.

The Army in further experiments at aerial reconnaissance in 1895 sent a camera aloft at Governor's Island in New York attached to a large kite.

With the obtaining of the first airplane by the Army in 1910 further experiments were made in the use of aerial photography. One of the first good aerial photographs was made from a Wright Brothers plane at the Army Flying School located at College Park, Maryland in 1911. Under the conditions, a good photograph was made with a hand held camera.

The importance of aerial photography was recognized during World War I when aerial photography became a military

necessity. It was then proven that military forces with the best photo intelligence often had the advantages over the opposing forces. The first Air Force aerial camera was a converted Graflex Camera made of wood with a magazine holding twelve 4x5" glass plates.

Some of the photographs made during World War I on glass plates are still in the file and in good condition.

While the need for accurate maps had been recognized by Army Commanders for centuries, the difficulties in obtaining adequate topographic maps, were often insurmountable. Similarly, good maps and charts were found necessary in the conduct of aerial operations.

Now with aerial photography, apart from the immediate application of intelligence gained, a map information source was found that could, with a few flights, be used to produce new maps or revise old ones. When, therefore, the United States found itself engaged in global operations during World War II, aerial photography became a prime tool for military planners and commanders.

The Air Force has many types of aerial photography:

- Mapping—Vertical
- Charting—Vertical & Oblique
- Reconnaissance—Vertical & Oblique
- Special Intelligence—Dicing
- Bomb Strike
- Strip (Sonne)
- Color Film-Reconnaissance
- Radar Scope

Also, there are many uses made of aerial photography in the military services, such as:

- Map Making
- Charting
- Intelligence & Counter Intelligence
- Tactical Planning
- Strategic Planning
- Logistic Area Planning

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Climatic Development  
Installation Planning  
International Cooperation, etc.

During and immediately after World War II, many tens of thousands of rolls of aerial film were shipped to a central library maintained by the US Air Force in Washington. Most of this film was produced under war time conditions when speed of production was more important than the maintenance of accurate records. As a result, the indexing of the photography was sorely neglected, and the US Air Force central library facility received car loads of film that was neither titled, plotted nor identified. The rapid demobilization of the military forces after World War I left the US Air Force with thousands of shipping crates full of film that could not be opened because of lack of personnel.

After years of tedious work, people assigned to the task were able to get the film out of the cases and onto shelves. Many types of indexing were tried including the production of photo indexes and the use of a punch card system. Some Air Force Theaters of Operation even developed index systems of their own which were different from those used in adjacent theaters.

The result was that by 1946, anyone desiring to utilize the central library of aerial film had to research 14 different index systems to locate specific photography.

The urgent requirement for aerial photography to meet certain planning aspects of the cold war made imperative the development of a uniform single system of indexing the tremendous amount of film in file. After lengthy and detailed study, including experimentation with systems in use by other aerial photographic organizations, the standard indexing system was developed, approved and put into operation in the US Air Force by official regulation, on a world-wide basis. It is now in use and the estimated savings in manpower to locate and select specific aerial photography are estimated at a ratio of one to six over the old system.

The standard indexing system consists of the plotting of every fifth consecutive exposure of a sortie located in a geographic one degree square, on a standard transparent acetate sheet keyed to a map or chart of a scale of 1:250,000. The acetate sheets

are filed in albums by geographic coordinates. The system as developed will also permit the continual evaluation of the photography now in the files to enable removing from the active files any film that is duplicative, or that can be replaced by more up-to-date, or more current, photography.

In addition to the plotting, other identifying data and related information is entered on the printed format of the acetate. This includes the type of photography, taking organization, date, scale, location, etc.

The main benefits of the Standard Indexing System are:

A style of indexing which makes possible the selection of specific photographic exposures for reproduction, with the maximum of speed, the minimum of waste and without reference to other indexing systems.

Easy and rapid accessibility and retrievability without prior reference to chart or map indices.

Easy file maintenance with positive control of all material.

An index which can be rapidly and economically duplicated to fill specific requirements for photo coverage information.

Photo coverage information which can be cross-indexed to to an operational print file.

Provisions for evaluation of photo coverage to determine what photography and indices should be added to or deleted from an operational file.

#### HOW THE SYSTEM WORKS:

If a research analyst desires photographic coverage of a particular area or target, he first determines the one degree quadrangle which includes the points of interest. If only the place name is known, a gazetteer can be used to determine the geographic coordinates. If the geographic coordinates are known, the one degree quadrangle is known.

When the one degree quadrangle is known, the research analyst goes immediately to the standard indexing system binder files and draws the binder which contains acetate overlays of all photography flown over that one degree quadrangle area. Reference to a chart or map index is not necessary.

Extracting the chart card, the researcher positions it, in register, under one or more

acetates until he finds the type of photographic coverage to fill his requirements. The acetates are arranged chronologically by year, with the sheets showing latest coverage on top, and within year by type of photography (mapping, charting or reconnaissance). All acetates are in exact register with the others because the pre-printed bisecting meridian (vertical registration line) and the pre-punched post holes have a fixed relationship.

Exact or individual exposures, including stereo pairs can be ordered because of the style of indexing employed in the Standard Indexing System. Mosaic or photo index; coverage information is located in the same binder, graphically indexed, but overprinted with a different format. If more detailed evaluation is desired prior to ordering prints or if reproduction is not absolutely necessary, the research analyst may view the photography by ordering the prints from the "view" file of the Aerial Print File. The "Print File Number" in the upper right-hand corner

of the acetate overlay is the locator file number for the prints of that particular sortie camera position.

The US Air Force radar photography is being plotted and indexed in a manner somewhat similar to the visual aerial photography, by the use of specific symbols for various range setting and distances.

This type of photography is plotted on a transparent sheet keyed to a World Aeronautical Chart at a scale of 1:1,000,000. Due to the large areas covered by the radar scope, this photography is plotted in composite form with all pertinent information that is necessary for its use for military purposes.

A booklet covering this topic is available on request. Address the Commanding Officer, Office of Research and Liaison, Aeronautical Chart and Information Center, Washington 25, D. C. Ask for ACIC Technical Report no. 65, entitled Standard Indexing System for Aerial and Radar Photography.

## PERFORMANCE CHARACTERISTICS OF "CRONAR" POLYESTER PHOTOGRAPHIC FILM BASE\*

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### ABSTRACT

The laboratory and field test performance of "Cronar" photographic film base are discussed and data presented on stability coefficients, flexibility, strength and optical properties of this new base. All of these data suggest that "Cronar" base will offer handling and performance advantages of especial benefit to the field of photogrammetry.

**B**ECAUSE of the restricted time available for this presentation, it will be necessary to limit our coverage to actual performance characteristics of "Cronar" base when sensitized with du Pont "Photolith" lithographic film emulsion

As these data will indicate, this base is ideally suited to many photographic fields, but a description of all of these applications and the interesting story of "Cronar" base must be deferred until another time.

Our remarks must be prefaced with the statement that "Cronar" base is not commercially available, today, and the field experience being reported is based on the

output of a pilot plant now producing continuous rolls of 11" material. Small quantities of this pilot plant base have been made available for field trial. Quantities of "Cronar" base will not be available until sometime after the commercial plant unit now under construction starts operation in the middle of this year.

The commercialization of polyester films is the culmination of many years of du Pont research and development. "Mylar" polyester film is now in production by the Film Dept. of du Pont for non-photographic applications. Its chemical relative, "Cronar" polyester photographic film base, will be manufactured by the Photo

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