

# SANTONI SOLAR AEROTRIANGULATION - WORKING METHODS ADJUSTMENTS AND RESULTS OF LATEST EXPERIENCES

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SUMMARY. — The latest studies and experimental works performed by I. G. M. and E. I. R. A. in the field of aerotriangulation with Santoni's methods, have been intended to find out the working procedure most suitable for its practical application (Premise).

It is established that Santoni's method of aerotriangulation differs from other methods because the imposition of the transversal and longitudinal tilt of each new photograph does not depend on the elimination of the vertical parallaxes among some points of the optical model, but on the knowledge of the altazimutal position of the sun and of the angular position of the camera axis with respect to sun direction at the moment of exposure. The analytical procedure and the special instruments are described, by which the above mentioned inclinations can be determined from the data collected through the solar photograph (chap. i.).

A critical examination of the special apparatuses (solar periscope, solar photogoniometer, solar mechanical calculator) and the usual instruments (Santoni camera mod. IV, Stereocartograph mod. IV) which are needed for an aerotriangulation according to the Santoni's solar method, leads to the exposition of the drawbacks and advantages shown by the experience (chap. 2.).

Entering into the actual carrying out of the experiment, the conditions of the exposures and ground surveys are described. It is shown that as a result of ground survey the strip—about 100 km in length—disposes of three terrestrial controls: at the beginning, at the middle and at the end (chap. 3.).

From the field surveys, one passes to the preliminary calculations and tests preceding the connection of photographs.

Carefully described is then the research concerning the setting of the camera—periscope, on its whole, with respect to the plotting instrument. This research is carried out on the pairs provided with ground control, and leads to the determination of a constant — if there is any — to be assumed as corrective factor for all pairs (chap. 4.).

One enters the working details of the photographic bridging. The analysis of the nadiral photographs connection comes to the noteworthy conclusion that it can provide the swing values of the intermediate photographs for the subsequent calculations; but it can not always provide a reliable value of the systematic error in the transfer of swing. The technique of the solar, definitive connection is then exposed, with the rough results at the end of the strip (chap. 5.).

Passing to the selected method of adjustment, its informative criteria are outlined which can be summed up as follows:

- 1<sup>o</sup>) — The systematic error, whatever it may be, is calculated according to its effects inside the last model.
- 2<sup>o</sup>) — According to the entity and sign of the deformation which is examined in that model, the systematic corrective factor is calculated, and then the strip adjusted.
- 3<sup>o</sup>) — The residual closing errors, referred to the geodetic net, are ascribed to accidental errors, and adjusted linearly.

The acquired results show, in the present case, a heavy influence of accidental errors mostly due to the photographic definition. The solar method supplies, in cases like that, *the possibility of reducing several bridges of the same aerea to a sole angular bridge*, so that the influence of the residual accidental errors can be put in evidence independently from the angular setting of the cameras. It follows that their influence may be reduced by taking the mean of the various connections. The final results prove that the solar methods allows also removing « a posteriori » many troulbers of photographic views (chap. 6.).