

Procedures for Utilizing LANDSAT Tapes Without Deskewing

by

Paul W. Cook

Deskewing the LANDSAT tapes as provided for in using EDITOR is not a necessary link in the analysis system. Instead, provision for retaining the original pixel alignment while only changing the tape format is presently possible. This will affect neither the location of registration points nor the later classification of the pixel data. Evidence of these contentions is presently contained in the work currently progressing on the 1976 Illinois study.

The procedures for using LANDSAT data without deskewing are quite similar to those normally used in preparing the LANDSAT tapes for use on BBN. The greatest difference is that the initial registration step in which control points are found on the photo as well as on maps is not needed. Instead, the α and β deskewing coefficients are both set to zero immediately in Walt's deskewing program. The result of this will be to produce a tape in BBN format with all the LANDSAT data shifted in line and column by constants so that all the data is centered within a 2660 line by 3690 column working area on the tape.

Using LANDSAT I tapes, I found the constant shift factors to be 166 lines and 373 columns. I determined these constants by using the BBN greyscaling program implemented on our IBM 370 to print out a small greyscale centered upon this area. The exact edge of the scene in band 7 then could be determined and the amount of pixel offset needed calculated.

In contrast to the normal deskewing process, this procedure allows one to have a tape ready for final registration overnight (i.e., in the time needed to run the deskewing program with zero coefficients). A greyscale of the upper left corner area centered at 166,³273 to determine the offset values may be run immediately after creation of the new tape.

Now, potential control points need be located only on the photo as soon as it is available. Using Bob Starbuck's XEDITOR Registration Program, these points are next digitized and a file of Goddard coordinates created. Greyscales for each point chosen will be printed out from the tape as soon as the set of coordinates are shifted by <USDA-SRS> FBLOCK. Maps for these points must now be located and the greyscales matched to each.

Selection of precision control points may now be completed quite quickly. A linear equation to obtain the initial polynomial fit must first be run. Then when the 3rd order equations show that the registration is complete, a precision calibration file may be produced.

To use this 3rd order calibration file, one must now put the file into TECO and change the α and β coefficients to zero. Once this correction is made, all future work with the LANDSAT data will treat the data as though it were deskewed. That is, the 3rd order calibration will be used in every case in which LANDSAT coordinates of the BBN format tape are needed. Therefore, all packing functions, raw data analysis functions (classify, cluster, etc.) will now proceed as they have always been done.

Consequently, not deskewing has one primary advantage. It allows one to register the scene more quickly by eliminating one step of the registration work. Also, it does not introduce any additional complications or confusions. The only change to the original data is that of a constant shift of pixel values within the tape.

Hopefully, the procedure for reformatting will be changed in the near future by Walt Donovan so that the new BBN format tape may contain the original Goddard coordinates. This would further simplify the previous procedures by eliminating any need to transform the coordinates for data values on the original tapes and thus not require one to treat the reformatted tapes as though they were deskewed.