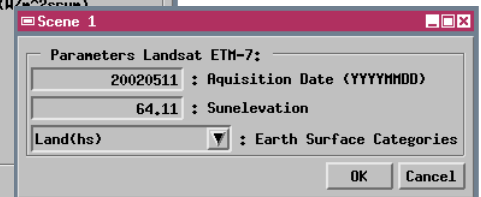
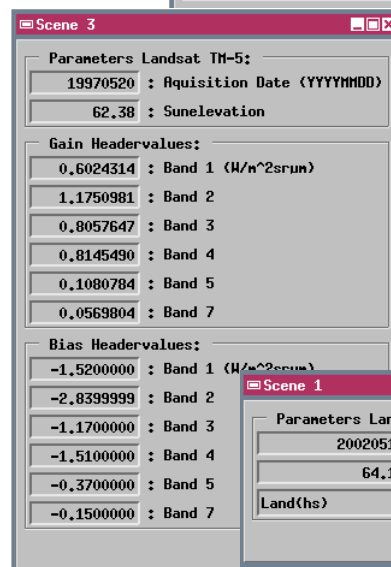
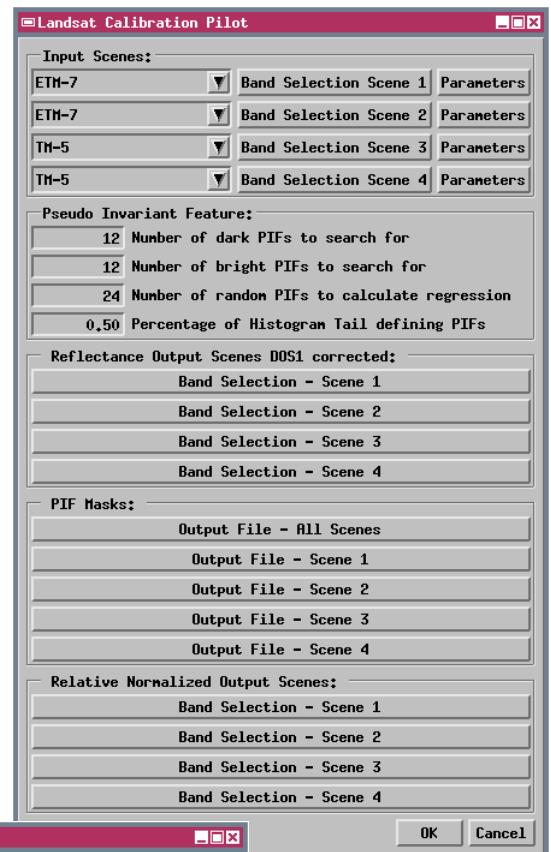


# Calibrate Multitemporal Landsat Scenes via SML

MicroImages clients in many countries are using the Spatial Manipulation Language (SML) to automate complex processing sequences and apply custom procedures to their geospatial data in the TNT products. One recent and ambitious example is the script `LandsatCalibrationPilot.sml` created by Mr. Ralf Koller, a graduate student in geography at Friedrich Alexander Universität, Erlangen-Nürnberg, Germany. This script processes a group of four Landsat scenes of the same area acquired on different dates to normalize them to a common apparent surface reflectance independent of the sensor type, illumination conditions, or atmospheric path radiance. In other words, the script automates the complex series of processing steps required to adjust a time-series of Landsat scenes to a common quantitative scale for use in monitoring change in surface conditions through time. Accommodating different sensor types for each of the scenes requires many branching points in the code that lead to alternative processing sequences. As a result, the current version of this script is nearly 83,000 lines long. Despite this complexity, Mr. Koller reports that he has successfully processed a 1309 by 2081-cell extract of four scenes in about 2 hours and 15 minutes on a Pentium III computer (866 MHz, 256 MB of RAM and 4GB of virtual memory).

Mr. Koller's script manages selection of the many input and output objects using a custom dialog window set up by a dialog specification in XML embedded in the script. The sensor type for each of the four scenes (Landsat7 ETM+, Landsat 5 TM, or MSS on Landsat 1 through 5) is set using combobox controls on the main dialog window. The selected scenes must have the same cell size, dimensions, and geographic extents. Scene-specific parameters (including acquisition date, sun elevation angle, and others) are input using additional custom parameter dialogs opened using the Parameters buttons on the main dialog. Buttons on the lower half of the main dialog are used to select the destinations for the various output objects.

Mr. Koller has graciously agreed to make this Landsat calibration / normalization script available to other MicroImages clients with the stipulation that it not be used for commercial purposes. You can download the script `LandsatCalibrationPilot.sml` from [microimages.com/freestuf/smlscripts.htm](http://microimages.com/freestuf/smlscripts.htm). Mr. Koller can be contacted at [rpk@gmx.net](mailto:rpk@gmx.net).



The script's main dialog window (above) as well as dialogs for entering parameters for different sensor types (left and below) are custom windows set up using XML specifications in the script.



Landsat5 TM, 11 May 1997



Landsat7 ETM+, 10 October 1999

Portion of two normalized reflectance Landsat scenes created by the `LandsatCalibrationPilot` SML script (RGB = Band 3-2-1).