DLT to Maya

Instructions and notes for recreating calibrated camera views in Maya or any other 3D modeling software

These instructions are somewhat particular to Maya, but should be a good starting point for using any other 3D modeling software.

1. Digitize the calibration frame using the DLTcalibration3.m package, or any other method you choose that is capable of creating the 11 DLT parameters *with the modified DLT algorithm*.
2. Load the coefficients file into MATLAB. In this example we'll assume that it is stored in the variable `coefs`.
3. Run the `DLTcameraPosition` function:
   `[xyz,T,ypr,Uo,Vo,Z] = DLTcameraPosition(coefs)` If you get a warning about non-orthogonal axes, stop now! You are most likely using DLT coefficients from a standard 11 parameter algorithm rather than the modified 11 parameter version. Your scene will not look right with these parameters, although it may come close. You really should reload your digitized frame into DLTcalibration3 (versions later than Feb. 16, 2007) and compute the coefficients using the "modified 11 parameter" menu option. Alternatively, you can use Tomislav Pribanic's mdlt1.m, available from http://www.isbweb.org/software/movanal/mdlt1.m
4. Start Maya and create a new scene
5. Set the scene orientation to "Z up" (even if your calibration frame isn't "z up"!)
6. Set Maya's Linear scale to the same scale as your calibration frame and the Angular scale to Degrees
7. Create a new camera, set the Far clip plane to something large (10,000 perhaps). All other default parameters should be fine.
8. Set the camera Transform Attributes as follows: the three Translate values are the `xyz` from DLTcameraPosition (in order) and the Rotate values are `ypr` (in order). Leave Scale, Shear and Rotate Axis alone; make sure that the rotation order is XYZ.
9. Create a NURBS plane, make it a child of the camera & inherit the transform of the camera.
10. Set the width of the NURBS plane to the width of your camera images (in pixels), set the ratio to the width/length ratio of your camera (yes, your plane will get really big!).
11. Set the Transform Attributes of the plane as follows: Rotate: all zero, Translate: 1st value is the width of the camera image (in pixels) divided by 2 minus `Uo`, or `(width/2 - Uo)`. 2nd value is the height of the camera image (in pixels) divided by 2 minus `Vo`, or `(height/2 - Vo)`. The 3rd Translate attribute is Z.
12. Change the material of the plane to display a file, preferably an image pulled from the video sequence or one of the calibration images.
13. Look through the camera (and set the shading options to display textures) – you should see your camera. Test the setup by viewing the calibration image through the camera and building the calibration frame in Maya.

Tips:

- You can manipulate the camera focal length and Film Back: Film Translate options to zoom in through the camera view and pan around the view.

- If you'd like to have a smaller NURBS plane, you can adjust the plane width and Translate attributes by a common scaling factor to reduce (or increase) the size of the plane while maintaining the camera image.