# Local_Coordinate_System

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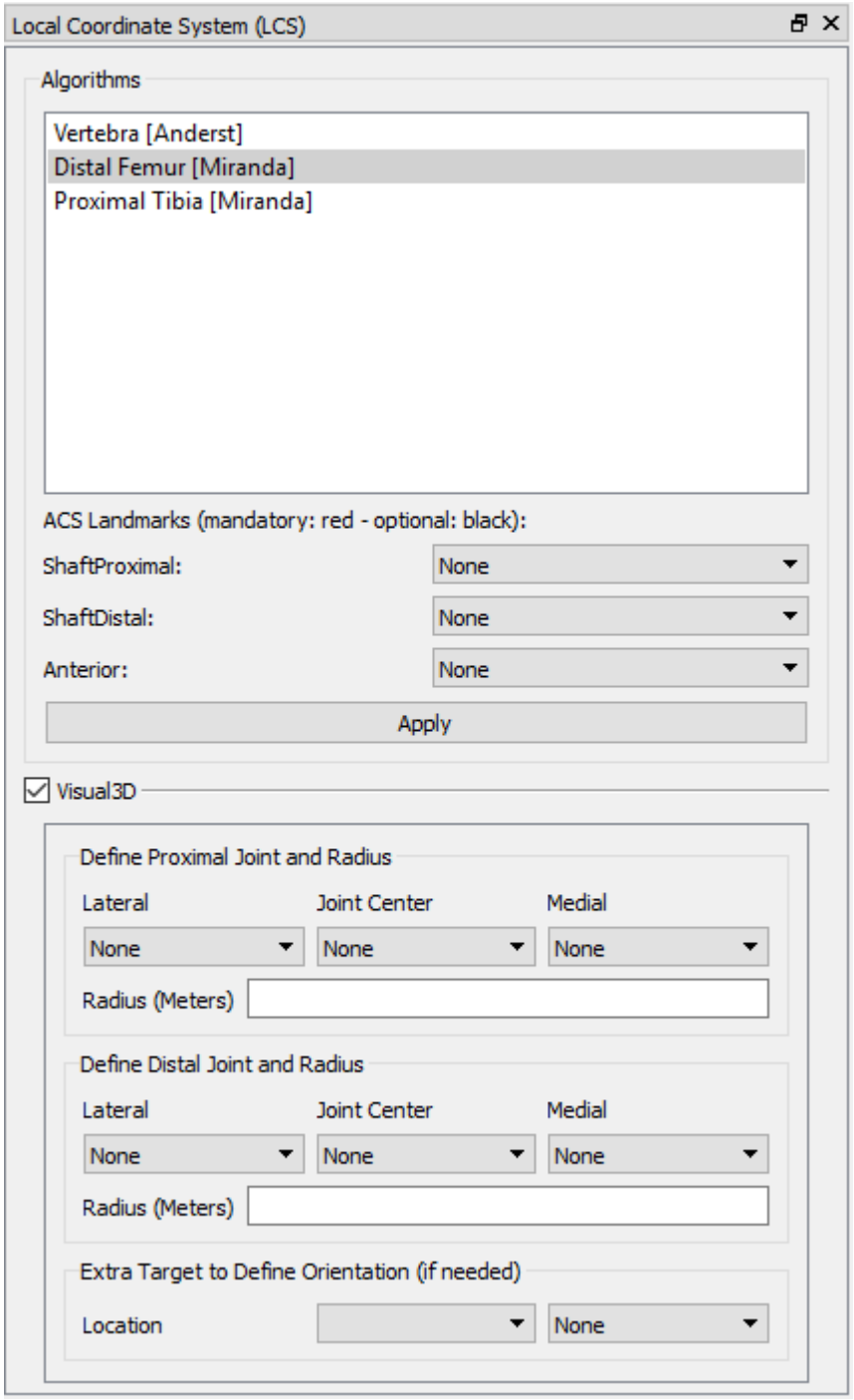


This widget lets you create a local coordinate system (LCS) for each object in your data set. Before tracking an object in X4D or Locate3D, you should define an LCS for it because the tracking output for each X-ray frame is the transform from the X-ray lab frame to the object's LCS. The LCS is stored in the subject file, and is expressed as the transform from the object's segmented image frame to its

local coordinate system (as if you were traveling from the segmented frame to the LCS). There are three methods of defining an LCS, as described in //How To: Define the LCS of an Object//.

| == LCS Algorithms == |
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| The LCS algorithms are implemented in a dll plugin framework, so it is possible to write your own and plug it into Orient3D. The currently implemented algorithms are:<br><br>* **Vertebra [Anderst]** *Anderst, W., personal communication*. This algorithm is designed for vertebral disks, and puts the LCS in the middle of the disk with Y pointing superiorly and Z anteriorly. It requires placement of eight landmarks, four around the perimeter of the superior surface of the disk, and four around the perimeter of the inferior surface of the disk.<br><br>* **Distal Femur [Miranda]** *Miranda, D., et al. J Biomech 43(8), pp. 1623–26, 2010*. This algorithm does not require any landmarks, but supports the use of three optional ones. It is recommended that you first try the algorithm without any landmarks. If the LCS is not calculated properly (which can happen if the femoral shaft is too short), try adding the *Anterior* landmark, which can go anywhere on the anterior side of the femur. If the LCS is still not right, try adding *ShaftProximal* and *ShaftDistal*, which are used to define the long axis of the femoral shaft.<br><br>* **Proximal Tibia [Miranda]** *Miranda, D., et al. J Biomech 43(8), pp. 1623–26, 2010*. This algorithm does not require any landmarks, but supports the use of three optional ones. It is recommended that you first try the algorithm without any landmarks. If the LCS is not calculated properly (which can happen if the tibial shaft is too short), try adding the *Anterior* landmark, which can go anywhere on the anterior side of the tibia. If the LCS is still not right, try adding *ShaftProximal* and *ShaftDistal*, which are used to define the long axis of the tibial shaft. |
| == Visual3D == |
| The Visual3D panel can be opened by checking its checkbox and lets you create an LCS using Visual3D's method of defining proximal and distal joints with targets. Consult the Visual3D documentation for details on this method. |