Graphical Coordinate Systems

A coordinate system is needed to input, store and display model geometry and graphics. Four different types of coordinate systems are used in a CAD system at different stages of geometric modelling and for different tasks.

**Model (or World, Database) Coordinate System (MCS)**

a) MCS - the reference space of the model with respect to which all of the geometrical data is stored.

b) It is a Cartesian system which forms the default coordinate system used by a software system.

![MSC and WCS diagrams](image)

**Working Coordinate System (WCS)**

a) An auxiliary coordinate system for conveniently entering graphical data into a CAD system.

b) WCS is normally attached to the modeled object (local coordinate system of a part), or determined by the data acquisition method (cylindrical coordinate system for a single-mirror range finder).

Geometric data in WCS has to be transferred into the MCS for storage and model construction.
**Screen Coordinate System (SCS)**

a) A 2-D device dependent coordinate system whose origin is usually located at the lower left corner of the graphics display.

b) The coordinate range of SCS can be either the resolution of the screen, or simply a scale from 0 to 1.

c) SCS is on the projection plane where projections of the modeled object are displayed.

![Screen Coordinate System Diagram](image)

**Viewing Coordinate System (VCS)**

A 3-D Cartesian coordinate system (right hand of left hand) in which a projection of the modeled object is formed. VSC will be discussed in detail under Perspective/Parallel Projections.

Relations between Different Coordinate Systems: