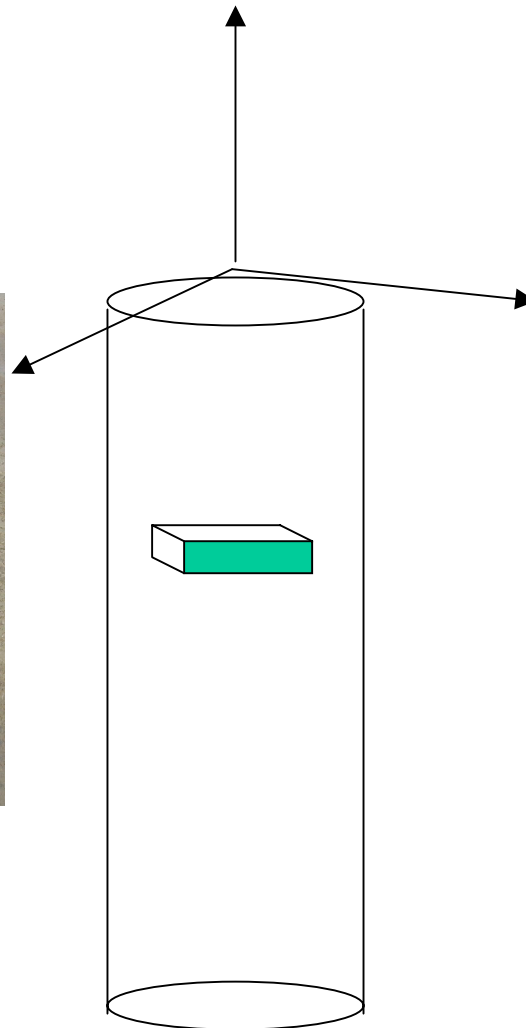




# ShapeAccelArray (SAA) Geometry

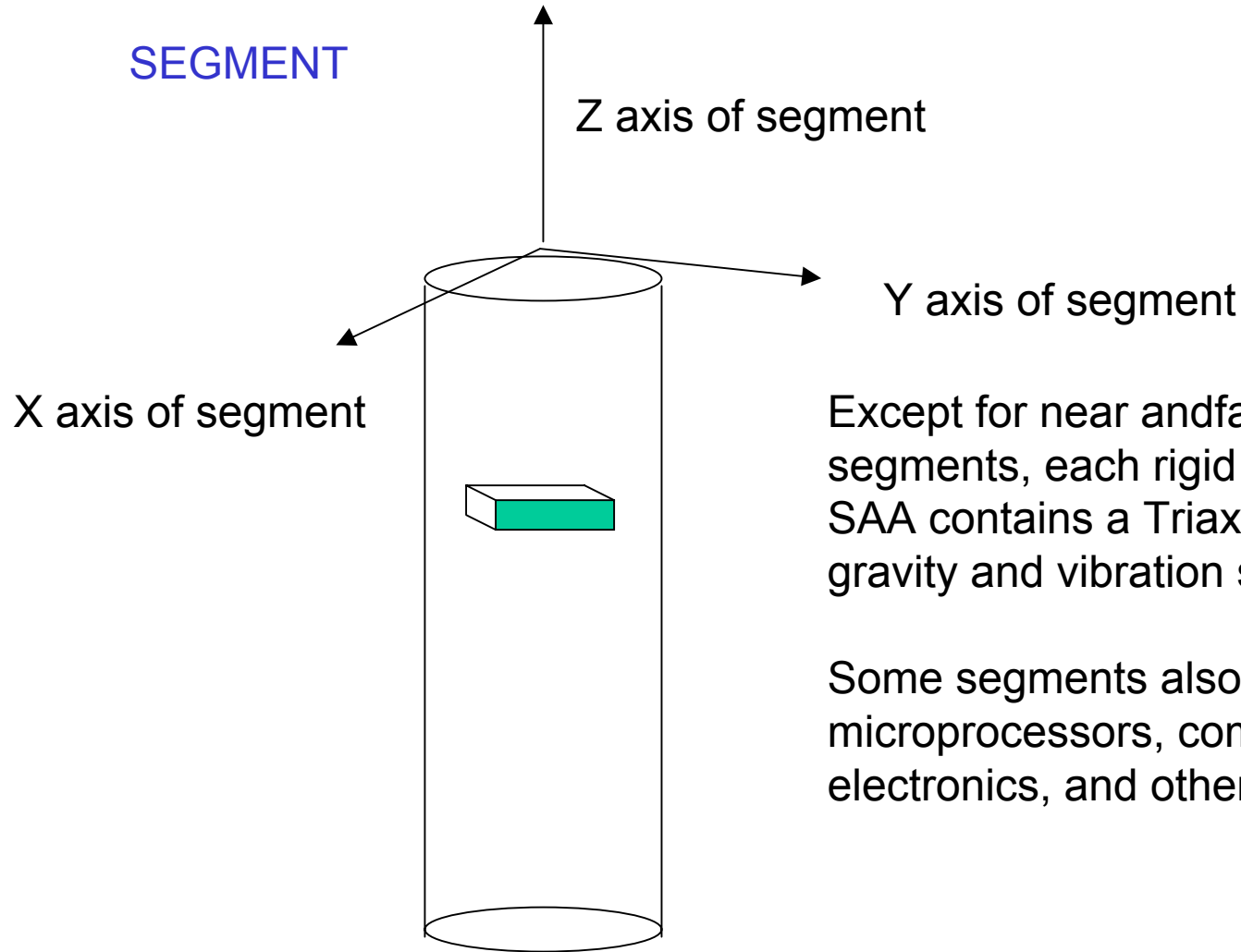




# DEFINITIONS



# SEGMENT



Except for near and far anchor segments, each rigid segment of SAA contains a Triaxial MEMS gravity and vibration sensor.

Some segments also contain microprocessors, communication electronics, and other sensors.

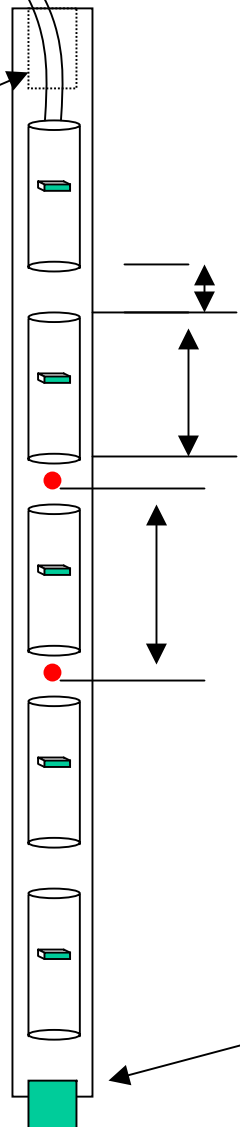


NEAR, or cable end

### SEGMENTS IN ARRAY

Most arrays have a non-sensorized segment at the NEAR end, used as a rigid attachment for arrays referenced at the NEAR end.

World Coordinate System z (vertical arrays).



Gap Length: flexible joint length

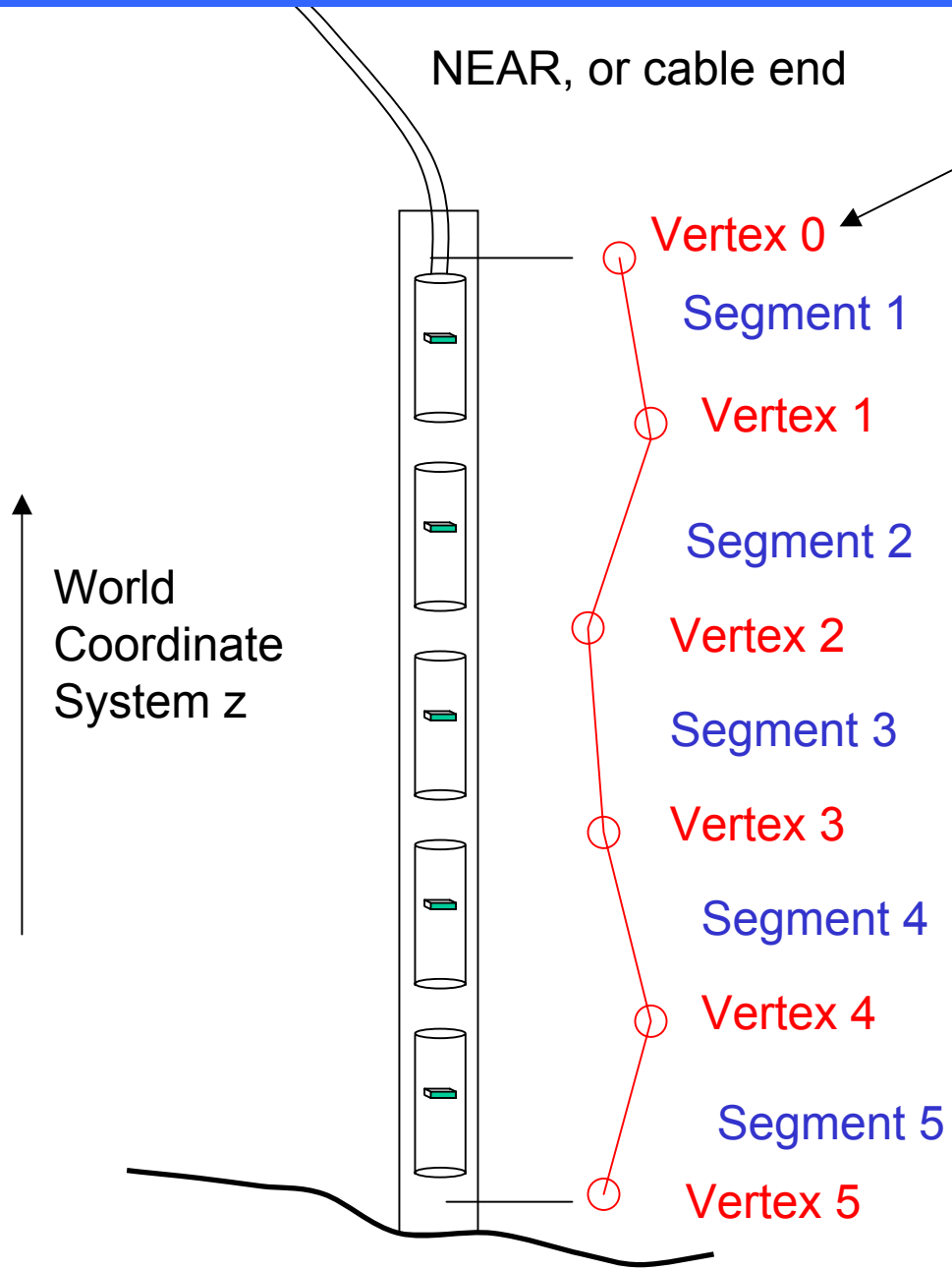
Rigid Length: rigid portion of segment

Segment Length in model = Rigid length + Gap Length = distance from joint center to joint center

An anchor segment at the FAR end contains no sensors. It is used as a rigid attachment for arrays referenced at the FAR end. Its length is documented elsewhere.



Data are associated with the joint centers, which are called VERTICES. The shape of the array is modelled in software as a 3D polyline. Each VERTEX of the polyline corresponds to the center of a joint on the real array.



Note: Vertex numbering is zero-referenced

Vertex numbering is always in the order of calculation. In this example, calculation starts at the top of the physical real-world segment. If the software is set for "Reference = FAR", then the numbering will be reversed.

(Note: normally arrays are supplied in increments of 8 segments)



NEAR joint center = end of software model if "reference=far".

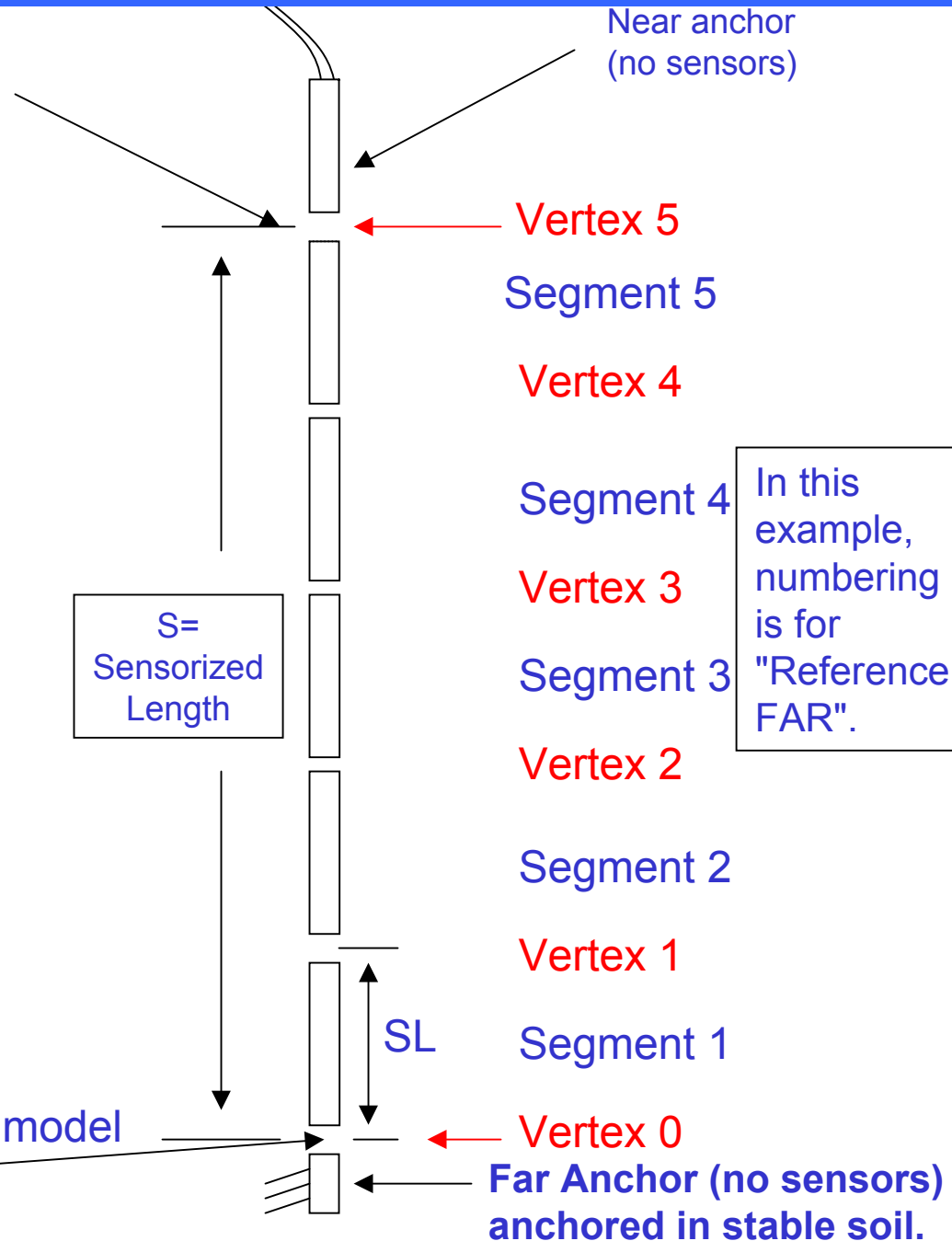
To determine locations on the array, should the markings be obscured, measure from the center of the FAR joint a distance S, the "sensorized" length, where

$S = (\text{no. of segments}) * (\text{segment length (SL)})$ .

SL is from joint-center to joint-center.

In this example, if SL = 305 mm, then  $S = 5 * 305 = 1525 \text{ mm}$ .

FAR joint center = beginning of software model if "reference = far".



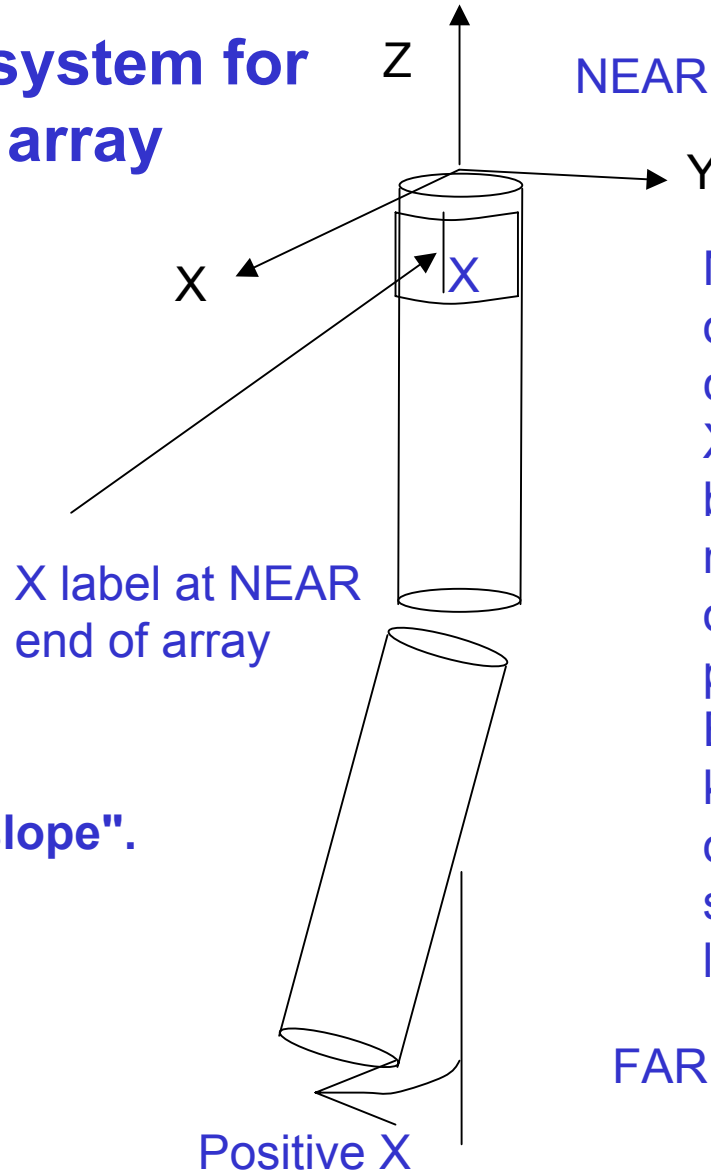
In this example, numbering is for "Reference = FAR".

Far Anchor (no sensors) anchored in stable soil.



## Definition of axis system for a near-referenced array

The 'X label' on an array is a factory marking used to orient the SAA in the local geography. During installation, it should be pointed in a known azimuth, such as "North", or "down-slope". It is used in defining a right-handed axes system for display of data, as shown in the following illustrations.



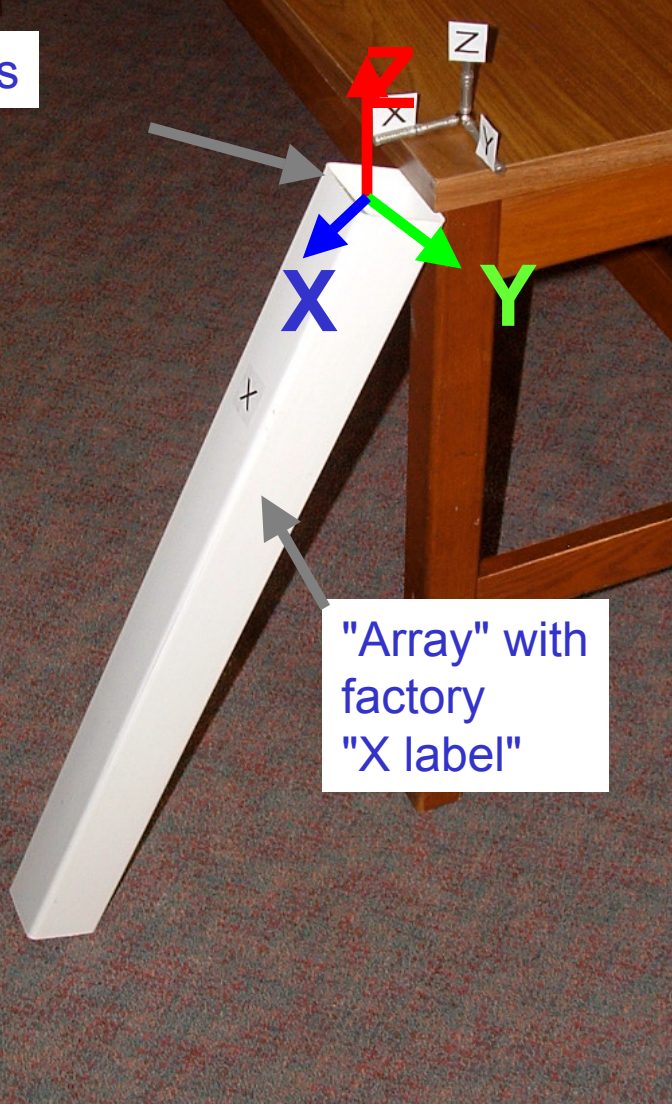
Note: Depending on the array coverings, the X mark may not be exactly at the near joint, or even on the sensorized part of the array. Ensure you know the locations of the ends of the sensorized length when installing!



**Examples of  
axes conventions  
appear on the  
following pages, using  
a white rectangular  
prism with an  
"X label" to represent  
an "Array" ...**

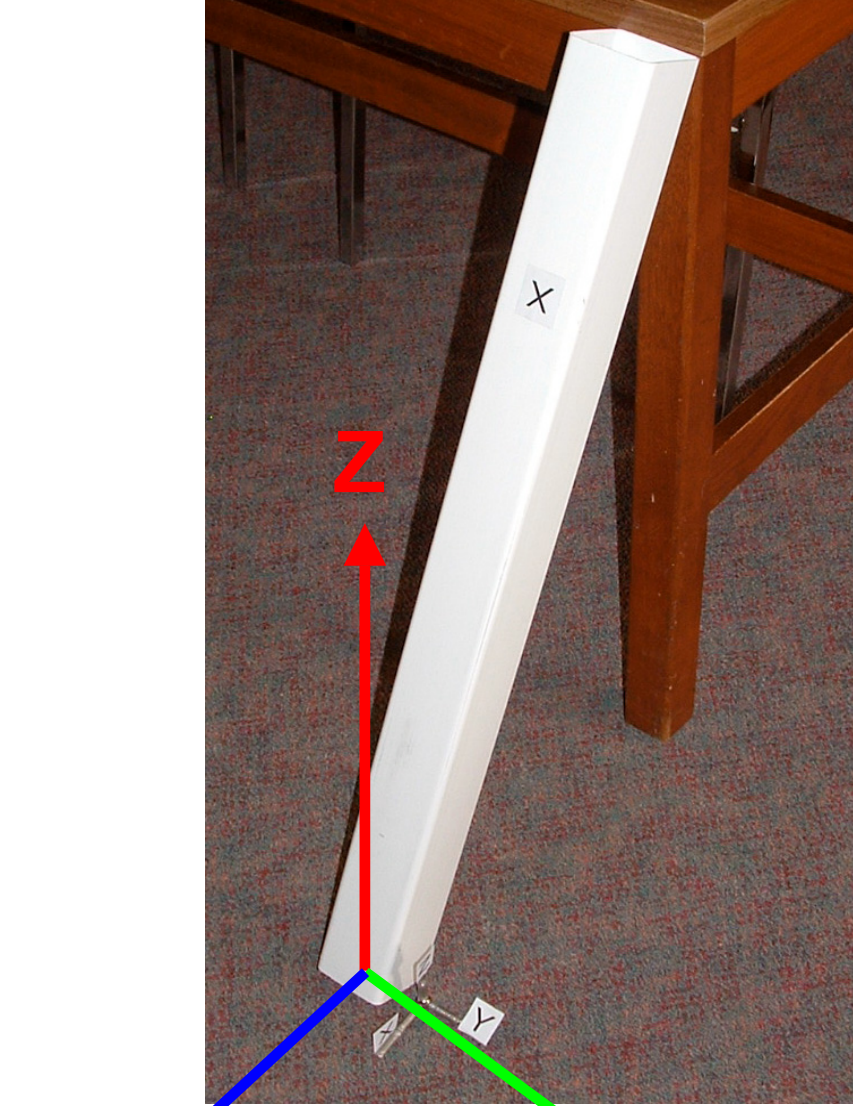


Axes



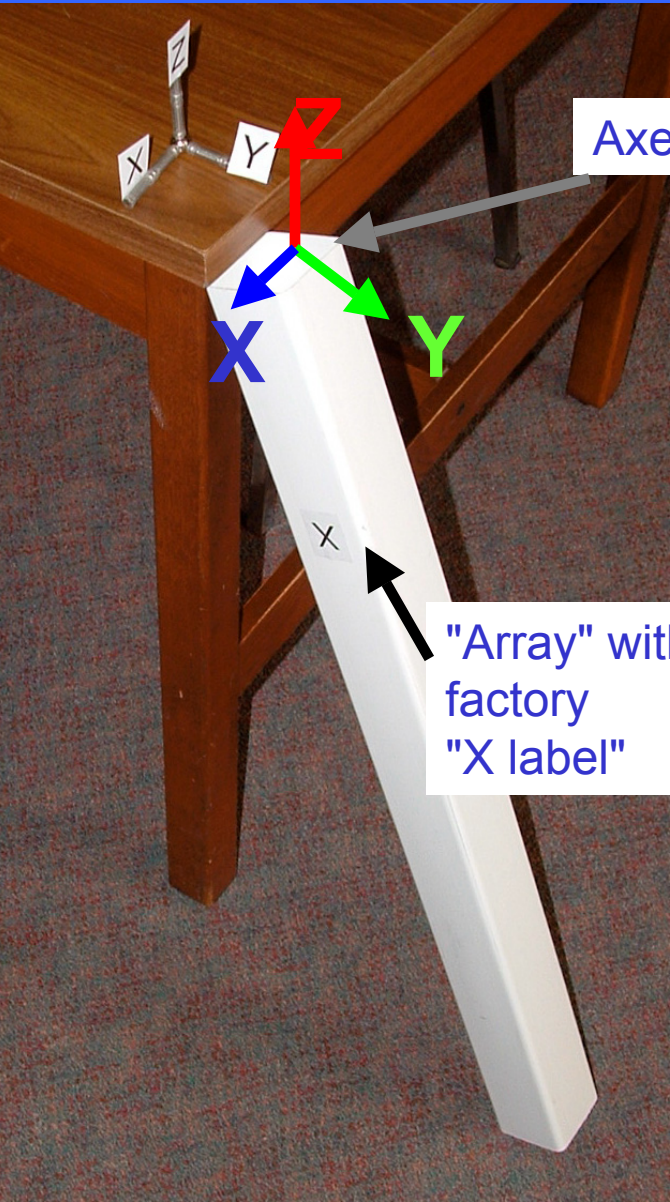
"Array" with factory "X label"

NEAR-Referenced xz shape

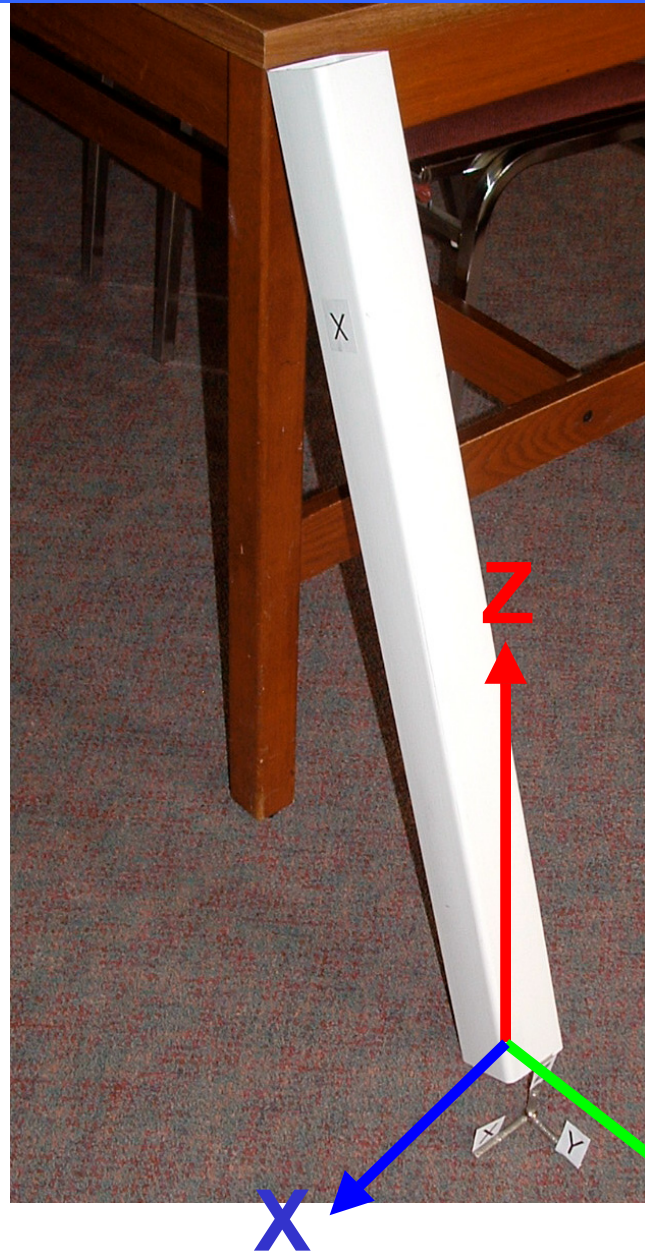


X Y Z

FAR-Referenced xz shape



NEAR-Referenced yz shape



FAR-Referenced yz shape