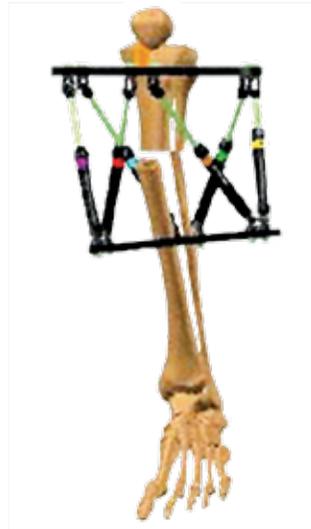


[www.spatialframe.com](http://www.spatialframe.com)

Version 4.1: Fracture reduction and  
deformity correction software



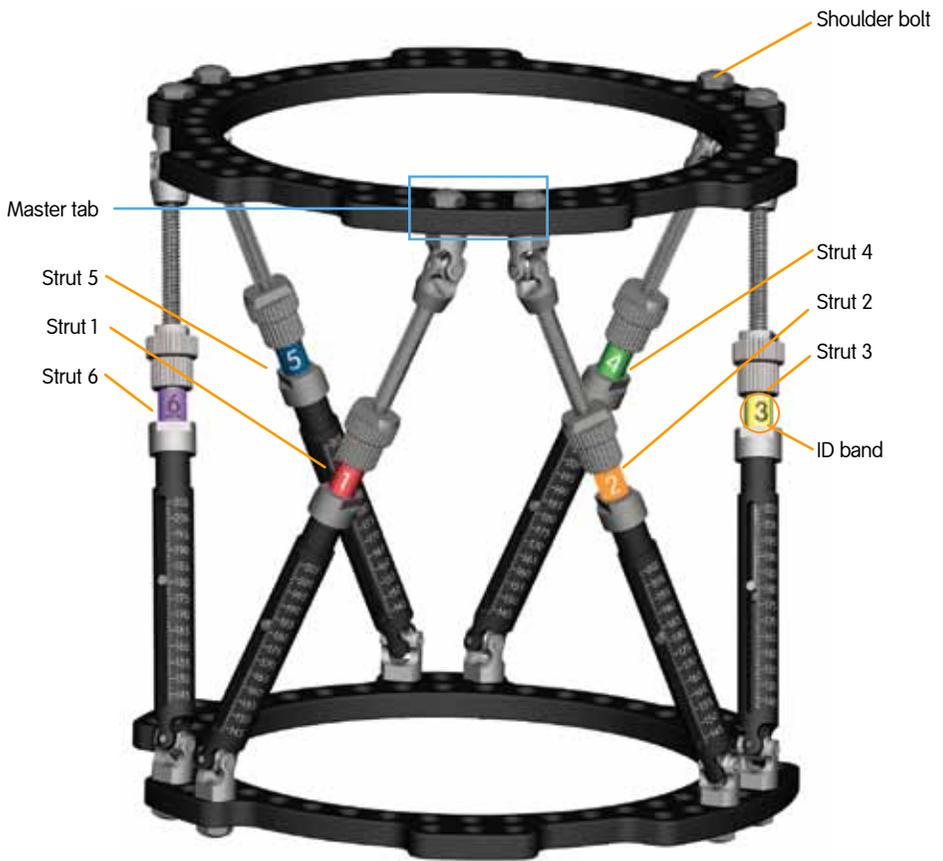
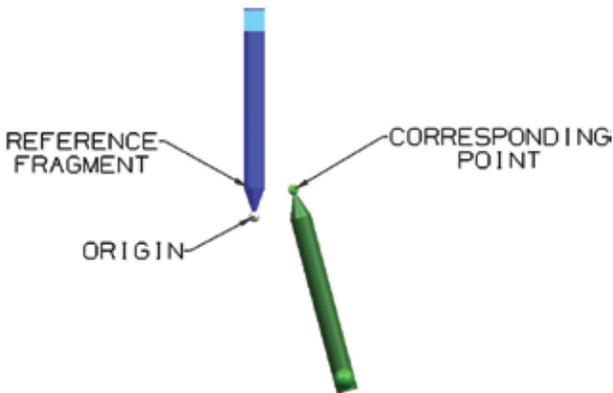


Figure 1

# Frame assembly

1. Struts are always numbered as shown in Figure 1 or when looking at the frame from the proximal ring toward the distal ring.  
**Counterclockwise:**  
1-red, 2-orange, 3-yellow, 4-green, 5-blue, 6-violet
2. The shared connection point for struts 1 and 2, located on the proximal ring, is the 7-hole **master tab**. The **master tab** is denoted by a blue box in Figure 1.
3. The **master tab** is **always** on the proximal ring.
4. The **master tab** is **always** directly anterior. If it is not directly anterior, rotary frame offset on [spatialframe.com](http://spatialframe.com) must be set at the appropriate degree of internal/external rotation.
5. If distal ring reference is selected, **do not** flip the frame upside down.
6. If distal ring reference is selected, use the empty tab located on the distal ring between struts 1 and 2 as an anterior reference **anti-master tab**. Place this tab directly anterior on the distal fragment or enter the appropriate rotary frame offset value in [spatialframe.com](http://spatialframe.com).
7. Always verify the 'initial' and 'final' frame images on the Strut Settings page prior to printing a prescription for the patient.

# Software terminology



**Origin:** a defined point in space (the X-Ray), usually on the distal tip of the reference fragment

**Corresponding point:** a defined point in space (the X-Ray), usually on the proximal tip of the moving fragment

**Reference fragment:** the stationary fragment, always has the origin on it, always colored blue in dowel view on spatialframe.com

**Moving fragment:** always has the corresponding point on it, always colored green in dowel view on spatialframe.com.

**The software creates a path to bring the corresponding point back to the origin.**

## Entering a case in the software

To begin a new case, you must first enter information such as the case name and date. Next, you will select the correction area by clicking on the skeletal image. Once you have selected an area, you must choose a region (ie proximal, mid-shaft or distal tibia). Then, you will choose an operating mode.

There are two operating modes, total residual mode and chronic mode.

**Total residual:** This is the most commonly used mode and requires use of FAST FX® struts.

In the total residual operating mode, the frame is applied acutely to mimic the fracture or deformity. This is also described as a crooked frame on a crooked bone. In this mode, the frame does not have to be in the neutral frame position at the beginning or end of the case.

**Chronic:** The chronic operating mode is used for nonunions, malunions and deformities. Radiographic measurements are taken to construct a frame that matches the affected limb. In this mode, the struts are set before the frame is applied to the bone. When correction is achieved, the struts will be at neutral length.

After you have selected an operating mode, you will enter information for four required parameter groups.



1. **Defining the deformity:**  
What is the shape of the bone?
2. **Selecting frame components:**  
Which frame are you using?
3. **Mounting the frame:**  
How is the frame positioned on the bone?
4. **Structure at-risk (SAR):**  
What anatomy may be jeopardized during the correction?

# Defining the deformity

## Step 1: Select the reference fragment

The reference fragment can be either the proximal or distal portion of the fracture or deformity. This guide illustrates proximal referencing. Distal referencing is no different except the origin resides on the distal, reference fragment and the corresponding point resides on the proximal, moving fragment.

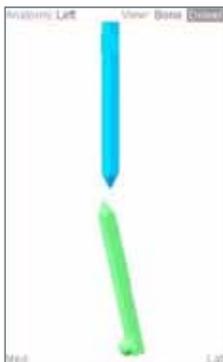


## Optional: Apply axial translation first

In cases where there is potential for bony impingement, you may choose to apply axial translation first. Axial translation will be corrected in the prescription before the remaining deformity.

## Step 2: Enter the deformity measurements

On this page, you may select dowel view or bone view. Please note that the bone view provides a graphic representation only.



Dowel view

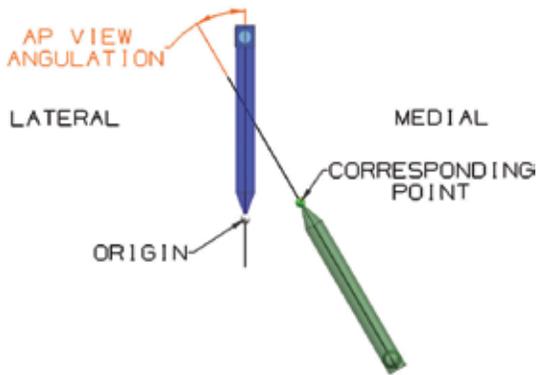


Bone view

There are six deformity measurements:

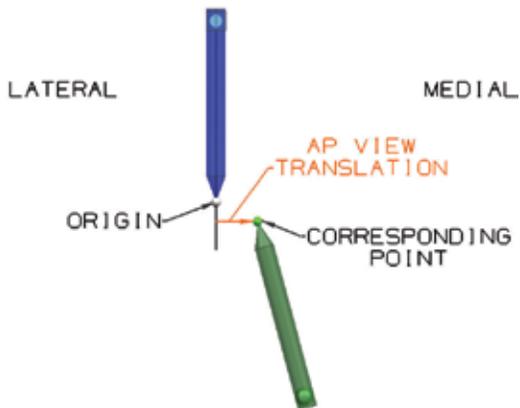
1. AP view angulation
2. AP view translation
3. Lateral view angulation
4. Lateral view translation
5. Axial view angulation
6. Axial view translation

## 1. AP view angulation (deg)



Using an AP radiograph, AP view angulation measures the angle, in degrees, between the fragments and is indicated in degrees varus or valgus.

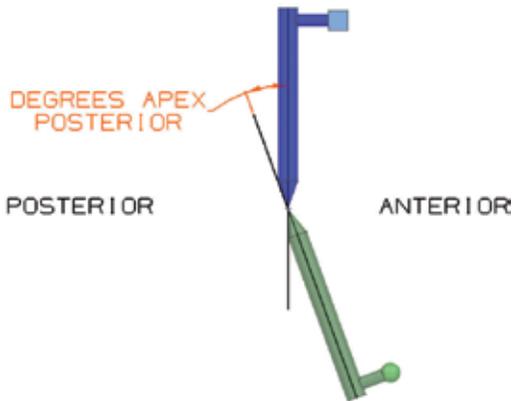
## 2. AP view translation (mm)



Using an AP radiograph, AP view translation measures the distance, in millimeters, that the corresponding point on the moving fragment is medial or lateral **to the origin** on the reference fragment.

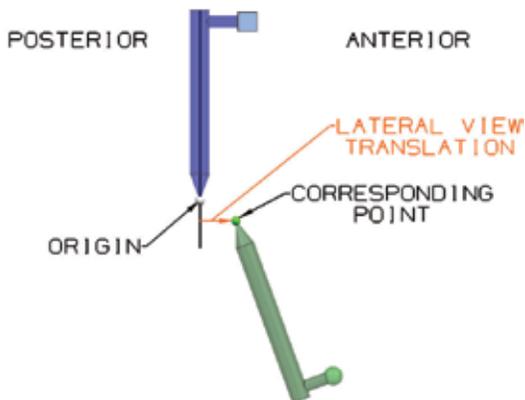
# Defining the deformity

## 3. Lateral view angulation (deg)



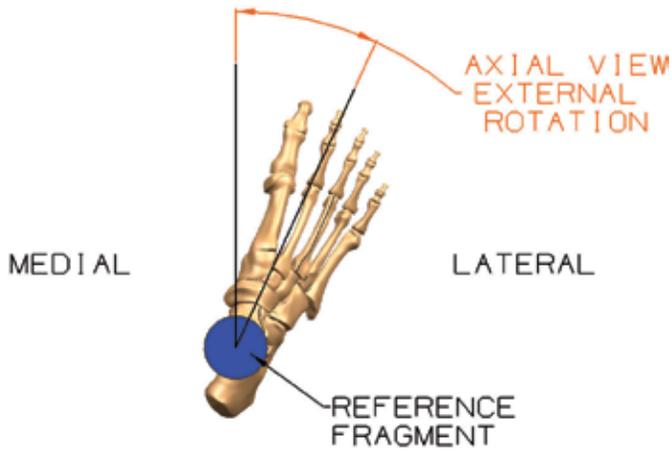
Using a lateral radiograph, lateral view angulation measures the angle, in degrees, that the moving fragment is in flexion (apex anterior) or extension (apex posterior).

## 4. Lateral view translation (mm)



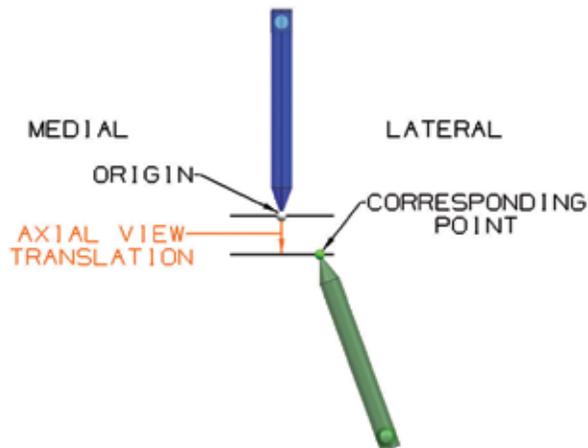
Using a lateral radiograph, lateral view translation measures the distance, in millimeters, that the corresponding point is anterior or posterior **to the origin**.

### 5. Axial view angulation (deg)



Axial view angulation measures, in degrees, the internal or external rotation between the reference fragment and the moving fragment. Axial view angulation is a clinical assessment and is determined from the perspective of the reference fragment.

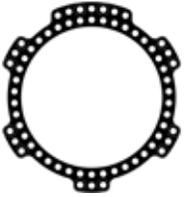
### 6. Axial view translation (mm)



Using an AP radiograph, axial view translation measures, in millimeters, how short or long the corresponding point is **to the origin**.

# Selecting frame components

## Step 1: Select ring type and size



**Full ring** - standard spatial ring which can be used in almost any application.



**2/3 ring** - primarily used around joints, UE applications and lateral femoral placement.



**U plate** - primarily used for foot applications involving buttress frames.



**Foot ring** - for use with static frames or strut driven frames.

## Open ring orientation

When using a 2/3 ring or U plate, you can describe the location of the ring opening.

## Step 2: Select strut family, type and size

► Next, **Select Struts:**

	Standard Struts					Fast FX Struts			
	XXS 59-76 mm 7107-0200	XS 75-96 mm 7107-0205	Short 90-125 mm 7107-0210	Medium 116-178 mm 7107-0220	Long 169-203 mm 7107-0230	XS 91-121 mm 7107-0705	Short 116-152 mm 7107-0710	Medium 143-205 mm 7107-0720	Long 195-311 mm 7107-0730
	Select All	Select All	Select All	Select All	Select All	Select All	Select All	Select All	Select All
Strut 1	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>
Strut 2	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>
Strut 3	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>
Strut 4	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>
Strut 5	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>
Strut 6	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>

Select strut type and size

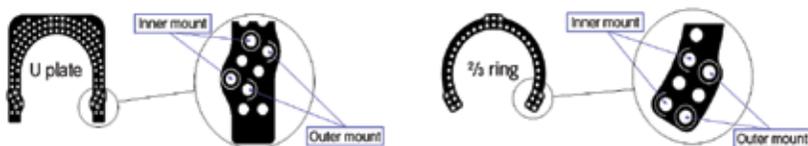
### Strut types

**Standard struts** are the original struts of the system. They can only compress or distract by rotation of the adjustment knob.

**FAST FX® struts** can be acutely adjusted by unsnapping the jam nut, and then re-locking it, or moved slowly by the rotating adjustment knob.

### Strut mountings

**Inner mount/outer mount:** This strut mounting option allows for a more customized fit for your corrections.

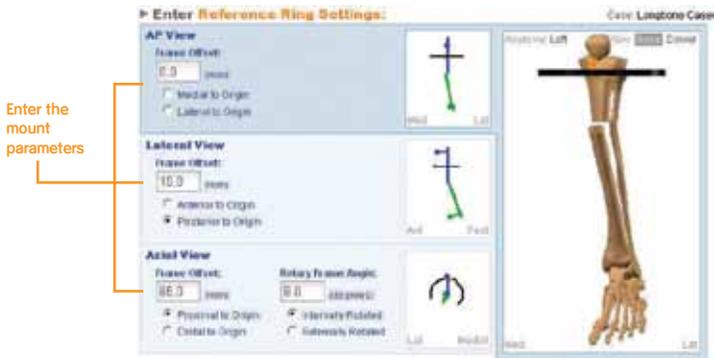


Full circles are standard mounts.

Half circles are alternate mounts.

Some 2/3 rings do not have full or half circles.

# Mounting the frame

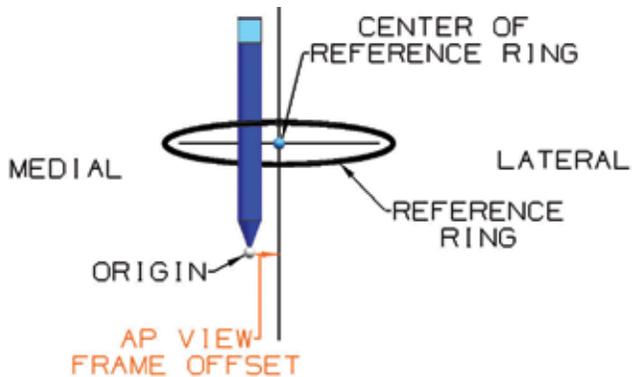


In this step you will describe where the center of the reference ring is located relative to the origin. Your descriptions will include:

1. AP view frame offset
2. Lateral view frame offset, and
3. Axial view frame offset

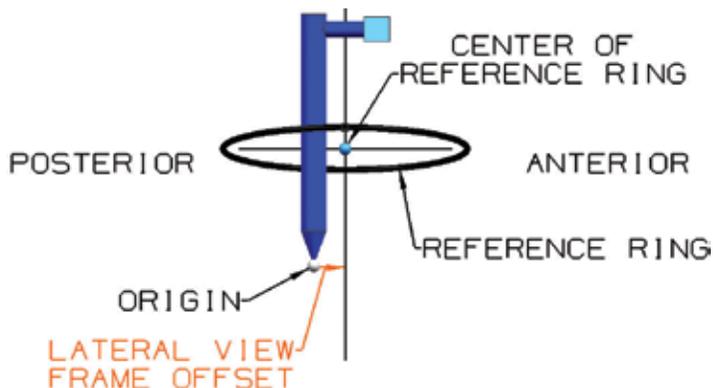
You will also describe the rotary frame angle, or the orientation of the master tab to the direct anterior position.

## 1. AP view frame offset



Using an AP radiograph, AP view frame offset measures the distance, in millimeters, that the center of the reference ring is medial or lateral **to the origin**.

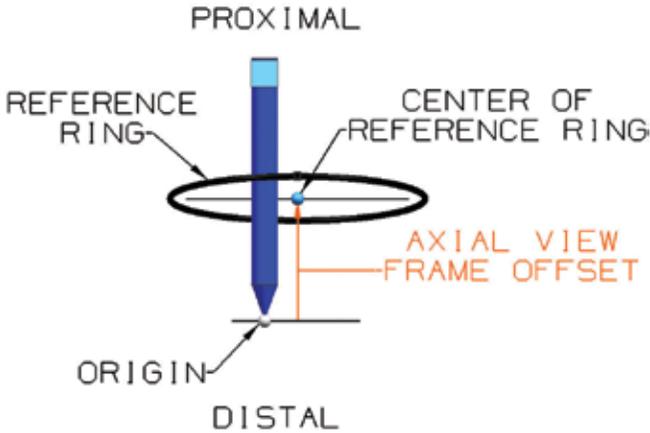
## 2. Lateral view frame offset



Using a lateral radiograph, lateral view frame offset measures the distance, in millimeters, that the center of the reference ring is anterior or posterior **to the origin**.

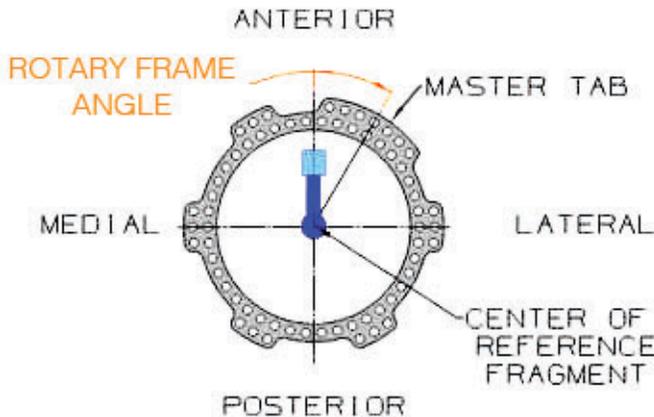
# Mounting the frame

## 3. Axial view frame offset (mm)



Using an AP radiograph, axial view frame offset measures the distance, in millimeters, that the center of the reference ring (beginning from the center of the ring thickness) is proximal or distal **to the origin**.

## Rotary frame angle (degrees)



Rotary frame angle measures, in degrees, the orientation of the master tab to the direct anterior position. Rotary frame angle is a clinical assessment.

## Structure at risk



### SAR

Please note that the bone view provides a graphical representation only. Users must clinically measure and describe the SAR location.

**SAR or structure at risk** represents a structure (neurovascular bundle, soft tissue envelope, skin graft or bone ends of the fracture itself) that may be affected by the correction process.

Describe where this point is with reference to the origin in the AP view, lateral view and axial view.

The structure at risk is the primary component to be considered to determine the correction time. To determine the minimum correction time, you must enter a maximum safe distraction rate. **1mm a day of correction is generally accepted.** However, the SAR may dictate that a correction proceed at a slower pace. The surgeon may override the recommended correction time by entering the number of days in the custom correction time box.

**Orthopaedics**

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