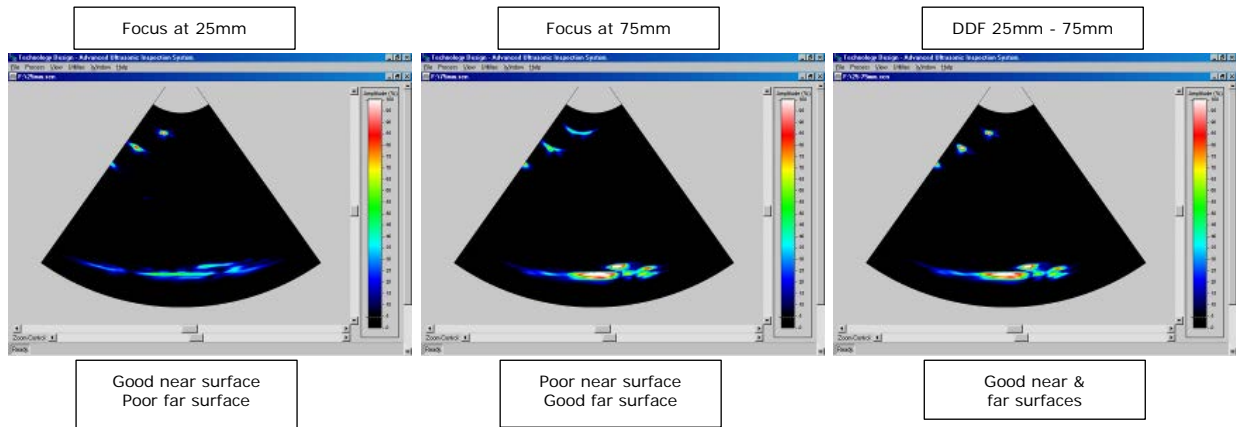


## Dynamic Depth Focussing

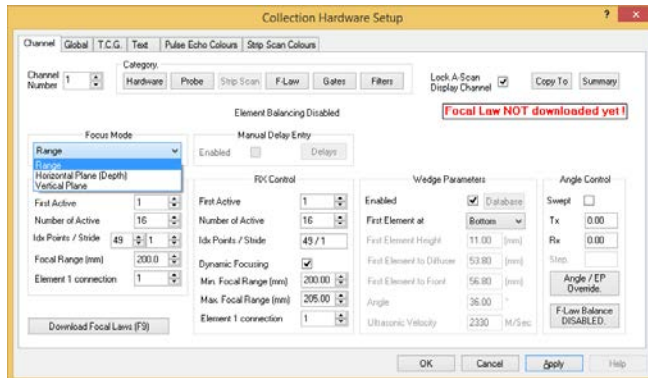
Dynamic Depth Focussing or DDF is a method of extending a single point of focus to a focal range. DDF is purely artificial and is always calculated on the received (Rx) data. It is important to remember that like point focus, DDF is only possible in the near field. It is therefore necessary to know the near field boundary before attempting to apply any focussing; this can easily be determined by displaying the near field in ESBeamTool.

The advantage of using DDF is that the entire area within the focal range displays improved visual definition. Owing to the concentration of energy at every point the echodynamic pattern of defects is sharper and can therefore be sized more precisely.

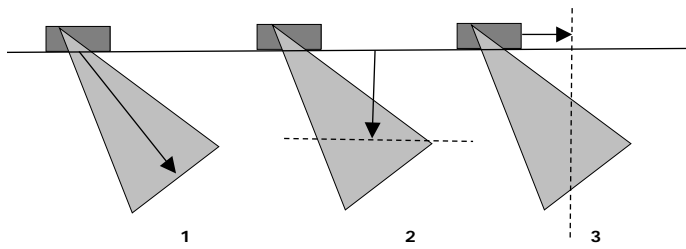
The following images illustrate the effect of DDF compared to point focus.



In the TD-Scan software there are four focus modes for phased array:



1. **Range** – The focal points are located by measuring along each beam path from the beam exit points. This mode is not particularly useful because the differing depth for the given range from each beams results in an arc of focal points
2. **Horizontal Plane (Depth)** - The focal points are located by measuring a depth from the surface. This mode is particularly useful for critical inspection of particular weld features e.g. the weld root.
3. **Vertical Plane** - The focal points are located by measuring a projection distance along the surface from the front of the wedge. This is the most useful mode because centreline cracking may be critically evaluated with great effect and it is also easy to define the focal area across the whole weld and HAZ area with precision.
4. The fourth is not so much a selectable mode, but rather a value adjustment that causes focussing to be impossible, therefore no focus. If any of the distance values depicted below are set to a value in the far field, there will be no focussing. N.B. setting the focus distance value to zero will cause the software to display an error message.



#### How to activate focussing:

##### Point Focus

- Complete UT setup and calibration.
- Select a focus mode from the drop-down list (**Setup-Collection Hardware-F/Law**)
- Enter the appropriate distance value to the focal point in both the **Tx** and **Rx** areas.
- Depending on the focus mode selected the focal value field heading in the Tx & Rx Control areas will change to **Focal Range (mm)**, **Focal Depth (mm)** or **Offset to Vertical (mm)**.
- The focus mode only affects channels that have multiple focal laws, i.e.
  - For Electronic scans, **Idx Points** > 1.
  - For Sectorial scans, **Swept** is enabled.

##### DDF

- Complete UT setup and calibration.
- Select a focus mode from the drop-down list (**Setup-Collection Hardware-F/Law**)
- Enter a distance value to the centre point between the minimum and maximum focal points in both the **Tx** area.
- Enable the **Dynamic Focusing** check box.
- Enter the **Min** and **Max** points of the chosen focal range in the **Rx** area. The wording of the value field headings will change depending on the focus mode selected.