LWD 1

Pulse Generator Assembly Introduction

Superslim and Slimhole

Pulse Generator Assembly Objectives

At the completion of this presentation you should be able to:

1. **Describe the functions of the pulse generator assembly.**
2. **Name the parts required to build the pulse generator assembly.**
3. **Describe the main difference in the assembly of the 1200/650 systems versus the Slimhole/Superslim systems.**

Superslim and Slimhole

- **Superslim Pulse Generator Assembly**

What does a Pulse Generator Assembly do?

- A mechanical assembly that uses the drilling fluid flow through the drillpipe to generate both electrical and hydraulic power and also to create pressure changes, or pulses, in that fluid.

What makes a Pulse Generator Assembly

- The Pulser
- The Flowgear (the parts that are installed on the pulser to build a turbine, valve, and to resist erosion)

What makes a Pulse Generator Assembly

- The Pulser
  - The central component of all four systems
  - The same pulser can be used on all four systems

The Pulser

The Pulser

- Generates electrical and hydraulic power
- Extends poppet into orifice to create a positive pressure pulse

The Flowgear

- Most of the flowgear comes in four sizes, related to the flow rate, and is used on one of the four systems.
  - 1200 System
  - 650 System
  - Slimhole System
  - Superslim System
- Some of the flowgear is common to two or more systems

Pulse Generator Assembly

- The four systems can be divided into two groups that have similar assembly procedures
  - 1200 and 650 Systems
  - Slimhole and Superslim Systems

Pulse Generator Assembly

- 1200 and 650 Systems
- Parts are fixed to the pulser on a Stator Support Tube Assembly

- Superslim and Slimhole Systems
- Parts are fixed to the pulser with a stator locator pin and split ring

Superslim System

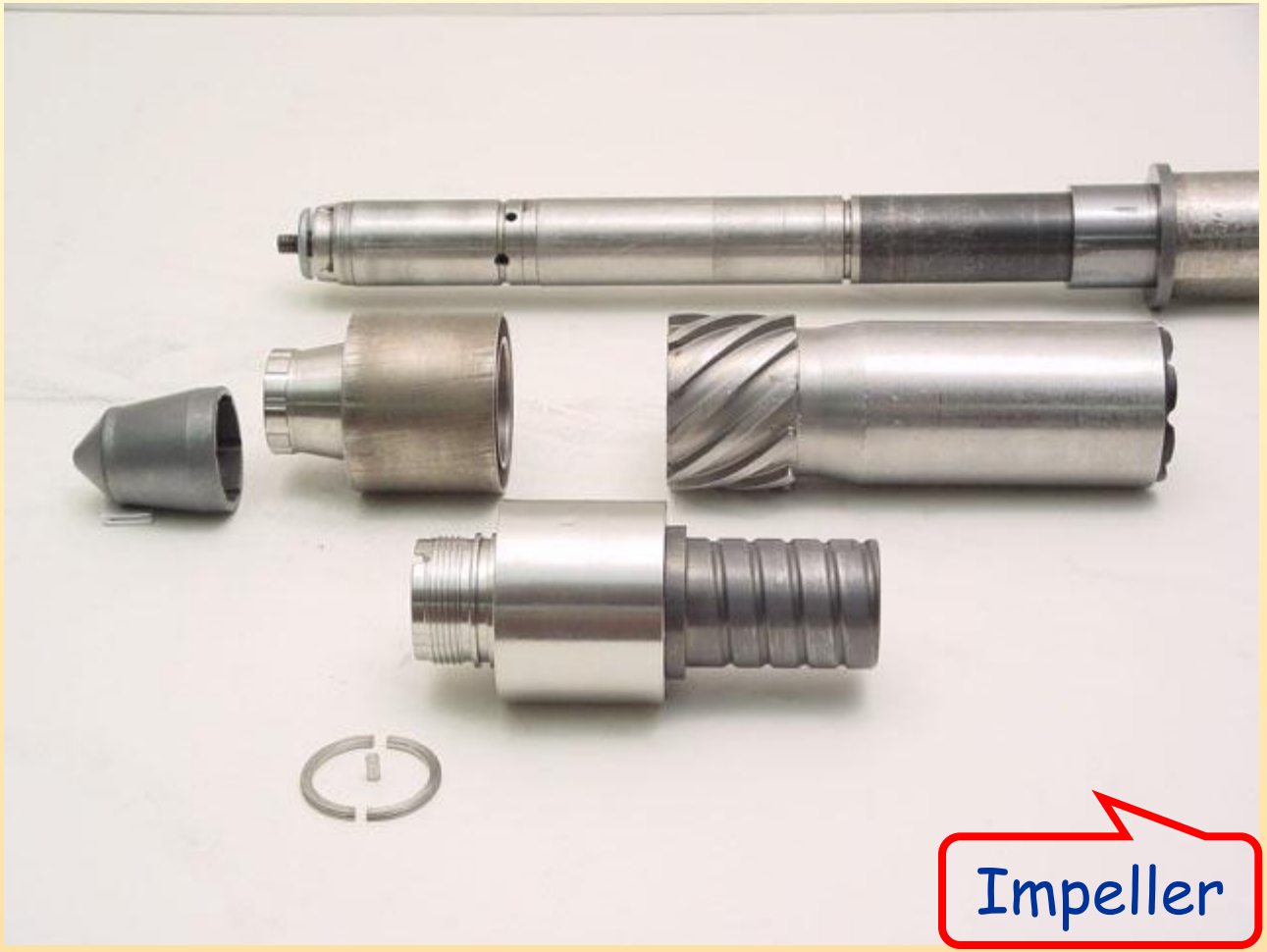
Superslim and Slimhole

- **The Impeller Assembly**

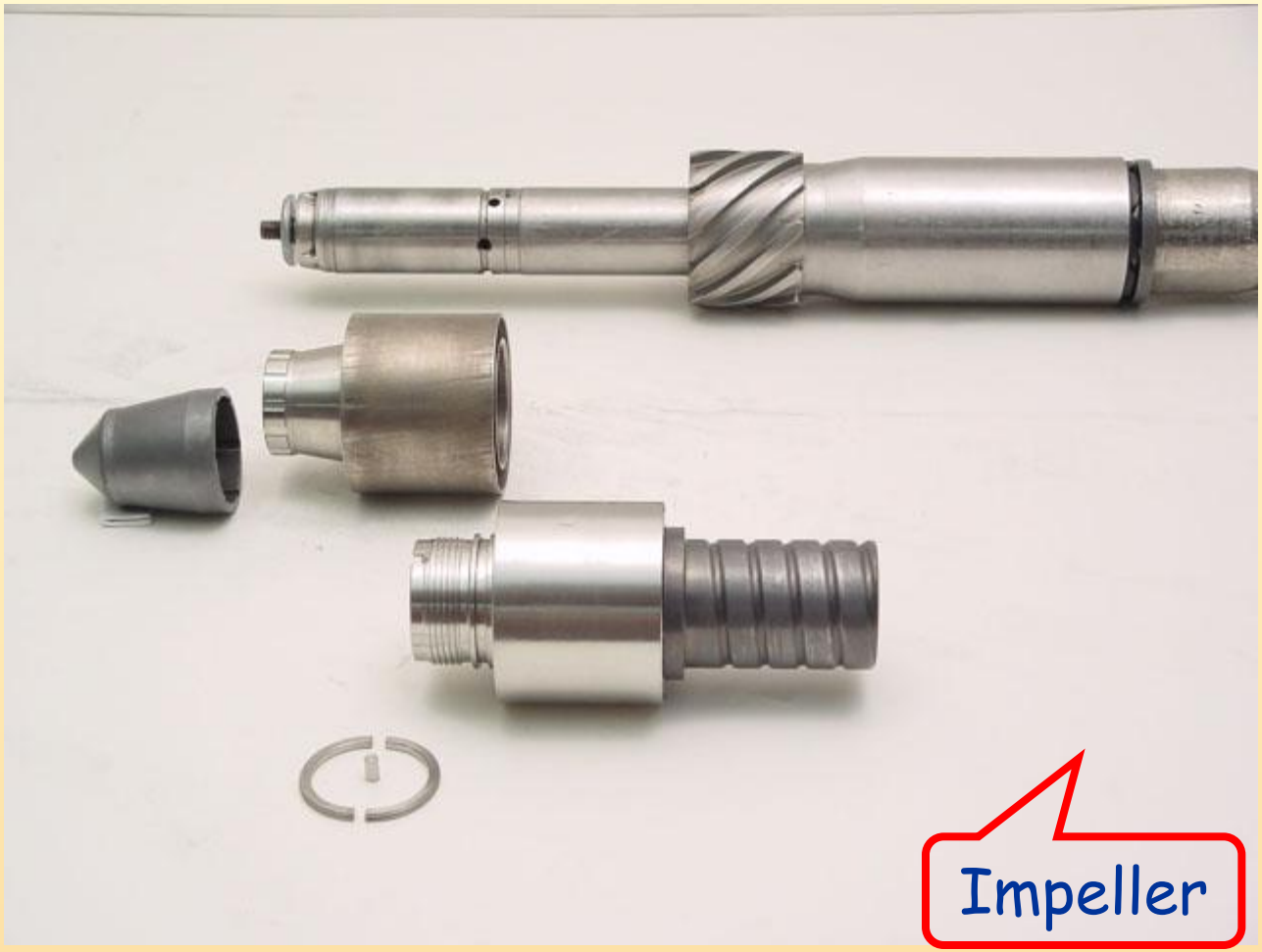
Superslim and Slimhole

- The Impeller Assembly
  - Rotates due to mud flow
  - Magnetically coupled to pulser's main shaft.
  - Vane angle related to flow rate
    - Slimhole System - 35°, 30° vane angles
    - Superslim System 45° vane angle
  - Two marine bearings

Superslim System



Superslim System



Superslim System

- The Upper Bearing Sleeve

Superslim System

- The Upper Bearing Sleeve
  - Supports the impeller's upper bearing
  - Threaded onto the shrouded stator

Superslim and Slimhole

- The Shrouded Stator

Superslim and Slimhole

- The Shrouded Stator
  - Pinned to the pulser poppet shaft housing
  - Angled vanes deflect fluid flow
  - Different vane exit angles dependent on flow rate
  - Shroud centralizes assembly in flowtube or flow sub
  - Shroud limits erosion in flowtube or flow sub

Superslim and Slimhole

- The Shrouded Stator Assembly

Superslim and Slimhole

- The Shrouded Stator Assembly

Slimhole System

- The Upper Bearing Sleeve

Slimhole System

- The Upper Bearing Sleeve
  - Supports the impeller's upper bearing
  - Threaded onto the shrouded stator

Slimhole System

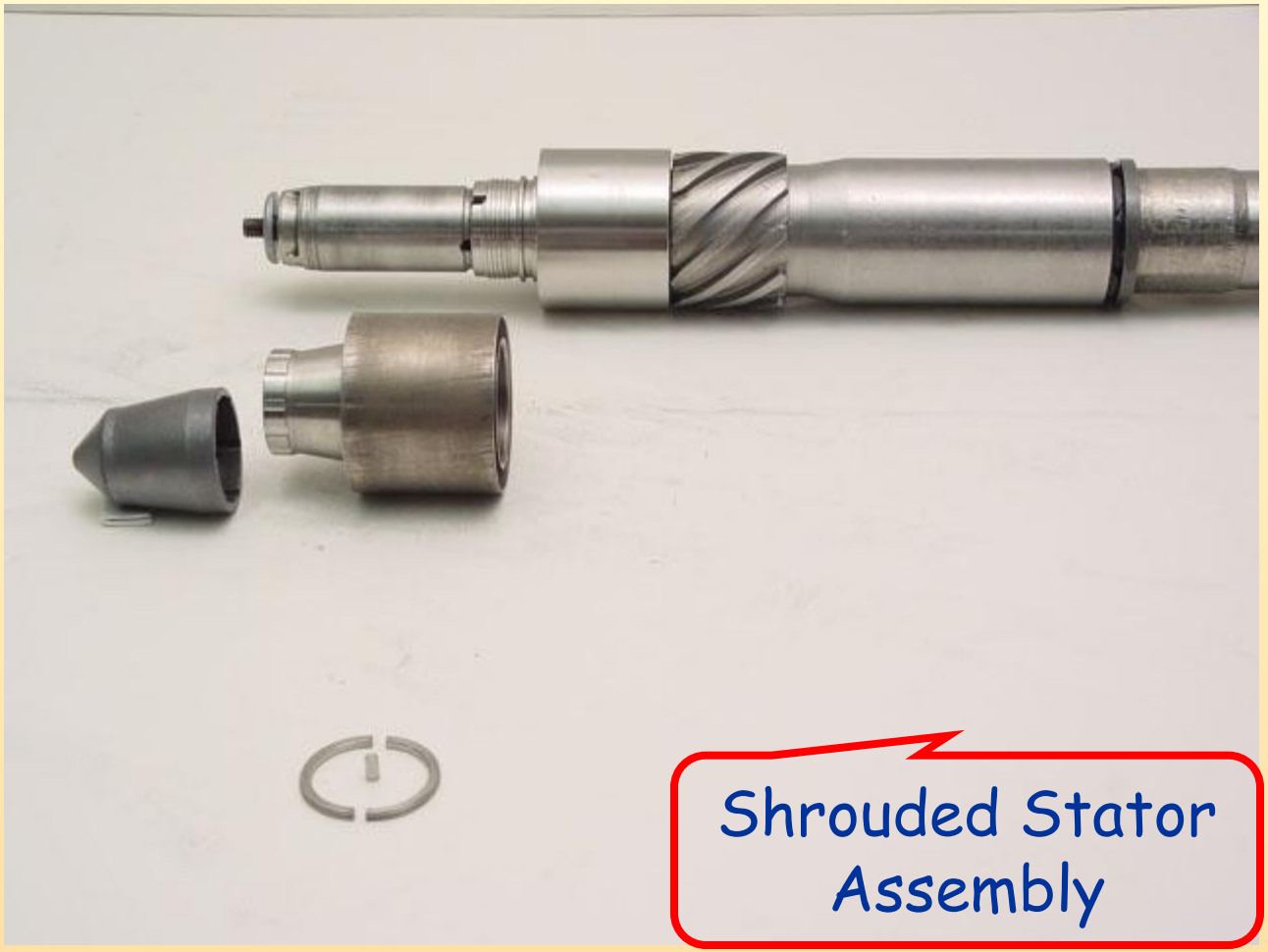
- The Flow Diverter

Slimhole System

- The Flow Diverter
  - Directs flow toward the impeller vanes
  - Installed between the upper bearing sleeve and the shrouded stator

Superslim System

Superslim System



Superslim and Slimhole

- The Stator Locator Pin

Superslim and Slimhole

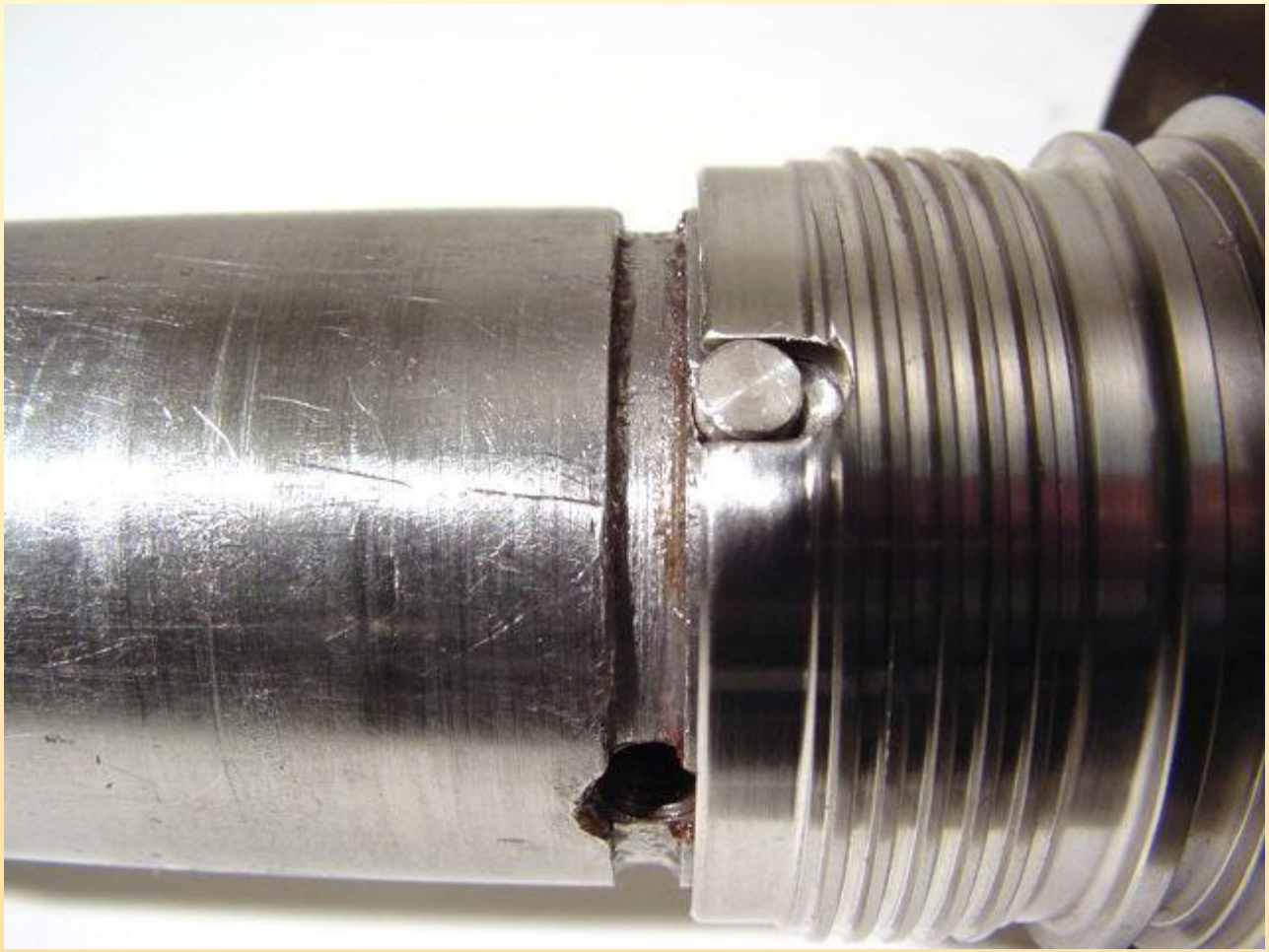
- The Stator Locator Pin
  - Fits in pin hole on the pulser poppet shaft housing
  - Prevents the shrouded stator from rotating on the pulser
  - Captured between shrouded stator and shroud/nose cap (nose cap-Slimhole)

Superslim System

Superslim System

Superslim and Slimhole

Superslim and Slimhole



Superslim and Slimhole

- The Split Retainer Ring

Superslim and Slimhole

- The Split Retainer Ring
  - Fits in ring groove on the pulser poppet shaft housing
  - Fastens shrouded stator and shroud/nose cap (nose cap-Slimhole) on pulser to prevent vertical movement

Superslim System

Superslim System

Superslim and Slimhole

Superslim and Slimhole

Superslim and Slimhole

Superslim System

- The Shroud/Nose Cap

Superslim System

- **The Shroud/Nose Cap (Superslim)**
  - **Threads onto shrouded stator**
  - **Captures split retainer ring and stator locator pin**
  - **Acts as transition from poppet outer diameter to outer diameter over pulser**
  - **Centralizes assembly in flow sub**
  - **Acts as support for Superslim orifice retainer**

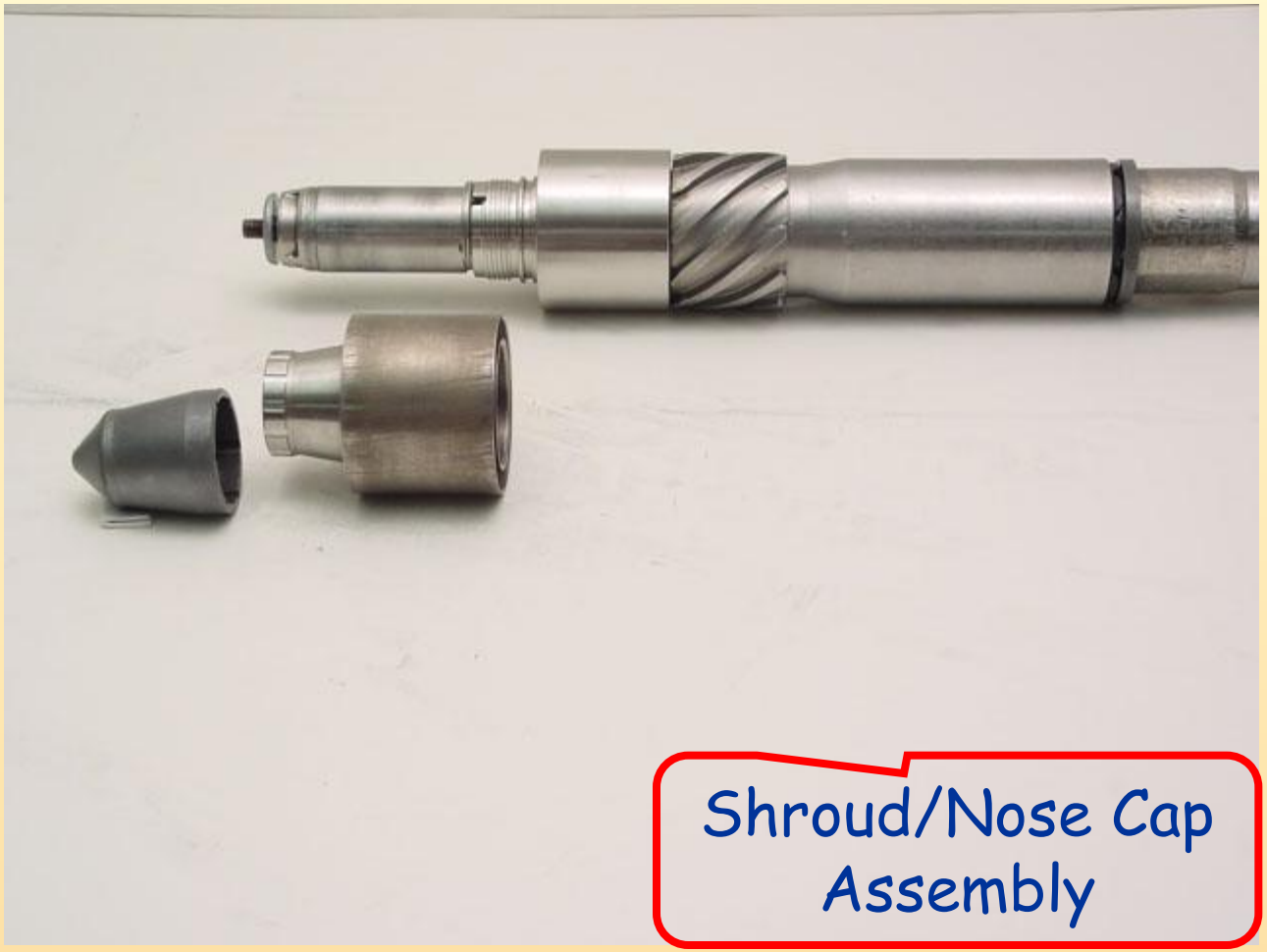
Slimhole System

- The Slimhole Nose Cap

Slimhole System

- The Slimhole Nose Cap
  - Threads onto shrouded stator
  - Traps stator locator pin and split ring to lock shrouded stator assembly onto pulser
  - Acts as transition from poppet outer diameter shrouded stator body outer diameter

Superslim System



Superslim System

Superslim and Slimhole

- The N6 Poppet

Superslim and Slimhole

Use the N6 poppet with a dovetail orifice

N6 Poppet

LW15 Poppet

Superslim and Slimhole

- The Poppet
  - Threads onto poppet shaft
  - Cause fluid flow restriction when extended into the orifice

Superslim System

Superslim System

Superslim System

Superslim and Slimhole

- The Flow Ring Key

Superslim and Slimhole

- The Flow Ring Key
  - Prevents pulser from rotating
  - Maintains highside alignment
  - Installed into notch in pulser bulkhead

Superslim System

Superslim System

Superslim System

- **Superslim Flow Ring/Straightener**

Superslim System

- The Flow Ring/Straightener
  - Slides over key on pulser
  - Vanes change rotational fluid flow from impeller to linear
  - Centralizes assembly in flow sub
  - Keys to Superslim Collar for toolface alignment

Slimhole System

- Slimhole Flow Ring/Straightener

Slimhole System

- The Flow Ring/Straightener
  - Slides over key on pulser
  - Vanes change rotational fluid flow from impeller to linear
  - Outer ring centralizes assembly in flowtube
  - Key on outer ring locks into groove in Slimhole flow tube

Superslim System

Superslim System

Slimhole System

- The Snap Ring

Slimhole System

- **The Snap Ring**
  - **Holds flow ring straightener in place during assembly**

Superslim and Slimhole

- The Spacer Sleeve

Superslim and Slimhole

- **The Spacer Sleeve**
  - **Provides transition from large outer diameter on pulser to 1.75 inch outer diameter of pressure case below pulser**

Superslim System

Superslim System

Superslim and Slimhole

- **Superslim Pulse Generator Assembly**