# Usage of Presentation State (PR) Objects for Ultrasound 3D images

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## Agenda

- ➢ **DICOM Presentation State**
- ➢ **Relationship to Image**
- ➢ **3D Presentation State Object**
- ➢ **Examples**
- ➢ **Conclusions**

# DICOM Presentation State

- ➤ **An independent DICOM Information Object Definition (IOD)**
- ➤ **Contains no pixel data**
- ➤ **Lightweight object**
- ➤ **Saves visual display specification**
- ➤ **Multiple presentation states**
- ➤ **Manually adjusting visual display settings**

# Relationship to Image

➢ **A set of standard DICOM attributes**

- **(0008,1115)    ReferencedSeriesSequence**
- **(0008,1140)    ReferencedImageSequence**
- **(0008,1150)    ReferencedSOPClassUID**
- **(0008,1155)    ReferencedSOPInstanceUID**

# Relationship to Image (Contd..)

# 3D Presentation State Object
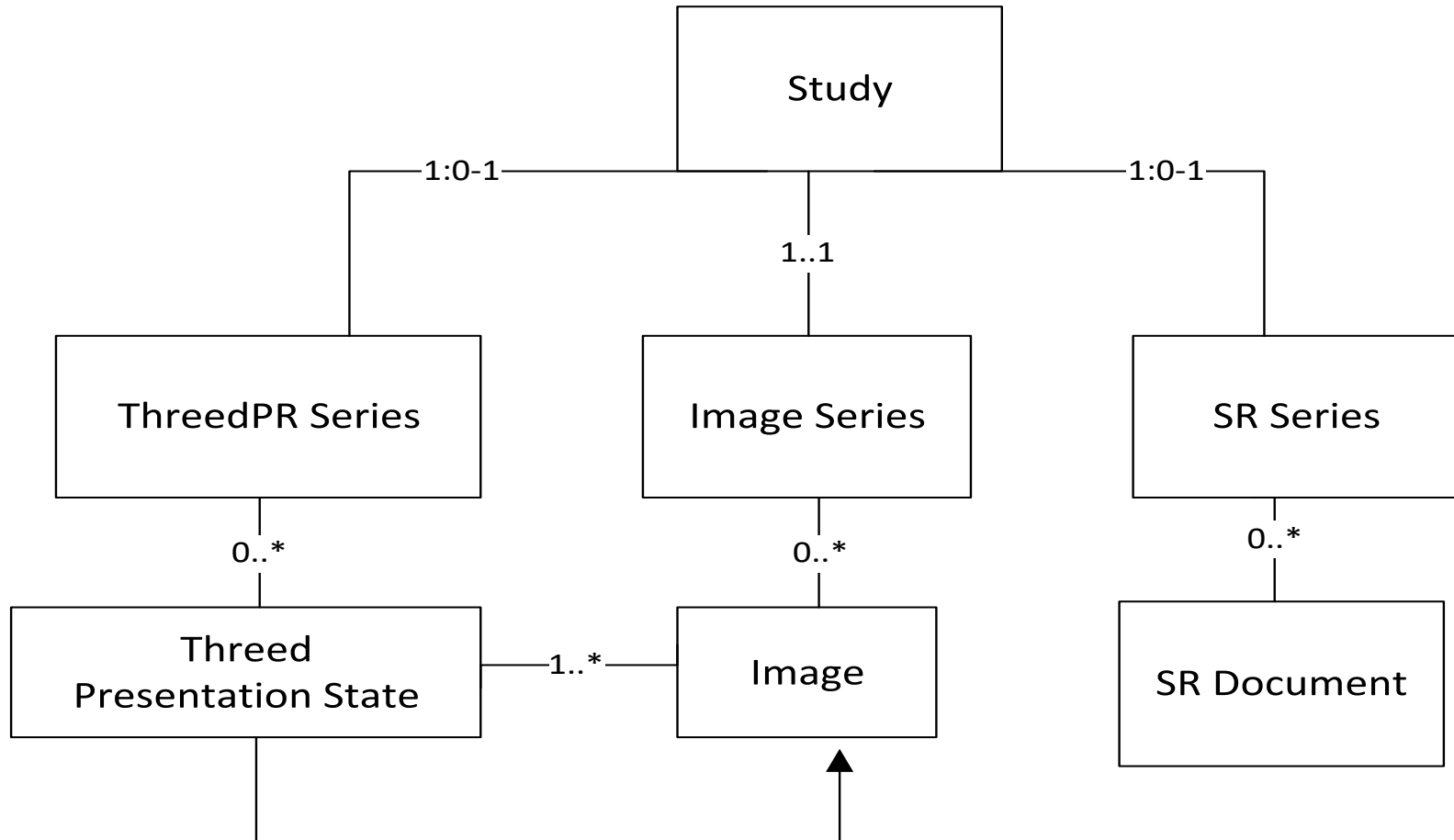
- ➤ **Need to transfer studies with 3D images**
- ➤ **Implemented DICOM 3D Presentation State object creation**
- ➤ **Render the 3D volume same as before capture**
- ➤ **Store\Retrieve to\from a PACS system**
- ➤ **Use of private tags**

# 3D Presentation State Object (Contd..)

➢ **3D Presentation State object stores the information given below:**

- **Volume orientation and rotation matrices**
- **Zoom factor, Gray map, Chroma map (colorization)**
- **Echo and color vision setting, smoothing, gain**
- **Brightness, Compression (dynamic range)**
- **Rotation style (absolute or relative)**
- **Volume look direction (Top, bottom, left, right, front and back)**
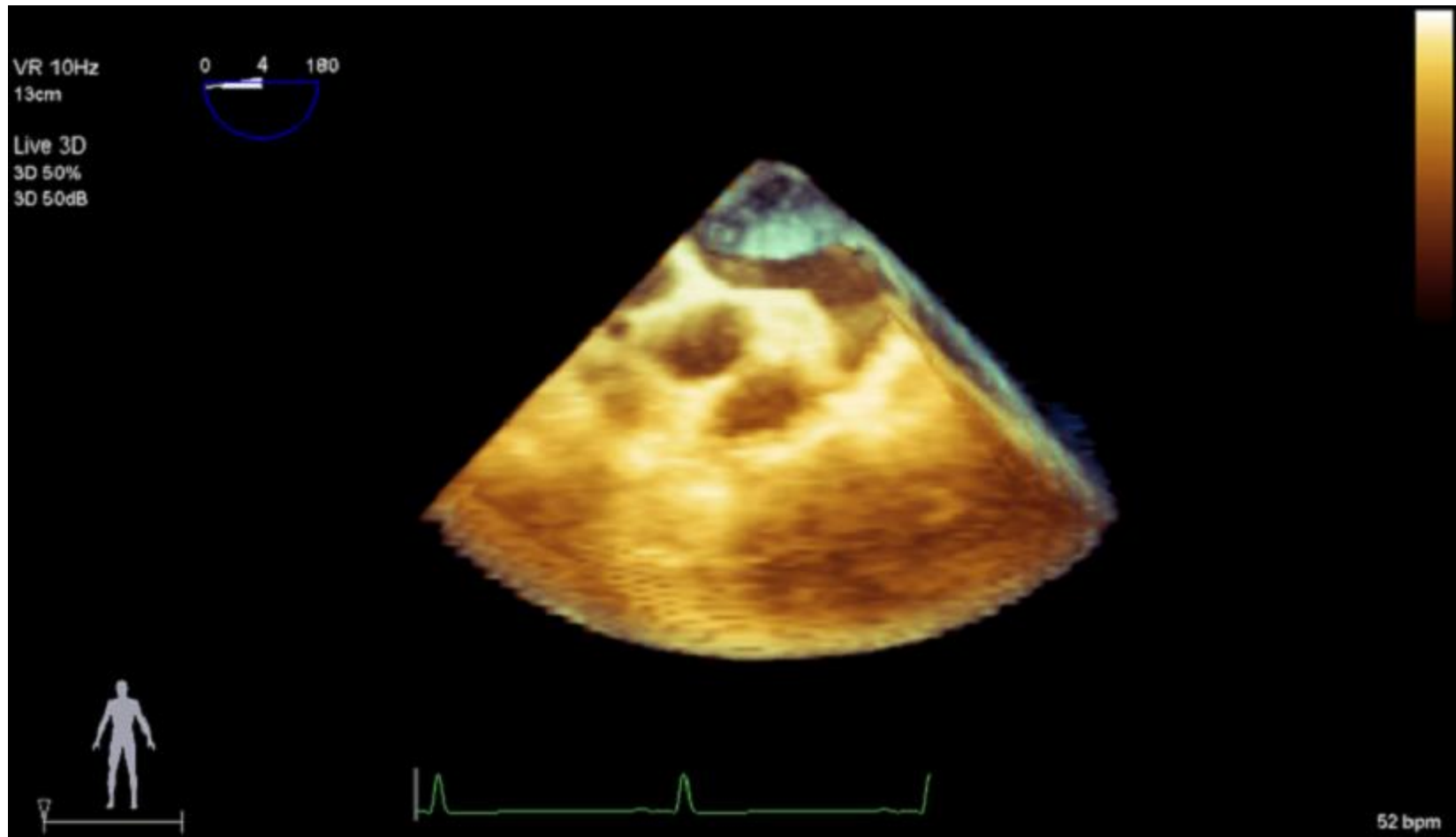- **Color baseline, Volume crop info**

# 3D Presentation State Object
## (Contd..)

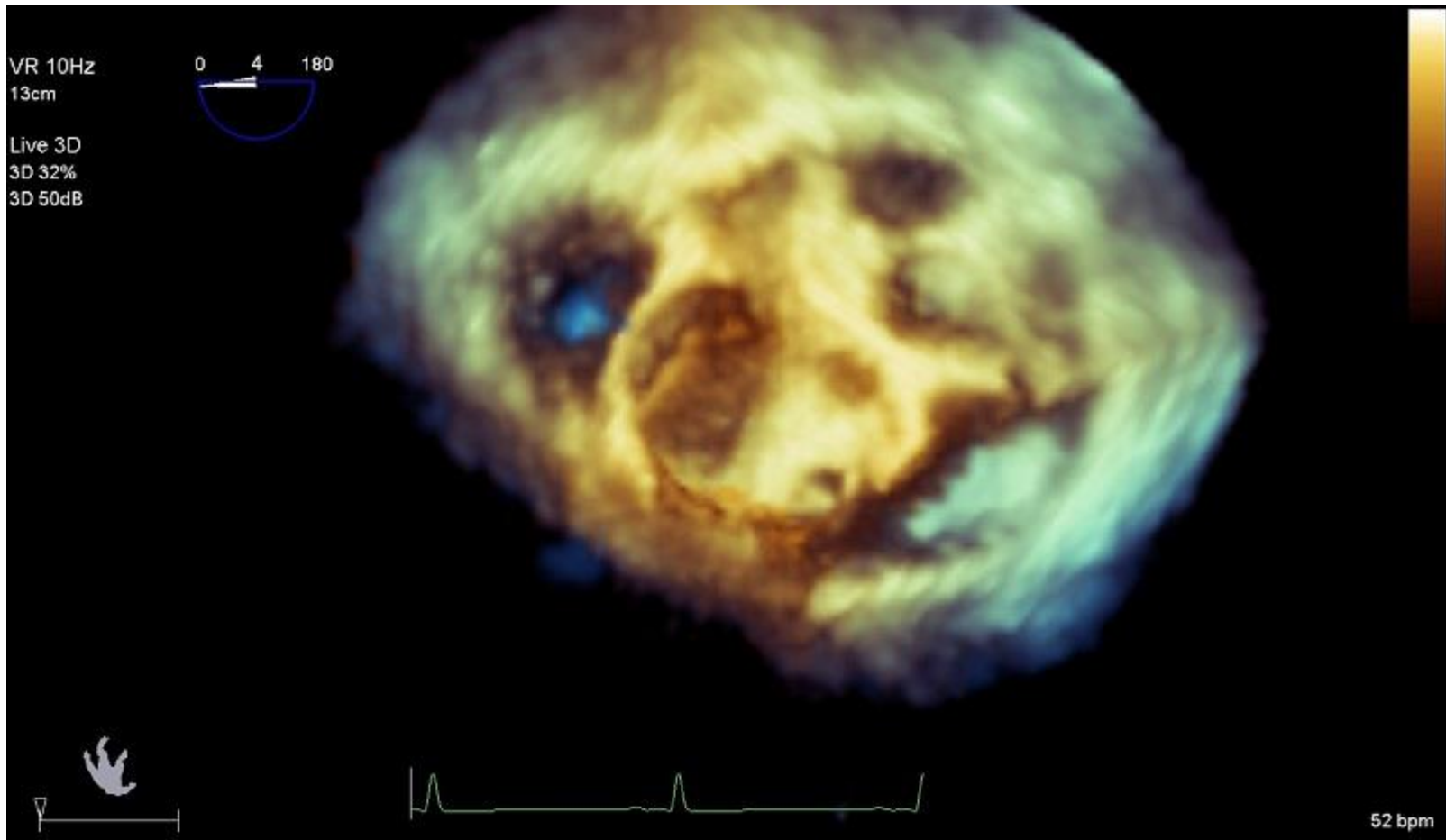**Original image with default Presentation State object**
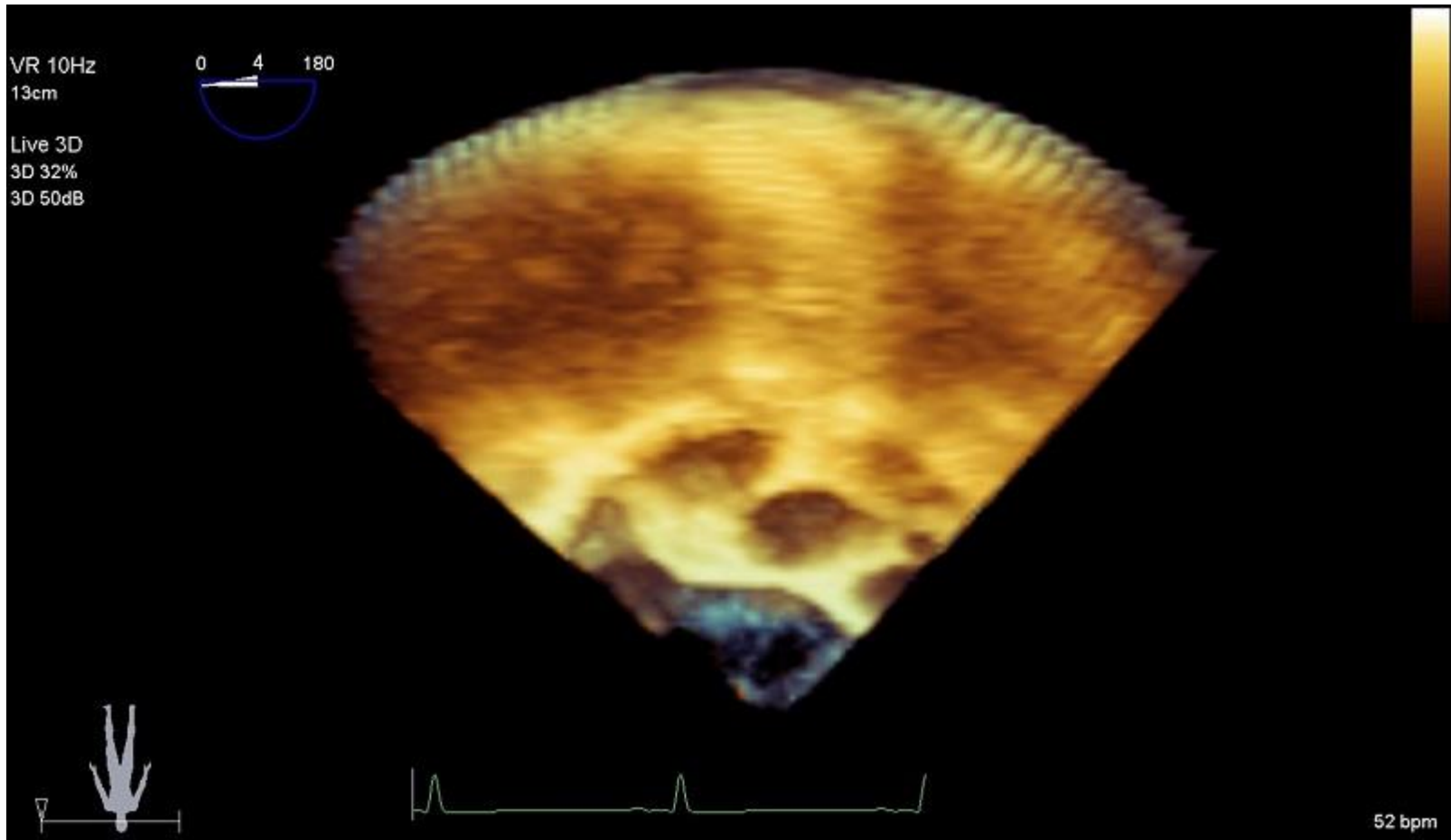
# 3D Presentation State Object (Contd..)
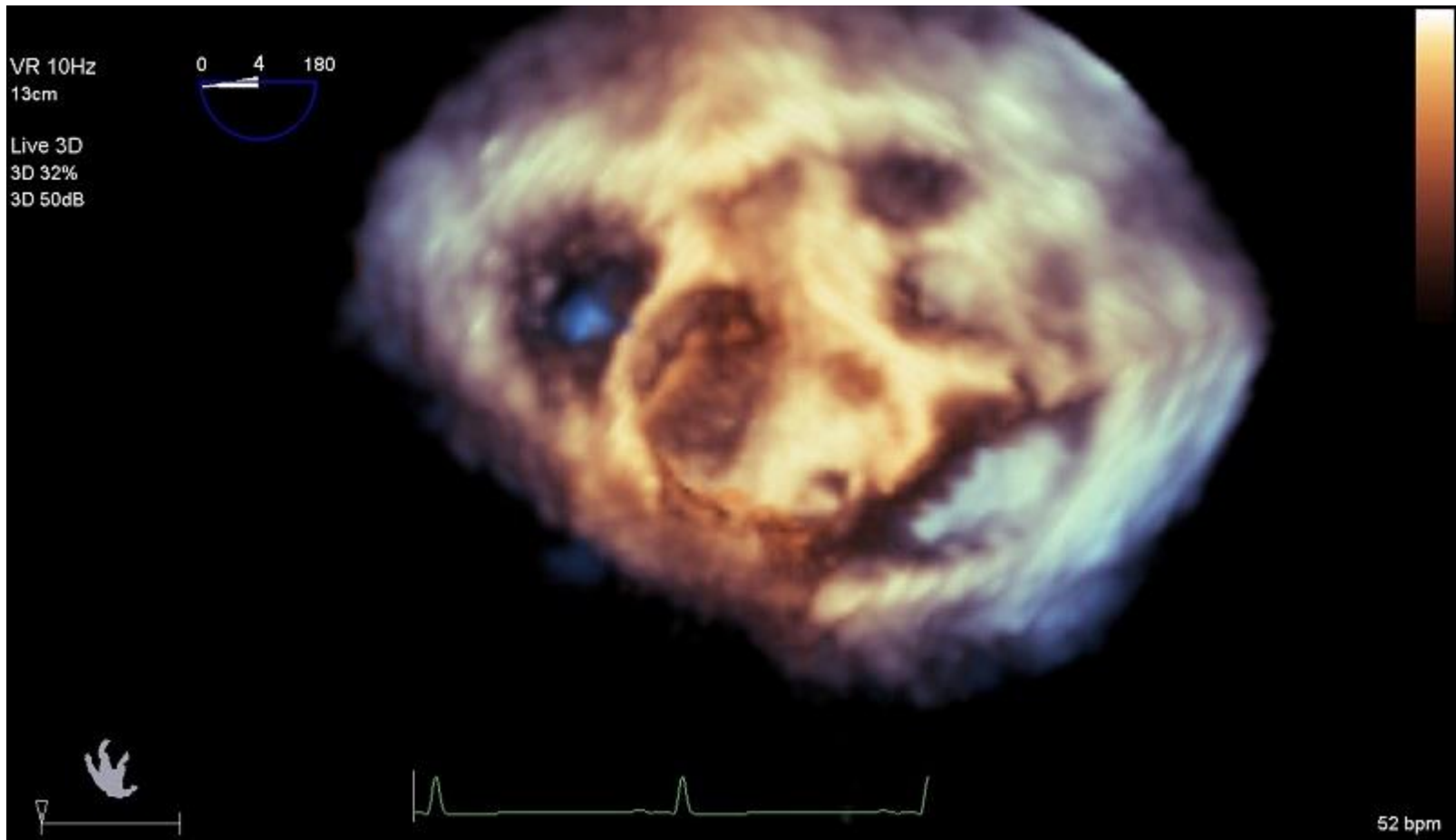
**Same image with different orientation**

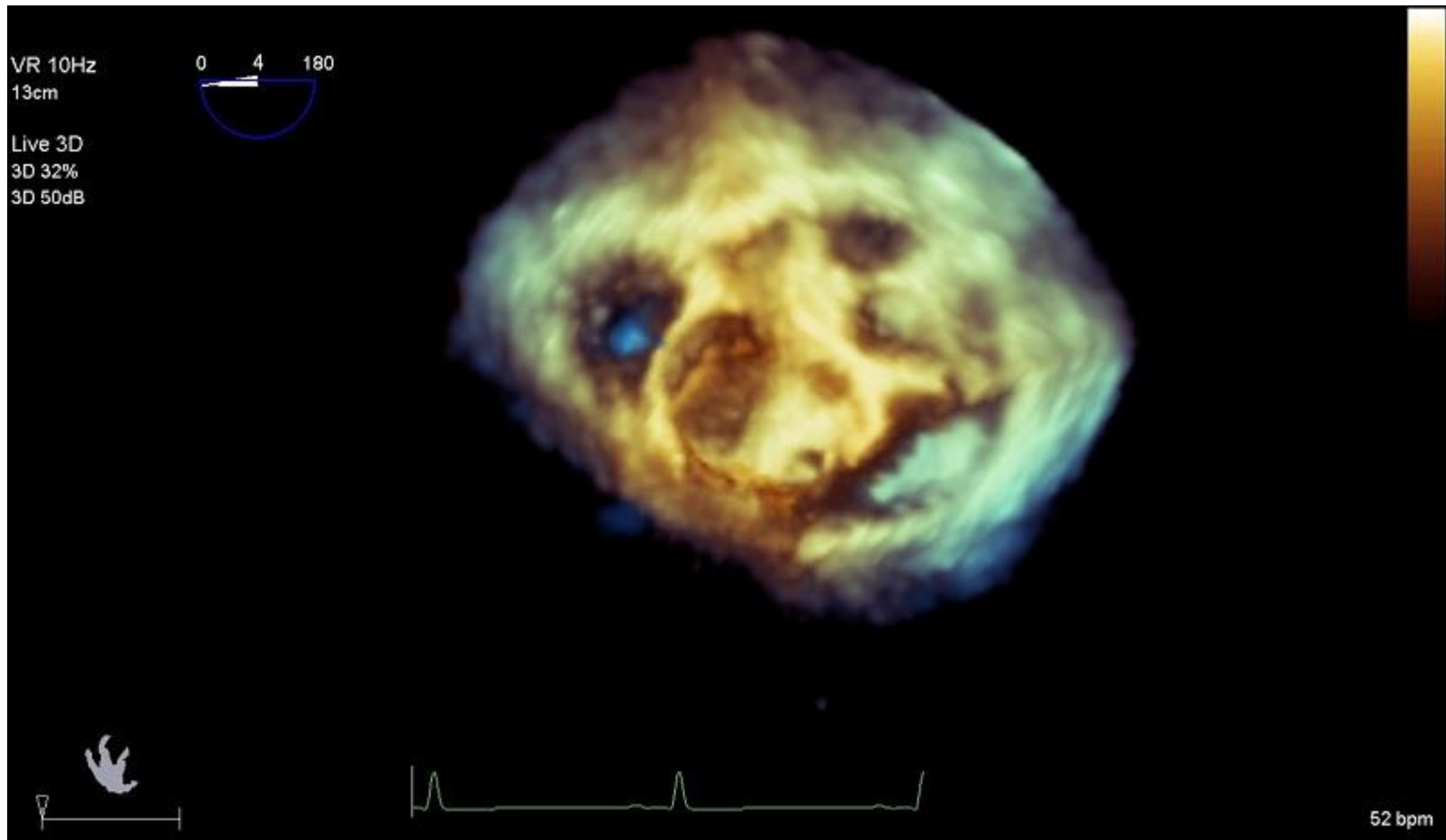## Same image with different rotation info

# 3D Presentation State Object (Contd..)

## Same image with different colorization

# 3D Presentation State Object (Contd..)

**Same image with change in Zoom factor**

# Conclusions

- ➤ **An independent DICOM IOD**
- ➤ **Helps to display\view DICOM images with different visual display specifications**
  - • **3D image volumes in different orientations and rotations**
- ➤ **Multiple presentation states**
- ➤ **Store\Retrieve to\from a PACS system**
- ➤ **DICOM Working Group - Defining an N dimensional Presentation State object**
  - • **Enhances interoperability**

# References

 [http://dicom.nema.org/](http://dicom.nema.org/)

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*Thank you for your attention!*