Enhanced CT Image
advantages and potential

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- **Introduction**

- **Use Cases (CT Cardio, Neuro Stroke)**

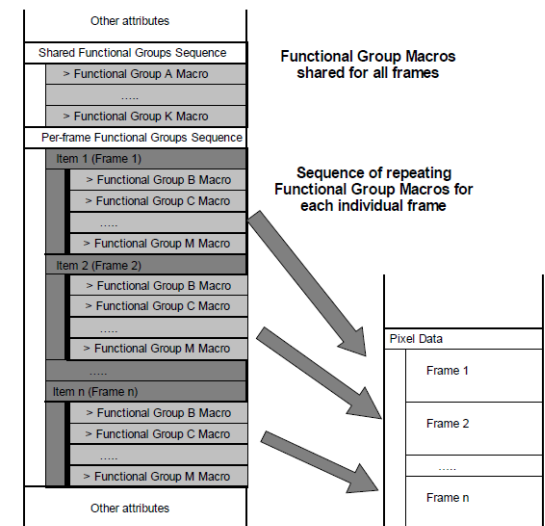- **Conclusions**

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- **Introduction**

- Supported Use Cases and Experiences

- Conclusions

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- **Introduction**
  - Enhanced MR, **CT**, US, XA, XRF, PET

  - Efficient way of storing unified parameters together with image data
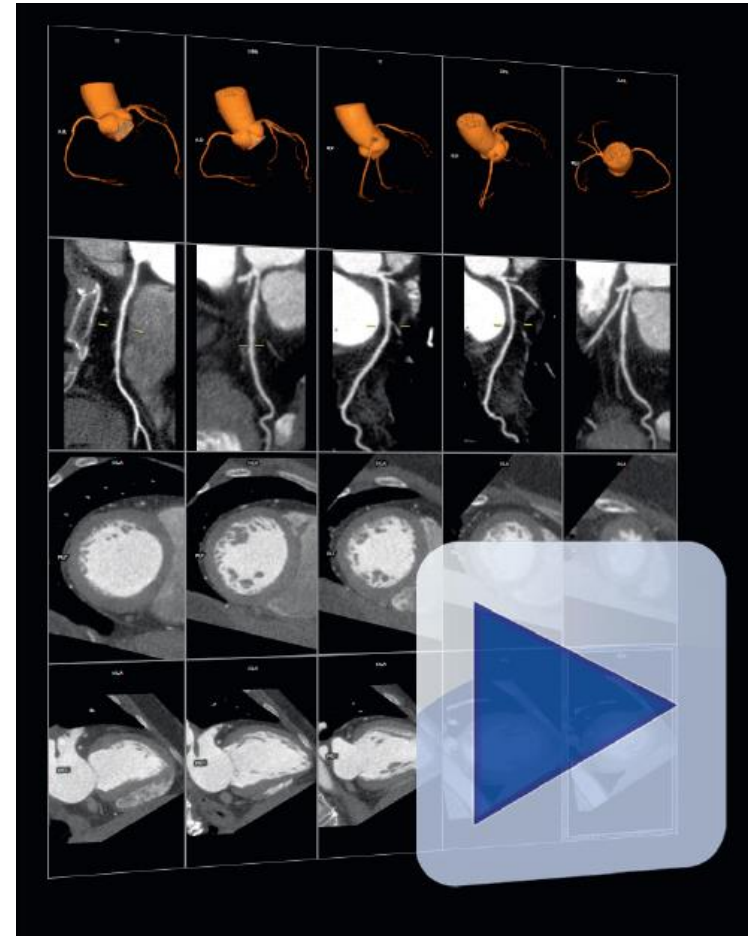
  - Support of complex use cases

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- ## Use Cases Cardio CT

  - **Saving of cardio result volumes like**
    - Single volume
    - Multi phase study
  - **Save cardiac and respiratory synchronization information.**
  - **Used to display heart beat animation**

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C.7.6.16.2.2.1   Timing Parameter Relationships

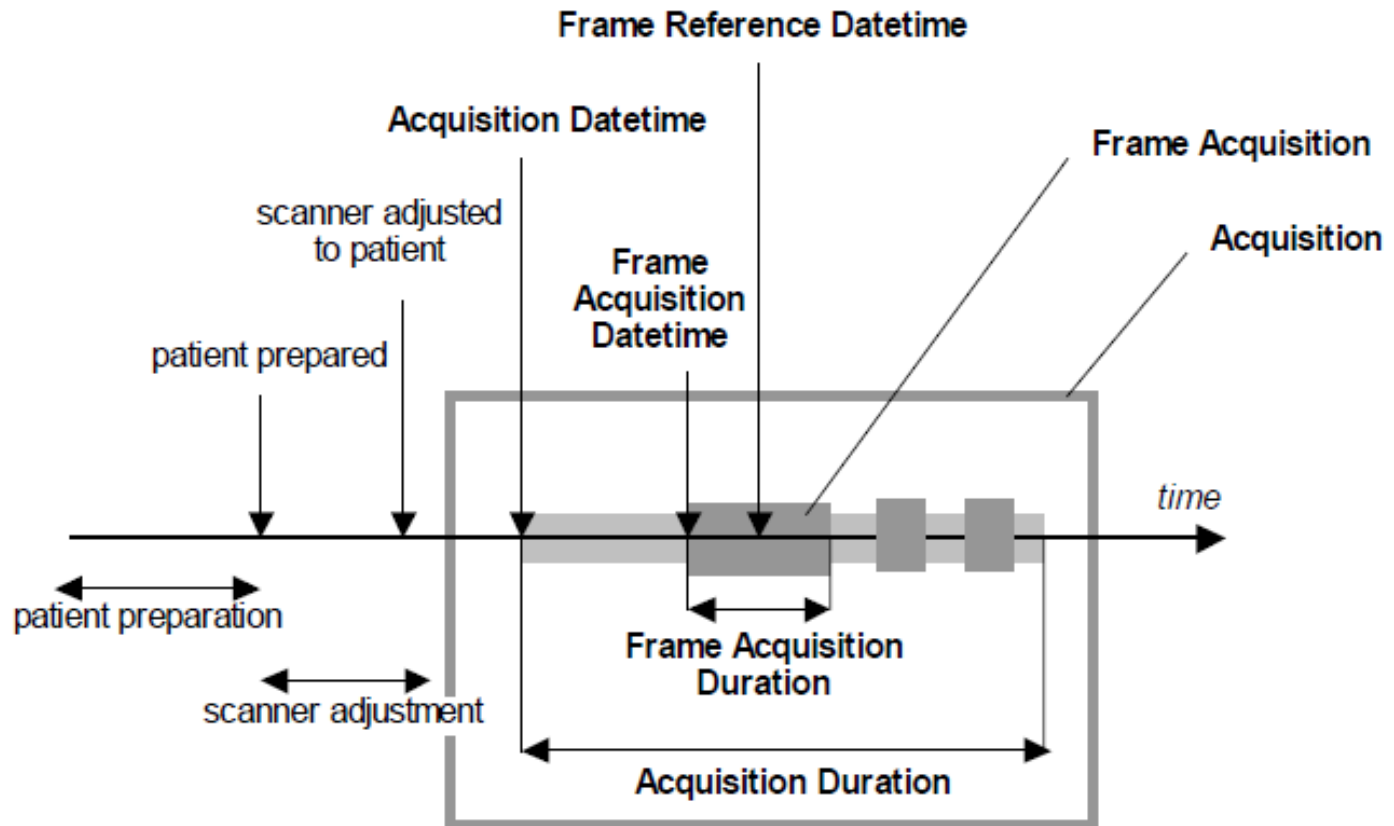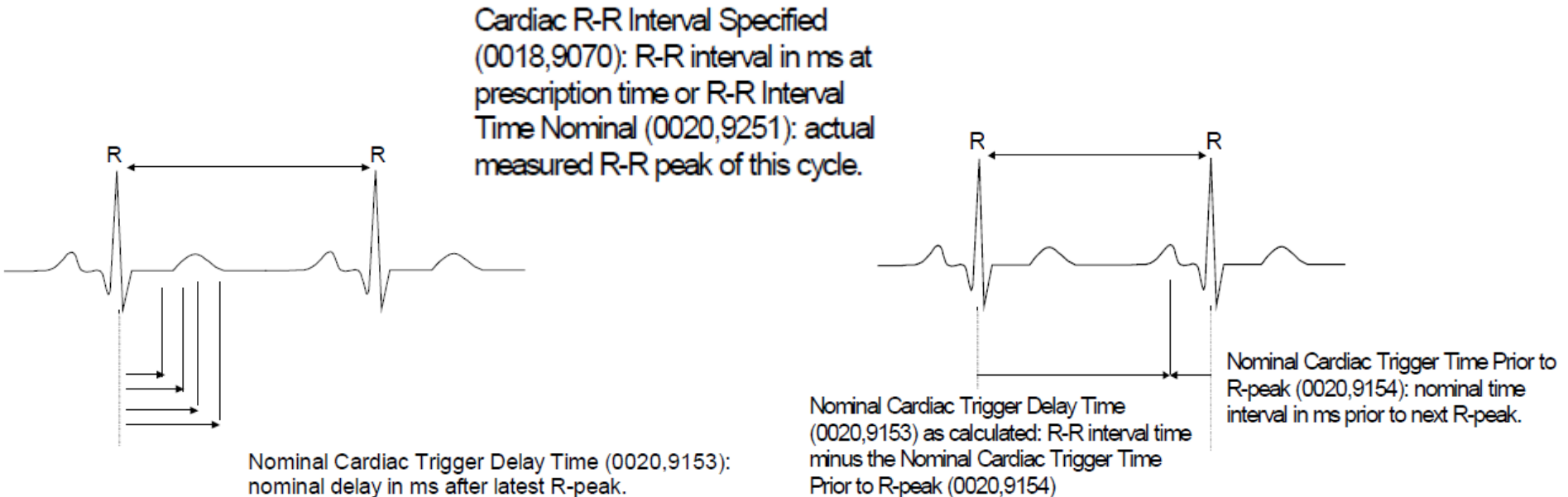Figure C.7.6.16-2 shows the relationships among the various timing parameters used.

Figure C.7.6.16-2
Relationship of Timing Related Attributes

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- **Cardiac synchronization information:**

Cardiac R-R Interval Specified (0018,9070): R-R interval in ms at prescription time or R-R Interval Time Nominal (0020,9251): actual measured R-R peak of this cycle.

Nominal Cardiac Trigger Delay Time (0020,9153): nominal delay in ms after latest R-peak.

Nominal Cardiac Trigger Delay Time (0020,9153) as calculated: R-R interval time minus the Nominal Cardiac Trigger Time Prior to R-peak (0020,9154)

Nominal Cardiac Trigger Time Prior to R-peak (0020,9154): nominal time interval in ms prior to next R-peak.

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DICOM hint to how to use dimensions:

- For example, the attribute specifying temporal position of frames may be any appropriate temporal attribute, such as Nominal Cardiac Trigger Delay Time (0020,9153) or Nominal Percentage of Cardiac Phase (0020,9241) in the Cardiac Synchronization Sequence (0018,9118) if the temporal position of frames is referenced to the cardiac R-wave, or Nominal Respiratory Trigger Delay Time (0020,9255) or Nominal Percentage of Respiratory Phase (0020,9245) in the Respiratory Synchronization Sequence (0020,9253) if the temporal position of frames is referenced to the latest inspiration maximum.

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- ## Use Cases Neuro Stroke

  - **Saving of perfusion result volumes like**
    - CBF(Cerebral Blood Flow)
    - CBV(Cerebral Blood Volume)
    - TTP(Time to Peak) etc.
  - **Save color LUT information together with unit information.**
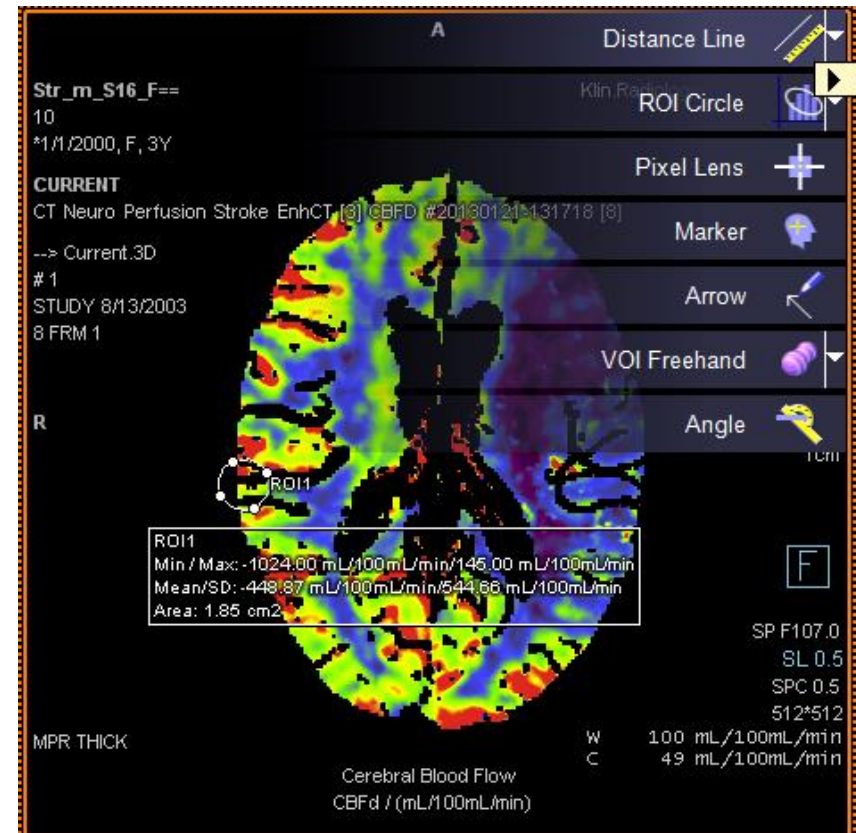 - **LUT is applied, the displayed images can show appropriate units.**

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Table C.7.6.19-1
SUPPLEMENTAL PALETTE COLOR TABLE LOOKUP MODULE ATTRIBUTES

Attribute Name	Tag	Type	Attribute Description
Red Palette Color Lookup Table Descriptor	(0028,1101)	1	Specifies the format of the Red Palette Color Lookup Table Data (0028,1201). See C.7.6.3.1.5 for further explanation.
Green Palette Color Lookup Table Descriptor	(0028,1102)	1	Specifies the format of the Green Palette Color Lookup Table Data (0028,1202). See C.7.6.3.1.5 for further explanation.
Blue Palette Color Lookup Table Descriptor	(0028,1103)	1	Specifies the format of the Blue Palette Color Lookup table Data (0028,1203). See C.7.6.3.1.5 for further explanation.
Red Palette Color Lookup Table Data	(0028,1201)	1	Red Palette Color Lookup Table Data. See C.7.6.3.1.6 for further explanation.
Green Palette Color Lookup Table Data	(0028,1202)	1	Green Palette Color Lookup Table Data. See C.7.6.3.1.6 for further explanation.
Blue Palette Color Lookup Table Data	(0028,1203)	1	Blue Palette Color Lookup Table Data. See C.7.6.3.1.6 for further explanation.

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DICOM hint to use presentation state objects:

- In order to annotate images, whether during acquisition or subsequently, SOP Instances of the Grayscale Softcopy Presentation State Storage or the Structured Report Storage SOP Classes that reference the image SOP Instance, may be used. No standard mechanism is provided for inclusion of annotations within the image SOP Instance itself, and implementers are discouraged from using private extensions to circumvent this restriction. Grayscale Softcopy Presentation State Storage Instances that are generated during acquisition may be referenced from the Image SOP Instance by using the Referenced Grayscale Presentation State Sequence in the Enhanced CT Image Module. See C.8.15.2.

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- ## **Conclusions**
    - Improve interoperability (color, real world value mapping, synchronization technique, etc.)
    - Support of time / respiratory synchronized volume representation
    - Grayscale images with color information
    - Combined functionality with Presentation State Objects (e.g. graphics, annotations, blending, …)
    - Even more potential and use cases together with Multi-Dimensional Presentation State Object (WG 11, Supplement 156)

References

  http://medical.NEMA.org/

  http://www.HL7.org/

  http://www.IHE.net/

Thank you for your attention !