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Experiences in building DICOM module for Proton radiation therapy planning system

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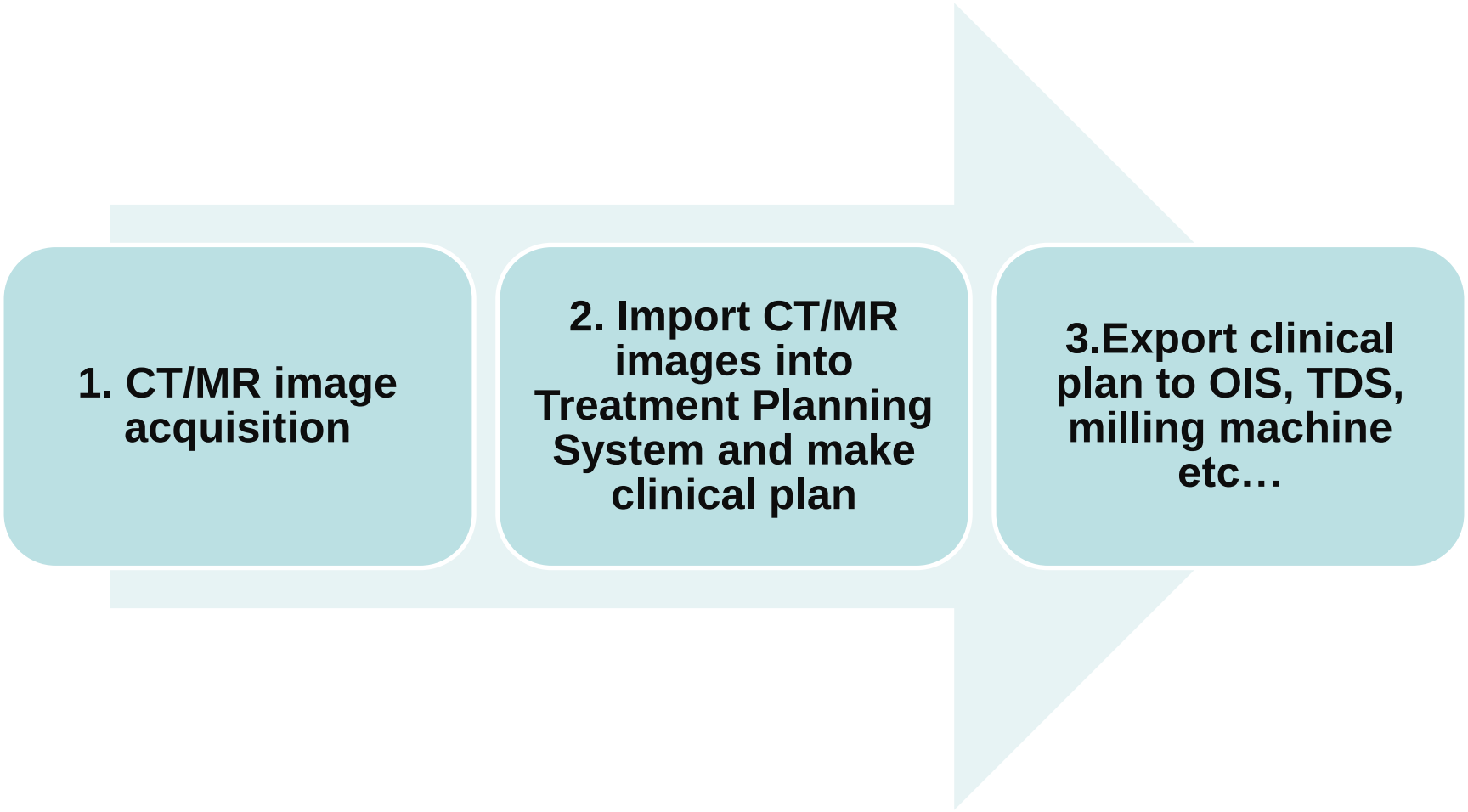
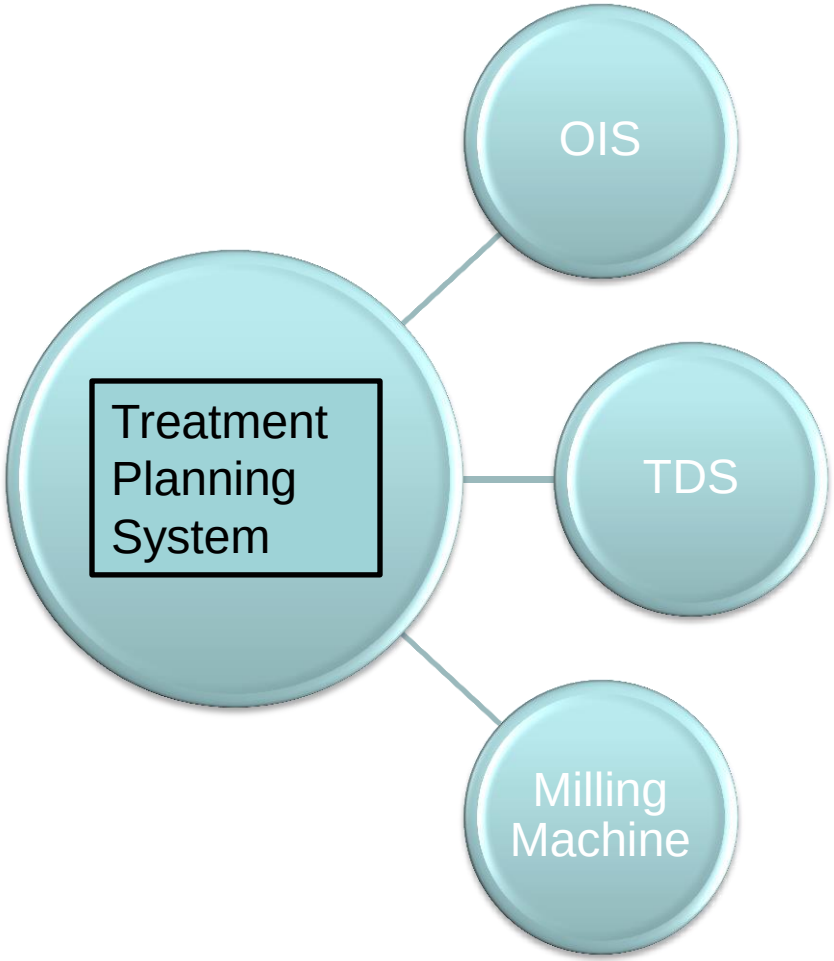
Proton Radiation Therapy Workflow



Usage Of RT ION Plan



Oncology Information System

Treatment Delivery System

Used to create beam modifiers

Introduction: RT ION Plan IOD

It addresses the requirements for transfer of treatment plans generated by a treatment planning system before or during a course of Ion therapy treatment.

Such plans may contain fractionation information, and define Ion beams.

IE	Module
Patient	Patient
	Clinical Trial Subject
Study	General Study
	Patient Study
	Clinical Trial Study
Series	RT Series
	Clinical Trial Series
Frame of Reference	Frame of Reference
Equipment	General Equipment

Plan	RT General Plan
	RT Prescription
	RT Ion Tolerance Tables
	RT Patient Setup
	RT Fraction Scheme
	RT Ion Beams
	Approval
	SOP Common

RT ION Implementation Experiences

Descriptive Vs Prescriptive model of TPS

Prescriptive model: It provides the physical components of the treatment machine in sufficient detail in order to generate an accurate plan for treatment.

Descriptive model: It provides the output of the treatment machine in terms of the physical parameters of the radiation beam itself

Various interoperability Challenges

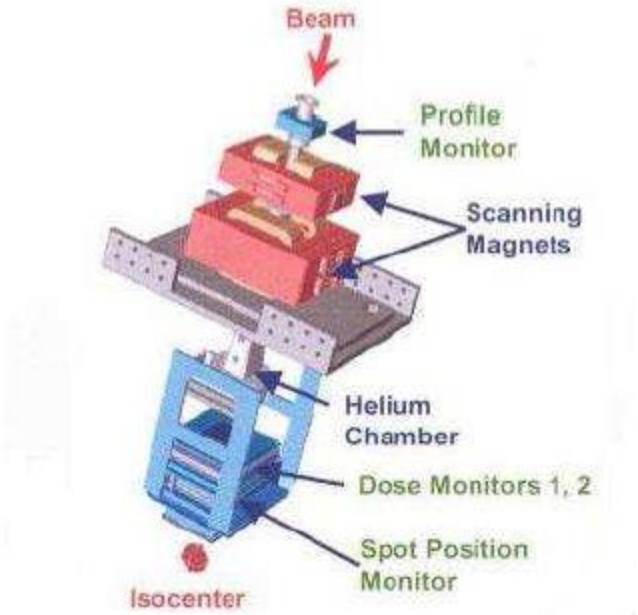
- **Proton Therapy Technology is evolving**

Different Interpretation of the same attribute

>>Compensator Mounting Position	(300A,02E1)	1	Indicates on which side of the Compensator Tray the compensator is
>>Compensator Column Offset	(300A,02E5)	1C	The offset distance (in mm) applied to the x coordinate of the Compensator Position (300A,00EA) for even numbered rows. Required if the compensator pattern is hexagonal.

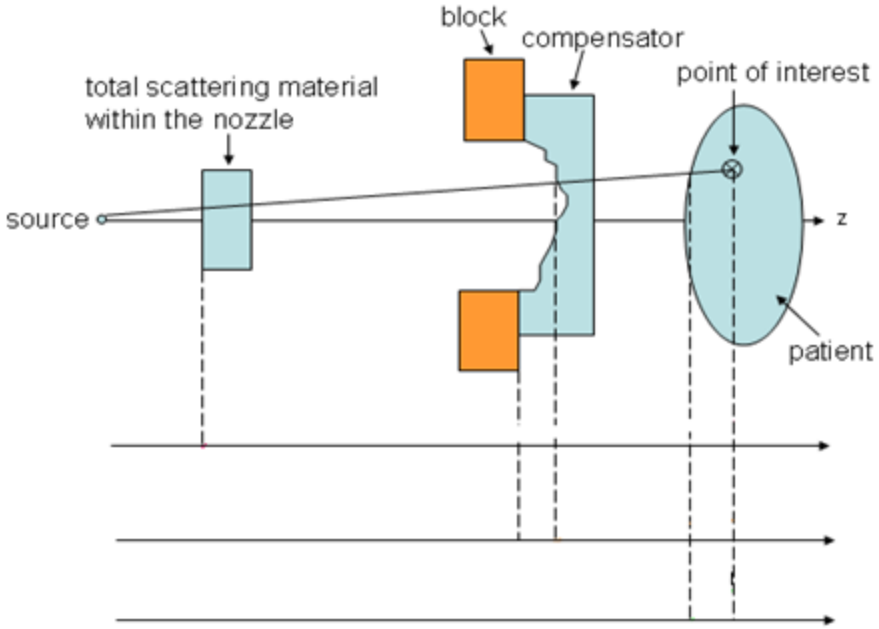
Various interoperability Challenges

- **Physical machine component details required in exported DICOM file is different for different treatment machine**



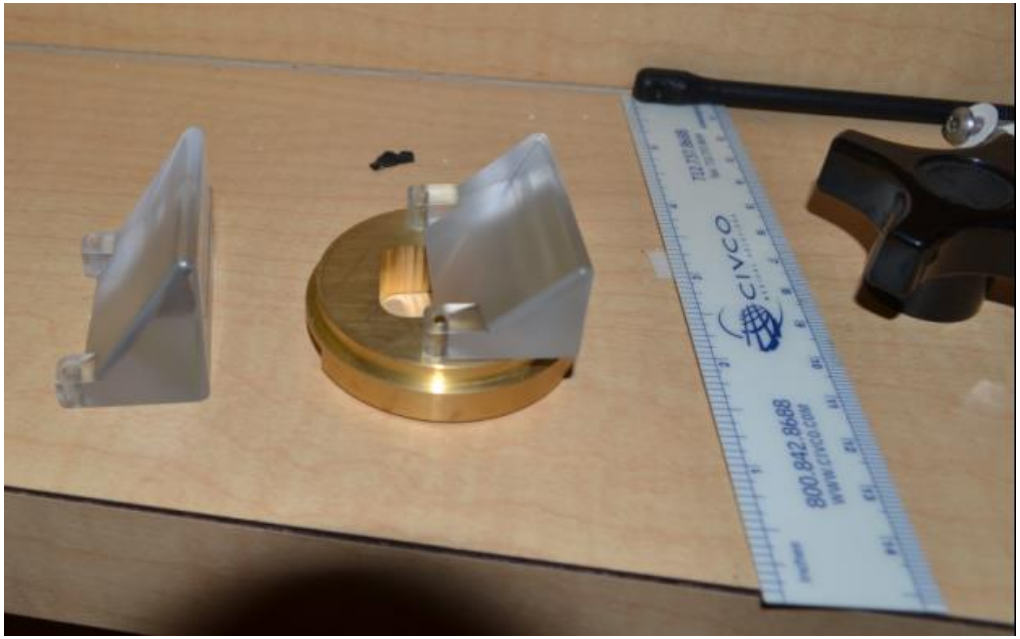
Various interoperability challenges

- **Correct communication of beam modifier(like Compensator & Aperture) to vendors**



Our Approaches:

- **Work closely with vendors and run interoperability tests in various scenarios**
- **Review the results of interoperability tests in great detail**



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Thank you for your attention!

References

http://dicom.nema.org/