2016 RADIOTHERAPY PLAN COMPETITION

Pinnacle TPS v9.10

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Contouring

- Virtual structure not needed for this case using Auto-Planning system from Pinnacle
  - No OAR's intersect with PTV:
    - LUNG_LEFT / PTV_TOT_EVAL
    - SPINAL CORD / PTV_TOT_EVAL

  - Hotspots and Coldspots points created as ROI to reduce / increase dose

- A ring for the SCL and a LIMIT PTV* are created only if done without Auto-Planning system.

*LIMIT PTV = External Roi – (PTV+2cm)

Field / Arc Geometry

- Isocenter location:
  - Lateral direction => Center of the patient (to avoid collisions)
  - Sup-Inf direction => Center of the PTV_TOT_EVAL's volume (which is big in this direction)
  - Ant-Post direction => 13 cm from the Breast Board (to avoid collisions)
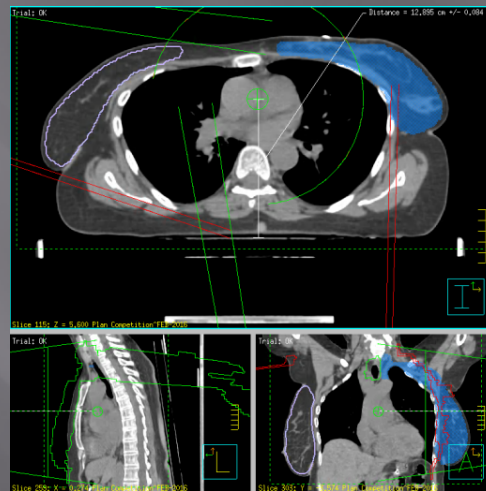
Field / Arc Geometry

- Energy:
  - 6 MV
- Gantry:
  - 2 arcs (high level of modulation required)
  - 174° to 281°
    - 174° to contribute to the post part of the PTV_TOT_EVAL (not 180° to protect LUNG_LEFT)
    - 281° to be tangent to the maximum of PTV_TOT_EVAL (no more to protect the BREAST_RIGHT)
    - $\Rightarrow$ Give the best angulation to improve your algorithm efficiency
- Maximum Delivery Time:
  - 70 seconds (no more: you will loose efficiency)
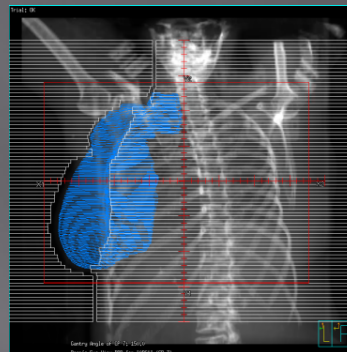
Field / Arc Geometry

- Collimator:
  - Angle: 0° (I consider the interleaf leakage transmission as negligible with the Agility Collimator)
  - Size:

X2: 17.79 cm	X1:19.98 cm
Y1:14.50 cm	Y2:14.00 cm

 The size is automatically fixed by Pinnacle (depending on PTV_TOT_EVAL's size)

Optimization Process

- 4 steps:
    1. Define Target and OAR Optimization goals
    2. Start Auto-Planning and observe
    3. Fine Tune your objectives and weightings
    4. Adjust your UM's number

Optimization Process

1. Auto-Plan window:
   - ▣ Defining Target Optimization Goals
     - 50 Gy in the PTV_TOT_EVAL

   - ▣ Defining OAR Optimization Goals
     - Define all the OAR Optimization Goals more strictly than asked in the Plan Competition
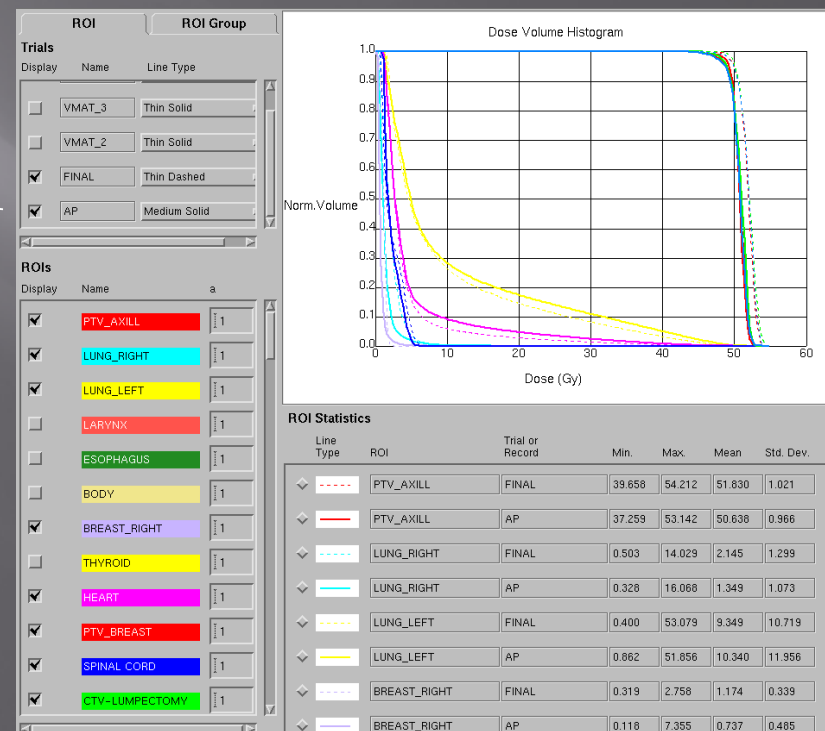   - All the priority are "High"
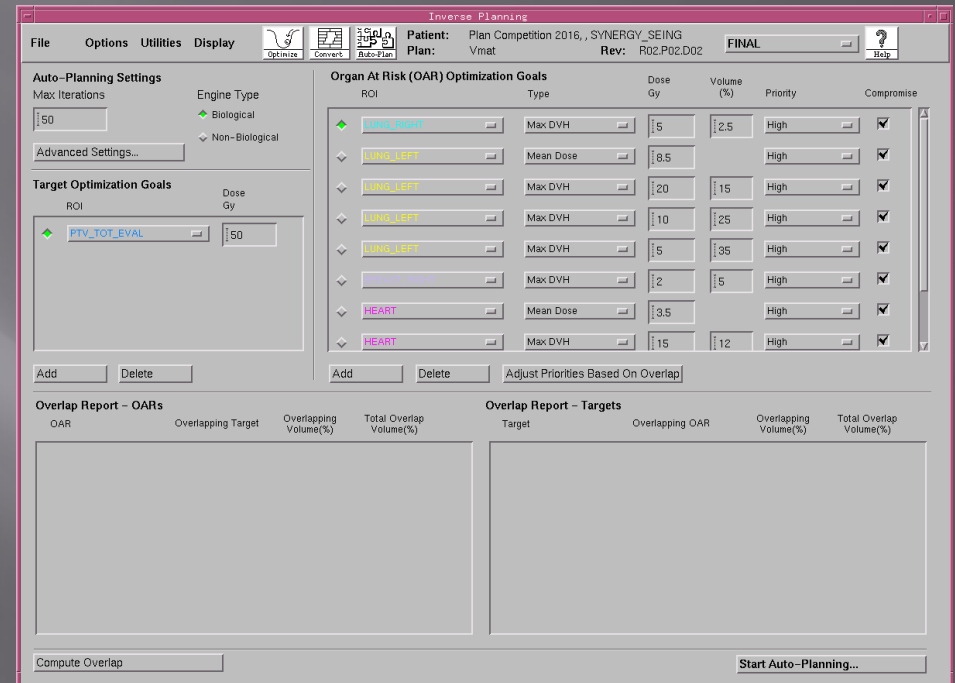
Optimization Process

- ▣ 2. Start Auto-Planning
  - ▪ Start Auto-Planning and observe (this is your base)

  ❑ Plan with Thin Dashed Lines is what I 've submitted

  ❑ Plan with Medium Solid Lines is what you get after Auto-Planning.

Optimization Process

- 3. In the Optimize window:

  - Focus on target coverage first.

  - Then, try to satisfy your OAR's criteria. This step must be done gradually (if you ask something too strong, you will "disturb" the optimization and your results will be bad).

  - When you are fine with OAR's criteria (you think you did the best as you can), work (again) with dose homogeneity if necessary.

      Good homogeneity

      =

      4. You can increase UM's number manually and satisfy hard criteria on the PTV_EVAL_TOT if necessary

General comments and recommendations

- Most important things

  =>> KNOW HOW YOUR OPTIMIZER WORKS

    - Isocenter location
    - Gantry's angulation
    - Fine Tune your objectives

General comments and recommendations

- ## Without Auto-Planning

  - Create a Limit PTV (External ROI-(PTV+2cm)
  - Create a RING PTV_SC (5mm) => If you want a better conformity on PTV_SC
  - Fine Tune your weightings at each optimization
  - Work your dose homogeneity
  - Adjust your UM's number if needed
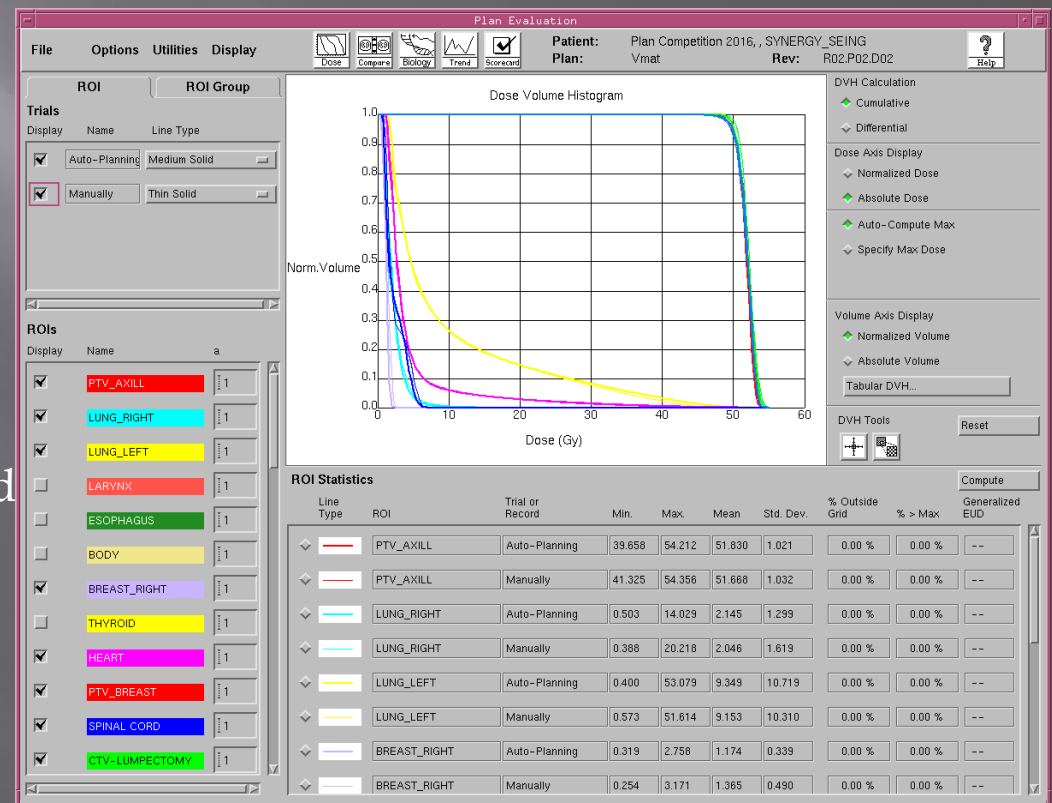
I have been using Auto-Planning to get a good base faster.
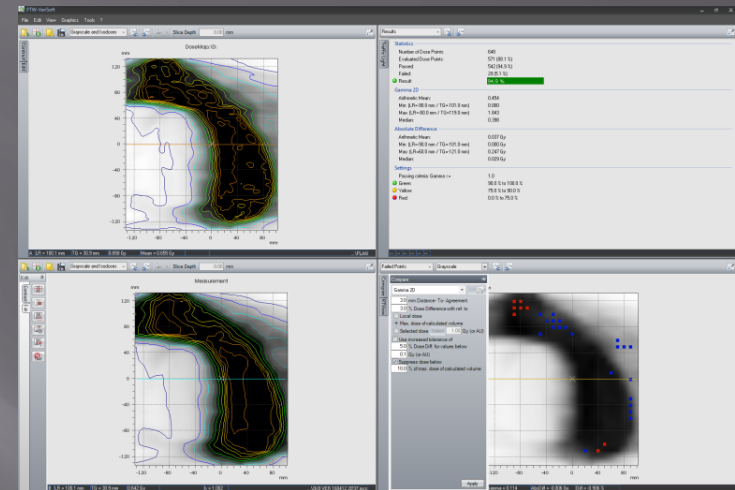
QA

- ▣ **Material:**
  - ▪ TPS: Pinnacle v9.10 (Philips)
  - ▪ R&V: MOSAIQ (Elekta)
  - ▪ Accelerator: Synergy (Elekta)
  - ▪ Collimator: Agility
  - ▪ Patient-specific QA system:
    - ▫ Octavius 2D (PTW)/Octavius 729

- ▣ **Results:**
  - ▪ Treatment time:
    - ▫ Arc 1: 1'23"
    - ▫ Arc 2: 1'20"
  - ▪ Percentage of points with a gamma index < 1:
    - ▫ 94.9 % passing (3% global 3mm , 10% lower Threshold)
    - ▫ 95.5 % passing (3% global 3mm, 05 % lower Threshold)

  =>> Octavius 3D will be better for this kind of localization

Thank you for your attention!