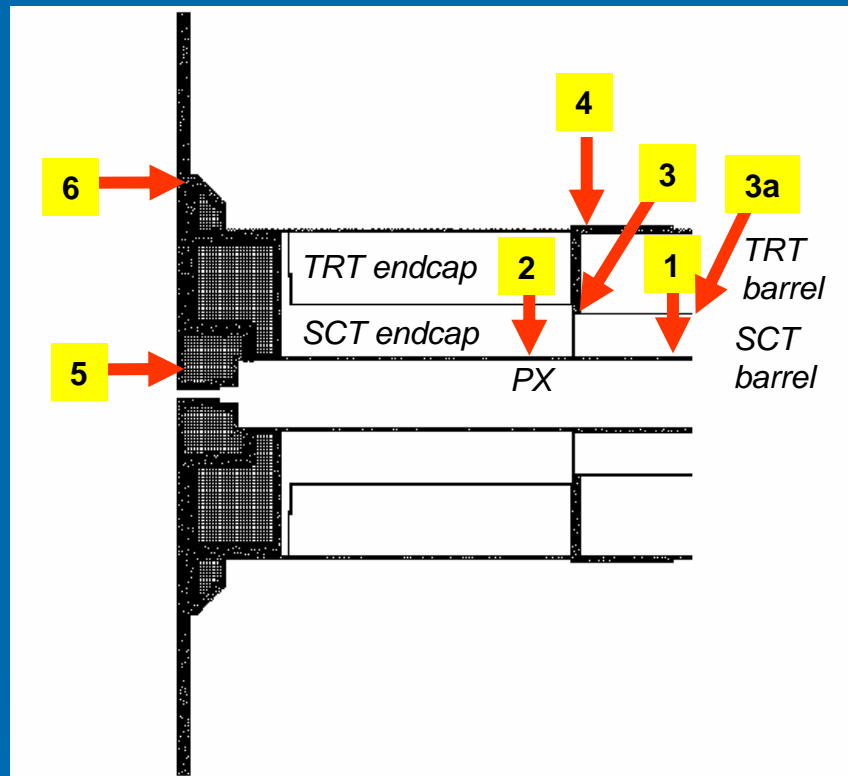


- *ATLAS inner detector – 3 independent subdetectors: SCT, TRT and Pixel;*
- *SCT, Pixel operate in N<sub>2</sub> environment and low (below 0°C) temperature;*
- *TRT operates at Xe-CO<sub>2</sub>-O<sub>2</sub> mixture at room temperature;*

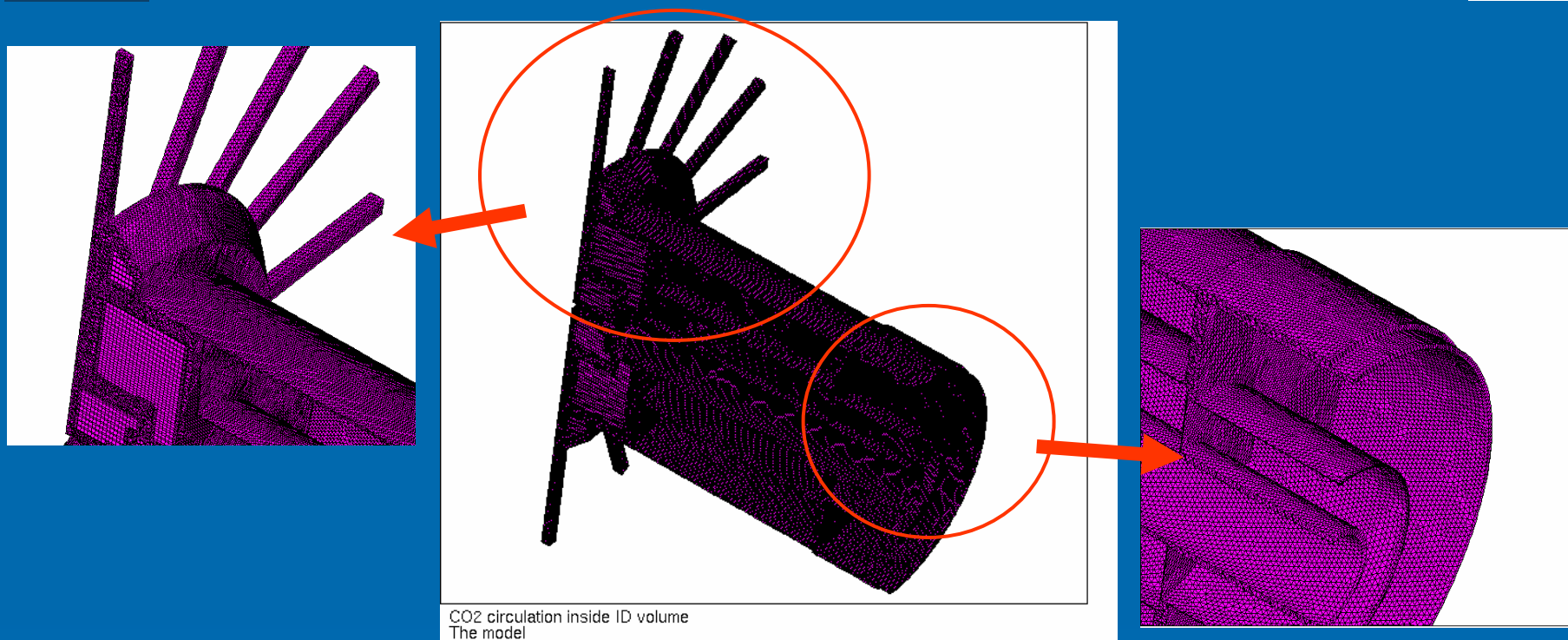


The global ID volume will be flushed with dry CO<sub>2</sub>. This gas has two functions:

- to avoid the condensation
- to remove N<sub>2</sub> from ID volume (N<sub>2</sub> may degrade TRT performance);

- There will be 6 CO<sub>2</sub> inlets par half of the ID volume with total flow of 5m<sup>3</sup>/h (10m<sup>3</sup>/h for the total volume);
- The purpose of this CFD study was to find the CO<sub>2</sub> concentration map inside ID volume in function of the flushing time.

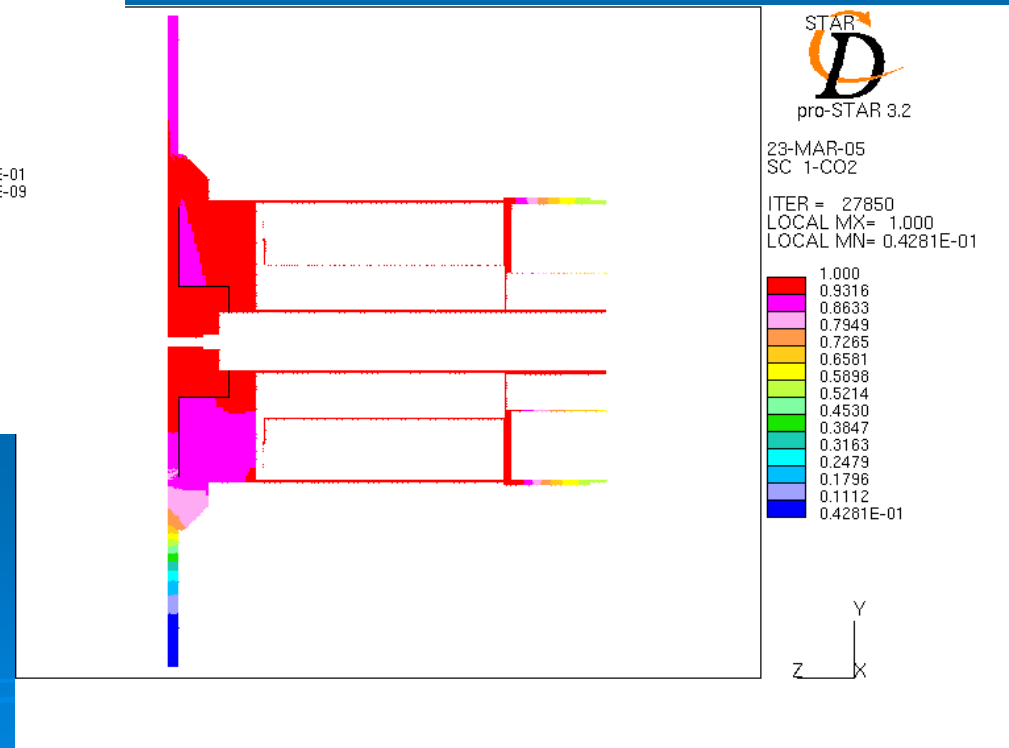
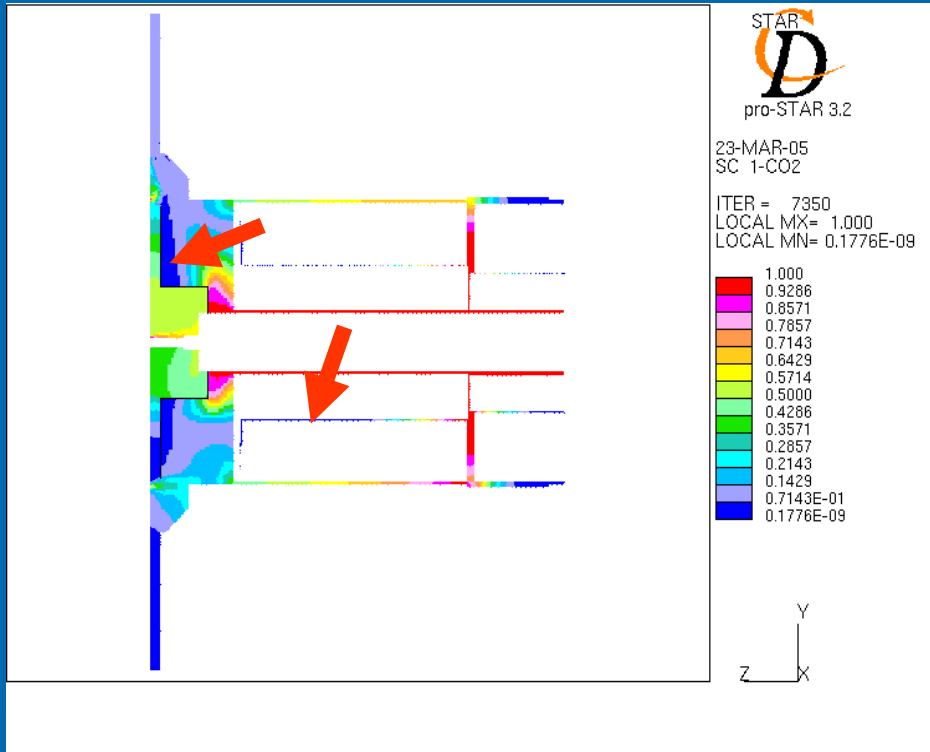
## The model of the ID volume



- The 3D model of the air spaces between subdetectors has been prepared;
- Due to the symmetry only half of the ID volume was modeled (cut in  $z=0$ )
- As the initial conditions it has been assumed the model is filled completely by air;
- 6 CO<sub>2</sub> inlets and 1 outlet to the domain has been defined,
- Transient calculations were performed on the total time of 2 hours



# The results after 14 and 120 minutes





# The average CO<sub>2</sub> concentration inside ID and dew point in function of CO<sub>2</sub> concentration

