Overview

Project: Cleanroom for BayernSat

Kai A. Griesbacher

The task of this project is to develop several concepts of a cleanroom system, that will be used for the integration process of the micro-satellite “BayernSat”. This satellite will be built at the Institute of Astronautics, which is part of the Technical University of Munich. As the assembly process requires a clean area with just a few dust particles left, a cleanroom is needed, which should be situated at the Institute of Astronautics.

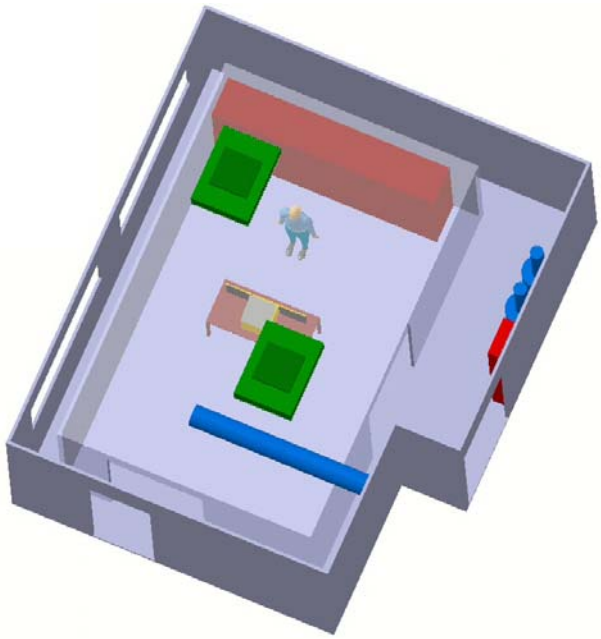
Baseline requirements:

- cleanroom class 100.000 (US Federal Standard 209e)
- flexible design which is easy to adapt to future projects
- the cleanroom must fit into a specific room of the Institute of Astronautics
- the cleanroom system must not be expansive

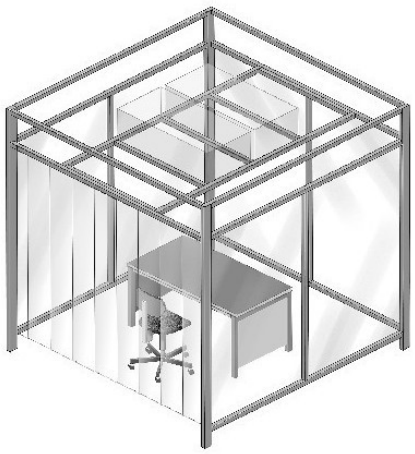
The assembly process also puts requirements on the cleanroom. Those requirements have to be found out within this project.

Overall concepts:

- The first concept includes a major adaptation of the existing air-conditioning system of the room, to achieve the required cleanroom class. Additional minor changes to the room itself will also be necessary.
- The second concept fulfills the task by using a cabin or tent system which will be integrated into the room. On top of the cabin/tent there will be Filter Fan Units (FFUs) that fill the cabin/tent with filtered air that is taken from the surrounding environment (see pictures 1, 2).



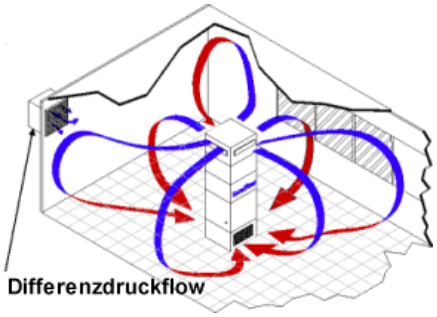
picture 1: assembly room containing a tent (transparent) with two FFUs (green)



picture 2: cleanroom tent with a basic aluminum structure, plastic walls and two FFUs on top

- The third concept resembles the first one. The difference lies within the usage of an independent flow tower instead of adapting the existing air-conditioning system. The flow tower takes air from the bottom of the room and puts it through filters that take the dust out of it. After that, the clean air flows back to the room from top of the flow tower without the particles. Repeating this procedure several times will result in the desired cleanroom class (see pictures 3, 4). Again minor changes to the room itself will be needed.

picture 3: flow tower with inlet at the bottom and outlet at the top



picture 4: flow tower with air coming out of it (blue) and going back into the tower (red) for filtering