



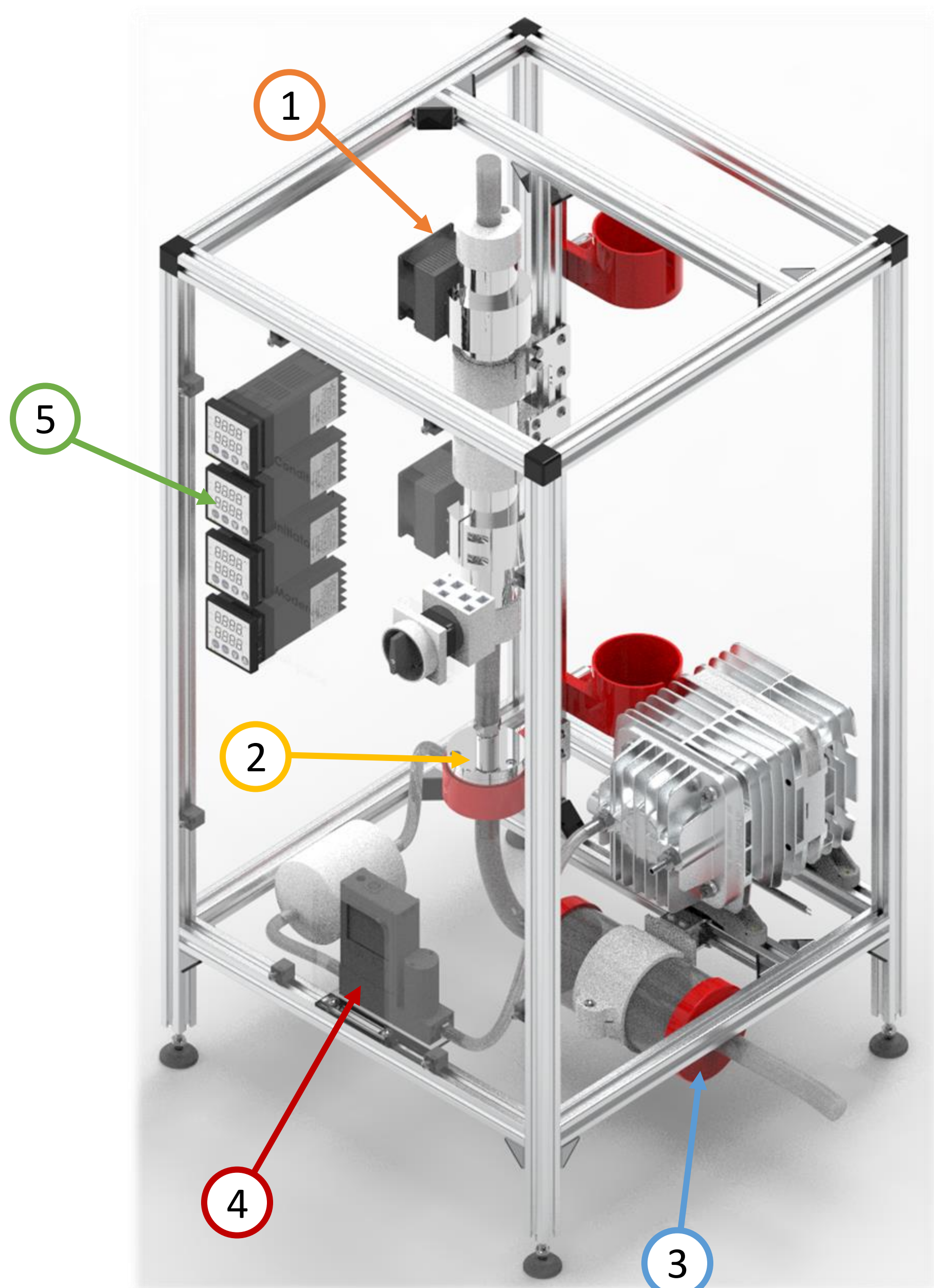
Design of an Airborne Particle concentrator

Background

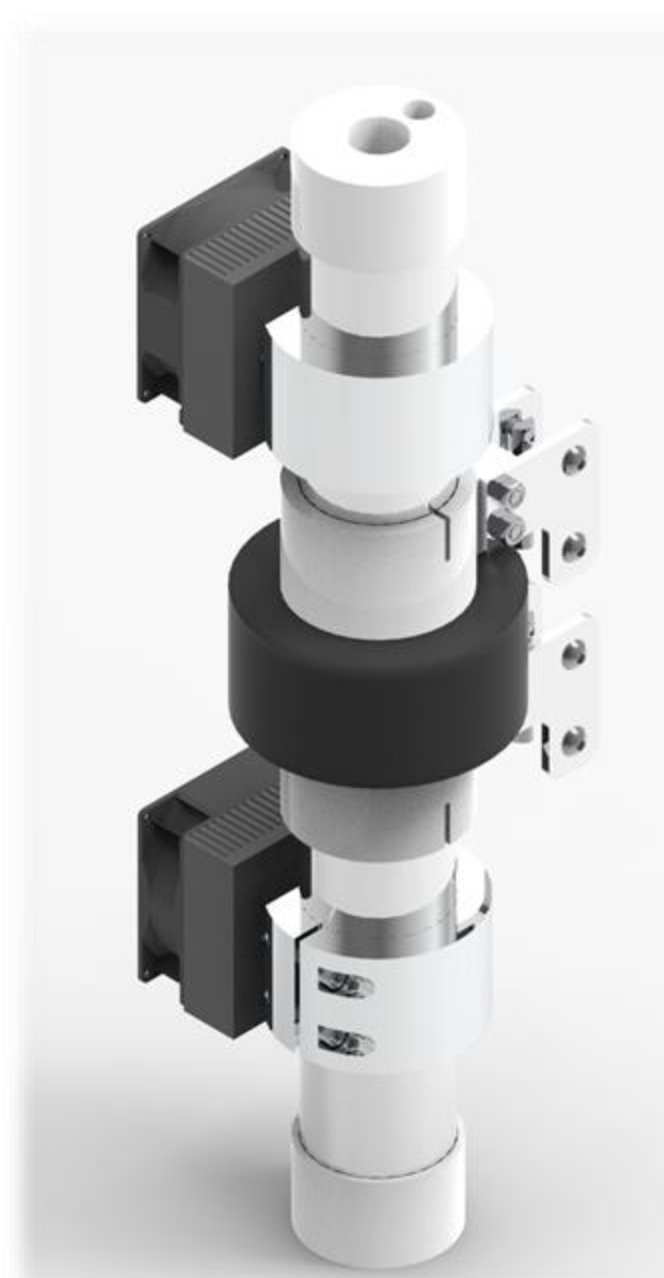
Stockholm University is doing research about the toxicity of airborne particles in road/rail tunnels with an ALI-system. The particle concentrator's mission is to provide particles for the ALI-system by increasing the concentration of particles in the air from the road/rail tunnel.

How the system works

Air from the rail/road tunnel is pulled into the particle concentrator. The growth tube (1) increases the mass of the particles. The virtual impactor (2) then concentrates the particles in the minor flow and discards air in the major flow. Finally, the minor flow is dried (3) and sent to the ALI system.

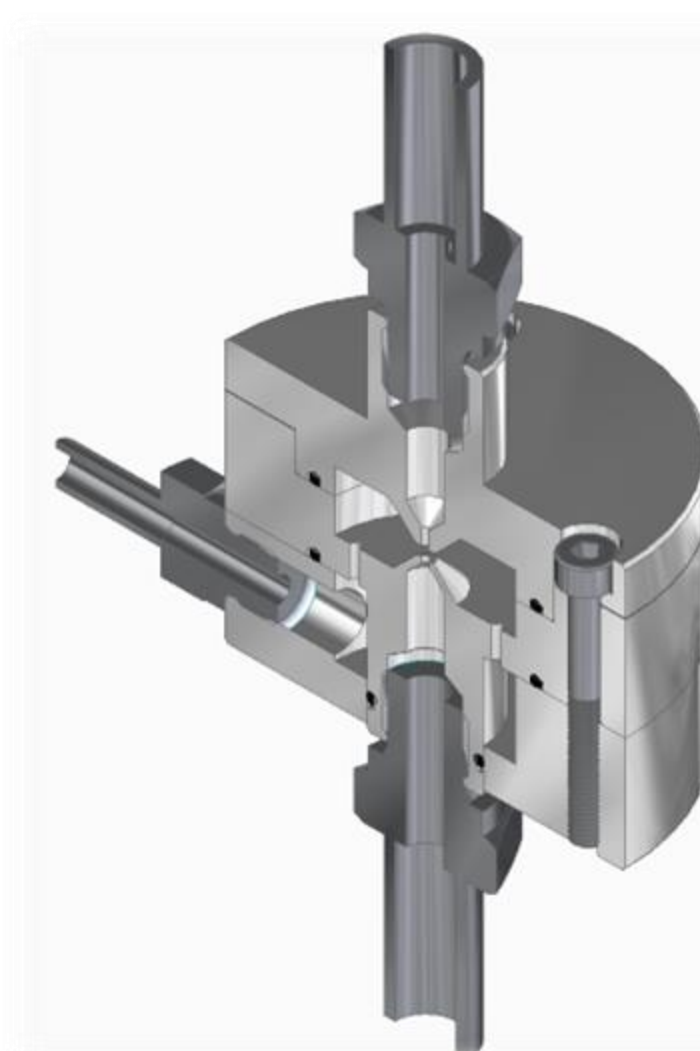


1. Growth tube



- Humidifies air
- Condenses water on particles
- Three temp. zones
 1. Conditioner (5°C)
 2. Initiator (50°C)
 3. Moderator (15°C)

2. Virtual impactor



- Accelerates particles
- Separates particles
- Major flow consists of air
- Minor flow consists of air and particles

3. Dryer

- Silica-gel dryer
- Dries air/particles



4. Major flow system

- Flow controller
- Water trap/filter
- Vacuum pump



5. Electronics

- Temperature controllers
- Thermocouples
- Peltier coolers & heating tape