Preliminary assumptions and details

on IAO 617m Station

# Initial guess (InnAQS2015)

(CSAT height above the building’s ground level)  
 (average building height in the surrounding estimated from count of storeys)  
 (height of zero displacement plane; (roughness length)  
🡪 (measurement height above zero displacement plane)  
CSAT Heading: 129°

# Differential GPS measurements (IAO)

Location of the IAO tower and height of the floor of the round walk at 9th level (DG) of Bruno-Sander-Haus were measure by Maren Haid & Thomas Muschinski using a differential GPS instrument on 2018-02-13) [see data file gnss\_20180213].  
Latitude: 47.2640351561 (=> MGI GK West[[1]](#footnote-1): Northing: 236666.16 m)  
Longitude: 11.3857068 (=> MGI GK West: Easting: 79667.97 m)  
Elevation (Austrian Gebrauchshöhe): 607.49 m (vertically under the CSAT volume)

|  |
| --- |
|  |
| Fig 1: Location of 617m Station (CPEC) in WGS 1984 (diffGPS) and transformed into MGI Austria GK West (M28) [for digital elevation model and digital surface model]. |

diffGPS was positioned directly vertically under the CSAT (100 cm from the SE strut of the mast; see Fig 2). With a CSAT height of CPEC200 (Station 617m) of 9.50 m the turbulence sampling position is:  
Latitude: 47.2640351561 (=> MGI GK West1: Northing: 236666.16 m)  
Longitude: 11.3857068 (=> MGI GK West: Easting: 79667.97 m)  
Elevation (Austrian Gebrauchshöhe): 616.99 m (center of CSAT volume)   
CSAT Heading: 129°

|  |  |
| --- | --- |
|  |  |
| Figure 2: Differential GPS measurement directly vertically below 617 m Station CSAT | |

The IAO manifold (OD 3/8”; ID ¼”; ~13 m) is heated to 30°C and covered by a thermal insulation sleeve (Armaflex HT-13X022/e). The sampling end is mounted -20 cm in longitudinal direction of the CPEC’s CSAT, points downwards and is furnished with a Teflon cup covered by a piece of mosquito screen to prevent rain and insects from entering the inlet (Fig 3). Aerosol particles () are removed by a virtual impactor ~1 m downstream of the sampling end. Sampling branch and blow-over branch of the virtual impactor are pumped by 2 parallel stages of an MD4 membrane pump (Vacuubrand GmBH) each; the blow-over flow is reduced to ~19 slpm by a critical orifice, the sampling line is pressure stabilized to 714 mbar by a pressure controller (P502C, Bronkhorst) resulting in a sampling flow of 18.9 slpm and a residence time of ~0.4 s (see Manifold\_Inlet\_IAO2018.pdf and IAO\_Manifold\_Inlet\_flows.xlsx for details).

|  |  |
| --- | --- |
|  |  |
| Figure 3: IAO manifold configuration and geometry | |

1. http://spatialreference.org/ref/epsg/mgi-austria-gk-west/ [↑](#footnote-ref-1)