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UAV DESCRIPTION



Fig. 1. Image of an UAV



UAV specifications: -wing aperture :1.2-2.4m; -altitude:4,000 meters max, min 2-3 feet; -cruising speed:80-100km/h; -maximum speed:140km/h. Minimum speed:8-10km/h; -range:10-15km package standard package extended 50km (radius may be increased in accord with the operational requirements of the project); -autonomy:60 minutes.

SIMULATED NO2 MAPS illustrating the trade-off between horizontal resolution and noise level (based on data from Table1)







Fig. 8. Simulated NO_2 map for a pixel size of 250x250m²

DOAS monitoring of tropospheric NO₂ from an UAV

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Fig. 2. Image of an UAV

SCHEMATIC SET-UP



Spectrometer : AvaSpec 2048 USB2 Dimensions:175x110x44mm Weight: 716 g (with no cover ~400g) Spectral range :200-750nm **Resolution (FWHM): 1.5 nm** Focal length: 75mm Entry slit: 50µm Grating: 600l/mm

Fig.6. Typical NO₂ field in the Antwerp area adapted from Immission Frequency Distribution Model***

Fig.9. Simulated NO_2 map for a pixel size of 500x500m²



Fig.7. Simulated NO₂ map for a pixel size of 100x100m²



Fig. 10. Simulated NO_2 map for a pixel size of 1000x1000m²



SCANNING TYPE USED & EXAMPLE OF PIXEL SIZE CALCULATION









Interpretation, 2nd Ed., W.H. Freeman

Table 1. Relations between parameters used

Altitude	Speed	Swath	Pixel size	Number of pixels	Inte
[m]	[km/h]	[km]	[m]	along the track	ti
3000	60	10	100	100	
3000	60	10	250	40	
3000	60	10	500	20	
3000	60	10	1000	10	
	Altitude [m] 3000 3000 3000 3000	Altitude Speed [m] [km/h] 3000 60 3000 60 3000 60 3000 60 3000 60 3000 60	Altitude [m]Speed [km/h]Swath [km]30006010300060103000601030006010	Altitude [m]Speed [km/h]Swath [km]Pixel size [m]300060101003000601025030006010500300060101000	Altitude [m]Speed [km/h]Swath [km]Pixel size [m]Number of pixels along the track300060101001003000601025040300060105002030006010100010

<u>experiment</u>

Total weight: <900g Volume: 300x75x110 mm Power: <20W





Fig. 11. The NO₂ map over Romania. OMI show an important smoothing effect due to size of the pixel

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Fig. 12. The NO₂ plot from ULM & DOAS experiment