

# TWEET-IE

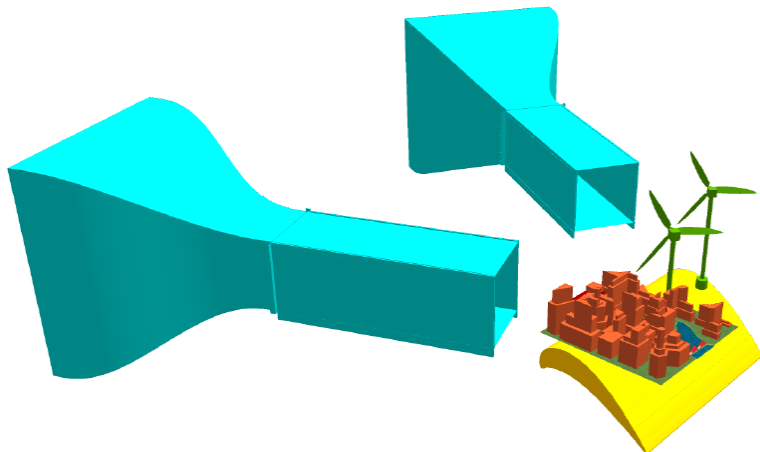
Twin Wind tunnels for Energy and the EnvironmenT - Innovations and Excellence

## Update on TWT4

Scale effects in urban flow wind tunnel studies

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# Test parameters

## Urban street canyon configuration

Same as Gromke and Ruck (2007)

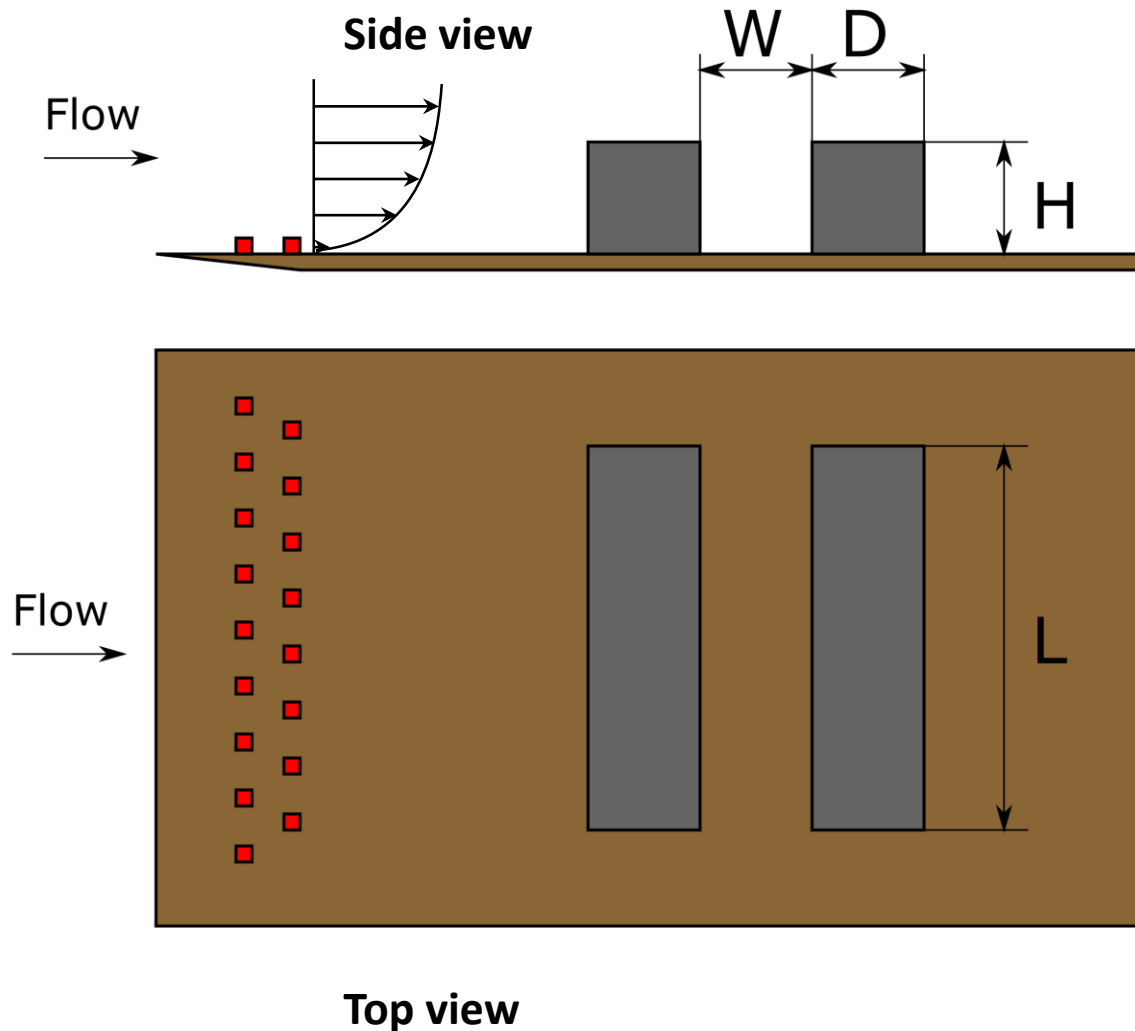
### Reference full-scale:

- $W = D = H = 18 \text{ m}$
- $L = 180 \text{ m}$

$W=D=H$ [cm]	$L$ [m]	Scale	$V_w$ [m/s]	$Re_H$
9	0.9	1:200	5	30,000
24	2.5	1:75	6	96,000
24	2.5	1:75	30	480,000

### Open points:

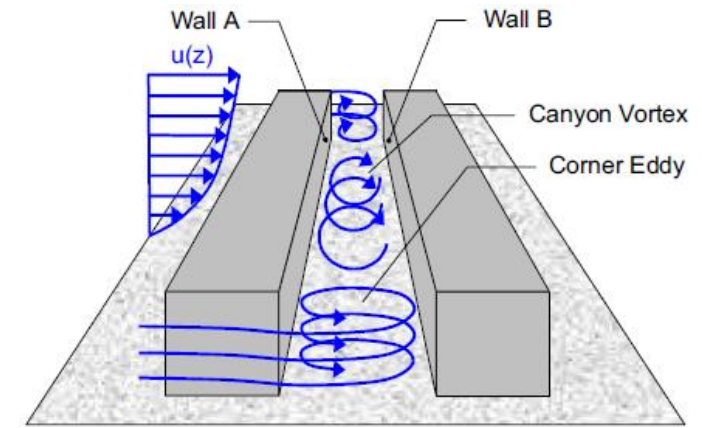
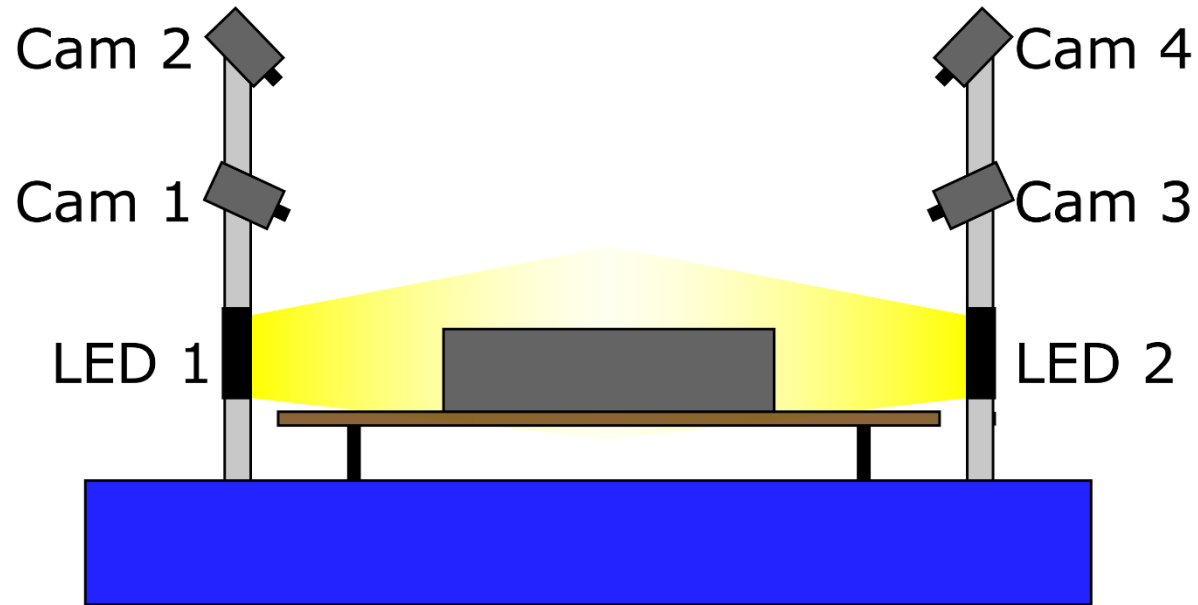
- Model vegetation and/or traffic?
- Instrument the floor or the walls with pressure ports?
- Further variation of parameters (e.g.  $W$ , yaw angle)?



# Experimental setup

## Option 1: High-speed cameras

Back View



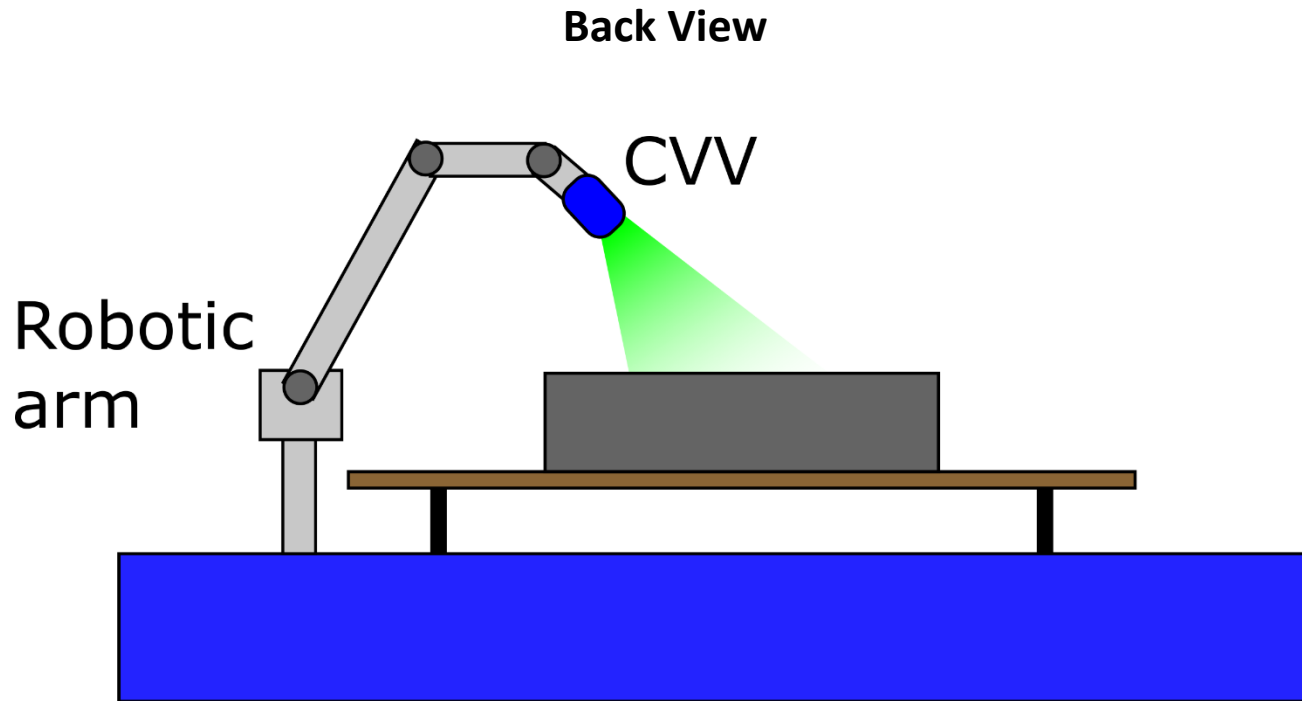
Gromke and Ruck (2007)

- Suited if no obstruction is present in the canyon
- Provides time-resolved flow information

Scale	$V_w$ [m/s]	Re	$f_{acq}$ [Hz]
1:200	5	30,000	1 kHz
1:75	6	96,000	1.2 kHz
1:75	30	480,000	6 kHz

# Experimental setup

## Option 1: Robotic Volumetric PIV



- Suited in presence of objects (e.g. vegetation) inside the canyon
- Provides only time-average (or phase-average) flow information
- The maximum speed is limited by the acquisition frequency of the CVV (~700 Hz) to about 15 m/s  
→  $Re_{Max} = 240,000$

Thank you for your attention

Questions?