

23TH INTERNATIONAL CLEAN AIR AND ENVIRONMENT CONFERENCE

16 - 18 SEPTEMBER 2019

INSTITUT ALAM SEKITAR MALAYSIA



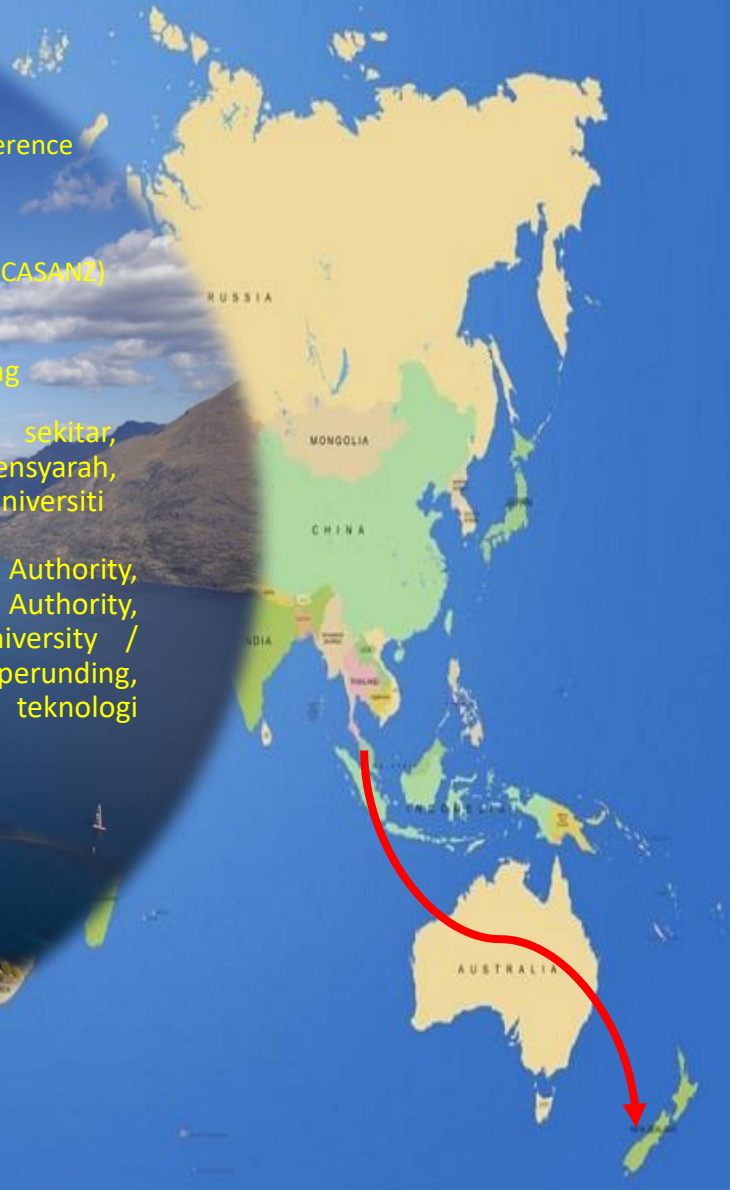
Program : 23th International Clean Air and Environment Conference

Tarikh : 16 - 18 September 2019

Lokasi : Hotel Rydes Lakeland Resort, Queenstown,

Penganjur : The Clean Air Society of Australia and New Zealand (CASANZ)

- Lebih 200 orang
- pegawai alam sekitar, perunding, pensyarah, NGO, pelajar universiti
- USEPA, UK Authority, AUSEPA, NZ Authority, penyelidik university / institut, perunding, rekabentuk teknologi dan juga NGO



TOPIK PEMBENTANGAN INSTITUT ALAM SEKITAR MALAYSIA

1

Sistem Atas Talian
Pembakaran Kecil Pekebun

2

Kawalan Kebakaran Hutan

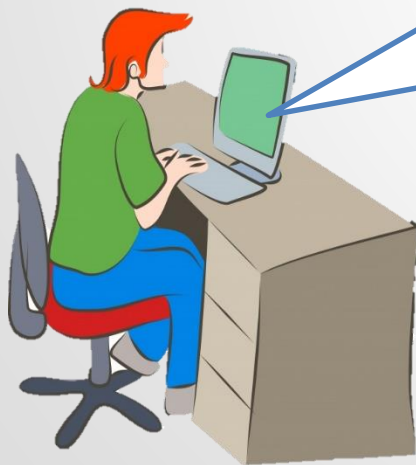
3

Pemodelan Kualiti Udara
- Application

4

Pengawasan Kualiti Udara
- Low Cost Sensor

SISTEM ATAS TALIAN PEMBAKARAN TERBUKA BAGI PEKEBUN KECIL INSTITUT ALAM SEKITAR MALAYSIA



$\geq 3\text{m/s}$



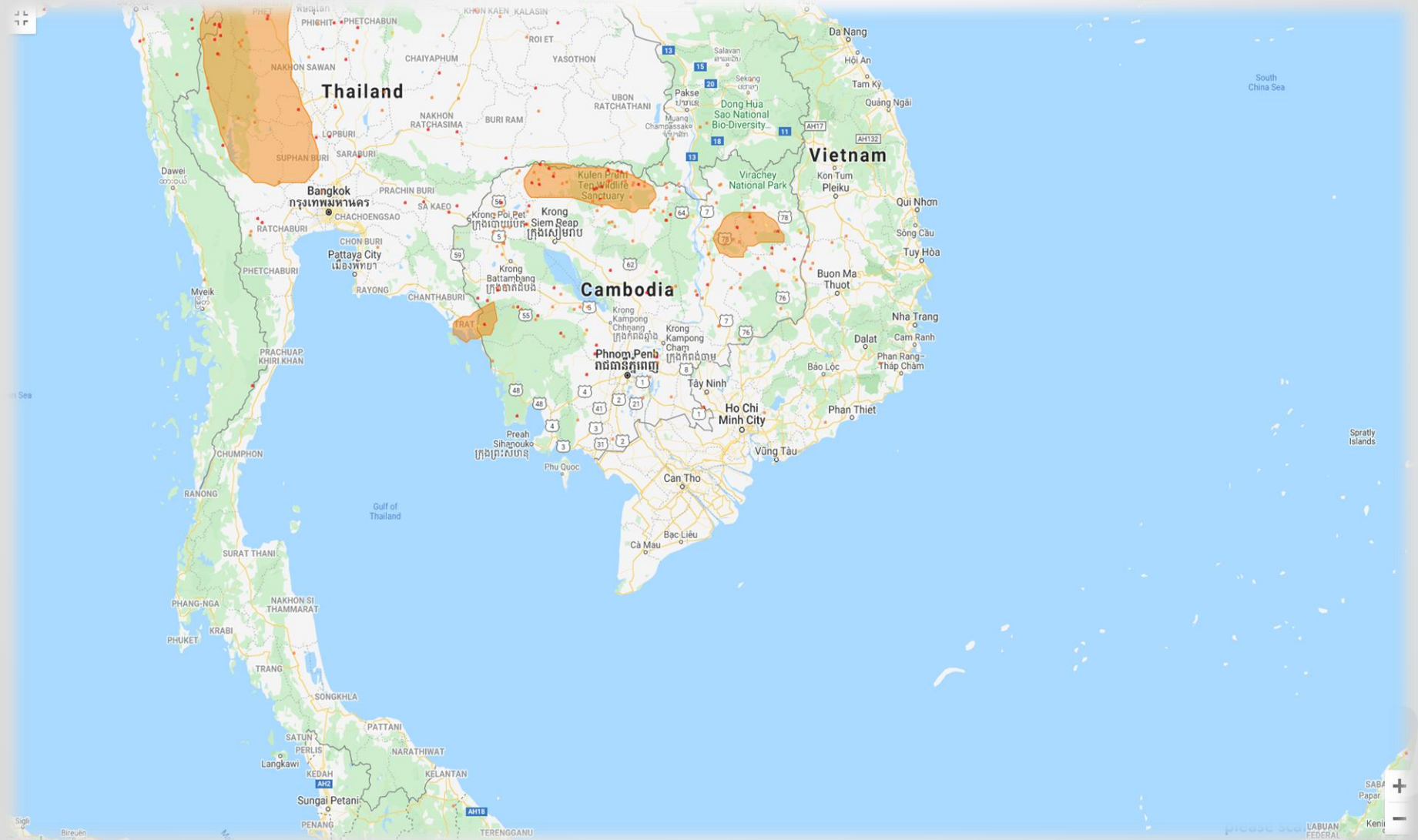
T_{in}



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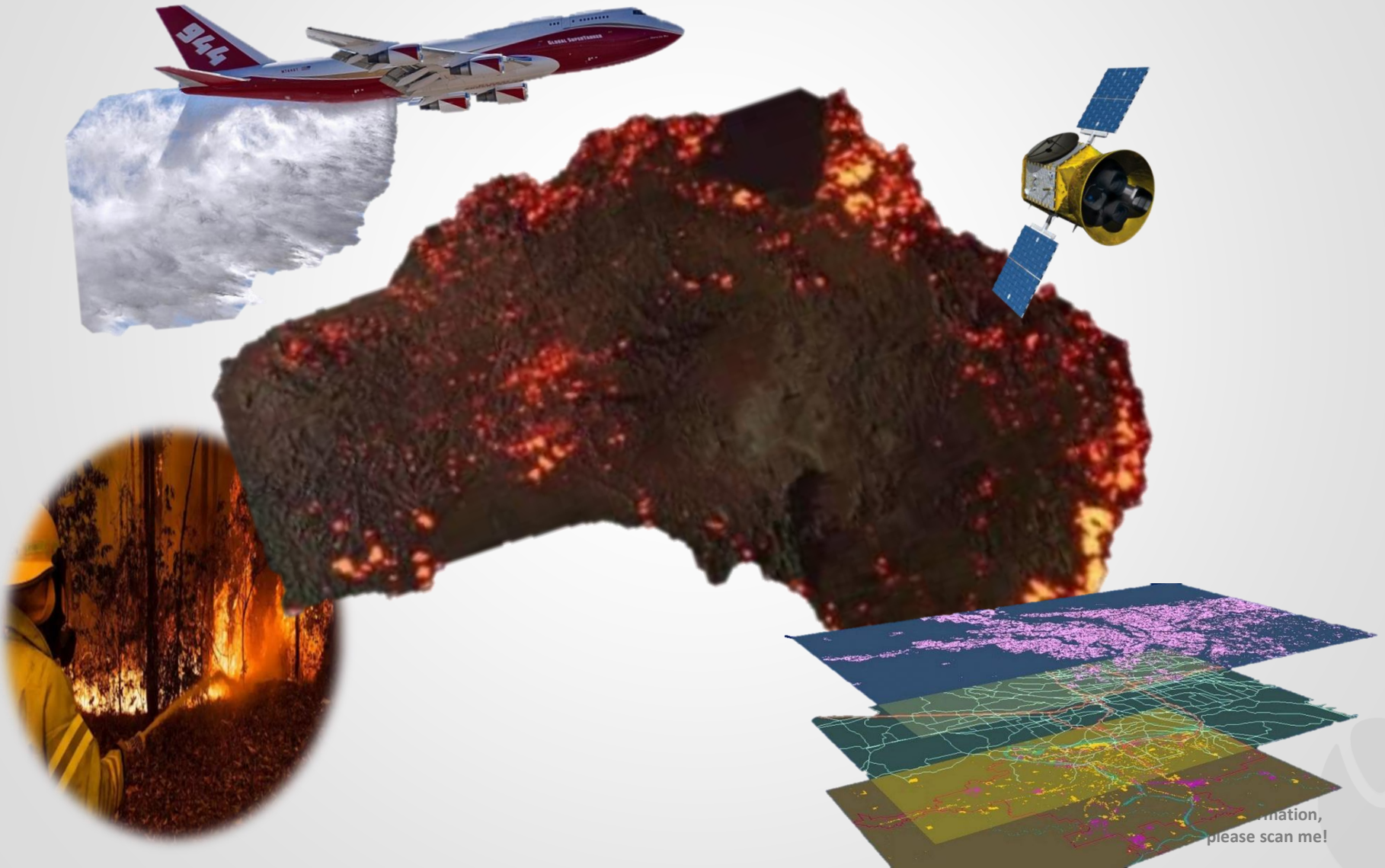
KAWALAN PEMBAKARAN TERBUKA DI AUSTRALIA

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KAWALAN PEMBAKARAN TERBUKA DI AUSTRALIA

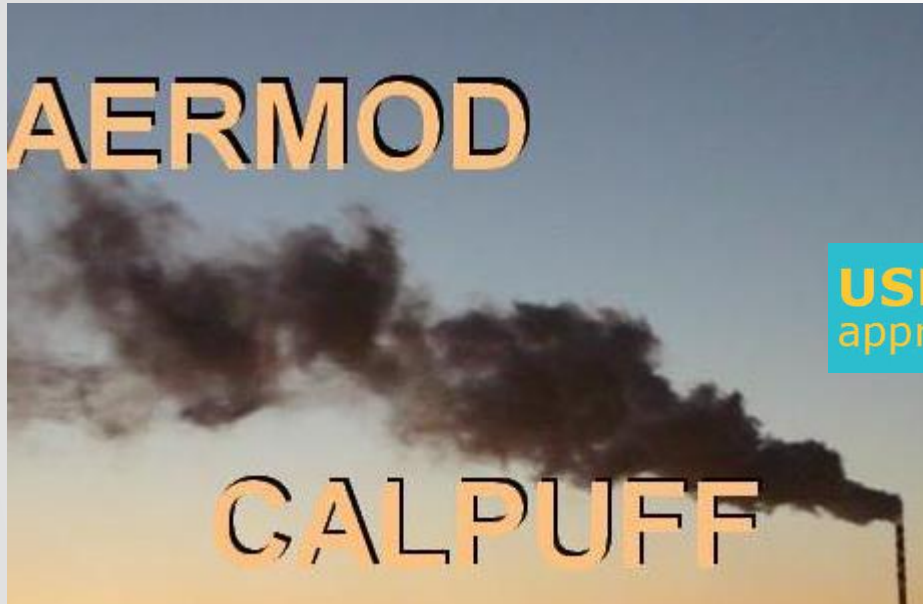
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PEMODELAN KUALITI UDARA

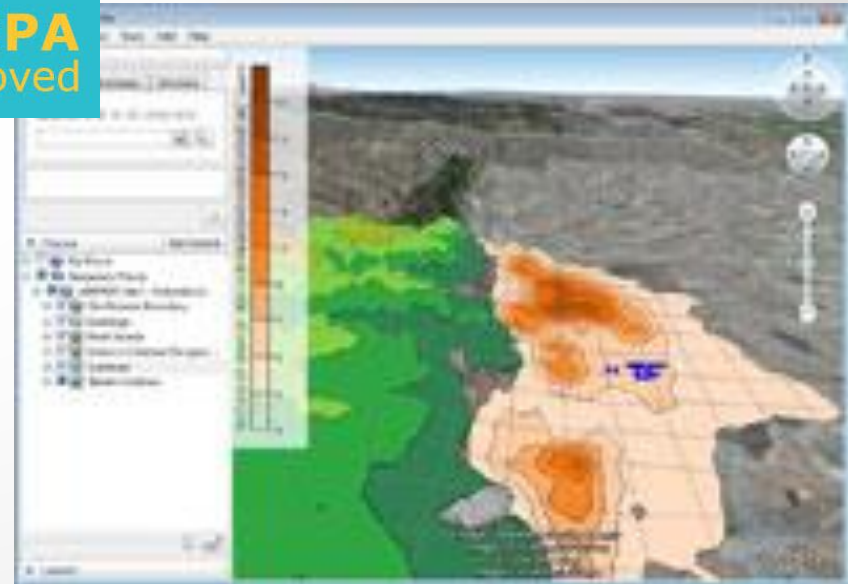
- APPLICATION

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air dispersion model for
regulatory assessment

USEPA
approved



predict
ground level
concentration

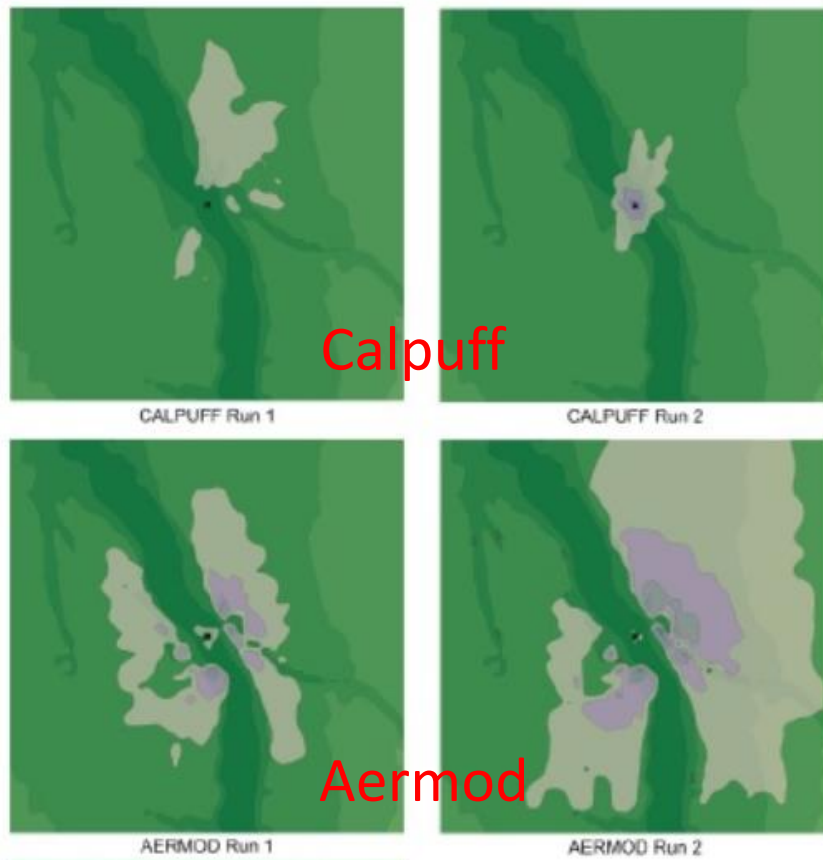
2017 - USEPA removed CALPUFF but
still relevant ?

PEMODELAN KUALITI UDARA

- APPLICATION

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same source, emission rate, terrain
valley & meteorological



AERMOD

Model air quality impacts due to industry emissions for permitting and planning purposes



AERSCREEN

A screening model based on the U.S. EPA AERMOD air quality dispersion model



CALPUFF

A multi-layer, multi-species non-steady-state puff dispersion model



SCREEN3

Air dispersion screening tool used to analyze multiple sources



AERMET

Process meteorological data for input into the BREEZE AERMOD dispersion model



ROADS

Air dispersion modeling suite that predicts air quality impacts from moving and idling motor vehicles



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PENGAWASAN KUALITI UDARA

- LOW COST SENSOR

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Experience of global small sensor co-location comparison studies with AQMesh



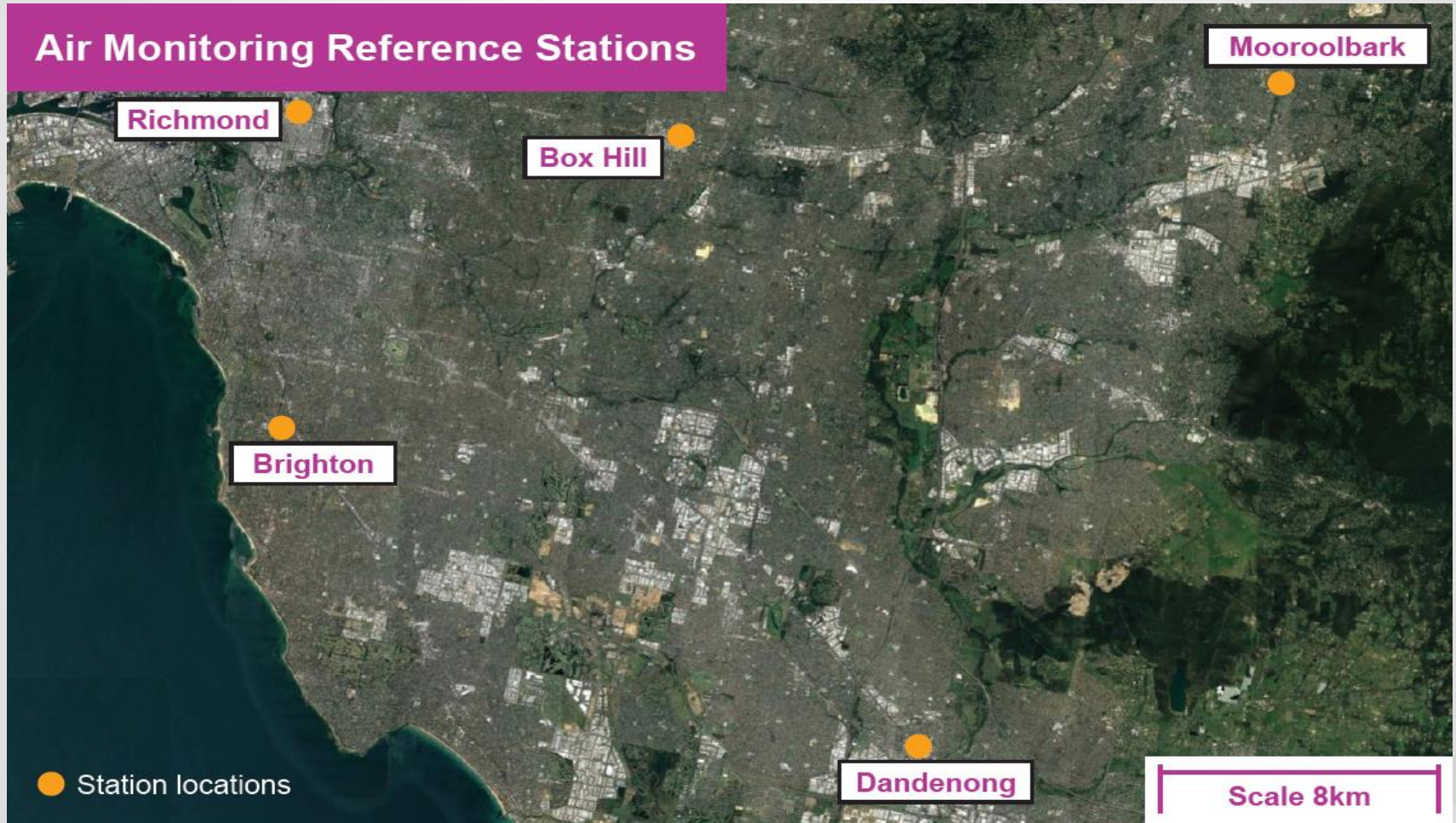
NO ₂	NO _x	SO ₂	H ₂ S
O ₃	PM _{2.5}	PM ₁	TPC
NO	CO ₂	Speaker icon	RH%
CO	PM ₁₀	AP	T



PENGAWASAN KUALITI UDARA

- LOW COST SENSOR

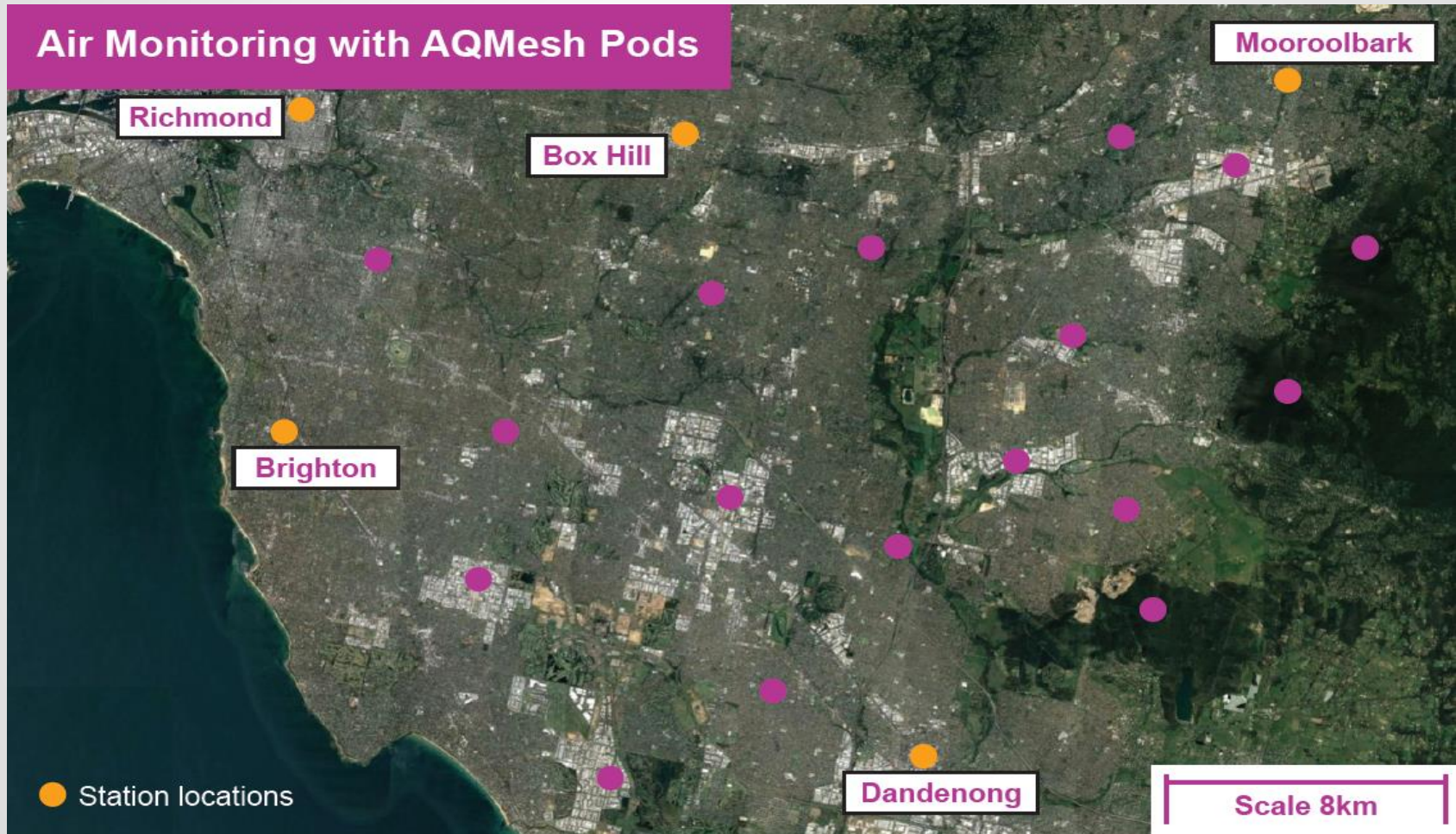
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PENGAWASAN KUALITI UDARA

- LOW COST SENSOR

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PENGAWASAN KUALITI UDARA

- LOW COST SENSOR

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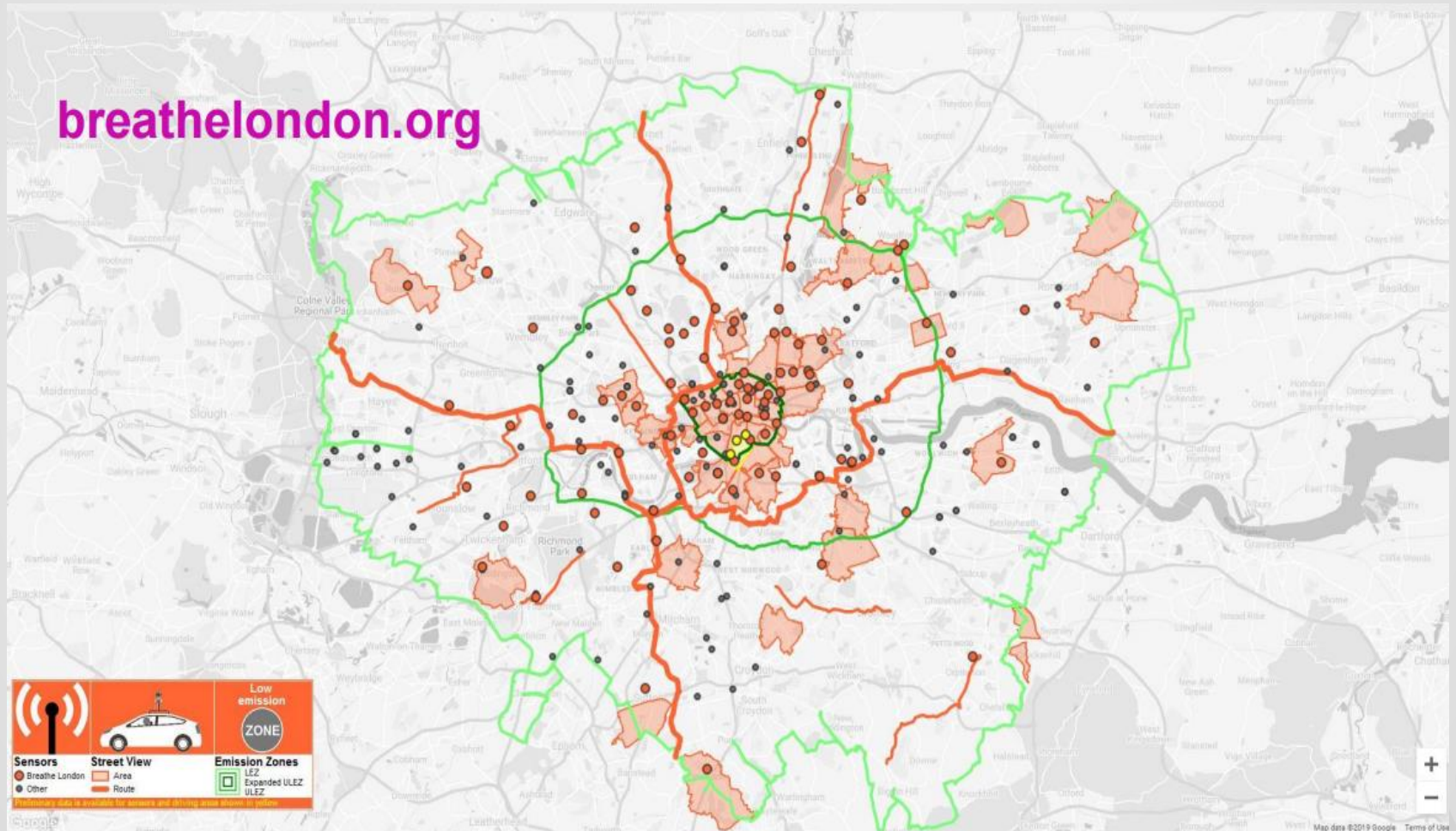


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PENGAWASAN KUALITI UDARA

- LOW COST SENSOR

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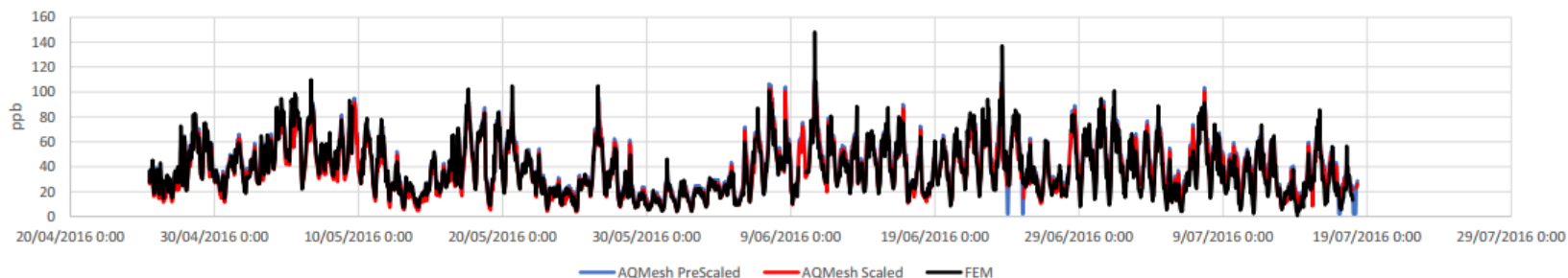
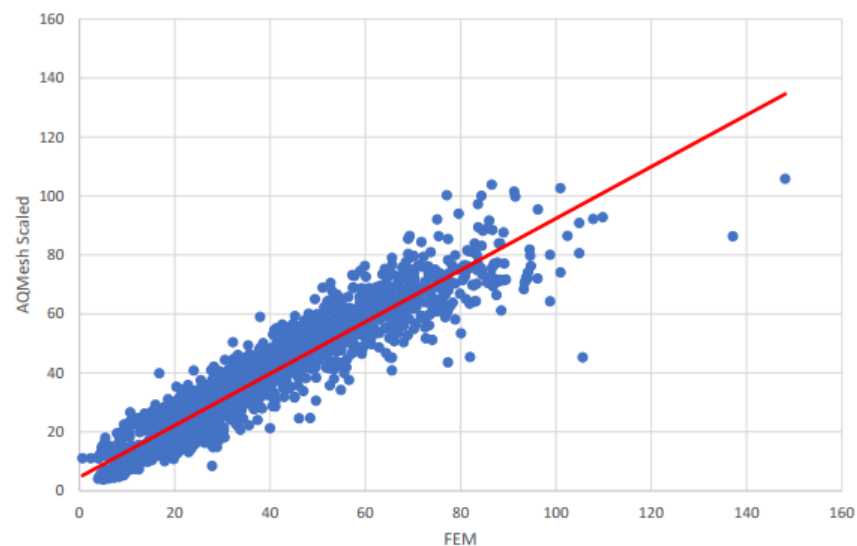
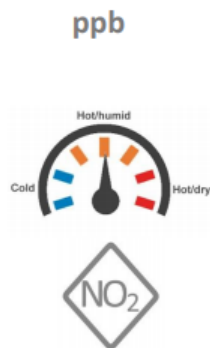
PENGAWASAN KUALITI UDARA

- LOW COST SENSOR

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AQMesh results – NO₂

R ²	0.89	
Accuracy (MAE)	PreScaled	Scaled
	4.50	5.09
Accuracy (RMSE)	PreScaled	Scaled
	6.17	7.14
Averaging interval	60 minute	
Conditions	Hot, humid	
Region	London, UK	
Location	Urban roadside	
Date	Apr – Jul 2016	
Processing version	v4.2.3	



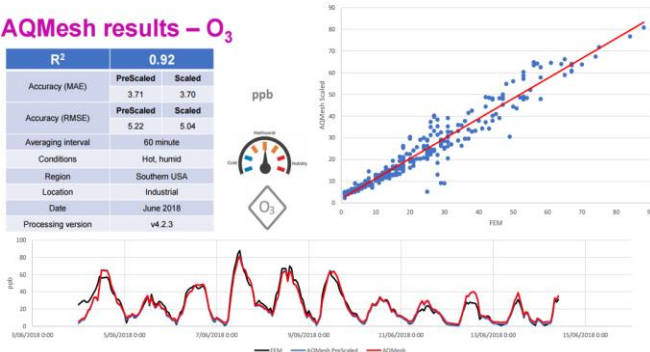
PENGAWASAN KUALITI UDARA

- LOW COST SENSOR

INSTITUT ALAM SEKITAR MALAYSIA

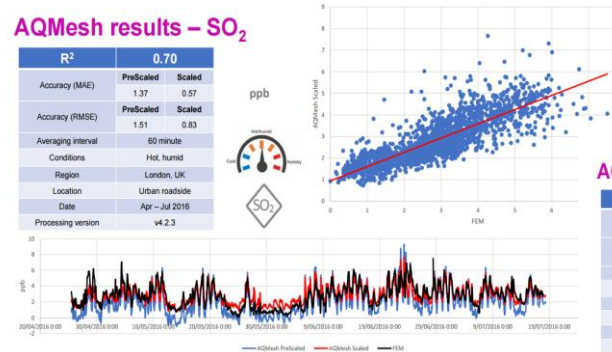
AQMesh results – O₃

R ²	0.92	
Accuracy (MAE)	PreScaled	Scaled
	3.71	3.70
Accuracy (RMSE)	PreScaled	Scaled
	5.22	5.04
Averaging interval	60 minute	
Conditions	Hot, humid	
Region	Southern USA	
Location	Industrial	
Date	June 2018	
Processing version	v4.2.3	



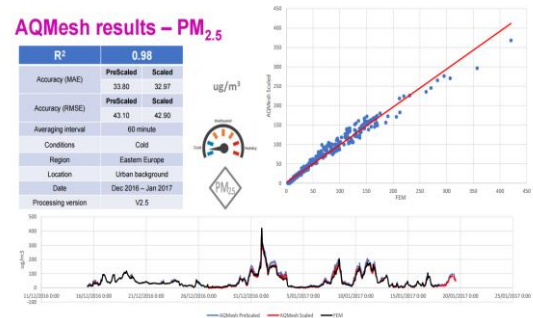
AQMesh results – SO₂

R ²	0.70	
Accuracy (MAE)	PreScaled	Scaled
	1.37	0.57
Accuracy (RMSE)	PreScaled	Scaled
	1.51	0.83
Averaging interval	60 minute	
Conditions	Hot, humid	
Region	London, UK	
Location	Urban roadside	
Date	Apr – Jul 2016	
Processing version	v4.2.3	



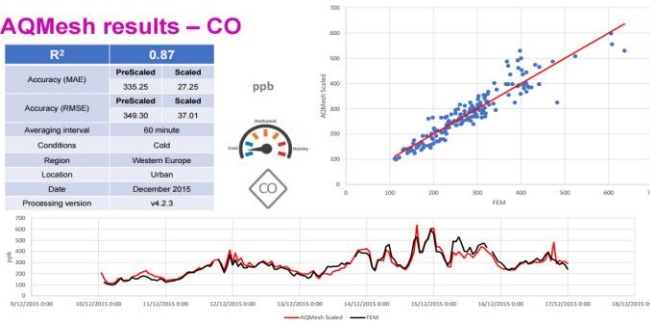
AQMesh results – PM_{2.5}

R ²	0.98	
Accuracy (MAE)	PreScaled	Scaled
	33.80	32.97
Accuracy (RMSE)	PreScaled	Scaled
	43.10	42.80
Averaging interval	60 minute	
Conditions	Cold	
Region	Eastern Europe	
Location	Urban background	
Date	Dec 2016 – Jan 2017	
Processing version	v5.5	



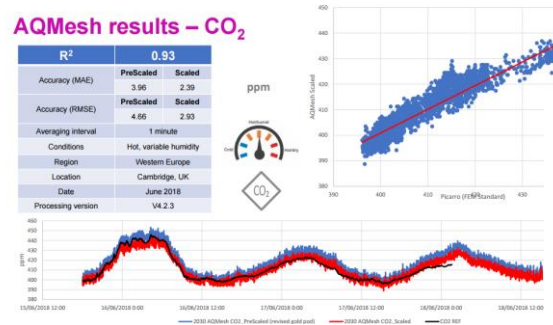
AQMesh results – CO

R ²	0.87	
Accuracy (MAE)	PreScaled	Scaled
	335.25	27.25
Accuracy (RMSE)	PreScaled	Scaled
	349.30	37.01
Averaging interval	60 minute	
Conditions	Cold	
Region	Western Europe	
Location	Urban	
Date	December 2015	
Processing version	v4.2.3	



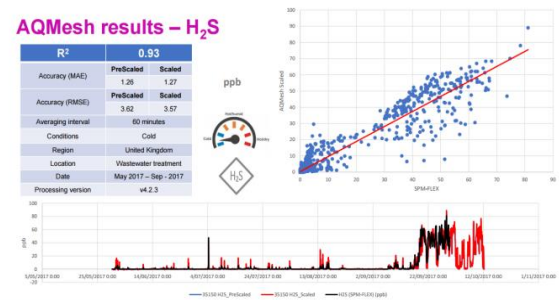
AQMesh results – CO₂

R ²	0.93	
Accuracy (MAE)	PreScaled	Scaled
	3.96	2.39
Accuracy (RMSE)	PreScaled	Scaled
	4.66	2.63
Averaging interval	1 minute	
Conditions	Hot, variate humidity	
Region	Western Europe	
Location	Cambridge, UK	
Date	June 2016	
Processing version	v4.2.3	



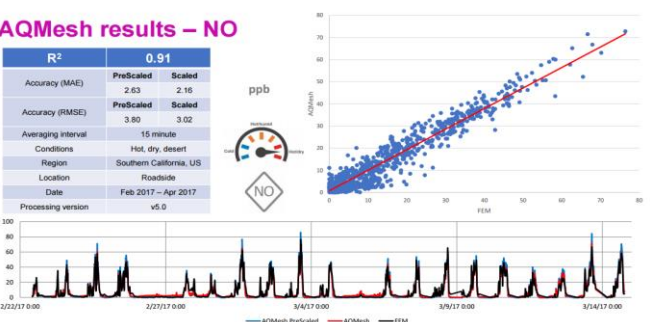
AQMesh results – H₂S

R ²	0.93	
Accuracy (MAE)	PreScaled	Scaled
	1.26	1.27
Accuracy (RMSE)	PreScaled	Scaled
	3.62	3.67
Averaging interval	60 minutes	
Conditions	Cold	
Region	United Kingdom	
Location	Wastewater treatment	
Date	May 2017 – Sep 2017	
Processing version	v4.2.3	



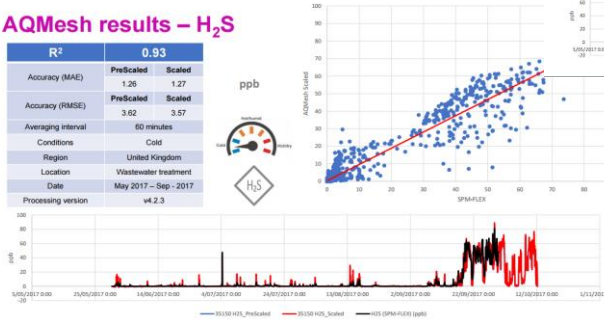
AQMesh results – NO

R ²	0.91	
Accuracy (MAE)	PreScaled	Scaled
	2.63	2.16
Accuracy (RMSE)	PreScaled	Scaled
	3.80	3.02
Averaging interval	15 minute	
Conditions	Hot, dry, desert	
Region	Southern California, US	
Location	Roadside	
Date	Feb 2017 – Apr 2017	
Processing version	v5.0	



AQMesh results – H₂S

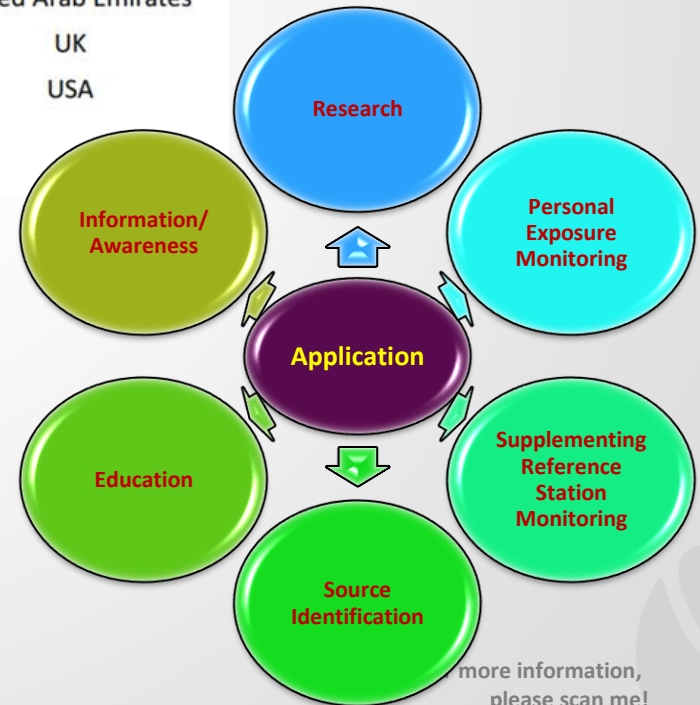
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Conditions	Cold	
Region	United Kingdom	
Location	Wastewater treatment	
Date	May 2017 – Sep 2017	
Processing version	v4.2.3	



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PENGAWASAN KUALITI UDARA - LOW COST SENSOR INSTITUT ALAM SEKITAR MALAYSIA

Australia	Czech Republic	Mozambique	Slovakia
Austria	Finland	Myanmar	Slovenia
Azerbaijan	France	Netherlands	South Africa
Bangladesh	Germany	Nicaragua	Spain
Belgium	Indonesia	Norway	Sweden
Bolivia	Ireland	Rwanda	Trinidad
Brazil	Israel	Saudi Arabia	United Arab Emirates
Canada	Italy	Serbia	UK
China	Malta	Singapore	USA



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